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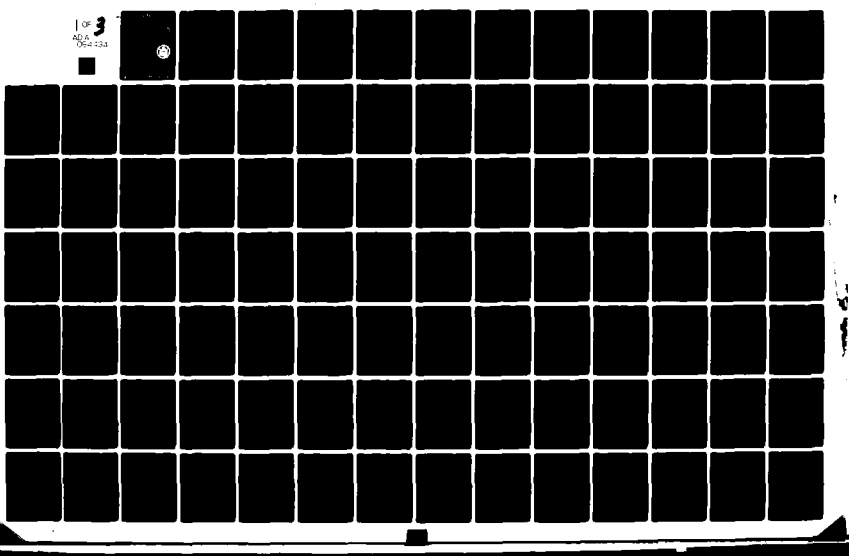

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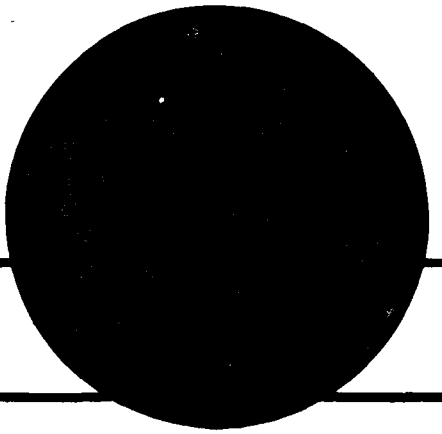

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PROCEEDINGS:

Symposium on Piloting and VTS Systems

MARITIME TRANSPORTATION RESEARCH BOARD
COMMISSION ON SOCIOTECHNICAL SYSTEMS
NATIONAL RESEARCH COUNCIL

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NATIONAL ACADEMY OF SCIENCES
WASHINGTON, D.C. 1980

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NOTICE

All opinions and comments expressed in these proceedings are those of the individual speakers or authors. They do not necessarily reflect the opinions or conclusions of the Maritime Transportation Research Board (MTRB); of MTRB's Committee on Research Needs to Reduce Maritime Collisions, Rammings, or Groundings; or of any member or staff of the National Academy of Sciences.

The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the Committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

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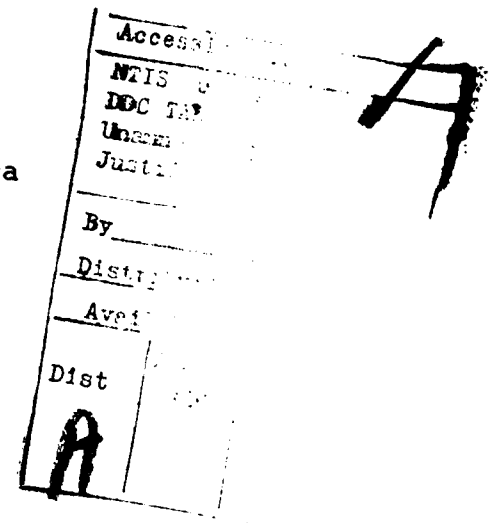

FOREWORD

In October 1977, the U.S. Coast Guard asked the Maritime Transportation Research Board (MTRB) to establish a committee to identify the research needed to reduce maritime collisions, rammings, and groundings. This request was in keeping with the continuing responsibility of the Coast Guard to ensure marine safety. The early discussions of the Committee on Maritime Collisions, Rammings, and Groundings, which included shipping, pilot, union, and Coast Guard representatives, highlighted the intensity of the controversy over piloting and vessel traffic service (VTS) systems. To augment the committee's deliberations and provide a neutral forum for the discussion of the issues, the MTRB decided to hold a symposium. A small planning group met to identify the topics, and speakers representing the major parties were invited to present papers. The symposium was structured to provide ample opportunity for audience questions and discussions.

Increased public sensitivity to maritime accidents and attendant actual, or assumed, environmental pollution has brought under question, among other things, the roles, responsibilities, and competencies of vessel pilots. With the hope that regulating traffic flow would reduce casualties, the Coast Guard was asked to establish VTS systems in several U.S. ports. The changes in traditional maritime roles and practices that have resulted from public questions or directions have proven highly controversial. As a result, some ports have experienced the maritime equivalent of civil disobediance. In addition to government-industry differences, the controversy is made more complex by intra-industry disagreements. The U.S. maritime industry comprises a number of segments, each characterized by different types of service, economic strengths, and operating methods, and surprising differences exist between segments or between various companies within a segment.

Although no issues were resolved at the symposium, extensive interest in the proceedings has been shown by individuals throughout the industry and government. Moreover, the enthusiastic audience participation during the symposium helped foster mutual understanding. MTRB has learned that several meetings between differing industry

groups and/or organizations have resulted from the symposium discussions.

There are no conclusions or recommendations in the proceedings other than personal ones made by the participants. MTRB's Committee on Collisions, Rammings, and Groundings will include in its report any conclusions based on the symposium.

With two exceptions, these proceedings contain edited transcripts of the presentations and discussions. Capt. George Quick and Capt. Robert Gardner elected to have the formal papers they submitted prior to the symposium published in the proceedings. However, the discussion following their presentations is included.

The Committee on Collisions, Rammings, and Groundings and MTRB thank the speakers and the attendees for making the symposium a success. Also, they want to thank the following persons who assisted the committee in planning for the symposium:

Capt. Alexander F. Kaufman; Assocation of Maryland Pilots
Mr. Jon Klein; Sea-Land Service Inc.
Capt. George A. Quick; Assocation of Maryland Pilots
Capt. William C. Rich; International Organization of Masters, Mates and Pilots
Mr. Chester A. Szychlinski; National Transporation Safety Board

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Symposium on Piloting and VTS Systems

PILOTING AND VTS SYSTEMS SYMPOSIUM

September 12, 1979

MR. LUNSFORD: Welcome to the National Academy of Sciences Symposium on Piloting and Vessel Traffic Systems. Our topic today is piloting. With the exception of Adm. Hayes' address, there will be a brief period following each presentation for questions from the audience. The afternoon session is for open discussion with the panel of speakers.

Our moderator today is Rear Admiral Mike Benkert, U.S. Coast Guard retired. Currently, he is President of the American Institute of Merchant Shipping. To underscore the importance of the issues to be discussed at this symposium, we are honored and fortunate to have Adm. John B. Hayes, Commandant, U.S. Coast Guard, as our Keynote Speaker.

ADM. JOHN B. HAYES

Commandant, U.S. Coast Guard

My most recent contact with pilots and piloting occurred during my last tour of duty in Alaska. We had a number of lively discussions about pilotage and particularly about how to handle the tanker traffic that would soon begin out of Valdez. So, I address you with a great deal of pleasure and with the knowledge that I am talking to a very professional gathering.

I am going to ask the question: Is there really a problem, or, as I prefer to call it, an opportunity? I think the fact that such a distinguished organization has sponsored this seminar, together with your presence here, speaks for itself. I hope I can set the stage for the remainder of your program and perhaps even tickle your imagination a bit.

Socrates once said that democracies are curious institutions. They generally provide the quality of government that people deserve. The same could be said for our overall record in marine safety. We get the quality of safety that we deserve. Despite our many efforts, the toll of casualties continues; there are rather large losses in property, lives, business assets, and income, as well as threats to the environment. To exemplify this point, one only needs to look at the recent collision between two oil tankers in the Caribbean, or at the Mississippi River tragedy that occurred when a Peruvian bulk carrier rammed a butane barge.

Now, I am fully aware of the American tendency to be too self-critical; sometimes we indulge ourselves too much in this luxury. However, I think that you probably will agree that we should frequently review all aspects of marine safety and the protection of our marine environment to make certain we are in step with the times. That is the task of this symposium.

When we consider such a review, one can legitimately ask if there is a particular key factor that could improve the safety record. I think most experts would agree with my perception that the human factor contributes to approximately 75 percent of all marine casualties. Regardless of how you look at it, people still run ships; they design and operate their systems, manufacture their equipment, and perform the required maintenance. Therefore, your focus on the very human function of piloting is astute and timely.

So that you can fully appreciate the significance of piloting in the overall marine safety picture, I would like to discuss some aspects of the evolution of piloting which you may not have considered. Curiously, the dictionary defines piloting as "the act of maneuvering a vessel over a course which presents unusual danger to the ship." Clearly, "the ship" is the emphasis. I suggest to you that such a simplistic view of the relationship between ships and natural dangers is much too narrow for today's maritime world. Today, piloting is much more significant. There are other factors that must be considered, including the environment, as well as the vastly different concepts of risk and parties-at-risk which now prevail in marine transportation. Whether we like it or not, things indeed have changed at sea.

There can be no doubt that the maritime environment is no longer a wide-open frontier where ships merely pass in the night. Moreover, its national importance grows each day. When I think that there are those who no longer see us as a maritime nation, I must disagree. If one looks at the proportion of our imports that are carried by sea, the impact they have on our national economy, and their importance to our society, it is clear that ships and those who manage ships are going to be a critical factor in our national economy far into the future. For example, we might call the Outer Continental Shelf the frontier of the 1980s. As the decade progresses, I think it will be increasingly alive with activity.

Consider, if you will, the following aspects of our maritime environment: A growing variety of activities; increased use of waterways, as well as increased congestion and conflict among users; greater differences among vessel capabilities and, unfortunately, the competency of their operators; a population explosion in recreational boats (current estimates indicate their numbers will double by 1990); and higher percentages of potentially hazardous cargo in transit on our oceans.

In terms of risk, there are additional factors we have to consider. There is certainly greater investment in our port facilities. We have more costly and sophisticated ships, and we have an increasing number of strategically high-value cargoes. For the first time in our nation's history, we have extremely critical offshore assets, such as the new Louisiana Offshore Oil Port, (LOOP). If the forecasts about LOOP are at all correct, and it does carry the proportion of imported oil that is anticipated, it will be of great strategic value to this country. Protecting this asset clearly will be high in the order of national priorities.

In addition, there are more people living near and working on the water, and, obviously, there are continuing environmental concerns. Finally, there is a greater sensitivity to economic and energy risks. This must, of course, be balanced with environmental considerations.

I could list some additional factors, but the point is simple. Effective piloting, whether it be done by a Master in coastal waters or by a licensed pilot aboard a ship on navigable waters, is a key factor in meeting a whole variety of national objectives. These include safety, protection of the environment, facilitating commerce, minimizing the cost of regulation to business, and strengthening the competency and readiness of our merchant marine.

As a result of the presidential initiatives of 1977, we are currently in the final stages of defining the measures needed to prevent incidents resulting from collision, ramming, and grounding. In terms of our national objectives, this area offers the highest potential payoff. Again, we return to people and piloting. There is the highest probability of incident when a vessel is operating under conditions in which prudence or rule dictate that a pilot be aboard. To put it another way, a pilot is, or should be, aboard when the situation demands the highest degree of experience in ship handling and seamanship, as well as knowledge of the local area, the latter being the most important.

Success depends on three separate, human operations. First is acquiring the correct information. Second is making the correct decisions. And third is performing the requisite maneuvers. While these operations are simply stated, good sailors know that the process is a great deal more complex. It embraces what many of you have heard me refer to as the elements of the marine transportation system.

Since it is a system problem, it follows that we should be looking for a system solution. Further, in developing the solution, we must first consider the capability of the person controlling the ship; second, the adequacy of the information he receives; third, the responsiveness of his ship and its inherent maneuvering capability; fourth, the characteristics of the waterway; and, fifth, the state of the operating environment. To one degree or another, all of these have a bearing on the subjects you will be discussing during this symposium. I strongly urge that you carefully consider how each relates to the other and all relate to the overall goal of safe piloting. For example, is VTS as important as we are prone to consider it to be? This is certainly a valid question to ask now that we have gained some experience with it.

I also would offer one caution. I think we are past the time of pontificating without substance. As my Vice Commandant sometimes bluntly puts it, we are past the time of driving tacks with a sledge hammer. We already have the simplistic, well-intentioned (but rather shallow) recommendations for "better traffic control," "better maneuverability," and "better communications." We now have to get to the hard part: How do we do it? How do we go about it? We not only have to figure out how to do it, but how to do it without over-regulation and excessive cost to industry, while still respecting the need to protect lives, property, and the environment. This is the dilemma we are all facing. You have a unique and timely opportunity to offer a major contribution to the nation and to the Coast Guard's effort, by working to define, in these two days, some workable steps to improve marine safety.

I hope that you will address two broad areas in some detail. The first is standards: standards for pilots, crewmen, vessel maneuvering characteristics, and channel and harbor configuration. Secondly, technology: How can we use existing technology to improve the design of ship bridges, communications, command and control equipment, and the development of simulators and other multi-media techniques?

As I reflect on the probability of success in coming up with reasonable solutions, I think that it is fortunate that improving human performance is probably the most efficient and effective way to improve safety. Perhaps the time has arrived to follow an old rule of good business practice--put your money where you get the best return on investment. I have been most impressed during the visits I recently have made to some of the schools that are supervised both by the industry and the unions. Frankly, I think the Coast Guard could take a lesson for some of its own training programs based on what is being done there.

In sum, I suspect that the answers that we are looking for will involve some combination of improved personnel competency, improved equipment reliability and redundancy, and improved maneuvering characteristics for certain types of vessels.

I should end this on the right note. Ship handling is an art, and all artisans have pride in their work. What we need to do is to nurture that art with reasonable standards, and with the availability of the best equipment and information that we can provide to its practitioners.

I hope I have helped to set the stage for what I believe will be an extremely productive two days. I wish you well in your deliberations.

RADM. HENRY H. BELL, USCG

Chief, Office of Merchant Marine Safety

Some of you may be familiar with my prepared statement, since I have addressed the same issue at a number of recent meetings. The issue, of course, is the proposed Coast Guard amendments to regulations governing the licensing or endorsement of pilots of U.S.-flag vessels.

I know that some of you are aware that I have been discussing the proposed pilot licensure or entitlement amendments for at least a year. However, I am confident that the topic is important today. While I can offer no guarantee, I have been told that the proposed new regulations will be published, and available for comment, in the near future.

The Coast Guard is proposing to amend the regulations that govern the qualifications of personnel involved in the piloting of U.S.-flag vessels where required by federal law. To date, the qualification standards for Coast Guard licensed pilots have provided qualified personnel to navigate vessels requiring federal pilots. However, the increasing traffic of ever-larger vessels, with its attendant safety and environmental considerations, requires that additional training be conducted to maintain the necessary personnel capability. Such training may be practical, or, possibly, may be conducted through the use of appropriate simulators. The current Coast Guard thinking on this matter is outlined below. With some modifications, these amendments will be published as a Notice of Proposed Rulemaking in the near future.

The existing licensing regulations allow an applicant who serves aboard vessels of limited tonnage to be examined for a license or endorsement as pilot of any gross tonnage. Under today's conditions, service on such vessels of limited tonnage is no longer considered to adequately qualify personnel to pilot very large vessels whose size and maneuvering characteristics differ significantly from such small vessels. Therefore, it is proposed that tonnage limitations be placed on a license or endorsement as a pilot. The tonnage limitations would more realistically reflect the applicant's experience, training, and qualifications.

A license or endorsement as pilot will be limited to a gross tonnage commensurate with the operational experience of the pilot. The tonnage limitation issued will be based on the gross tonnage of the vessels on which an applicant's overall service is obtained, as well as on the gross tonnage of the vessels on which the required round trips are made for the route for which the pilot seeks a license or endorsement. Tonnage limitations which will be placed on a license or endorsement as pilot are as follows:

- 1,600 gross tons--service on vessels of less than 1,600 gross tons;
- 10,000 gross tons--service on vessels of between 1,600 and 10,000 gross tons;
- 60,000 gross tons--service on vessels of between 10,000 and 60,000 gross tons;
- 120,000 gross tons--service on vessels of between 60,000 and 120,000 gross tons;
- Any gross tons--service on vessels over 120,000 gross tons.

An applicant desiring to increase the tonnage limitation on his license or endorsement must have one year's service as a pilot on his present license or endorsement. In addition, he must have documentary evidence of having completed a minimum of eight round trips as an observer pilot on vessels whose gross tonnage is commensurate with the desired increase in tonnage limitation.

Further, it is considered necessary that a pilot give positive evidence of his continuing qualification for the license he holds. It is also necessary that he be knowledgeable about the types, sizes, and maneuvering characteristics of new vessels that are developed as marine transportation changes. Therefore, it is proposed that an applicant for renewal of a license or endorsement as pilot must show recent service as an observer pilot, pilot, or deck officer for each route authorized. An applicant who has not served as an observer pilot, pilot, or deck officer for each route authorized within three years preceding the date of application for renewal may renew such license or endorsement, but a tonnage limitation will be placed on that license or endorsement. We also propose that an applicant whose license or endorsement is limited under this provision may have the tonnage limitation removed or upgraded. To do so, he must present evidence of having completed five round trips for that route, including trips on vessels of the previously authorized tonnage, within three years immediately preceding the date of application for removal of tonnage limitation.

All licenses or endorsements issued prior to the effective date of these new regulations will continue to qualify the licensee to serve in the same grade as stated in the license, for the effective period of the license and subject to those existing limitations on the license. However, all applicants, at the time of license renewal, must show the required recency of service for each route as outlined above.

This proposal does not require shiphandling simulator training. However, it will propose to allow the acceptance of such training as a substitute for partial round trips required for a specific route and for an increase in the tonnage limitation on a license or endorsement as a first class-pilot.

As many of you are aware, the Coast Guard is presently involved in a joint USCG-MARAD research and demonstration (R&D) project which is being performed to determine if shiphandling simulator training is beneficial and if such training should be required for certain deck licenses. If this study supports a positive recommendation for requiring shiphandling simulator training, the Coast Guard will then consider a proposed rule change in this regard. It is possible that the rule change would affect masters, chief mates, and pilots of large vessels. However, such a rule would only be promulgated when sufficient simulators are available. At present there is only one shiphandling simulator that is operational; it is located at La Guardia Airport in New York. The shiphandling simulator at CAORF, Kings' Point, New York, is a federally funded simulator dedicated to research.

Due to the increased demands and the responsibilities placed on pilots, it is felt that the minimum age necessary for obtaining a pilot's license should be 21. Therefore, the provision for issuing a second-class pilot's license at age 19 is being deleted in our proposal. Any existing license as a second-class pilot will be raised in grade to that of a First Class Pilot, without further examination, when the applicant reaches the age of 21.

It is also considered necessary that a pilot periodically undergo a physical examination to determine if he remains physically qualified to perform his duties. Therefore, we are proposing that the holder of a license or endorsement as a first-class pilot will be required to undergo an annual physical exam for this purpose. I might point out here that the minimum age requirements and the annual physical exam requirements are, in our opinion, non-optional considerations that were mandated by the Port and Tanker Safety Act of 1978.

This concludes my, formal overview of the proposed rulemaking. Now, I have a caveat for the record. There are many considerations basic to the proposed rule-making that I have not addressed here. I have avoided a long discussion about some of the constraints contained in the Administrative Procedures Act. However, in response to your questions or during this afternoon's discussion, I will try to elaborate to the extent that legal constraints allow.

DISCUSSION

ADM. BENKERT: I would like to expand upon some of Adm. Bell's comments. When a regulatory proposal is made by the Coast Guard, particularly under the Administrative Procedures Act, it is just a proposal. When regulatory proposals are offered, there is normally a fairly lengthy period of time alloted by the Coast Guard for public comment. Comments may be submitted in writing, and, depending on the scope and gravity of the proposal, provisions may be made for public hearings to allow for an airing of the specifics of the proposal. Once written comments have been received by the government and public hearings have been held, the Coast Guard takes a period of time to reflect on the opinions presented. The Coast Guard will not proceed to publish the new regulations until all of the material presented has been taken into account. Most of you are well aware of this process, but it does seem that every time regulation proposals are made, there is a certain amount of confusion and concern.

As Adm. Bell has said, he is under some constraints on a discussion of the specifics of the proposal, since the regulations have not been published yet. However, he will try to respond to your questions to the extent possible. We might also ask him to outline the Coast Guard's philosophy with respect to pilotage.

CAPT. MOOKHOEK: I believe that the standards that the Coast Guard is proposing to establish are different from those that were proposed to the international delegation in London at the IMCO meeting. Are we working toward establishing international standards that would be similar to those established for the United States?

CMDR. NORMAN: I would like to respond to the question. The paper that was submitted at the 12th session of the Subcommittee on Standards of Training, Certification, and Watchkeeping of IMCO is a joint paper prepared by AIMS in cooperation with the American Pilots Association; it was presented by the U.S. delegation. It is a very general paper that does not address specifics. Basically, it says

that a pilot must undergo traning, meet certain physical requirements, and be qualified, but the paper does not outline in detail the training standards.

ADM. BELL: There is no plan to impose U.S. standards internationally. In certain areas of the world pilotage is, first of all, a money-making proposition. Pilotage fees are often added tariffs for entering ports, and, in some cases, the pilotage service available is probably hazardous to the safety of a ship. The purpose of the paper was to provide developing countries with a guide to the minimum standards a pilot should meet. In addition to collecting the fee, he should have the skill to provide the necessary service that pilots traditionally provide in the more advanced maritime countries. The paper was a general standards document; it did not represent any attempt to formulate international mandatory standards of pilotage. The paper was intended to give some developing countries an idea of what the maritime community expects to find in a pilot when he comes aboard a ship.

CAPT. MOOKHOEK: I understand. Will the proposed regulations take into account any foreign training on simulators or, for that matter, training at Grenoble?

ADM. BELL: We have not considered including such training. The difficulty is that each simulator in the world is different. Some operate in real time but are relatively crude in their visual presentation and in their duplication of the bridge environment. Others are quite sophisticated. For example, Port Revel duplicates in a scale model the ship and its handling characteristics but does not work in real time; it compresses time. I have yet to see an evaluation of its operation, however. One of the reasons we are so interested in studying simulators is that we need to know if they are all beneficial.

Does the mariner really gain something from a simulator, or are we seeing what is called, in industrial phychology, the Hawthorne effect? The Hawthorne effect was established in a series of experiments conducted in the late 1930s. Essentially it was found that if you pay more attention to people, they perform better. Simple attention to a group of people will improve their performance and their attitudes, and production increases as a result. This may be what we are seeing with some of these simulators. On the other hand, the ship masters and pilots who undergo simulator training may actually be enhancing their knowledge. We just do not know. At this point with respect to marine simulation, how to evaluate results is a difficult issue. The methods used for the procedural simulators used by nuclear regulatory agencies, as well as those used for aircraft simulators, do not apply. We have entirely different problems in marine simulation.

CAPT. MOOKHOEK: The Coast Guard has already accepted simulation for pilot endorsements in the past. You did that at the last reporting, and you know that some of the endorsements issued were based on work with foreign simulators. There appears to be a discrepancy.

ADM. BELL: Allow me to clarify. We did use simulators at Valdez. We also had simulator investigations of shiphandling and simulator investigations of pilotage of ships in the Puget Sound area. These were both specific cases; they are not precedents for a general rule. Simulators were used to address immediate problems that had arisen, not as an integral part of normal pilot qualification procedures. The simulators were used to investigate whether auxilliary controls, such as tugs or other constraints on the movement of a vessel, were going to be necessary. They were not really used to judge the pilot's ability to handle a vessel from a personal, professional point of view. The situations are not parallel.

CAPT. MOOKHOEK: There were two programs that were vastly different. The tugboat question you describe was handled separately. However, when we had to qualify approximately 100 masters for a pilot's endorsement from Hinchinbrook to Rocky Point to Valdez, simulators were used strictly for the qualification process. Five hundred points were required; 200 were assigned to the simulator training.

ADM. BELL: That is true. We had an unusual case there, you must admit. Suddenly, for many reasons, we had a requirement to ensure that vessels could be safely brought into the new port. There were no opportunities for many of the pilots to have gained experience with the vessels or to learn their maneuvering characteristics. I think the situation was somewhat atypical. We had a port, built from base zero, and introduced a whole new class of vessels into it. It was an isolated instance, but the experience we gained on simulators will obviously be used in this whole program.

ADM. BENKERT: Many of you are familiar with the IMCO forum, particularly the Subcommittee on Training and Watchkeeping, which is one of the IMCO subcommittees of the Maritime Safety Committee. For approximately eight years, this group has done a great deal of work on the development of an international convention for standards of training, watchkeeping, and certification of shipboard personnel. The United States has played a big part in this effort.

One of the areas that has been deliberately avoided by the Subcommittee is the area of pilotage qualification. In the convention that was accepted last summer, there is no coverage whatsoever of the pilotage arena. At the time, I

think there were very good reasons for the omission. A large number of the participating nations felt that pilotage was a national matter. Pilotage conditions differ greatly from country to country. There are many varying systems for certifying and monitoring pilots. Therefore, the Subcommittee chose to confine their work to general standards of training and watchkeeping for shipboard personnel and avoid pilotage.

After the convention was developed last summer, a number of people felt that the subject of pilotage should be addressed in an international forum. The United States developed, with the assistance of a number of groups, a paper which was submitted to the Standards of Training and Watchkeeping Subcommittee. It dealt with the general philosophy of pilotage and set forth a general approach to standards of pilotage qualification. In a general sense, the paper can be used as a guideline for individual nations in developing their own system and their own evaluation proceedures.

Capt. Neely of the American Pilots Association, as well as a number of people in that association, had a rather large part in development of that paper. Capt. Neely, would you like to add anything to what I have said?

CAPT. NEELY: I would like to add that there was a general consensus among the nations represented at the IMCO meeeting that each had established standards for pilot qualification that were successful as far as their own commerce was concerned. It was also noted that there is a vast difference between general standards for coast-wise piloting and standards for inland water piloting.

In my opinion, the North Sea Pilotage Act, which covers coast-wise pilots, marked the beginning of the development of general guidelines for pilotage by IMCO. I also believe that the American Pilots Association's program of state pilotage, which has been successful for over 200 years, puts us in the category of leaders in the field of piloting at this time. In this program, of course, people get their training on the job, which is a critical factor. There has been some discussion about the use of foreign simulators in training. Personally, I believe that simulator training cannot take the place of on-the-bridge training for an apprentice program, a deputy program, or any other type of program. It would be wrong for us to entertain the idea if using foreign simulators. Simulators can only be effectively used on a local basis. If a man is to substitute simulator training for practical experience, the simulator must be for the local area.

ADM. BELL: I agree completely. I think we have to recognize that local knowledge is one of the most difficult

things to obtain without the on-the-job practical training that we have. I do not think that anyone is considering trying to develop a simulator that will reproduce the harbor conditions in New Haven or Baltimore. In this country, we are still wedded to that concept of practical on-the-job training. The local knowledge that the pilot possesses is one of the key elements of the service he offers. His expertise ensures the safe transit of the vessel in the area.

However, the pilot has another recognized area of expertise, his shiphandling ability. It is this area that some of the regulations are beginning to address. In addition to his local knowledge, the pilot must have a very broad knowledge of the handling characteristics of certain classes of vessels. I am certain that you would all agree that a 1600 gross ton vessel handles differently than a 60,000 gross ton vessel. The pilot must have local knowledge, as well as knowledge about the handling characteristics of the ship that he is piloting through the waters.

I believe that there is a place for simulation in the latter area. Simulation can allow a pilot to experience emergency maneuvers on broad classes of vessels. As a general training tool, this is one of the greatest strengths of the maritime simulator.

We have masters and we have pilots who have never experienced a steering gear failure. The question is, Will the master or pilot without experience be able to handle a vessel under such circumstances? Is it not better to have him experience the response of a vessel when it suffers these casualties in a mechanical simulator? As far as I am concerned, it is much better to have run through it a couple of times in a simulator than to wait for that first time in real life.

CAPT. SORENSEN: We commend the Coast Guard for adopting a licensing procedure that uses limited tonnage. Such a system has been in existence in New York and New Jersey for approximately 75 to 80 years; it is operated by the Board of Commissioners. As you know, according to our procedures, it takes approximately 10 years from the time a pilot receives an unlimited license from the Coast Guard before the state permits him to pilot an unlimited tonnage vessel.

I have, however, two concerns. The first is that the 1600 gross tons classification seems totally unreasonable. I know of very few ships that will fall within this range. I hope that before the classification system is adopted, the Coast Guard would consult with state pilots associations and the American Pilots Association. My second concern is the

proposed use of simulation in the place of round trips. In New York, we require approximately 700 trips before we allow a pilot to handle a ship alone. Eight round trips is simply not enough.

ADM. BELL: We have received complaints from many in the industry that they are unable to discuss directly with the Coast Guard questions regarding Coast Guard rulemaking. Previously, the Coast Guard had a whole series of advisory committees that met during the various stages of formalization of proposals. Some of them were relatively ad hoc, some were very structured and had charters.

There has been a change in the Executive Branch of our government, however. We no longer have advisory committees, per se. Changes in Coast Guard procedures are dictated by federal policy. The input that we used to have through direct dialogue now must come through the rulemaking procedure. Through our rulemaking procedure, we solicit the kind of input you wish to make. There is a period for public comment, as Adm. Benkert noted, during which anyone who has any interest in the rulemaking may respond. Contrary to popular belief, comments are not filed away while we go ahead with our own preconceived plans.

We have to study all comments and, in fact, answer them in the preamble of any further action. Our evaluation of all comments is published in the Federal Register. As you are aware, evaluation of comments often results in a complete revision of the proposal. When this occurs, we often have to go through another round of comments.

Once these proposed regulations are published, we will certainly be looking for your input. Recognizing that the gross tonnage breaks are controversial, we tried to draw on the experience and skills of those in the industry. We essentially took straw polls of those in the industry, asking if there is a consensus about appropriate breaks for a limited tonnage license.

The main way of obtaining your input, however, is through our rulemaking process. So, I welcome your comment on the 1600 gross tons classification. We would be most pleased to have anyone else comment on this or on any of the other provisions.

CAPT. SORENSEN: I would just like to add to my original statement about simulators. While I do not feel that simulators will take the place of on-the-ship training, I would be remiss if I did not mention that in New York we think a great deal of the Grenoble School. We have 120 pilots. Approximately 60 of them have received training at Grenoble. We have not been able to send all 120 because of the cost, but we send as many as we can.

CAPT. OLIVER K. COLLAR

Sea-Land Service, Inc.

I was asked to present my views on pilot training, pilot certification, and on the pilot's responsibility to the ship owner and to the public. But first, I intend to depart from the subject matter of my prepared paper and address several areas of concern that are pertinent to modern-day vessel piloting. The views I present are the product of many years of personal experience both ashore and afloat, and the result of a continuous learning process that is activated every time I board a vessel. My experience has served me well and I hope that my statements will provide a structure or guideline for other pilots who would seek to understand and cope with the potentially difficult situations which face every pilot each time they board a vessel.

The question is often asked, How does one become a pilot? I recall, during the early stages of my seagoing career, when I asked the same question of an old-time San Francisco Bay and river pilot, who quickly replied, "There is nothing to it. All that is required is 10 percent knowledge, 10 percent luck, and 80 percent guts." Looking back, I don't think he meant this, literally, and I doubt if you would chalk up many points if you used this statement in your essay of general knowledge in a Coast Guard examination room.

The gutsiness part I fully understand when I embark or disembark vessels in the angry seas of Alaska. Some people think that all that is required is to complete 20 observer trips, enroll in some retired sea captain's navigation school, and take crash courses in pertinent subjects for the Coast Guard examination. If an applicant is successful in passing the examination, his license is endorsed as First Class Pilot for the particular route for which he has made application. According to federal law, he is a first class pilot.

Then, on rare occasions, you will come across what I call "the professional endorsement seeker." Years ago, I had one such individual who came to me aboard the ship and announced himself as my new Second Mate. He proudly displayed his license on my desk and every line was filled to the brim. Stapled to the license was page 2, single

spaced and completely filled. He had endorsements for every dog hole from Maine to Texas, and from California to Alaska. He said, "Captain, I can take your ship anywhere." As it turned out, he was the worst deck officer of the whole lot. We later found out that he also had a Liberian Master's license, just as a backup.

But, as we all know from experience, the federal endorsement is only a starter and the apprentice has a long, long way to go before earning the title of pilot. He must acquire experience from on-the-job training, like conning and maneuvering vessels during the many and varied conditions related to weather, traffic, day and night operations, periods of reduced visibility, and a multitude of other factors that may cause a threat to the safe operation of a vessel. All of these prime functions must be accomplished under the watchful eye of the instructor, a seasoned, expert pilot who has earned the title as a result of his experience and record.

Even an expert pilot can make a mistake, such as inadvertently giving a wrong course, misaligning an approach to a dock, or over-correcting a course. A sudden gust of wind may play havoc with a delicate docking maneuver, or a combination of detriments might arise that could endanger life and property. It requires a pilot with experience and expertise to recognize imminent danger and determine what immediate actions must be taken to best avert a potentially serious incident.

The apprentice pilot must be allowed to make his own mistakes in order for him to learn and to develop the knowledge and ability to make the split-second decisions to safely maneuver the vessel out of an uncomfortable situation. It is not an easy task to break in an apprentice pilot and shiphandler. Of course the teacher is there, standing by, to give the student assistance, if required, or to take over before an incident becomes irreversible. When the apprentice has observed my techniques on numerous trips and when time permits so that port operations are not jeopardized, I allow him to do his own thing in the conning and maneuvering of the vessel. Again, he will learn best from his own mistakes, but you are there as a backup to pull him out of a situation before it becomes critical.

Eventually a point is reached when the apprentice has acquired the combination of elements that make a pilot. It occurs when he can go through the entire operation without your having to correct his maneuvers or to give him words of wisdom, when you feel comfortable with him, when you feel he has confidence in himself, and after he has encountered all of the adverse conditions mentioned earlier. Then and only then can he go out on his own; he has certainly earned the title of pilot.

I had the opportunity to train my son as an Alaska pilot in the Cook Inlet and Kodiak Island waters. Cook Inlet is ice-clogged annually, from mid-November to mid-April, with the ice obtaining a thickness of up to five feet and pans reaching nearly a mile across. As a part of the Aleutian chain, the entire area, and Kodiak in particular, is well known for the unpredictable fierce winds that winter can produce. I don't mind admitting that I bit a few cigars in two when we reached that point in his training where he was allowed to make his own mistakes.

He was doing just fine and, after numerous trips together in and out of the area one day, after he had the ship tied up, he turned to me and said, "Any complaints?" I said, "No, Don, fine job. You did a very fine job." He said, "Well, it is getting a little embarrassing." I said, "What do you mean by that statement?" He said, "Well, these people are going to think you are going to ride with me forever." I said, "Well, Don, I really don't want to ride with you forever," but I said, "I would like to observe your actions during one of the better blows and you haven't experienced anything over 50 knots yet." He answered back, "Well, if that is what it is going to take, I am going to pray for a 'williwa.'" I don't know if he over-prayed or not, but the next trip we hit upon a real "jim-doozer." I did not have to be concerned with biting my cigar in two, as the wind took care of that, and the Alaska-sized horizontal snowflakes smack in my eyeballs made the situation as rough as ever I had encountered. When the vessel was finally secured to the dock, I was proud to shake the hand of a new pilot.

I wanted to use this personal story as an example to emphasize that an apprentice pilot must be able to handle vessels under all the situations that you, as an instructor, think he will face before you can turn him loose. This is a necessary take-off point so that he will continue to develop a talent for shiphandling in order to be a model pilot. Piloting is an art which is an extension of one's self; it requires the ability to "know" the vessel, to "feel" her power and her position, and to understand what is required for her safety.

As we are all aware, the role of the pilot today has changed considerably from what it was in times past, particularly in areas of property and environmental liability and responsibility. I shall attempt to cover those areas of pilot liability and responsibility that I deem, from my experience and training, to be of greatest importance in today's world.

Perhaps the most ill-defined and volatile area of a pilot's responsibility while conning a vessel is his responsibility and liability to the public. The courts have

taken an active role in reminding pilots that they are liable for their actions, both in civil and criminal proceedings. However, the pilot's responsibility to the public is not yet well-defined and, while the law is shaping that responsibility, some incidents have arisen where a pilot, through an honest error or negligence, has harmed the public good or created a situation where he is liable for personal injury claims or even criminal negligence.

The area of public responsibility certainly has to include environmental considerations, such as oil spills and similar ecological disasters caused by pilot error or negligence. While errors in navigation are exempted under certain laws, certainly no such indemnity exists to protect the pilot, master, or ship owners from eventual litigation in cases involving environmental damages.

A pilot is additionally responsible to the public to do his utmost to ensure the safe delivery of the vessel's cargo, as that cargo is an important link in the economic chain.

Lastly, the pilot has a responsibility to the public to ensure that his fellow pilots are well qualified to conduct vessels in a safe and efficient manner. The burden should be on the various pilotage organizations to police themselves, because no other form of evaluation is as effective as peer evaluation. Professional skills have to be developed and attitudes and temperaments must be formulated which will provide the pilot with a solid base for understanding his responsibilities. Then he will be in a position to fully appreciate the consequences of his actions.

At this point, the next logical consideration regarding the pilot's various areas of responsibility is that of the master/pilot relationship. Of all of the relationships the pilot encounters professionally, this one involves the closest interactions. It is also the one which comes under the closest scrutiny. Times have changed and so have the classic roles and responsibilities of the pilot and master.

In earlier definitions, the pilot was simply the professional advisor to the master and possessed the local knowledge to safely navigate a vessel into and out of port. Today, as we all know, that singular relationship does not exist. The courts now recognize the contribution of pilot error or negligence and no longer assign full and final liability to the Master. Pilots, as discussed earlier, are liable for negligent acts which may result in civil or criminal suits. Although the master does have the ultimate responsibility for his vessel, it is now legally recognized that the pilot is the local professional navigator, specifically employed for his expert knowledge of a certain

locale. To that extent, the pilot is liable for the effect of his decisions affecting the safety of the vessel or the public domain.

So, although the basic definition of the master's responsibility remains unchanged, an additional degree of accountability has been assigned to the vessel's pilot. Now he is not only morally responsible for his actions but legally as well.

In order to ensure that the people assigned as pilots are properly qualified, a system of pilot certification must be in evidence for each port or piloting region. In my opinion, I would be hard pressed to say that any one set of requirements could properly ensure competent pilots for any widespread area. Requirements for piloting have to be responsive to each piloting route, since different routes may require different skills and vessel handling.

Today, the pilot's primary role is one of vessel handling and local knowledge. Therefore, each area must set its own standards for acceptable levels of piloting efficiency and entry-level experience. This is not to say that a uniform code of requirements which defines minimum entry qualifications cannot exist nationally, but such a code has to be further augmented by additional training and performance skills designed to accommodate the particular pilotage route.

In most major ports, the level of experience and performance required exceeds state and federal requirements, and certification is administered by the local, state, or private pilotage organization. National standards and qualifications for pilots should generally be concerned with certifying that an individual has the base experience and background to become a pilot.

The ultimate development of a professional shiphandler must be the result of an intensive and comprehensive on-the-job training program conducted by working pilots of the licensure area. Piloting is an art that takes practice and experience on a continuing basis; eventually the skills and concepts are fully absorbed and become second nature to the expert pilot. But learning never ceases, and practice cannot be long neglected.

Let us now consider some points related to the initial pilot certificate issued by the U.S. Coast Guard. There is a need to upgrade skills and to provide advanced training. Significant changes are occurring in modern tanker operations, in the sizes and capabilities of some modern ships, and in new or unusual cargo and vessel relationships. Pilots should be encouraged to improve their skills by attending schools and vessel-handling training centers to

further develop their abilities to handle today's--and tomorrow's--vessels. For example, it is my opinion that most pilots have little or no experience on large ocean-going tow boats which frequently enter port towing two barges of 18,000 tons each on two wires stretching out at nearly 1,500 feet. A good portion of the members of most pilot groups would be hard pressed to navigate and tow such a configuration safely in restricted waters.

The age-old dilemma of who pays and who benefits from pilot training programs arises here. It is my contention that the individual or organization with the most to gain by having confident, well-trained pilots is the vessel owner. The owner is responsible for the actions of his vessel and any subsequent damages or liabilities. It does not always seem equitable but, as we in the industry well know, the owner always pays.

I do not advocate that vessel owners should necessarily bear the cost of pilot training or upgrading unilaterally because it is also in the interest of the pilot organization members who have acquired the new or improved skills. What I encourage is that the pilot groups and the vessel owners mutually accept the rational approach and take positive action to encourage and require additional training as a mutually shared expense.

It is a difficult situation, as the owner has every right to expect and require a competent pilot, but the unexpected will sometimes occur and, once again, the owner is on the line through no fault of his own. It would be well then for both the pilot organization and an association of owners to mutually accept the obvious advantages of additional training. They may then proceed to work out arrangements to ensure that all certificated pilots have had the benefit of all of the training available.

The specific administration of pilot certification should be, in my opinion, performed at the local level so that it will be responsive to local problems. Overall administration of minimum requirements, based on experience and general knowledge, can be administered on a wider scale. However, once a pilot has met the minimum Coast Guard requirements, then his full acceptance as a pilot and final certification should come from a state or a private pilotage group comprised, at least in part, of active professional pilots. It would be very difficult, indeed, to ensure the necessary level of local control of certification on any wider geographic scale. The system must be able to develop standards and function in accordance with local requirements.

Finally, let me briefly touch upon an area not heretofore covered but which is an area of vital concern to

me, the company pilot. The foregoing statements dealt with pilot training and certification. In the case of the company pilot, there are pressures and responsibilities which are not always present in independent pilot groups and associations.

Certainly, all of the aforementioned relationships pertain, but a new variable is introduced when the pilot is a permanent employee of the company. The company pilot must weigh the trade-offs between safety and delay, between prudence and additional expenditure for the company, each time he boards the vessel. Given his loyalties to the company, he often asks himself whether he should be producing a little bit more, trying a little bit harder, or pushing a little bit longer to get the vessel tied up and working. Contrast this with the case of a ship's master who may go to sea for 30 years, yet never handle his own vessel except to reduce speed to pick up a pilot. Many masters are not even remotely familiar with the handling characteristics of their vessels under docking and maneuvering situations during adverse conditions.

It is difficult to consider ones self anything but one of the ship's company, once employed as a company pilot. It is a very special and rewarding relationship, but certainly it is not one that comes easily or without its own special pressures and responsibilities. The most difficult time in any pilot's career comes when the decision is made not to proceed, for reasons of safety or other just cause. The company pilot must be willing to stand by his professional convictions for the ultimate safety of the vessel and crew, and for the public good.

In a constantly changing world, the pilot's role has undergone dramatic changes. His responsibilities have increased, as have his liabilities. He is no longer an independent entity unto himself. Today, more than ever, we must strive to provide our pilots not only with the professional skills necessary to safely handle vessels under all conditions, but also with the educational and professional understanding of all of the new areas of exposures which face them and the vessel each time they say, "I've got her."

DISCUSSION

CAPT. RICH: We must address ourselves to the issue of what we can do to elevate the pilot profession and move in a positive direction. In particular, we have to consider the function of the pilot as an ex-officio Minister without Portfolio to the public in the matter of protecting the marine environment. There are many people in the country who would agree that this is a pressing issue, so I am delighted that you mentioned it. It is a subject that needs further research and discussion.

Another subject that is worthy of further attention is the cooperative formation of groups that can focus on the problems in the field. We do this now at a rather parochial level through the collective bargaining process among the masters, mates, pilots, and ship owners, as well as through the creation of such institutes as the Maritime Institute of Technology and Graduate Studies. As you know, pilots are now able to go to the Institute if they personally pay the fees. We clearly need more and better cooperation throughout the industry, and the suggestions you have made deserve our careful consideration.

CAPT. COLLAR: The person with the most to gain by having competent pilots is the ship owner. He is the one who ends up paying for loss or damage. Therefore, improved schools that will help pilots upgrade their skills should be a mutual undertaking of pilot's associations and ship owners. If we can do this, everyone will benefit.

ADM. BENKERT: I have a personal comment. The record of pilotage in the United States, overall, is truly outstanding. Regardless of the good or bad regulations, or the individual difficulties among owners, masters, and pilots, the record of U.S. pilots in safe navigation of vessels is superb. We have thousands and thousands of transits of vessels in our country, all kinds of vessels, in all kinds of ports, under all kinds of varying weather conditions.

Of course we can improve on some of the mechanics of pilot traiing. There is a whole range of new ideas in this area, but if you look at the record of the true professionals who have been engaged in this business for many, many years, you will find that it is truly excellent both in the safety sense and in the operational sense. I think we ought not to forget that.

CAPT. MOOKHOEK: Do you have any safety data?

CAPT. NEELY: I would like to respond. Our latest survey shows that the percentage of incidents on passages in the United States is 0.00009. This figure is based on several thousand passages annually. The new regulations that the Coast Guard will issue will make ships even safer. Improvements will include secondary steering, crewmen standing by with the anchor, and a general operational upgrading of ships. Improving entry and qualification requirements for personnel will also improve our safety record.

I have to give credit for our good record to date to our belief in training men on the job. I am not downgrading simulators, but they can not replace on-the-job training. You learn to pilot by having an experienced pilot looking over your shoulder.

For every passage that is made with a pilot aboard, the owner can expect the very best service. After all, if there is an incident, the pilot's livelihood, and perhaps his life, may be in jeopardy.

ADM. BELL: I agree that we are not here today to condemn our pilotage system. We all know that the United States probably has some of the highest standards in pilotage.

However, as Capt. Collar said, we are living in a changing world. Years ago, professional subjects were left to the professionals; the non-professionals bowed to the wisdom of the professional in many areas. Nowadays, people are questioning many of the experts. Look at the number of court suits against professionals that, 20 years ago, never would have surfaced.

There is an awakening public understanding of a lot of things that go on in the world. I interpret today's meeting as symptomatic of the words and the phrases that we hear throughout our legislative bodies and in the media. The public is saying: Yes, you have a pilotage standard in the marine industry that is good. We do not take umbrage with what happened in the past, but we feel that you have got to do better.

The message I have heard over the last seven years is: Yes, you may have done a good job; we don't disagree with you; yes, you are professionals; you know your business; but, we are the final judge; and we want improved performance and improved standards.

We have 0.00009 accidents per safe transit; we transport X million gallons of oil and only spill three barrels. But, basically, the public seems to feel that three is too many.

They don't like our track record. It was fine 10 years ago, but it doesn't meet the demands of the public today.

In summary, what we are doing here is not condemning any individual, organization, or system. What we are trying to do is determine how we can be more responsive in the future to the public's concerns about professionalism, performance, and levels of competence. As Capt. Collar indicated, the pilot now has a responsibility to the public that takes precedence over his other responsibilities. We are in a different arena today, and that is what we should try to address.

CAPT. DOUGLAS HARD

MarineSafety International

I assure you that I feel a little bit like Daniel going into the lion's den. The speakers have made it clear that simulation is a hotly debated issue. Of course, as Director of MarineSafety International, I always run the risk of sounding like a paint salesman, and I hope I do not come across that way today.

Adm. Hayes mentioned two things which I would like to address before turning to my formal remarks. First, as Adm. Hayes stressed, it is very, very important to make a distinction between pilotage and being a pilot. Pilotage is a certification that one receives for having passed an examination which shows that one has acquired a certain amount of knowledge. Being a pilot is having the ability and skill to handle any vessel under any conditions, in any body of water. Shiphandling requires a great deal of experience and expertise. You cannot gain all this in a simulator. A simulator is simply a tool that can help in the learning process. However, you learn to handle a vessel by being on a ship. This is a very important distinction, and the difference between pilotage and being a pilot is a topic that I will return to later.

Adm. Hayes also stressed another point that I think is very important. It has to do with national policy. As he mentioned, the United States is very dependent on oceanborne commerce. We need, however, to educate the American public of this fact. The public must understand that the United States, and greater North America, constitute an island--a physical and economic island. We are absolutely dependent upon our marine transportation system, and, of course, on our ability to defend that system.

Any student of history will tell you that the rise and fall of nations is a function of their economies. The critical factor is the ability of the nation to support free trade and to ensure import and export of needed resources and manufactured goods. This was true in Roman days; it is true today. Unfortunately, today we have no assurance that the commerce of the world will be free. For many years, the free world's commerce was defended by Britain's Royal Navy, and shipping was secure. But this is no longer the case. We must now rely on ourselves.

We in the United States depend upon oceanborne commerce. Yet we have very few American-flag ships. Moreover, only a small percentage of the vessels that carry our commerce are under American control. We must stress to the American public the extent of our dependence on marine transportation and the need to defend the sea lanes. Approximately 70 percent of the world's surface is covered by water. It is our lifeline. We must ensure its safety to ensure our way of life.

Now, I will turn to my formal remarks. During the last several years, I have had the opportunity to work for a company that offers training services. The parent company, FlightSafety International, has offered training services in the aviation industry for almost 30 years. The company is well known and well respected in that field. It operates close to 35 simulators that range from the Concord simulator in France to smaller corporate aircraft simulators here in the United States. It has a great deal of expertise in simulation technology.

Simulation is a science. It requires extensive research to simulate an actual experience on a highway, on the water, or in the air. Simulation is also quite an art. For example, no automobile manufacturer would be able to build an automobile simulator as well as a simulation engineer. There is both art and science in simulation, just as there is in piloting.

Simulation in the marine field is unique and quite distinct from any of the other types. It must not be assumed that because procedures and practices have proven successful in space travel or aviation they will be directly applicable to maritime needs. I cannot overly stress this word of caution. Simulation techniques offer powerful tools of enormous potential benefit to the maritime community, but they must be evaluated and employed by qualified mariners.

For example, astronauts were familiarized with the lunar surface and the handling characteristics of their spacecraft via simulation long before attempts were made to land on the moon. This same technology now makes it possible to recreate specific bodies of water and to simulate the movements of virtually any type of vessel on those bodies of water. A no-risk, relatively inexpensive, practical training and testing apparatus is now available. But the principles and techniques used in the training and testing of aerospace personnel cannot be blindly applied to the marine field.

To illustrate some of the factors which make marine simulation unique, let me draw a comparison between airplanes and ships. First, there are vast differences in the handling characteristics of an airplane and a ship. The

gross take-off weight of a Boeing 747 is approximately 300 tons, and there are close to 200,000 horsepower maneuvering those tons. Therefore, it is a relatively agile piece of equipment that can respond very quickly. Compare this to a medium-sized super-tanker, such as the VLCC, which averages 300,000 tons displacement. The average VLCC has approximately 40,000 horsepower. The difference in weight-power ratio is significant. In this example, we have an airplane, which is 1,000 times lighter than the ship, having six times the horsepower. The ship has only one six-thousandth the power to respond. Moreover, there are structural differences. An airplane is not built to withstand a casualty--a ship is. Before an airplane is allowed to fly, it has an airworthiness certificate. For all practical purposes, a ship has only to float, and it can go to sea.

The factors outlined make the skills and training involved in piloting these vehicles radically different. Obviously, the time sequence is entirely different. An airplane pilot must react very quickly. He has only a few seconds to make what may be a life or death decision. A ship's pilot often must commit his vessel to a harbor, or a narrows, and later contend with dangerous changes in weather conditions. Ships simply cannot respond as quickly to changes in the environment as can other transport vehicles. Once a ship is committed to a course, there is often very little leeway. Handling a ship is very much like trying to drive a Mack truck on ice with an egg beater for an engine.

There are many other differences as well. For example, in fair weather, an airplane pilot can look down and gauge the distance to the ground. A ship's master only knows how far it is from the deck to the water. Yet, the important thing to him is how much water there is beneath the ship. While his depth recorder will give him an accurate reading of that (if he is still moving, he knows he has enough water; his problems begin if he grounds) he must have the skill and experience to gauge how deep the water is <u>ahead</u> of him, and to do so in time to maneuver as necessary.

I hope I have made my point. Marine simulation is unique. Simulative techniques offer powerful tools. However, to realize their potential benefits, they must be adapted by, evaluated by, and used under the direction of qualified mariners.

To clarify the ways in which simulators can improve the existing marine certification processes, I would like to review them briefly. First, there is the written examination, which can be very objective. Then, there is an oral examination, the results of which will depend a great deal on the experience of the examiner. Next, you have to show evidence of your observer trips. Finally, you must be

able to draw an acceptable chart of the area from memory. The subjective nature of parts of this process is obvious. For example, what is an acceptable chart? This judgment will depend a great deal on the examiner and his background. It would help, for instance, if the examiners themselves had the advantage of simulation training. In most cases, the examiner does not have experience comparable to that of the person being examined.

Two distinct types of simulation training are available now. The first is vessel familiarization. It is possible to recreate the handling characteristics of a marine craft fairly realistically. Of course, the quality of the recreation varies. The quality primarily depends upon the sophistication of the programming, not the sophistication of the hardware.

How well such recreations can be done is open to debate. The optimal ratio of time on a simulator to operational experience for a particular examination is open to debate. The devices that are available are more than adequate for helping a man meet the requirements that have been established for a pilot's endorsement. However, the very sophisticated device required to determine if a man is ready for his first trip alone does not yet exist. We may have it tomorrow, but we do not have it today.

Today's generation of simulators is, however, at least adequate for training a cadet or an apprentice. In any training program, the first step is to ascertain the intention and the level of training required. Any training program is only as good as the objectives that have been recognized and addressed. Also, a training program will be no better than the people who designed, developed, and operate the program. A simulator is a tool; it can be of benefit only if it is used properly. These are very, very important points in the debate over simulation.

The second type of simulator training is geographic. For example, during the Valdez operation, we learned enough to be able to geographically simulate the area. Now, I do not mean that we recreated the entire southern coast of Alaska with such exactness, or with such precision, that you could not distinguish it from the real place. What we did do was to recreate enough of it to accomplish a specific task. A man who has never been to Alaska can come into the simulator, work for a week, and, when he leaves, he will have a good idea of what he will encounter when he gets there.

This does not in any way eliminate the need for the man to go there, to go in and out of the area, and to learn firsthand. There is nothing like standing on the bridge of

a ship and looking ahead to the time when it will be your responsibility.

There is a feeling that comes up the back of your spine the first time you take command of a ship. With simulator training, a man at least has some idea what to expect. He knows where he is going to pick up lights, and he knows when he should be preparing to make his report to the traffic supervisor in a VTS system. He is not all thumbs; he has confidence. I speak from experience. I worked on a VLCC simulator for several years before I had command of a VLCC. Simulator training does not eliminate the anxiety, but it does improve confidence. You know what you are supposed to do, and you try to do it. There is an important distinction there.

Having a command of knowledge and being able to demonstrate that knowledge through writing is one thing. Being able to perform when the pressure is on is something else. You can put pressure on a man in a simulator, and this is another important practical advantage. You can create all sorts of situations and conditions in a simulator that a man may have to confront in reality. The most experienced master or pilot, with 30 years at sea and a clean safety record, has not encountered that casualty which may be fatal. He has no more experience with such events than the third mate just fresh out of the Coast Guard inspection office, with the ink still wet on his license.

You hope that the more experienced man will make a better judgment of the alternatives available to him when he encounters a given situation, but there is no guarantee. He has never had to do it before. The simulator can put masters and pilots through a type of road test. This capability is lacking in our current certification procedures, not just for pilots, but for all of us. I took four licenses, but I never had to prove that I could do anything except write an examination.

Emergency situations, environmental stresses, weather conditions, bad tide effect, an unusual wind, all can be created in a simulator. The man who is being considered for promotion to master, or relieving master, can be evaluated by management or by the senior masters of the company in a simulator. His grasp of situations can be tested, as can his performance under stress. You can do a lot more evaluation in a few weeks in a simulator than you can at sea. At sea there is only one man watching, and you have only one man's evaluation, the master's.

In marine simulation, the quality of the simulator is critical. Some types of simulators cannot be adapted to shiphandling. Among those simulators that can be used in this way, the precision of shiphandling training depends a

great deal on the capability of the specific machine and the sophistication of the programming. This is often overlooked. Manufacturers of simulators tend to place too much emphasis on the attractiveness of their product. The stress is on the quality of the visual image, e.g., the clarity of objects or lights 10 to 15 miles distant, the color of images, computer generated displays, and so forth. While these are important, they are not critical. The real issue is whether or not the instrument provides a good representation of the particular ship and the particular body of water. Incidentally, this judgment can only be made by seasoned pilots and masters.

There must be an evolutionary period before marine simulation reaches its full potential, but progress is being made. One of the most important and notable achievements, thus far, is the pilot certification program in Valdez, Alaska. Valdez was a unique situation. It was a chance to start from scratch. Since a new deep-water port was being developed, it was possible to totally revise the pilotage requirements. Yet, there were enormous pressures on the people involved with Valdez. Environmentalists were concerned. There were federal, state, local, and corporate interests involved. Other pressures were generated by the pilots and the oil companies. Everyone had a vital interest in what was to be developed at Valdez.

A lot of credit for Valdez must go to two men in particular. The first is Capt. Bob Nichols, USCG. Although he is now here in Washington, he was the Commanding Officer of the Anchorage Marine Safety Office during the port's planning stages. Capt. Nichols believed that simulation had reached the point where it could be used to help the Port of Valdez become operational. He did a great deal of investigating. He talked to many people involved in simulation research and simulation operations, as well as to representatives of many different organizations. He stuck his neck out, and I commend him for doing so. He said that, as the Officer in Charge Marine Inspection for the area, he was willing to set up pilotage requirement standards. He said he was willing to accept some form of VLCC simulation in lieu of part of the customary requirements for obtaining the right to sit for a pilot examination. A unique system was established in which VLCC shiphandling simulator training could be used as a substitute for a portion of the required shipboard experience. Simulator training and testing could be used to provide further evidence of the applicant's skills. The reduction in shipboard experience requirements was done on a man-to-man basis, depending on the individual's qualifications. It still is.

Capt. Nichols set up a system in which 500 points were required in order for an applicant to sit for a pilot endorsement for Prince William Sound and Port Valdez,

unlimited tonnage. One of the alternatives for acquiring a portion of the 500 points was to gain experience at a VLCC simulation training facility.

About two years ago, when the Valdez office was established, Commander Homer Purdy, USCG, was assigned as Officer in Charge-Marine Inspection. Commander Purdy had enough confidence in the system to continue it. In so doing, he has established two very important principles. First, it was recognized that simulation is a useful tool for providing an opportunity for an applicant to become familiar with the handling characteristics of large vessels. Second, he authorized the use of geographic simulation just last year. As I mentioned previously, this simulation technique makes it possible to recreate a given geographic area so precisely that a person can be trained to navigate the route simulated.

Valdez demonstrated some of the practical advantages of simulation. The situation at Valdez demanded that large numbers of American pilots be certified quickly. Hinchinbrook Inlet, the gateway from the Gulf of Alaska, is about 60 miles from the narrows. Early in the planning for Valdez, it was apparent that it would not be practical for local pilots to board American vessels out at Hinchinbrook. Therefore, it became a requirement that each vessel have someone aboard with pilotage certification for those waters.

Efforts were made to provide practical training trips aboard ships at Valdez. At least two vessels, the ARGO FAIRBANKS and the OVERSEAS CHICAGO, were dedicated for use as training platforms. I was aboard both at various times on observer trips up and down the Sound and in and out of the port. Again, there is no way that a simulator can recreate the reality of being aboard a ship. Being aboard is the real thing; you train on the platform on which you will work. However, I do question how much experience was gained after the first two or three training trips. On each trip, there were 40 captains aboard the bridge of one ship who spent considerable time in someone else's way. The first task was to find a niche in a corner for stowing gear. Most looked hopefully for a corner with a seat and asked where the coffee pot was located. I believe that the effort invested would have been far more productive, and greater benefits accrued, had simulation been used in conjunction with those observer trips.

This is not to say that observer trips are unnecessary. The most experienced master or pilot in the world still has things to learn the first time he boards a different type of ship. However, if some of those things can be learned in a simulator, it is a much less expensive and much more efficient use of time. In addition, a lot of risk situations can be encountered in a simulator that would have

to be avoided on a training run of a real ship. Of course, how well such exercises can be done depends upon the capability of the simulator. How much credit should be given to the trainee depends on the skill of the evaluator. But the technology is available to do extraordinary things with simulators.

Of course, I have been talking about the requirements for pilotage certification; I have not been talking about the making of a pilot. The certification requirements are only legalistic in nature. However, I am saying that using simulators in the pilot certification procedure can improve the process. I hope that, in the long run, it will also improve the product, but that has yet to be proven. A lot more research must be done to prove that the effects of simulation training transfer from the simulator to the real world.

Such research will take a long period of time. It will take time to gather data on the numbers of people needed for an accurate statistical analysis. Ships move slowly; we have to have patience. We also need more research in areas such as low-velocity, high-RPM characteristics of ships; channel effects; tide effects; and eddy current effects. While there is no simulator that I know of that has programmed these variables yet, it is possible to make creative use of existing facilities.

The Grenoble facility is a good example. Granted, it uses small boats; however, they are riding in water. It is possible to practice anchoring, riding at anchor, or overtaking vessels in a channel. There is, of course, the problem of scaling. Everything happens five times faster than normal. Ideally, a man would be able to have experience at a Grenoble-type facility and then have training on a real-time simulator. This would reduce the scaling problem substantially. Yet, to my knowledge, formal training of this type has not yet been implemented.

Simulation is a reality. The real issue is how to evaluate it in a professional manner. We may find out, as experience increases, that there are many more things simulators can do than was originally thought. There are also areas in which experience shows that they are not as effective as was hoped. These areas must be clearly delineated for the regulatory bodies.

Looking to the future, we have the Louisiana Offshore Oil Port (LOOP) project. Plans call for a joint program of simulator training for LOOP mooring masters and LOOP Traffic Supervisors. Each will learn to appreciate the problems facing the other. It is very important for the man who sits at a radar scope, directing traffic in an area, to be fully aware of the problems and responsibilities facing the men on

the ships. If anyone is going to direct a pilot, he should be at least as knowledgable as that pilot. Therefore, simulators will be used to help train all LOOP personnel.

Such practical training is a necessity. Too often, technological advances are marketed inappropriately. For example, we have collision avoidance systems on the market today. A collision avoidance system is nothing more than a collision assessment system. The assessment will be no better than the skill of the man looking at the scope. If he does not understand the information he is receiving, he may end up with a collision-avoidance-system-assisted collision. I believe that we have had a few of these already. Collision avoidance systems have been accepted as a panacea. These systems are just like computers; you have to know how to make proper use of them. If you do not, it would be better to turn it off and use prudent seamanship to safeguard the ship.

Now, we have to address the difficult question. Who is going to pay for simulation training? Simulation is not inexpensive. It may be that commercial companies, such as the one that I work for, are the answer. We may need programs subsidized by union schools or the federal government. Perhaps jointly funded programs are the answer. I am not sure, but someone has to assume the responsibility. The funds required are considerable. Therefore, it is very important not to have overkill. It would be senseless to have many simulators that are only being used 10 percent of the time.

Today, we can simulate a ship's characteristics, simulate a geographic area, simulate its hydrodynamic conditions, simulate cargo operations, and simulate VTS procedures. We can simulate a whole world of things. The use of simulators is only limited by the imagination of the user. That is why it is so important that professional groups, such as this one, meet to discuss the issues. We should gather together recognized authorities in the field, representatives of the various groups that have a vested interest in this operation--the public, the companies, the pilots, the training organizations, the unions, everyone. It is very important that we all put our heads together and make use of this tool. This new technology should not be seen as an attempt to put somebody out of a job or as an attempt to make it more difficult for someone to get a license. Simulation is not, and should not, be used as a threat or means of revoking licenses. It should be a tool used to improve all of our skills. To that end, it can be of benefit if it is properly employed by people with the right credentials. We cannot just turn it on with a key and hope for the best. That will not work. It cannot work and should not be attempted.

The opportunities are here. I believe it was Admiral Hayes who said that you can look at something as a problem or as an opportunity. Let's look at these things that face us as the opportunities for handling the problems.

I think the most impressive thing that I have seen in many years was the first picture of this globe of ours taken from outer space. It is a very fragile thing. Yet it is a vast thing as well, as anyone who has had to navigate a ship across the expanses of our oceans knows. To use an old expression, we are all in the same boat. We are all on this planet together for the foreseeable future, certainly our lifetimes. We have got to make the best of what we have. That is going to mean better use of our resources and better use of the aids and tools that we have available for doing our respective jobs.

I would like to see us unite with a common goal: to improve ourselves and to accept our differences. Therefore, let us begin at a level where we all can agree. We are all interested in marine safety. We are all interested in better efficiency. We would like to see the ship owner make a profit. We would like to see more ships under the American flag. The only way these things are going to happen is to make them economically realistic. So let us work together to improve efficiency and improve safety.

ADM. BENKERT: I would like to postpone any questions. We will have a chance to talk more about simulators and question Captain Hard this afternoon during our panel session.

PILOTAGE

Capt. George A. Quick
Association of Maryland Pilots

It is my belief that one of the major problems in maritime pilotage is a lack of understanding of the role and function of a pilot, even among many pilots. I am going to discuss pilotage as an institution from my viewpoint.[1] Knowing that my views won't be shared by everyone, I have attached references or annotations to explain or support the basis of my beliefs.

All maritime nations since ancient times have offered inducements for mariners to become pilots and maintain pilotage systems for the protection of shipping.[2] We may not be the oldest profession but we are certainly the oldest regulated profession.[3] The Colonial legislatures had pilotage laws in effect prior to our becoming a nation.[4] The Constitution, adopted in 1789, delegated to the federal government the regulation of interstate commerce. However, the first Congress realized that such regulation would interfere with the pilotage systems and regulations of the various states. Congress quickly passed an act that left pilotage under state control.[5]

The state laws generally provided for a system of regulated publicly employed pilots who conducted oceangoing ships to and from the sea and whose terms and conditions of service were established by law.[6] Pilotage remained exclusively a public service under state control until 1871, when Congress acted to provide for the federal licensing of pilots on steam vessels engaged in the coastwise or interior commerce of the country.[7] At that time, steam engines were considered inherently dangerous, and many laws were being passed to protect the public from this new threat created by the Industrial Revolution. Since many state laws exempted ships engaged in strictly coastwise or interior commerce from the requirement of taking aboard a public pilot, Congress felt there was a need to ensure that these new and dangerous vessels driven by steam employ someone familiar with the waters over which the vessel was navigating.

This new Act of Congress created a different category of federally licensed pilot. Often, the newly-styled pilot was actually the master or another officer of the vessel acting

as pilot by virtue of an additional license endorsement. This has caused confusion in defining the term "pilot" and in defining the role and function of a pilot.

The term "pilot" in the United States is used to describe two entirely different sets of relationships:

1. It can refer to a federally licensed employee of the ship who is subject to the selection and control of the shipowner and whose terms and conditions of employment are determined by mutual agreement. The relationship is the common law one of employer and employee.

2. It can refer to the state-licensed publicly regulated pilot who is not subject to the selection and control of the shipowner and whose terms and conditions of service are established by statute and are not subject to negotiation.[8] The relationthip is created by compulsion of law and defined by the state compulsory pilotage statute and court cases applying general principles of maritime law.

In simple terms, the federally licensed pilot is acting in a private capacity and on privately agreed-upon terms and conditions. The state licensed pilot is exercising a public function on publicly regulated terms and conditions.[9]

The legal text writers and the court decisions attempt to avoid confusion by generally referring to the pilot acting in a private capacity as a "voluntary" pilot and referring to the pilot exercising a public function as a "compulsory" pilot although the distinction still becomes blurred in some contexts.[10]

In a sense, the coastwise seagoing vessel is compelled under the 1871 statute to employ a federally licensed pilot (in the same manner as it is compelled to employ a specified complement of licensed officers and engineers or certified seamen), but that is not the type of compulsion referred to in the distinction between "voluntary" and "compulsory" pilotage. In the "voluntary pilot" situation the employment contract is by mutual agreement between the shipowner and the employee pilot, even though the shipowner is compelled to select his employee from among a class, i.e., federally licensed pilots. In the "compulsory pilot" situation the pilot is placed on the ship by compulsion of law and under terms and conditions established by law. The concept of "compulsory pilotage" excludes any right of the shipowner and pilot to mutually agree on the terms of their relationship. The right of selection and control, as well as the terms and conditions of service are not properly the subject of negotiations; they are established by the state to serve the state's superior interests.

The British and Canadian practice is to avoid the confusion by legally defining a "pilot" in the following terms:

> "'pilot' means any person not belonging to the ship who has the conduct thereof"--Canada, Pilotage Act, Sec. 2(i), (1971); Great Britain, Merchant Shipping Act of 1894, sec. 742, amended to Pilotage Act of 1913.

Under their definition, employees of the ship who navigate the vessel in pilotage waters are not considered to be, nor licensed as, pilots.

Under British and Canadian practice, an employee comparable to our federally licensed pilot would be granted a pilotage certificate, not a license, exempting the vessel on which he serves from the obligation of taking on board a licensed public pilot. The pilotage certificate is issued for a one year period on the basis of relatively limited experience and is restricted to the ship named on the certificate. The issuance of a license as pilot is limited to those who undertake piloting as a distinct profession. There are substantially higher standards, similar to our state licensing procedures, and the terms and conditions of employment are the subject of public regulation.

It seems to me that this avoids the unhappy situation where no distinction is made between the professional pilot with broad experience exercising a public responsibility and the company employee with relatively limited experience who works for the shipowner in a private capacity.

There is a vast difference in the training, experience, perceived duties and responsibilities, working relationships, legal relationships, and attitudes that separate the federally licensed employee pilot and the state licensed public pilot. An understanding of the differences is necessary if we are to progress further in our discussion of the pilotage scene.

The state licensed pilot is regulated by state statutes creating compulsory pilotage. His state license is both a certificate of competency and a franchise as a public service requiring him to assume public obligations in maintaining pilot stations and operating a pilotage system. The rights, duties, and obligations of all parties, including the owner, and the relationship between master and pilot are created by law and not by mutual agreement between the parties. Common law principles governing the usual employment contract have no application.

The general scheme in effect throughout most of the world is one in which a vessel approaching the coast with

the intent of making port has a compulsory obligation to accept a local pilot. The pilot is skilled in navigating those waters and knowledgeable about local hazards. He is placed in charge of the navigation of the ship and the ship owners pay the fee for his services. This is prescribed by local law.[11] The purpose is to protect the safety of shipping by assuring that a complement of pilots will be available when needed at designated locations (pilot stations) and by placing navigational control of the ship in the hands of a qualified local expert when the ship is in a high risk area.[12]

As part of their franchise as a public service, it is compulsory for the pilots to maintain pilot boats at established stations known to all mariners, to keep a complement of qualified pilots available to render services at all times, to go to any ship needing pilotage services without discrimination or choice, and to provide these services under legally established terms and conditions. The pilotage fee is prescribed by law and published in a tariff.

In order to comply with his obligations under a compulsory pilotage statute, the individual pilot has to devote a considerable part of his early years to education and training to develop professional expertise.[13] He has to invest his capital in his share of pilot station vessels, launches, offices, shore stations, communications equipment, automobiles, and all the other equipment and facilities needed to maintain and operate an essential service to shipping within his pilotage district. He has to be responsible for and employ on his pilot station vessels a considerable work force of masters, watch officers, engineers, launch operators, seamen and stewards, as well as an office staff of dispatchers, drivers, and administrative personnel. He undertakes these obligations on speculation as to the future needs of shipping at the port he serves and with no guarantees or contractual obligations from the shipping industry to protect his investment or future income.

Compulsory pilotage is the creation of statute, not of contract. It is regulated in much the same manner as a public service company and charged with the public responsibility of rendering pilotage services to vessels. The pilot is in no sense the employee or servant of the shipowner or the vessel he pilots. The shipowner is not personally liable for the acts or negligence of the public pilot,[14] although the ship is liable <u>in rem</u> under American law. He is required to be accepted by the vessel and placed in charge of her navigation to serve the state's interest in protecting life and property--and in today's world, the environment--from the hazards of navigation.[15] He sees his duty and obligation as being owed to local political

authority and the public, rather than to the shipowner. The public nature and regulation of the terms and condition of his service protect and insulate him from the demands and pressures that can be placed on an ordinary employee to compromise the margins of safety.

In contrast, the federally licensed pilot serves in a private capacity as a common law employee of the shipowner. The shipowner has the right of selection and the right to exercise control over his employees in the performance of their duties.[16] The terms and conditions of employment are privately negotiated with the shipowner. Prospects for future employment are dependent upon how well the employee satisfies the demands placed upon him by his employer. The master and the federally licensed pilot work for, and are answerable to, the same employer. Both are licensed by the same federal agency, the Coast Guard. In some cases the master and pilot may, in fact, be the same person serving in a dual capacity. This lack of independence and the absence of checks and balances should give the public cause for concern when they consider that the sea-going, coastwise tankers are exempt from the protection of state compulsory pilotage laws. The majority of them are navigated on our inland waters by company employee pilots or masters serving in the dual capacity of pilot.

The 1971 collision of the ARIZONA STANDARD and the OREGON STANDARD under the Golden Gate Bridge in San Francisco is a good example of the consequences of exempting coastwise tankers from state compulsory pilotage laws. Both tankers were under the sole control of masters attempting to perform a dual role as pilot on the basis of a Coast Guard endorsement. They were under pressure to move their ships despite the restricted visibility and limited experience they possessed. The resulting oil pollution and national publicity was one of the driving forces behind the Coast Guard's move to establish Vessel Traffic Systems.

Instead of a massive effort to install expensive and sophisticated electronic systems of doubtful effectiveness, it would have been wiser to ensure the competency of personnel handling ships by increasing the amount of experience and recency of service requirements for licensing. If the vessel is very large or carrying oil or hazardous cargoes which present a potential threat to the environment or the public, her movement should be under compulsory pilotage so as to insulate the pilot from commercial pressures. As a response to the threat of oil pollution in their waters, the legislatures of California and Washington attempted to pass legislation placing large oil tankers in coastwise trade under state compulsory pilotage laws, but both attempts failed because of pre-emption of the field by the Congressional Act of 1871, which places exclusive regulation in the Coast Guard.

I have spent a fair amount of time discussing the contrasting roles of the federal and state licensed pilots, and I am afraid this may create the erroneous impression that federally licensed pilots are a major factor in the piloting of large ocean-going ships. They are not. Their employment is limited to a very small number of sea-going ships engaged in the coastwise trade. To put the situation in numerical perspective there are about 1200 compulsory pilots nationwide and there are probably less than 50 federally licensed employee pilots working regularly. These are primarily employed on coastwise tankers of the major oil companies. The vast majority, probably well over 95 percent, of ocean-going ships moving on the inland waterways are under the control of state licensed public pilots operating in a compulsory pilotage system.

Independent decision-making is a concomitant of compulsory pilotage. I believe that this point is not widely known or appreciated. The independence of the compulsory pilot effectively insulates him from potential commercial pressures which could endanger the ship or other property. In other words, navigational control in high risk areas should be placed in the charge of a compulsory public pilot who does not "belong to the ship," i.e., the pilot is free of the shipowner's interest and control.

Although compulsory pilots hold licenses issued by the state, they also hold federal pilot licenses, since this is generally one of the first steps in beginning a career as a professional pilot. I have experience in serving as both a "voluntary" private employee pilot and a "compulsory" public pilot. Therefore, keeping the foregoing in mind, I would like to express my views on some aspects of piloting.

The Compulsory Pilot and Master Relationship

The personal relationship between the master and the pilot is invariably a friendly one, based on mutual respect and a common heritage as professional seamen regardless of nationality. They both have the same goal, a safe and expeditious transit of the ship over the pilotage route. Their interests seldom conflict and I doubt if either gives much thought to the finer points of their legal relationship.[17]

Because shipping is international in character, the relationship between master and pilot has to be uniform and standardized regardless of the flag the ship flies or the differences in nationality between the pilot, the master, and the crew. The relationship is not a topic for discussion between them; it is known and understood from long experience and cannot vary from ship to ship or place to place at the whim of the pilot, the master, or shipping

management.[18] To permit any variation would cause great confusion in the roles and functions and the rights and obligations of each.

The law governing this relationship reflects general shipboard practice and can be found in the works of legal text writers and the court decisions that define the duties and obligations of masters and pilots in restricted waters. Centuries of maritime history and tradition have developed the basic principles.[20]

The first and most important legal principle is that the compulsory pilot is not an employee, servant, or agent of the shipowner, the ship, or its master. He is placed aboard by the state with the conditions of his service fixed by law. The shipowner or master has no right of selection or control over him. The compulsory pilotage statute insulates him from the commercial interests of the shipowner and protects him from coercion. His fee is set by law and he can receive no increase in fee for accepting greater risks, nor can he be penalized with a lesser fee for taking precautions in conflict with the owner's interests. His future employment does not depend upon satisfying the demands of the shipowner to maintain a schedule or move the vessel with unacceptable margins of safety. He is free to exercise independent professional judgement as to the acceptability of the risks. The public nature of his role leads him to place a higher priority on the protection of life, property, and the environment than the master who has to consider all decisions in light of the owner's commercial interest. The compulsory pilot's autonomy and independence are, I believe, the single most important safeguard that exists in the shipping world.

Unfortunately, most of the management people we deal with on a day to day basis generally do not have a background that includes shipboard experience. They don't fully understand the pressures and responsibilities placed on the master and how the master/pilot relationship functions as a buffer against shoreside management pressure. The usual shore personnel we encounter have a strong background in traffic, terminal operations, stevedoring, freight solicitation, or other related job categories that place a heavy emphasis on cost-effectiveness, competitive advantage, and maintenance of schedule. These emphases unfortunately impact on the master, and he may rightly believe that his future employment may depend upon how well he handles the conflicting demands of ship safety and the shipowner's commercial interest. In a recent survey of ship masters, 40 percent indicated that maintaining a schedule was the prime criterion in judging their job performance, and 50 percent indicated that there was strong pressure to meet schedules even under poor conditions.[21] It is not unusual to find an apprehensive master, faced with a risk he

sees as unacceptable, seeking shelter from the owner's displeasure by indicating diplomatically that it would be appreciated if the pilot accepted the responsibility for a decision to delay transit. It is clear, considering the exposure to risk that large ocean-going ships are subjected to in confined pilotage waters, that the casualty rate would be far higher if it were not for the freedom of compulsory pilots to exercise their own best judgement without fear of management retalitation.

A second legal principle is that pilots pay a price for the independence and insulation from shipowner control that they derive from compulsory pilotage statutes.

If the control over navigation is taken away from the shipowner and the master and placed in the hands of the compulsory pilot under operation of law, with no right of selection and control, the shipowner and master are released from personal liability for the acts of the pilot, since he is not their employee or servant.[22] The pilot stands alone, and a leading text on Admiralty law states it rather succinctly:

> "He so far is in charge of the ship that his errors expose him to appalling consequences. . . . If he injures the vessel which employs him he is liable for the damages. If through her he injures other property, he is liable for that as well; and if the vessel employing him is by his act exposed to liability to the other vessel, he is liable over to her." Robinson on Admiralty, p. 697

The potential personal exposure to liability that the pilot has when he assumes responsibility for a multi-million dollar ship is, for all practical purposes, uninsurable since the premiums would approach, or may even exceed, the pilotage charges. Any attempt to have the cost of insurance included in the pilotage tariff would be met with strong shipowner opposition because the owner's basic insurance already covers the owner for the acts of the pilot. Thus, if the pilotage charges also include the cost of liability insurance, the owner would in effect be required to pay for the same coverage twice. If he attempted to negotiate an exculpatory contract or indemnification agreement with the shipowner, as is common with voluntary pilots acting as docking masters, the effort would probably fail, since his relationship with the shipowner is not a contractual one subject to negotiated terms.[23] The result is that the compulsory pilot steps on the bridge of a ship and takes charge with a horrendous, uninsured personal liability hanging over his head. Management frequently belittles that risk by claiming the owner's recourse against the pilot is financially unreal, as the pilot does not have the resources

to pay for the damages he could incur. That makes little difference to the pilot; he is liable for all he owns and faces the possibility of bankruptcy if harm comes to the ship through his error. The fact that pilots are not sued more frequently and placed in bankruptcy is an act of compassion on the part of Admiralty lawyers and insurance companies.

This potential liability has always colored the pilot's attitude. He will not share responsibility or become involved in navigation by committee. He will demand effective and absolute control over the ship. If there is any intentional or substantial interference by the master with his control, he will probably consider himself displaced and leave the bridge so there will be no question of who was in charge when the casualty occurs. It should be remembered that the relationship of the pilot to the ship is that of a stranger and in the event of a casualty it may be difficult for the pilot to prove the actual circumstances, be they intentional interference, delay in carrying out orders, or error on the part of the ship's personnel. The compulsory pilot has far more at risk than action against his license and a suspension when he takes charge of a ship.

The third legal principle is that the pilot does not serve in an advisory capacity.

The "Report of the Royal Commission on Pilotage"[24] contains a detailed analysis of the British and Canadian statutory definition of the term:

> "'pilot means any person not belonging to a ship who has the conduct thereof."

The Royal Commission decided that to conduct means:

> "to have charge and control of navigation; in other words, of the movement of the vessel. . . Similarly, if anyone is merely used as an advisor and not entrusted with the navigation of the ship, he is not the pilot of that ship."[25]

The Royal Commission, after reviewing the actual practices followed aboard ship concluded:

> "The pilot does not act as an advisor to the Master but actually navigates the ship. In point of fact the Master is then, to a certain extent, an advisor to the pilot when he points out the peculiarities of the ship. ....This factual situation which corresponds to the legal definition of 'pilot' is, in fact, the only realistic solution because, if

pilots were used merely as advisors, navigation would be very hazardous and, at times, it would be impossible to proceed safely. . . . The first course a ship is committed to is frequently the last. If bad judgement has been used, the result is inevitable and swift. . . . . The legislation of most countries recognizes the realistic situation that there is not time for advice, consultation and deliberation between the pilot and Master and that the pilot must navigate the vessel himself. How this situation is covered in legislation is a question of semantics,. . ."[26]

The authoritative legal text "Corpus Juris Secundum" states the law as derived from the American Court decisions to be:

"Generally, while exercising his functions, a pilot is in sole control of the navigation of the ship and his orders must be obeyed as in effect orders of the master. While a pilot who is in charge of a vessel supersedes the master in so far as the navigation of the vessel is concerned, the master does not surrender his vessel to the pilot and the pilot is not the master; the master is still in command of the vessel, notwithstanding the presence of a pilot. There are occasions when the master may and should interfere and even displace the pilot. Thus, the master may properly displace an obviously incompetent or intoxicated pilot, and the circumstances may be such as to require the master to displace a compulsory pilot because of imcompetency or physical incapacity. If, however, the master does not observe that a compulsory pilot is incompetent or physically incapacitated, the master is justified in relying on the pilot, but not blindly. In orfer to be justified in displacing a pilot, the master should be sure that the pilot is for some reason incompetent, and the master or other officer is not bound to interfere with, or to displace, the pilot, if the pilot is not making an obvious mistake, or danger from his acts is not imminent. The view has been expressed that, even where the master deems a compulsory pilot incompetent, the master is not under an absolute duty to displace the pilot."[27]

The American court decisions have dealt in broad terms with the relationship between the master and the pilot, and the right or duty of the master to displace a pilot.[28] But, they have not explored the finer points of the division of control between the master and the pilot to the same extent as the British courts. Prior to 1913, British law held both the owner and the ship free of all liability for acts of

compulsory pilots. Considerable litigation arose revolving around the role and duties of a pilot and whether an action causing damage was properly within the duty of the master or the pilot. Since limitation was only granted on the basis of sole fault of the pilot, the cases generally attempted to include the master's lack of vigilance as contributing to the accident in order to avoid the injured party being forced to look for relief only from the pilot. For a discussion of the problem see THE CHINA, 7 Wall. (U.S. 67, 1868). Due to the international nature of maritime law and pilotage, and in the absence of American cases holding to the contrary, the British decisions are applicable to the division of control between the master and the pilot on ships engaged in foreign trade in United States waters; in other words, the compulsory pilot situation.

G. K. Geen, the author of "The Law of Pilotage," includes in his excellent work a review of the British case law on the division of control between the master and pilot.[29] He has concluded:

> "The attitude of the courts to the master-pilot relationship is based on precedents created more than a century ago, the guiding principle of which has been throughout that the paramount danger to a ship under pilotage is that created by a 'divided authority.' Attention was drawn to this danger on innumerable occasions, but was perhaps put most succinctly by Dr. Lushington in the case of THE PEERLESS in 1860:
>
> > 'There may be occasions on which the master of a ship is justified in interfering with the pilot in charge but they are very rare. If we encourage such interfering, we should have a double authority on board, a divisum imperium, the parent of all confusion, from which many accidents and much mischief would probably ensue. If the pilot is intoxicated, or is steering a course to the certain destruction of the vessel, the master no doubt may interfere and ought to interfere, but it is only in urgent cases.'

G. K. Geen then goes on to analyze and cite British cases pertaining to the general duties of the master and pilot regarding the legal meaning of interference, keeping a lookout, observance of collision regulations, sound signals, private sound signals, whether to proceed, anchoring, speed, and the use of radar.[30]

From his analysis, it is apparent that the British and American law respecting the role and function of a compulsory pilot are consistent. He is to be placed in navigational control of the ship and give all orders

effecting the navigation of the ship, i.e., rudder orders, courses, speed, anchoring, weighing anchor, whistle signals, and the like. He is entitled to the cooperation of the master and crew, and they are to see that his orders are carried out and are not to interfere with his control of the navigation unless the pilot is manifestly incapacitated, incompetent, or placing the ship in clear and imminent danger.

In the 'voluntary' pilot situation where the pilot's status is one of an employee the law states that the vessel shall "be under the control and direction of pilots" licensed by the Coast Guard. (The Act of 1871, now found in 46 USC 364). On the surface, it would appear he has nearly the same role to play in navigating the ship as a compulsory pilot, but his employee status and relationship with the master interfere with his effective control. After all, the employee pilot thinks, he and the master are employed by the same shipowner and answerable to the same licensing authority, the Coast Guard. Rightly or wrongly, he feels the master is a fellow employee in a supervisory capacity with the right to interfere with or control his actions and the right to overrule his decisions. The employee pilot has to accept interference and control cheerfully or risk loss of employment or being banned by that company's ships in the future. There is a tendency to be reluctantly seduced or coerced into situations that would not be tolerated on ships under compulsory pilotage--where the pilot's responsibilities are clear and his independent role is protected.

The Compulsory Pilot/Management Relationship

On a policy-making level, our contacts are limited to national trade associations representing companies that own and operate ships and local trade associations that purportedly represent the shipowner's interests. In actual fact, the local trade associations represent local port business interests, i.e., stevedoring, terminal operations, warehousing, freight forwarding, ship agencies, etc.

It appears to us that the trade associations see their role as limited to an adversary one. They are primarily interested in fostering legislation or governmental regulatory policies that favor their shipowner members and enhancing the competitive advantage of the business members of their local associations. The unfortunate result is that much of the dialogue between representatives of industry and pilots occurrs over the issues of control over, or cost of, pilotage services, and in an antagonistic climate. The lack of a forum for discussing mutual problems and concerns on a co-operative basis leads to many misunderstandings. The

differing perceptions of the role and function of a pilot further compounds the problem.

The pilot sees his role as one of serving a mixture of both private and public interests. He basically serves private industry needs by expediting the movement of the ship to make schedules, avoiding lost shoreside labor commitments, carrying the optimum cargo capacity through the available channel depths, and protecting the safety of the ship. His role in maintaining a compulsory pilotage system as a public service with public responsibilities has already been discussed.

Not unnaturally, industry representatives place greater emphasis on the private role of the pilot in discussions and tend to perceive the pilot as a quasi-employee of the ship serving a private interest objective. This view leads to a developing trend to speak of the pilot as "a servant of the ship" who functions as "an advisor to the master," and "utilizing" the pilot in a "team effort" in the navigation of the ship. Such terminology re-enforces the perception of the pilot as serving private needs at the expense of his public responsibilities. The terms convey an impression of the pilot's role and function that is not found in maritime law or in actual shipboard practice.

Our concern over attempts to depict the pilot as an "advisor" to the master is twofold. The first and obvious concern is that any attempt to discount our real responsibilities will diminish our standing in the maritime community and weaken our claim to adequate remuneration for our training and responsibilities. Second, and of more importance to the public, if the pilot's role can be downgraded to an "advisor" to the team, what happens to his right and duty to refuse to move a ship when the circumstances are unsafe due to inadequate keel clearance, reduced visibility, deficient equipment or crew, or any other reasons?

It should be borne in mind that about 80 percent of the ocean-going ships transiting our inland waters are foreign flag with masters and officers licensed by foreign nations.[31] The control over their conduct and license lies abroad in the governments of Liberia, Panama, Singapore, Korea, Russia, Poland, Turkey, Cyprus, and other "traditional" maritime nations. The only American presence aboard with a sense of obligation and responsibility to the local community and its political institutions is the pilot. When a vessel is under pilotage, it may be appropriate for the master to represent the shipowner's commercial interests and give them high priority. Efforts by shipping management to claim the pilot's primary loyalty as well should be resisted as inconsistent with his public role. Compulsory pilotage should provide a system of checks and balances

between the pilot and the master, between public and private responsibilities, and between local and foreign allegiances. These distinctions should not be blurred by fuzzy language in discussions of the pilot's role and function.

Another potential problem in pilotage and pilot/management relations arises from past efforts of management to bring state pilot licensing under federal, i.e., Coast Guard, control. Our concern here is that the present Coast Guard licensing system is one of "voluntary" pilotage with the pilot in an employee relationship to the shipowner. Federal legislation to bring pilots aboard ships engaged in foreign trade under the same Coast Guard licensing procedures as "voluntary" pilots on coastwise ships could pre-empt the right of states to license and regulate pilots in a compulsory pilotage system. It could result in pilots on all vessels being reduced to the category of employee "voluntary" pilots. Remember, the voluntary pilot is subject to selection and negotiates the terms and conditions of employment. Loyalty to the employer is a component of negotiation, i.e., a higher priority on the owner's economic interests is a factor. Under such a system, the United States would then become the only major maritime nation without a true compulsory pilotage system. The selection, control, terms, and conditions governing pilotage would shift from the state to the shipowner.

Our investment in pilot stations, our livelihoods, our pensions, our standards of training and professionalism, and the orderly administration of a pilotage system depend upon stability in state regulation. Therefore we are disturbed by past efforts of management to upset that stability.

There is a need for constructive dialogue with shipping management, and it should begin with a discussion of the basic issue of the role and function of the pilot and his traditional status in the maritime community.

Licensing, Training and Qualifications of Pilots

There are three basic routes for becoming a compulsory state licensed pilot:

1.) Only an apprenticeship, in which the candidate serves his entire time on pilot station vessels and as an apprentice pilot on ships transiting the pilotage district. The apprentice receives instruction in basic nautical skills and piloting under senior pilots. This is generally a process requiring 5 to 10 years of increasing responsibility before reaching senior pilot status.

2.) Service as a master or employee pilot on inland vessels, such as tugs or river craft, followed by selection

and training as a pilot on ocean-going ships for a period of time.

3.) Service as a master or deck officer on ocean-going ships, followed by selection and training as a pilot for a period of time.

Each geographical area seems to have a preference toward one or the other methods of selection and training. Some areas combine methods. The preference is the result of opinion about the best way to learn the peculiarities of the local area. It is also probably colored somewhat by the background of the pilots in the area who believe that the best future pilots are those cast in their own image.

My state association requires a college degree, preferably a maritime academy education, followed by service at sea as an officer, plus a four to six year apprenticeship. The length of the apprenticeship depends on license and experience on entry. Our selection process includes an eye exam, with standards for uncorrected vision higher than the Coast Guard permits with the aid of glasses, and an extensive physical exam, with an abnormality of any nature or tendency to obesity being a cause for automatic rejection. Selection includes an interview by a committee of 15 senior pilots with emphasis on self-control under pressure, motivation, and quality of past experience and performance. Selection is generally based on a combination of age and license held and only those who have raised the level of their license and sought advancement as quickly as possible are considered. Our goal is to recruit the hard driving, aggressive, ambitious young officer who is already on the fast track of advancement in the industry. About one out of every 20 candidates interviewed is accepted.

Each method of training has one thing in common, heavy emphasis on hands on experience under the guidance and observation of a senior pilot on all types of vessels under a wide variety of conditions and taking incremental steps in size of vessel and responsibilities. Federal pilot licensing by the Coast Guard is accomplished either before entering training or in the early stages of training and is not given much weight as an indication of competency. We require far more observation, training, and experience than possession of a Coast Guard license requires before we consider an individual pilot qualified to serve without restrictions.

Actual training and licensing consists of intensive exposure to the pilotage environment. The apprentice is scheduled for about 100 hours a week on duty with approximately 50 hours a week on the bridges of ships. The routine is purposely exhausting to serve both as a training method and a test of motivation and commitment. After a

very short indoctrination, the apprentice is expected to actually do the piloting with a senior pilot guiding, instructing, and observing how the apprentice handles various situations. The senior pilot takes over if the apprentice seems to be headed for trouble. The senior pilots compare opinions on the performance of the apprentice, and their collective opinion determines if the apprentice is continued in the training program and eventually licensed. If his performance is unacceptable, he can be dropped at the sole discretion of the officers of the association without the need to show cause or offer explanation. If he is licensed, it is on the basis of his having actually performed satisfactorily as a pilot under a wide variety of conditions for a number of years under senior pilot observation.

In marked contrast are the Coast Guard federal licensing requirements. Licensing is based on a written examination that the candidate is qualified to "sit for" after a relatively limited number of trips over the route as an observer without provision for "hands on" experience and evaluation by a qualified pilot.

I believe the differing approaches to selection, training, and licensing lead to differing views between the state authorities and the Coast Guard on the issues of pilot discipline and accountability. It appears to us that the Coast Guard approach is to issue a federal pilot license on the basis of very scanty experience and training; however, the Coast Guard formulated policy with the knowledge that the license holder can only work under his federal license in an employee category. The Federal Government expects or hopes that the employer will act responsibly to determine the actual competency of the newly employed pilot. In the event an employee pilot proves that he is actually incompetent, by causing a casualty, the Coast Guard attempts to spur him to greater effort or to remove him from the system by suspension or revocation proceedings against his license. In such a system, it seems to us the effort to screen out incompetent personnel occurs after the fact. Extensive evaluation should occur prior to certification as a pilot through more stringent standards for experience and training.

In our state system, licensing is based on observable and proven competency under actual conditions. Every pilot licensed by the State of Maryland has proven without question that he is a competent professional pilot. If a casualty occurs, it is the result of "competent error" by a well trained and qualified expert who for some reason could not cope with an extraordinary situation. "Incompetent error," caused by a lack of training, skills, or experience, rarely occurs. Under our system, state pilotage authorities are slow to penalize competent error. Most cases involve

professional judgement and there is a proper reluctance to substitute the local authority's judgement for the judgement of a competent professional who was on the scene and performing under unknowable pressures.

Of course, if a casualty occurs because of willful misconduct or inattention to duty, penalties will follow. But if a casualty results in spite of the pilot's conscientious best efforts, penalties will probably not be imposed. Adding a minor additional burden in the form of a suspension will have little effect on the attitude of a pilot already burdened with the fear of financial liability and possible bankruptcy, and looking forward with dread to years of litigation on the issue of fault in the courts. Months will be devoted to analyzing the actions he was forced to take over a period of a few minutes or seconds.

Competent pilots can, and do, occasionally become incompetent pilots due to physical deterioration or infirmities, alcoholism, or other causes. In such cases they are, quite frankly, coerced into accepting a disability or retirement pension, hopefully before rather than after a casualty, and their removal from the system should be considered a legitimate cost of a safe and efficient pilotage system.

As with most professional groups, we have an aversion to public executions, and we are ever mindful that actions finding minor fault against a pilot that result in minor penalties can prejudice lawsuits between shipowners and companies involving many millions. For these reasons, compiling a public record of disciplinary actions taken against pilots is not high on our list of priorities, and the public record is deceptive because more pilots have been removed from the system than the record would indicate. Thus, the Coast Guard is not impressed with the statistics on actions taken against pilots by state authorities.

While state standards generally are far higher than the federal pilot standards administered by the Coast Guard, the Coast Guard standards are nevertheless important because they constitute a minimum standard for state licensing and the only standard for federal licensed "voluntary" pilots on coastwise ships.

If the pilot's license is to be taken at face value as qualifying the holder as a professional pilot, then the present Coast Guard standards for obtaining and maintaining the license are far too low in terms of required experience and recency of service. The problem stems from the Coast Guard being required to license pilots under one uniform national regulation on vastly different vessels and waterways. This includes Great Lakes vessels; the vessels employed in the vast inland river transportation system;

tugs and inland vessels navigating bays, sounds, and harbors of the country; masters and officers acting in a collateral role as pilots of their own coastwise ships; and pilots boarding ocean-going vessels solely to perform pilotage services. The standards applicable for permitting a member of the vessel's permanent complement to navigate his own vessel, where he has an intimate knowledge of the characteristics of the vessel and her crew, are not the standards that should be applied to the professional pilot who boards as a stranger and has to be qualified to take charge of any vessel under any conditions.

Unfortunately, the Coast Guard's licensing procedures don't recognize this distinction, and licensing requirements are set low enough and broad enough to encompass all categories under the same regulation. Because of this "least common denominator" principle, possession of a Coast Guard pilot license endorsement really says very little about the holder's experience or training.

RECOMMENDATIONS

Coast Guard Licensing Standards

Consideration should be given to adopting the British and Canadian practice of distinguishing between a master or other officers employed aboard a ship with collateral duties as pilot of that ship, and the professional pilot who boards solely to provide pilotage services over a specific route. This could be accomplished by retaining the term "first class pilot" for the former and designating the latter as "senior pilot". The present Coast Guard written examination for issuance of a pilot license is adequate, but the standards of experience and recency of service requirements should be substantially increased.

In order to qualify and sit for a license as senior pilot the applicant should have instruction and experience obtained by actually acting as pilot under the supervision of a qualified pilot. The number of hours of such instruction and experience should depend upon the license the applicant holds. I would suggest the following schedule is not unreasonable:

Master/Chief officer	1,000 hours
Second Officer	1,500 hours
Third Officer	2,000 hours
Unlicensed	3,000 hours

The experience should include at least 50 round trips over each route for which licensing is sought, with at least 25 percent of the trips occurring during the hours of darkness.

Initial licensing should be limited to vessels of restricted length overall (L.O.A.), perhaps 600-650 feet L.O.A. Upon successfully completing at least 1000 hours as pilot of vessels restricted to that length, the size limitation should be increased to vessels of possibly 750-800 feet L.O.A. After successful completion of an additional 2000 hours as pilot of vessels limited to this category, an unlimited license should be issued.

These standards are below the established practice in my state, but I do not believe them to be too high for a professional pilot. Of course, local conditions, particularly in ports with low traffic volume, may render these standards unobtainable or unnecessary. But, they should be considered as the general goal for licensing of professional pilots at major ports with high traffic density.

Vessel length should be the basis for limitation of licenses, rather than gross tonnage, as length is an immutable indicator of the actual physical size of the ship. Gross tonnage is a measure of the internal volume of the ship, and astute naval architects can vary the gross tonnage of vessels of identical dimensions with uncanny ability.

2. Coast Guard-Recency of Service Requirement

In order to maintain the validity of any class of pilot license, the holder should have recent experience over the pilotage route. If the pilot has not made a trip over the route within the past year, he should be required to qualify by making at least one trip over the route as an observer before being permitted to act as pilot in charge of the navigation of a ship. The provision could be self-regulated with substantial fines imposed if violations come to light either after a casualty or through spot checks. Of course, this too should be a general goal and might only be obtainable at ports with a reasonable volume of traffic.

3. Permitting State Action on Oil or Hazardous Cargo

The law placing exclusive jurisdiction in the Coast Guard for the licensing of pilots on sea-going coastwise ships (46 USC, sect. 364) should be amended to permit states to have concurrent jurisdiction over the licensing of pilots for this category of ship if they are carrying oil or hazardous cargoes that threaten the environment. This would permit the states to protect themselves against the possible

coercion of company employee federal pilots by placing these ships under the protection of state regulated compulsory pilotage.

4. Periodic Training

The industry and pilots should arrange for periodic re-training, not in shiphandling skills that pilots practice daily, but in understanding the role and function of a pilot, environmental awareness, the impact of new regulations, pilotage law, new developments in equipment, etc. This concept requires that management agree to the additional pilotage charges that would be needed to support a training facility and provide for the additional pilot personnel required to allow for training time.

5. Master/Pilot Relationship

The master/pilot relationship on the bridge of a ship underway in pilotage waters is rarely, if ever, the subject of discussion or dispute between the master and the pilot. It seems to arise only in discussions with management ashore.

On the bridge, the master and the pilot each feel responsible for the safety of the ship. There is undoubtedly some element of ambiguity in their feelings about who will be held responsible if a casualty occurs. I wonder if the interests of safety are not best served by leaving it that way? There is sufficient grief for both if a casualty occurs, and I question if it is in the public interest to define their respective duties so precisely as to relieve either from the necessity of eternal vigilance.

It may be in the public interest to enhance safety by spelling out in law or regulation that neither has the sole authority to order the vessel to undertake a passage or continue a passage without the concurrence of the other. As a practical matter, this is what normally occurs. But with the industry attempting to redefine the role of the pilot as advisory, it might be wise to assure that checks and balances remain in place. If conditions are unacceptable and the margin of safety is questionable, both the master and the pilot should have the right to veto the decision of the other to attempt or continue a passage, and a passage should only be attempted when both have agreed that it is safe and reasonable to do so.

We should avoid discussions or rhetoric from management about ultimate responsibility or authority. Each is ultimately responsible for his own actions to different authorities and with differing consequences. What we should

be concerned with is concurrent responsibility and concurrent opinions as to the acceptability of contemplated actions.

6. National Accreditation Board

If it is felt that an effort should be made to improve the standards of pilotage service on ocean-going vessels entering the inland waters of the United States, consideration should be given to the establishment of an advisory, private sector National Accreditation Board, possibly with representatives from management, pilots, insurance companies, admiralty attorneys, environmentalists, and the Coast Guard.

The Board would be responsible for periodic review of the standards for accreditation of pilots in any locality on the basis of local conditions. This recommendation recognizes that it is difficult to apply a uniform standard nationwide, but it allows for the highest practical standards for any locality. Of course, standards can be raised periodically, perhaps on a phased-in or scheduled basis.

Board recommendations could include:

1.) Selection and qualifications for entry of pilot apprentices into training:

2.) Training standards and minimum experience for initial license;

3.) Appropriate limitations on the initial license and provision for appropriate incremental changes in the limits imposed until unlimited status is attained.

4.) Recency of service requirements and provisions for re-qualification after an absence from active piloting.

5.) Provision for periodic training courses to expose pilots to new developments in regulations, laws, and equipment.

Suspension or revocation of accreditation for an individual pilot might follow a casualty in which it can be shown he was incompetent or negligent. The Board might utilize a hearing examiner to determine the facts. In addition, the results of the Coast Guard investigation would be made a part of the record. On the basis of all the evidence, including the opinions of other pilots on the standard of care required under the circumstances, the hearing examiner could submit a recommendation to the Board. If the Board suspends or revokes the accreditation of an

individual pilot but the state regulatory agency or pilot association permits him to act as pilot during the period of suspension, the association could lose its accreditation with appropriate sanctions being imposed. While the Board's actions would not carry the force of law, I believe their recommendations would be of great persuasive authority. The role of the American Bar Association and the American Medical Association in setting standards and self-regulating their professions could serve as examples.

Individual state regulatory agencies could make Board accreditation a prerequisite for acting as pilot on a state license; states would, in effect be adopting the actions of the National Board as their own actions.

While the Coast Guard would be a proper participant in a National Accreditation Board, along with other interests that offer professional expertise, under no circumstances should the Coast Guard be permitted to have sole licensing authority and the power to determine fault after a casualty. There is a serious conflict of interest between that of licensing authority and the various other roles the Coast Guard performs.

The Coast Guard is responsible for aids to navigation that, unfortunately, are sometimes improperly or negligently maintained and may lead to a vessel casualty. The pilot may then be in the unhappy position of having the Coast Guard proceeding against his license on the basis that it was the pilot's sole fault and not the fault of the Coast Guard. The Coast Guard has a strong financial interest in succeeding against the pilot, for if it fails, the Coast Guard could be held liable for damages due to the defective aid to navigation. (see UNIVERSE TANKSHIPS v. U.S., 336 F. Supp. 282 (1972))

The Coast Guard is operating vessels that have collisions with vessels under the control of compulsory pilots. Recent examples are the USCG WHITE ALDER and S.S. HELENA collision in the Mississippi River on 7 December, 1968, with the loss of 17 lives, and the collision between the USCG CUYAHOGA and M.V. SANTA CRUZ in the Chesapeake Bay on 20 October, 1978, with the loss of 11 lives. There appears to be a conflict of interest when the Coast Guard sits in judgement on the causes of collisions to which they are a party. The Coast Guard has the right to determine negligence in such cases and may be tempted to show fault on the part of the pilot. It give us great concern that this could effect the outcome of substantial lawsuits, including negligence cases against the Coast Guard.

The Coast Guard is operating Vessel Traffic Systems in which they can order vessels to comply with their instructions or issue advice that a pilot can only ignore at

his peril. Into the traditional master/pilot relationship a new element has been introduced. The decision making process on the bridge now has to include the unseen, but vocal, disembodied presence of the Coast Guard, represented by a junior officer or enlisted rating, who may have little experience, but who nevertheless is an active participant by virtue of a radio link to the ship. He possesses the legal authority of the Coast Guard to command compliance with his instructions. When casualties occur in which the Coast Guard VTS personnel may be at fault, the Coast Guard will have a strong self interest in placing the blame elsewhere, probably on the pilot, to avoid the consequences and lawsuits resulting from their own possible negligence.

7. Operational Procedures

Operational procedures should not be discussed under the subject of training and qualifications of pilots, as found in the U.S. proposal to IMCO. Training and qualifications relate to the capability of the pilot as an individual, while operational procedures refer to interaction with ship's personnel. Experience has shown us that the interests of safety are best served by cooperation betwen the pilot and the master and bridge personnel, but the pilot should rely on them as little as possible. If circumstances permit, he should assure himself that every order he gives is satisfactorily followed. He should check every course, every rudder order, and every engine order on the telegraph and the response of the engines on the tachometer. If the master or bridge personnel wish to maintain a track line, independently determine the ship's position, check all orders given, etc., the pilot will welcome the monitoring and support effort as a back-up to his efforts and as a check against error. But this should not be considered as, or described as, "team effort" navigation. The pilot will not find this type of operational procedure in effect on most ships. He has no right to insist upon it and should not be held accountable for the failure of the ship's personnel to follow the mandate of either the British or U.S. regulations requiring it. If he does find it, and depends upon it, it loses its purpose as an independent check. Any requirement placing such duties on ship's personnel should not properly be included in discussions of training and qualifications of pilots as it implies that the pilot might be justified in relying on ship's personnel or might be held responsible for the inactions of ship personnel. Both conclusions are clearly erroneous.

REFERENCE NOTES AND ANNOTATIONS

1.1 In a case where a shipowner stubbornly refused to acknowledge the effect of pilotage laws, a federal court judge was moved to comment:

"To be sure, state compulsory pilotage is not a body of law familiar to most legal practitioners, much less one at the forefront of public attention. Yet it is not a particularly difficulty body of law. Indeed, unlike the state of flux that characterizes many areas of contemporary law, pilotage law is remarkably straightforward and firmly established."

Jackson v. Marine Exploration Co. Inc., 583 F.2d 1350 (1978)

2.1 In a case discussing state pilotage laws the Supreme Court of Oregon stated:

"It appears from the report to Parliament that some form of control over pilotage had existed in England and other European countries since about the 14th century.

In the United States, Massachusetts adopted laws regulating pilotage as early as 1783. Some of the other states adopted regulatory laws shortly after Congress, in 1789, specifically provided that the states should exercise control over most of the forms of pilotage."

Powell v. State, 355 P.2d 227 (1960)

2.2 In a British decision the court stated:

"This doctrine of compulsory pilotage is an enacted doctrine no doubt. It was not enacted for the protection only of ships; it was enacted for the protection of ports; of commercial ports in particular because if a vessel is wrecked and lost and sunk near to the entrance, or within the entrance of a commercial port, she is not only lost herself, but she is a great danger and obstruction to the port and to

other vessels, and would interfere with the commercial business of the port."

The Charlton, 8 Asp. M.L.C. 29 at p. 29 (1895)

2.3 In a qenral discussion of the law of pilotage a leading legal encyclopedia states:

"The purpose of these laws is to insure at all times a due supply of men well qualifed by skill, knowledqe, and experience to protect vessels entering ports and harbors from the dangers of navigation, by holding out to such men sufficient inducements to prepare themselves for the discharge of their duties and to pursue a business attended with so much of peril and hardship."

70 Am Jur 2d, Shipping, Sec. 61.

3.1 "The profession or employment of pilot has existed from the earliest times, and laws have been enacted in every nation engaged in commerce regulating and protecting pilots. Such laws are to be classed under the head of maritime law, pilotage being a subordinate but highly useful branch thereof; and statutory provisions with relation thereto are entitled to a liberal construction in order to give full efficiency to laws especially designed to promote the interest of commerce, and to protect the lives and property of the citizens engaged in it."

70 Am Jur 2d, Shipping, Sec. 54.

4.1 An early Supreme Court decision commented:

"When the government of the Union was brought into existence it found a system for the regulations of its pilots in full force in every state."

Gibbons v. Ogden, 9 Wheat 207.

5.1 In one of the first Supreme Court decisions on the effect of the commerce clause of the Constitution it was found:

"The act of 1789 contains a clear and authoritative declaration by the first congress that the nature of this subject is such that until congress should find it necessary to exert its powers, it should be left to the legislation of the states; that it is local and not national; that it is likely to be the best provided for, not by one system or plan of regulations, but by as many as the legislative discretion of the several states should deem

applicable to the local peculiarities of the ports within their limits."

Cooley v. Board of Wardens, 12 HOW (US) 288, 13 L Ed. 996.

5.2 The Act of Aug. 7, 1789 is now contained in 46 USC Sec. 211:

"Until further provision is made by Congress, all pilots in the bays, inlets, rivers, harbors, and ports of the United States shall continue to be regulated in conformity with the existing laws of the States repsectively wherein such pilots may be, or with such laws as the States may respectively enact for the purpose."

6.1 The Federal Court for the Southern District of Florida stated:

"Since the organization of the state government no less than 25 acts have been passed upon this subject, and by a large majority of these local boards have been given full and complete powers to make rules and regulations, establish rates and change the same, as deemed best; and under them full power in regard to compensation has been claimed and exercised. In no case has the right to fix rates been held to be separate from the question of complusory pilotage, nor has either question been passed upon or treated separately."

The Chase, 14 F. 857 (1882)

7.1 The Act of Feb. 28, 1871 is now contained in 46 USC Sec. 364:

"...and every coastwise sea-going steam-vessel subject to the navigation laws of the United States, and to the rules and regulations aforesaid, not sailng under register, shall, when under way, except on the high seas, be under the control and direction of pilots licensed by the inspectors of steamboats (Commandant of the Coast Guard or Commissioner of Customs)."

8.1 In a case concerning a suit against a pilot for damages a shipowner had to pay due to the acts of the pilot it was said:

"A licensed pilot, enjoying the emoluments of compulsory pilotage, is quite in a different class from an ordinary employee. He assumes to have a skill and a knowledge in respect to navigation in the

particular waters over which his license extends superior to and more to be trusted than that of the master, and from the moment he begins his duty he take command and supersedes the master in respect to the navigation. His remuneration is fixed by law, and is proportionate to his responsibility, and his liability for neglect or want of skill must be in a similar proportion."

Guy v. Donald, 157 F. 530 (1907)

9.1 A leading legal encyclopedia states:

"In some jurisdictions, on a consideration of pertinent statutes, a pilot has been regarded as a public officer, that is to say, as a state officer, whose office is created by the legislature in the exercise of the police power for the general welfare. In other jurisdictions the view has been taken that a pilot is not a public officer. In any event the office of a pilot is so far public as to be subject to regulations.

The rights, privileges, and powers which are vested by law in a pilot are franchises."

70 C.J.S. Pilots, Sec. 1(b)

9.2 A basic textbook on admiralty explains:

"The liabiilties and rights as between the pilot and the vessel are determined by the sort of pilot the man is. The federally licensed pilot is ordinarily an employee of the coasting ship and the rights and liabilities between him and the owner are those applicable to a member of her ship's company.

The state pilot is usually paid on a fee basis and he has the owner's liability in personam, and also a lien on the ship, for his fees.

The local pilot is entitled to the fees which the state statutes give him. They may be considerable. The federal pilot is usually a salaried man."

Robinson on Admiralty, p. 694.

9.3 The U.S. Supreme Court in a landmark decision on pilotage regulation commented:

"Since 1805 Louisiana pilots have been State officers whose work has been controlled by the State.

Thus in Louisiana, as elsewhere, it seems to have been accepted at an early date that in pilotage, unlike other occupations, competition for appointment, for the opportunity to serve particular ships and for fees, adversely affect the public interest in pilotage."

Kotch v. Pilot Comm'rs., 330 US 560 (1947)

9.4 In dicussing the justification of compulsory pilotage the Royal Commission commented:

"From the service point of view, pilotage has been defined as the ultimate means to enhance safe and speedy transit of ships through confined waters. It is a public service in the full sense of the world when it is controlled, maintained or provided primarily to serve the superior interests of the State; it is a private service when its main purpose is to serve private needs, but safety remains the principal aim in both cases: in the former, "safety or navigation" through Canadian waterways; in the latter, "safety of the ship", including safety of privately owned port installations."

Canada, Report of Royal Commission on Pilotage, Part 1, p 473 (1968)

10.1 "The coastwise steamer pilot is ordinarily one of the ship's officers. He is not "compulsory" in the sense that the state pilot has been held to be in several cases where the statutes of the state pilot has been fought over. In these the owner seeks to establish that he was "compulsory" and insists that as he was "compulsory" there is no 'respondeat superior' and the ship owner is not personally liable. The courts have agreed with the conclusion once the "compulsory" character is found."

Robinson on Admiralty, p. 702.

11.1 "If the pilot charges seem heavy the pilot's responsibilities are great, and it must also be recalled that his job is often one of great hazard. Come wind come weather he boards incoming ships at sea and he leaves outgoing vessels outside the shelter of harbors. And he does both by small boats."

Robinson on Admiralty, p. 695.

12.1 In considering the status of pilots the U.S. Supreme Court stated:

"Studies of the long history of pilotage reveal that it is a unique institution and must be judged as such. In order to avoid invisible hazards vessels approaching and leaving ports must be conducted from and to open waters by persons intimately familiar with the local waters. The pilot's job generally requires that he go outside the harbor's entrance in a small boat to meet incoming ships, board them and direct their course from open water to the port. The same service is performed for vessels leaving the port. Pilots are thus indispensable cogs in the transportation system of every maritime economy. Their work prevents traffic congestion and accidents which would impair navigation in and to the ports. It affect the safety of lives and cargo, the cost and time expended in port calls, and, in some measure, the competitive attractiveness of particular ports. Thus, for the same reasons that governments of most maritime communities have subsidized, regulate, or have themselves operated docks and other harbor facilities and sought to improve the approaches to their ports, they have closely regulated and often operated their ports' pilotage systems.

The object of the entire pilotage law, as we have pointed out, is to secure for the State and others interested the safest and most efficiently operated pilotage system practicable."

Kotch v. Pilot Comm'rs., 330 US 557 (1947)

12.2 In a case where the ship struck a dike a federal court stated:

"The purpose of requiring a vessel to take a pilot is to have her in charge of a competent person, familiar with particular waters. When on board he is temporarily in charge of her whole navigation, including the duty of determining her course and speed, and the time, place, and manner of anchoring her. The master is not entirely absolved of responsibility when a pilot is in charge, but before he is justified in displacing him he should be sure that the pilot is for some reason incompetent...the navigation of the ship was primarily in charge of the pilot, and, while the master had the right, if he deemed him incompetent and circumstances warranted it, to displace him, he was not under the absolute duty to do so, but was entitled to exercise his sound discretion. Whether he should have displaced him, in the facts shown, was not a matter of law for the court, but was a question to be determined by the jury on all the facts and circumstances of the case."

Dampskibsselskabet Atalanta A/S et al v. U.S. 31 F. 2d 962 (1929)

12.3 In a case where a ship attempted a transit without a pilot and a casualty resulted, the federal court found:

"There are very few published decisions on the question of whether a local pilot is necessary to complete the proper manning of a vessel when she leaves port. This is probably because pilotage is so universally customary and so generally compulsory at all ports of any importance throughout the world that very few vessels enter or leave a harbor without taking a pilot. The rule announced by the text-writers and supported by some earlier decisions, in substance, is this: Where pilotage is customary at a port, a pilot is available, and the nature of the navigation requires one, it is a breach of the warranty of seaworthiness if a pilot is not taken....The rule is supported by sound reason. A pilot is employed because he is presumed to have knowledge of the tides and currents and their effects upon the ship and of all other dangers affecting the safety of the vessel due to local conditions. The master, however competent he might be to navigate his ship in the open waters of the ocean, would not be expected to have this knowledge. It is apparent that it would be as hazardous for a ship to attempt to follow a dangerous channel to sea without a competent hand on the tiller as it would be if the steering gear was defective."

The Framlington Court 68 F2d 304 (1934)

13.1 In a suit against a pilot for damages sustained by the ship he was piloting, the federal court found:

"He was charged with the safety of the vessel, and bound to use due diligence and care and reasonable skill in the execise of his important functions. He is answerable if the vessel suffered damage through his negligence or want of skill while she was under his control....The skill required of a pilot is the ordinary care of an expert in his profession. When in charge of navigation, he supersedes the master, and is liable for negligence."

The Dora Allison 213 F. 646 (1914)

14.1 In a case where the ship struck a bridge the federal court commented on the pilot-shipowner relationship as follows:

"There is no dispute that the ship's use of the pilot in our pending case was compulsory. It is well settled that the owner of a vessel is not liable, personally, for the negligence of a compulsory pilot because the element of compulsion eliminates the 'respondeat superior nexus' which would normally serve as a basis for imputing a pilot's negligence to the ship owner.

However, it has also been held, since the Supreme Court's decision in The China, 7 Wall (U.S.) 67 that, notwithstanding personal non-liability of the ship owner in such a case, the ship itself remains liable 'in rem' for damages arising out of a collision due to the pilot's negligence--even though the use of the pilot is compulsory.

Harrison v. Hughes, 125 F. 860, citing The China and its progeny, succinctly states its rule and the theory upon which it is based:

> ...The theory of the admiralty law in this country in such cases, is that the collision impressed upon the wrongdoing vessel a maritime lien, which the vessel carries with it into whosesoever hands it may come. The vessel is treated, according to this theory, as the guilty thing. It is the res, to which fault is imputable, and which is held to respond in damages. The responsibility of the owners, as owners, and the law of agency, as applicable to the employment of a pilot, do not come into consideration.'"

Calif. v. M. V. Ilice, 534 F. 2d 841 (1976)

15.1 In an early Supreme Court case testing the validity of compulsory pilotage laws the court stated:

"Like other laws they are framed to meet the most usual cases, 'quae frequentius accidant'" they rest upon the propriety of securing lives and property exposed to the perils of a dangerous navigation, by taking on board a person peculiarly skilled to encounter or avoid them; upon the policy of discouraging the commanders of vessels from refusing to receive such persons on board at the proper times and places; and upon the expediency, and even intrinsic justice, of not suffering those who have incurred labor, and expense, and danger, to place themselves in a position to render important service generally necessary, to go unrewarded because the master of a particular vessel either rashly refuses

their proffered assistance, or, contrary to the general epxerience does not need it."

Cooley v. Board of Wardens, 12 How. (U.S.) 299, 13 L Ed. 996 (1851)

16.1 In a case involving a "voluntary" pilot the federal court stated:

"The pilot was placed in charge of the Seekonk by the master and not by the law, and the rights and obligations of the parties must be determined by reference to the relation thus established."

Los Angeles v. Standard Transp. Co., 32 F. 2d 990 (1929)

17.1 In an excellent legal opinion prepared by a Coast Guard legal officer it is stated: (citations omitted)

"Because of this delicate balance between the authority of the master and the liability of the owner, the case law dealing with the relationship between the master and the pilot is often confusing and sometimes appears contradictory. As a general rule, it may be stated that it is discretionary with the master whether to remove the pilot. The master has the same power to remove the pilot that he has to remove any subordinate officer and this power becomes a duty to interfere in a case of the pilot's intoxication or manifest incapacity, in cases of danger unforeseen by the pilot, or in cases of great necessity. But the pilot is more than a mere subordinate to the master and, while on his pilotage grounds, is a temporary master, for the time being in command of the navigation of the ship and his orders must be obeyed in all mamers connected with her navigation. He is, in a sense, a master pro hac vice and gives all orders and directions as to speed, course, stopping, and other matters regarding vessel navigation. Although a master may relieve a pilot, he does so at his peril and with regard to certain matters within the peculiar province of the pilot he must not interfere unless the master sees that the pilot is plainly misgoverning the situation. The exercise of the masters power to relieve the pilot rests within his sound discretion and is determined by the factual situation. Further, the master, in waters unfamiliar to him, is entitled to rely on the knowledge and skill of a pilot and is not bound to overrule him. The master should not substitute his judgment for that of the pilot except in cases of clear and obvious danger. It has been repeatedly held that a ships officer is not negligent in failing tc

intervene unless the pilot is doing something obviously dangerous.

This principle is particulary well settled and of long standing with regard to matters based on the special knowledge of the pilot regarding local conditions. The pilot has sole direction of the vessel in those respects where his local knowledge is presumably required such as the course, speed, and manuevering of the vessel. In some cases, the masters "power" to relieve the pilot has been severely circumscribed and it has been stated that the master has no right to interfere with the pilot without ample justification, the navigation of the ship being taken out of the hands of the master and transferred to the pilot.

It is thus apparent that the popular misconception that a pilot is a "mere advisor" to the master is without substantial foundation in the law. While the master is still the master and in overall command of the ship, and does have the power to relieve the pilot, he may do so only at the substantial peril of exposing himself and the owner of the vessel to far ranging liability. For purposes of adminstering the Ports and Waterways Safety Act, it is readily apparent that the pilot is indeed in control of the operation and navigation of a vessel both in practice and under admiralty law. It is significant to note, that while a master has been found negligent in many cases for acting improperly to relieve a pilot, for acting improperly after relieving a pilot, or for failure to relieve a pilot, pilots themselves have been held almost universally accountable for their own improper actions. Attempts to relieve themselves of liabilty by alleging that they were not actually in control and that the sole responsiblity for the navigation of the vessel rested with the master have been of no avail."

U.S. Coast Guard Legal Memorandum, P. E. Versaw, 13th Coast Guard District Legal Officer, 13 April, 1977.

18.1 In a rare state court case involving maritime law the New York Supreme Court wrote the following excellent description of the duties of the pilot and master:

"Where a compulsory pilot is in charge of a ship, the master being required to permit him to navigate it, if the master observes that the pilot is incompetent or physically incapable, then it is the duty of the master to refuse to permit the pilot to act. But if no such reasons are present, then the master is justified in relying upon the pilot, but not

blindly. Under the circumstances of this case, if a situation arose where the master, exercising that reasonable vigilance which the master of a ship should exercise, observed, or should have observed, that the pilot was so navigating the vessel that she was going, or was likely to go, into danger, and there was in the exercise of reasonable care and vigilance an opportunity for the master to intervene so as to save the ship from danger, the master should have acted accordingly. Of course, where danger is suddenly sensed, too late for action by the master, the master's failure to act cannot be charged against the ship. Whether a particular situation calls for action rests in sound judgment, for on some occasions to interfere might be more dangerous than noninterference, or there might be justifiable expectation that the pilot, through his own capacity and superior skill and knowledge, would be able to draw the ship away from the danger zone. These are questions of fact for a jury."

Hinman v. Moran, 268 N.Y.S. 410 (1934)

19.1 The U.S. Supreme Court in discussin the pilots role in maritime commerce stated:

"Now, a pilot, so far as respects the navigation of the vessel in that part of the voyage which is his pilotage-ground, is the temporary master charged with the safety of the vessel and cargo, and of the lives of those on board, and intrusted with the command of the crew. He is not only one of the persons engaged in navigation, but he occupies a most important and responsible place among those thus engaged.

Cooley v. Board of Wardens, 12 HOW (US) 288 13 L Ed. 996 (1851)

19.2 In a later U.S. Supreme Court decision the role of the pilot was affirmed:

"To the pilot, therefore, temporarily belongs the whole conduct of the navigation of the ship, including the duty of determining her course and speed, and the time, place and manner of anchoring here....But the master still has the duty of seeing to the safety of the ship, and to tne proper stowage of the cargo. For instance, the duty to keep a good lookout rests upon the master and crew."

Ralli v. Troop, 157 US 386, 15 S. Ct. 657 (1894)

19.3 In a case involving the role of the pilot the Supreme Court of Washington commented:

"A pilot while in charge of a ship supersedes the master, in so far as the navigation of the vessel is concerned, but the master is at all times in command, and may and should advise with the pilot, and can displace him in case of intoxication or manifest incompetence. Any power of command exercised by the pilot is limited to the navigation of the ship....While exercising his functions a pilot is in sole control of the navigation of the ship, and his orders must be obeyed as in effect orders of the master. But the master is still in command of the vessel, as distinguished from its navigation, and may properly displace an obviously incompetent or intoxicated pilot, although he is not bound to do so unless the pilot is making an obvious mistake."

Grays Harbor v. The Brimanger, 18 P. 2d 29 (1933)

20.1 Judge Learned Hand discussed the history of the role of the pilot:

"It is of course true that a master does not surrender his ship to a pilot and that there remain occasions when he must interfere and even displace him. The first case, so far as we know, came up in England in 1847, soon after the compulsory pilotage act was passed. The Gipsey King, 2 W. Robinson 537. It chanced to concern the proper catting of an anchor on a vessel in charge of a pilot, and Dr. Lushington, in excusing the owner because the catting was the pilot's spoke as follows (p. 547): 'It is, I apprehend, an established principle of law that the mode, the time, and place of bringing a vessel to an anchor, is within the peculiar province of the pilot who is in charge.' Only three years later the Privy Council, speaking through Baron Parke (The Christiana, 7 Moore P.C. 160, 172), said of a compulsory pilot: 'It was his sole duty to select the proper anchorage-place, the mode of anchoring and preparing to anchor.' And still earlier on the same page: 'The Pilot has, unquestionably, the sole direction of the vessel in those respects where his local knowledge is presumably required; the direction, the course, the maneuvers of the vessel, when sailing, belong to him.' In 1857 Dr. Lushington in The Argo, Swabey, 462, announced the limitation upon this which is generally accepted and which the Supreme Court recognized obiter in The China; and again in somewhat truncated form in The Oregon. It was this: 'a master has no right to interfere with the pilot, except in cases of the pilot's intoxication or manifest incapacity, or in cases of danger which the pilot does not foresee, or in cases of great necessity.' He said further: 'The

navigation of the ship is taken out of the hands of the master and transferred to the pilot.'

Union Shipping v. U.S., 127 F. 2d 775 (1942)

20.2 In a suit against the pilot brought by a shipowner for damages sustained when his vessel struck a dock while attempting to berth, a Federal court discussed the duties of the pilot and master in the following terms:

"Having found that the pilot placed the vessel in such a position as to constitute an immediate threat of danger both to herself and to the Barbey Dock, and having determined that the subsequent harm done was a result of the pilot's action, does this of itself fasten liability upon the pilot and absolve the vessel? It is settled law that the fact that a pilot was on board the vessel does not release the ship's master form his duties. The master still remains in command of his vessel and retains the authority to control the actions of the pilot to assure the safety of his ship and to avoid any imminent danger....The courts have held that the master not only retained the power, but had the duty to interfere in all cases of necessity or danger and to displace the pilot....The earlier cases, in speaking of the master removing the pilot, were concerned only with situations where it appears the pilot was intoxicated or manifestly incompetent....Later cases have appeared to hold the master to a higher degree of responsiblity than the earlier courts contemplated....The master's duty to relieve the pilot rests within the master's sound discretion, and can only be viewed in light of the surrounding factual situation....In light of the obvious confusion that would exist on a vessel if, on his slightest whim, the master would countermand the pilot's order, the master to insure the safety of his command should exercices his power to remove the pilot discriminately. The master ought not to substitute his judgment for that of the pilot except in cases of obvious danger, or where danger is apparent and avoidable."

Barbey Packing v. The Stavros, 169 F. Supp. 901 (1959)

21.1 In discussing human factors and their impact on ship casualties Mr. W. O. Gray of Exxon Corporation stated:

"The in-depth survey provided several instances where risk taking contributed to a casualty or near-casualty. For instance, when asked to select among 12 criteria used by companies for grading a captain's performance, 40 percent of those responding to the question indicated that making schedules was the prime

criterion. When asked how companies feel about meeting schedules in poor conditions, 50 percent of those responding said that there was strong pressure to meet schedules. Almost all of those responding reported sailing on a ship that they personally knew to be unseaworthy.

Perhaps the most revealing disclosure from the interviews was that of a company that in 1969 dropped a safety program that offered a good bonus to tugs and crews with the least accident claims, because the program resulted in decreased productivity and a slowdown in task completion."

Oil Companies International Marine Forum, Safe Navigation Symposium, Session 2, Paper No. 3, Human Factors by W. O. Gray. Presented at Washington, D.C. 17-18 January, 1978.

22.1 In another Supreme Court decision relating to the role of the pilot it was held:

"The liability of the owner at common law for the act of a pilot on his vessel is well stated by Mr. Justice Story in his Treatise on Agency, 2d ed. Sec. 456a: 'The master of a ship, and the owner also, is liable for any injury done by the negligence of the crew employed in the ship. The same doctrine will apply to the case of a pilot employed by the master or owner, by whose negligency any injury happens to a third person or his property; as, for example by a collison with another ship, occasioned by his negligence. And it will make no difference in the case that the pilot, if any is employed, is required to be a licensed pilot; provided the master is at liberty to take a pilot, or not, at his pleasure; for in such a case the master acts voluntarily, although he is necessarily required to selct from a particular class. On the other hand, if it is compulsive upon the master to take a pilot, and a fortiori, if he is bound to do so under a penalty, then, and in such case, neither he nor the owner will be liable for injuries occasioned by the negligence of the pilot; for in such a case the pilot cannot be deemed properly the servant of the master or the owner, but is forced upon them, and the maxim, 'Qui facit per alium facit per se', does not apply.'

The answer to the second question must therefore be that in an action at common law the shipowner is not liable for injuries inflicted exclusively by negligence of a pilot accepted by a vessel compulsorily."

Homer Ramsdell v. La Compagnie Generale Transatlantique, 182 US 1161 (1901)

22.2 In a recent case where the ship struck a dry dock the court absolved the master and crew in the following language:

"We also uphold the District Court's finding that 'the Captain and crew of the Hong Kong Clipper were not guilty of any negligence contributing proximately to the collision,' since the ship was under the sole command of Pilot Jenkins throughout the period with which we are concerned here."

Latex Construction Co. v. Jacksonville Shipyards, Inc., 442 F. 2d 452 (1971)

23.1 In a case involving damages caused by the acts of a "voluntary" pilot a federal court held:

"The first question is whether Aultman was a noncompulsory pilot. If so, he was in much the same position as one of the ship's officers. Under the ordinary rules of respondeat superior, the shipowner would be responsible for Aultman's actions. If, on the other hand, the district court had concluded that pilotage was compulsory, the 'respondeat superior nexus' would have been broken, and APL would not be personally liable for the results of the pilot's negligence....Because of the voluntary nature of the pilotage, and the availablity of trip insurance at a nominal cost, the provisions of the tariff of the Port of Long Beach exculpating the pilot and his employers from liability are valid and enforceable."

U.S. v. S.S. President Van Buren, 490 F. 2d 506, 509 (1974)

23.2 In discussing the effect of exculpatory agreements a legal authority on the subject has written:

"The pilot associations in Oregon (which as voluntary pilotage only, i.e., either the master or the owner of the vessel is privileged to pilot the vessel and need not hire a pilot), have adopted an ingenious system which has been sanctioned, insofar as it is legally permissible to do so, by the Oregon State Legislature. The system adopted is on the theory that state pilotage rates must directly reflect the cost to the pilots of doing business; consequently, if they must pay rather high premiums to procure adequate insurance to protect themselves against a high degree of liability, the pilotage rates would necessariy have to be increased. Since all

vessel owners carry P&I insurance on their vessels, which insurance protects the vessel owner with respect to negligence of the pilot aboard it, if the pilots likewise carry liability insurance, the vessel owner is paying for his liability coverage twice--first in connection with the P&I premium and second in paying an increment in the pilotage fee to reflect the cost of liability insurance for the pilot."

Law of Tug, Tow and Pilotage, p. 484

24.1 Canada, Report of the Royal Commission on Pilotage, Part 1, p. 22

25.1 Ibid, p. 23 and 24

25.2 A legal reference defines "conduct" as follows:

"Conduct (verb): A regulation having statutory force which provides that a ship is to be conducted by a pilot does not mean that she is to be navigated under his advice; it means that she must be conducted by him, and that makes pilotage compulsory"

Words and Phrases Legally Defined, Second Edition, Saunders

26.1 Canada, Report of the Royal Commission on Pilotage, p. 30 and 31

27.1 70 C.J.S., Pilots Sec. 14

28.1 "The rule stated in the case of Homer Ramsdell Co. v. Com. Gen. Trans., to the effect that in actions at common law the shipowner is not liable for injuries inflicted exclusively by negligence of a pilot accepted by a vessel compulsorily, does not exempt the shipowner from liability where negligence of the vessel's master prximately contributed to the injury complained of in such an action....We are of opinion that the evidence mentioned tended to prove conduct of the pilot, known to the master, giving rise to a case of danger or great necessity, calling for the intervention of the master. A master of a vessel is not without fault in acquiescing in conduct of a pilot which involves apparent and avoidable danger, whether such danger is to the vessel upon which the pilot is, or to another vessel, or persons or property thereon or on shore...as to whether the negligence shown was exclusively that of the pilot, and as to whether negligence of the master proximately contributed to the injury, should have been submitted to the jury under appropriate instructions."

Jure v. United Fruit Co., 6 F. 2d 7 (1925)

28.2 "The responsibility for the safety of the ship rests upon the master. The pilot, because of his superior knowledge of the depth of water and location of the channel, has charge of the navigation of the vessel, but even then the master is not absolved from his duties, but may advise the pilot, and even displace him in case of manifest incompetency....We recognize the rule contended for by defendant that the master ought not to substitute his judgment for that of the pilot except in cases of obvious danger, or as expressed in the Jure Case, where danger is apparent and avoidable. But we think a proper case for the master's assertion of authority for the safety of his ship presents itself where it is obvious or apparent that danger from some cause is imminent, though the particular cause of danger may not be appreciated."

Charente S. S. Co. v. U.S., 12 F. 2d 413 (1926)

28.3 "The master is not merely entitled but bound to point out to the compulsory pilot that he may be mistaken in an opinon he has formed (The Tactician (1907) p. 244). He is also entitled, in order to avoid immediate peril, to take the navigation out of the hands of the pilot, but if he does so he must be prepared to show justification...'...if the master sees fit to take the navigation out of the hands of the pilot and countermands his orders, he must satisfy the court that he was justified in so doing, and that the action which he took was at all events more calculated to avoid a collision than the manoeuvre which he countermanded.''

British, Tower Field v. Dock Board, L1.L. Rep. 233, p. 259 (1950)

29.1 The Law of Pilotage, Chapter Seven, Division of Control Between Master and Pilot, p. 58

30.1 Ibid, p. 61, et seq.

31.1 PORT OF BALTIMORE VESSEL TRAFFIC, 1978
(prepared by the Great Lakes Commission)

Total Arrivals	4,295	Chile	25
United States	831	Finland	25
Foreign Flag	3,464	Iran	20
Liberia	568	Taiwan	20
Greece	364	South Korea	20
West Germany	328	Peru	19
United Kingdom	302	Turkey	19
Norway	233	Iceland	18
U.S.S.R.	156	Philippines	16
Denmark	135	Cyprus	15
Japan	130	Egypt	15
Panama	118	Indonesia	14
Italy	100	Kuwait	13
Sweden	94	Ecuador	10
Singapore	82	Pakistan	10
Netherlands	78	Honduras	9
France	73	Canada	7
Spain	63	Israel	7
Poland	56	Algeria	5
Yugoslavia	46	Bangladesh	4
Brazil	45	Portugal	4
Argentina	39	Switzerland	4
India	34	Netherlands Antilles	3
Colombia	31	Libya	2
Venezuela	30	Malaysia	2
South Africa	26	Austria	1
Belgium	25	Nigeria	1

Source: Baltimore Maritime Exchange Monthly Reports.

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DISCUSSION

CAPT. STILLWAGGON: One of the things that a lot of people forget is that pilots are not the individuals that everybody thinks they are. Pilots are part of a crew and part of a team, whether or not they like it. I don't agree that the pilot and captain should vote on decisions. The pilot should advise the captain of all the easy and difficult parts of a passage.

The high quality of the compulsary state pilots has been emphasized. I won't disagree. I have been a pilot on a ship of 383,000 deadweight tons, and I don't think any of the state pilots here have had that kind of experience. I also have served in many ports and, in fact, am in competition with state pilots in some ports. All of this leads me to believe that there is a place for federal pilots in the system.

I do strongly agree that Coast Guard licensing procedure is inadequate. Anyone with a good memory and good cartographic skills can get a license. The person could be a fifth rate pilot but a first rate illustrator. In fact, he submits his drawings to the examiner who may be an ensign or a junior commander. If the examiner likes the picture, the license is issued.

I also have strong feelings about Coast Guard jurisdiction in licensing and in casualty review. This jurisdiction only covers actions against Coast Guard licensees; thus, if I should get into a casualty with a state licensed pilot, then only my license may come into jeopardy. The Coast Guard cannot call a state pilot before it regardless of fault. Therefore, the Coast Guard should not be the one who examines me after an accident. I would rather be examined by a group of my peers. Let that body of peers be compulsary state pilots, if necessary. At least, when I explain what happened, the reviewers will know what I am talking about.

While I respect the Coast Guard and fear its power concerning my license, there is no one who has handled ships like we, the compulsary and the federal pilots. We do it day in, day out, under all sorts of conditions. I think that if there is a casualty, the pilot's associations should have an opportunity to investigate, as well as other interested parties, including industry personnel.

As a company pilot who received a license in 1941, I have never performed jobs that exceeded my ability. I don't know of any federal pilot who would be willing to forego

safety because of a timetable. I am also a state pilot in Long Island Sound and attend the state pilot meetings there. If you will pardon the expression, I sometimes feel like an outcast because they are not very fond of federal pilots. But when you shake it all down, a pilot is a pilot, whether he is federal, or whether he is state-licensed. If the pilot is fully qualified, these things don't matter.

The important thing is that the pilot should be well trained. The pilot must be qualified. When the ship comes up over the horizon and enters a port, the master of that vessel is entitled to the most qualified man to guide his vessel. He turns the ship over to the control of the pilot, and yet, under today's rules, he is responsible for anything the pilot does. Therefore, why don't we focus on this here instead of worrying whether a guy is a state pilot or a federal pilot. I think we should do something about making every pilot the best pilot. Then we will have no casualties to worry about.

ADM. BENKERT: Captain Quick has certainly mentioned a number of controversial issues. We can all agree with some of his comments, but a number of his remarks may have raised a few hackles.

I think we should be careful about impugning the motivation of an organization like the American Institute of Merchant Shipping. Perhaps, as pointed out by Captain Stillwagon, we need to find a more constructive approach. We have good pilots doing good jobs under both state and federal systems. I feel that the motivation of the ship owners, or of the Coast Guard for that matter, shouldn't be questioned in this respect.

All of the concerned parties may have different ideas about how things should be done. I know there are some very different ideas among a number of us concerning the responsibility of the pilot, even the role of the pilot. But, I think we are all agreed that training should provide as high a level of pilotage as possible for our vessels. I am simply saying that neither the state pilots, the federal pilots, management, ship owners, nor ship masters have any particular proprietary lease on proper and sound motivation. We are all deeply concerned about the same thing, although we may all feel there is a need to approach it differently.

CAPT. G.S. SALVESEN

Tanker Department, Exxon International

I am employed by the Exxon International Company which is one of the affiliates of Exxon Corporation. Exxon affiliates own and/or operate about 140 ocean-going tankers, totaling 17.5 million deadweight tons and sailing under 14 national flags. Panamanian and Liberian flag ships make up about 50 percent of this fleet. The Exxon International company manages these Panamanian and Liberian vessels. Because our ships are worldwide traders, it is rarely economically feasible to lock these vessels into a dedicated trade. Those of you who are U.S. flag, coastwide operators may not have this constraint. Therefore, we may view the master/pilot relationship issue from different perspectives.

Exxon officers for our vessels come from Italy, Spain, the Philippines, Korea, and Japan. In our judgement, these countries require qualifications for officers that are equivalent, in all specifics, to U.S. Coast Guard requirements. In some areas, Exxon's own, more stringent, standards are also imposed. Exxon Corporation feels a strong responsibility to ensure safe, pollution-free, and efficient operations throughout its sphere of activities. We are not unique in this respect. Other responsible owner/operators behave similarly.

This paper will provide an overview of the ways in which pilot organizations and ship owners can work together to improve master/pilot working relationships. Formalizing smooth working relationships will reduce the problems associated with the so called "one-man error."

We require that all casualties, even those that are minor, be thoroughly investigated. I am sure many of you do the same. We determine the cause and recommend corrective action to avoid recurrences. As might be expected, our investigations covering collisions, rammings, and groundings indicate that a major portion of the incidents occurred with pilots aboard. The navigation and control of vessels are most critical in pilotage waters because exposure to stationary objects, congested traffic, and shoaling are much greater in such areas.

Indeed, a recent analysis of the casualties between January 1977 and the present revealed that 82 percent of the

navigational incidents occurred while a pilot was on board. The casualties included groundings, berthing damages, and contacts with stationary objects. I expect that many other ship owners have similar casualty experiences. It is clear that many of these incidents can be directly attributed to breakdowns in master/pilot communication. Therefore, it should be obvious that there needs to be improvements in the effectiveness of the master/pilot relationship. I would expect that many other ship owners have similar experiences. Of the navigational incidents which occurred while a pilot was on board, 30 percent can be attributed to a poor master/pilot relationship. Incidents caused by other factors such as poor quality of tugs, lack of sufficient underkeel clearance, and poor navigational aids are not included in this 30 percent. However, even in these cases, optimum master and pilot team performance might avoid an incident or mitigate the consequences.

It is important to note that all four of our higher-cost navigation incidents, during the period covered by this review, occurred with a pilot on board. Furthermore, two of the four incidents were directly related to poor master/pilot information exchange. This also was a contributing factor in the third largest incident. Our experience clearly shows the necessity for working to improve this area of our operation.

With this background in mind, I would now like to discuss four topics related to the master/pilot working relationship:

- Master/pilot information exchange;
- Feedback from pilots;
- Economics of a reasonable delay; and
- Pilot training/familiarization.

The first topic is master/pilot information exchange. All of the participants in this symposium, as well as all of us in the industry, must work to establish effective procedures that will assure reliable master/pilot communications. This is a sensitive area, and solutions are not easy to achieve. Traditionally, the communication between master and pilot consists of minimal verbal information exchange. Yet, the effective utilization of a pilot depends on how well the pilot and master communicate. It also depends on the mutual respect and understanding which each has for the functions and duties of the other.

The master knows the characteristics of his ship. With few exceptions, a pilot is aboard in an advisory capacity because he knows the waters. Without a doubt, most pilots

feel that the term "advisor" underrates their role and is contrary to the actual situation found aboard ship. Still the role of a pilot can be quite far-reaching; it involves advising on local port conditions, shiphandling, communicating with tugs and harbor authorities, directing tie-up, and offering mooring and berthing advice. While the master retains full jurisdiction and responsibility, it has become customary to let the pilot "take her" and actually control the ship's maneuvers.

A shipowner may consider using pilots mainly as advisors and encouraging the masters to do their own shiphandling. This might provide masters with the best training for shiphandling. This should also enable them to assess the performance of pilots when the pilots actually handle the ships. The reason we have not pursued this practice is quite obvious. Most pilots and tug captains engaged in docking are more proficient at docking and close-quarters shiphandling than most ships' masters. Pilots reinforce their skills every day and know local conditions. Our masters do not have this opportunity. They trade worldwide and are frequently engaged in voyages that exceed one month.

This raises an important issue, the respective roles of master and pilot. Dozens of instances could be cited in which it would be dead wrong for a master to take the ship's controls away from the pilot. There are probably another dozen situations in which it would be negligence of duty for a master not to do so. The point I wish to make is that there is a need for preplanning; the exchange of information should be formalized long before a critical maneuver has commenced. If the pilot and the master are communicating effectively and working as a team, their roles need not conflict. The following discussion will highlight procedures that will help them communicate effectively.

In order to utilize a pilot effectively, the master must ensure that both routine and exceptional information regarding the vessel is passed on to the pilot either before, or as soon as, he has boarded. On the other hand, whenever a pilot boards, the master must be informed about routine and exceptional information on waterways, traffic, and the port.

Exxon has prepared a Navigation and Bridge Organization Manual to assist masters and deck officers in achieving the safe and efficient navigation of their vessel. Included in this manual is our ongoing effort to formalize a smooth and timely flow of essential information between master and pilot. Along with a number of other ship owners, we have introduced a Master/Pilot Information Exchange Form. This form requires that the following pertinent information be provided in writing by the master to the pilot:

- Vessel Particulars This should include the draft, length overall, breadth, distance from bow to manifold, distance from manifold to bridge, etc. The pilot also should be briefed about the type of engines (e.g., turbine, diesel), bow thruster capacity, and whether or not the engines are operated by bridge controls.

- Maneuvering Speeds/Revolutions The pilot should be provided with information about maneuvering speeds and the corresponding revolutions at full, half, slow, and dead slow speeds. The pilot also should be informed about the crash stop distances and turning circles at the various speeds.

- Equipment Defects/Limitations Which May Effect Pilotage Immediately after boarding the vessel, the pilot should be told about any deficiencies or limitations in the radar equipment, collision avoidance systems, fathometers, rudder angle indicators, compasses, etc.

- General Information for Pilots The pilot also should be briefed about any other conditions aboard the ship that will impinge on his ability to perform his pilotage duties. This may include crew standby requirements, the number of standbys available, and their stations.

The Exxon manual also stipulates that the following information be provided by the pilot to the master:

- Intended navigation plan for the passage This should include courses, headings, and distances off danger areas.

- Speed Required (or Intended) This should include the speed required for narrows, bends, turns, and congested areas; the expected time that the vessel has to arrive at the berth/turning basin at high/low/slack water, as well as average speed to this position.

- Navigation Restrictions This should include information about dredging operations that affect the vessel's navigation.

- Status of Navigational Aids This should include any recent changes in navigational aids, such as the relocation of buoys.

- Tides, currents, weather anticipated This should include tide, current, and weather conditions that preclude vessel movement.

- Expected Traffic Conditions
- Planned Berthing Procedures this should include:

  --Number and timing of tugs required

  --Source of lines for securing tugs (ship or tug)

  --Communication procedures between vessel and tugs

  --Placement of tugs alongside

  --Plans for dock line handlers

  --Determination of starboard/port berthing

  --Sequence of running out/retrieving mooring lines

- Any other information critical to the safe passage. This may include such items as the minimum acceptable visibility at any point in the passage or the use of anchors in an emergency.

Many of the casualty investigations of incidents with pilots aboard reveal that the necessary exchange of information that could have avoided the casualty did not take place. Masters complain that getting information from the pilot about his intentions is like "pulling teeth." Pilots complain that the masters do not inform them of the status of the machinery and equipment. Another pilot complaint is that they are often not satisfied with the maneuvering characteristics of the vessel.

The master is required to sign the Master/Pilot Information Exchange Form, and we insist that the form be reviewed with the boarding pilot. The pilot is also asked to sign the form. The signing of the form is not intended to increase the pilot's legal obligations. It is intended to make sure the exchange of information has been accomplished. If, in fact, we can accomplish a comprehensive and routine information exchange, the signing of the form by the pilot becomes superfluous.

As ship owners, we would like to establish additional procedures to assure safety. However, these procedures are contingent upon acceptance by pilots. For example, pilots, docking masters, and vessel masters and officers must discuss the planned mooring procedures at some time during the inbound passage. We would like to prepare a scaled diagram of each berth arrangement that our vessels normally trade at in order to assist in reviewing mooring procedures. We could then prepare a simple model of the vessel having the same scale as the berth. The ship's model would identify the location of the winches and the fairleads. The

fairleads would be numbered from forward to aft. The berth arrangement would include: minimum number of moorings required, capacity of bollards, location of manifold, basin limits, etc. These procedures would make it possible for the bridge team to clearly plan the mooring procedure. This preplanning should help to directly reduce the number of berth damages.

As a second example of what should be done for a smooth and timely flow of essential information, I suggest that pilot associations provide individual pilots with an "information paper". This paper should be delivered to the master at the time the pilot boards. As previously mentioned, the paper should include any data critical to a safe passage. By having this information in writing, misunderstandings due to language barriers would be eliminated. Up-to-date written information is important because pilots observe changing conditions daily while working in the port. Also, pilot associations are promptly informed of any changes in navigational conditions. Recent changes, of course, may not be known by the master.

The question of who has the most current information, the master or pilot, is relevant to our discussion at this point. Recent changes in navigation aids and water depths are published in "Notice to Mariners" and "Daily Memorandum." The pilot's information in all probability is more current, but this difference in currency of information adds to the complexity of the master/pilot relationship. The following example will illustrate the difference in timeliness of information:

- The U.S. "Notice to Mariners," No. 14, dated April 7, 1979, listed the controlling depths of the Marcus Hook Range as 32.2 feet and 34.3 feet for the left inside and right inside quarters respectively. This was based on the Corps of Engineers sounding of December 1978.

- The Army Corps of Engineers again sounded the Marcus Hook Range on April 10, 1979, when the depths of 37.6 feet and 38.3 feet respectively were found. This revised channel depth was published in "Notice to Mariners" No. 24 dated June 16, 1979. A copy of this "Notice to Mariners" probably did not reach the vessel until a month after it was published, i.e., mid-July.

This is only an example. I am not attempting here to shift responsibility for draft control to the pilot. I am merely emphasizing the point that the pilot's information is likely to be more current than the master's and that this information should be shared with the master at the earliest possible time.

We strongly solicit feedback from pilots because we recognize the professionalism of a good pilot and the valuable information he can provide. It would certainly be helpful to include pilot feedback in owner's port and berth approvals. Ship owners frequently maintain company manuals that provide information on the ports that their vessels visit and provide evaluations of available berths. Every effort is made to keep this information up-to-date. However, the pilots do not always agree with the port and berth information in company manuals. For example, pilots may know that a vessel is loaded too deeply for safe channel transit unless the owner incurs a high risk for the operation. Similarly, they may know that a berth is not really capable, in their judgment, of accomodating that class of vessel.

The crucial point is information exchange--coordination and cooperation--between pilot and master. Although my entire career has been in Tanker Operations (at sea and ashore), I have never seen a written suggestion from a pilot association before a casualty. I have received many complaints after a casualty, however. We would like to receive feedback on the condition of the vessel from the pilot after his task is completed, especially comments related to her maneuvering. Any deficiencies in the equipment related to the safe operation of the vessel in pilotage waters also should be reported. On the other hand, we, as ship owners, should be informed by the pilot association when a vessel's master has not provided the pilot with information about the correct status of the machinery, mooring equipment, and navigational equipment.

Pilot Associations should be encouraged to:

- Propose their recommendations for changes in company port and berth approval manuals, as well as current shipboard practices, directly to the operations department of the ship owner.

- Refuse to handle a ship whenever the pilot has serious doubts concerning the vessel's safety or the conduct of the personnel.

I would like to touch briefly on the "economics of a reasonable delay." We place <u>higher priority on safety than on economics</u>. In 1977, the daily replacement value in the foreign market of a 35-45 MDWT vessel was about $5,500. At this low rate, there was not much emphasis placed on quick turnaround. A reasonable delay was not expensive. Today, the replacement value of the same ship is three times as costly. Notwithstanding, our position remains unchanged; safety before profits. In order to implement this policy, our general agents worldwide are being informed of our position so that they do not apply pressure on company

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masters. The safety of the vessel, property and people are much more important than the economic considerations. We will not compromise.

We are fully aware that time is required for the master and pilot to communicate. We also realize that a short delay could result in a vessel missing the tide. Nevertheless, our masters are authorized and expected to delay their vessels from either entering or leaving port in order to complete the Master/Pilot Information Exchange Form for as long a period as is deemed necessary. Our masters and pilots must carry out this information exchange to the best of their abilities.

We also emphasize the dangers of excessive speeds and abnormal maneuvers during the port passage. This is sometimes the practice in order to arrive off the berth at the time of favorable berthing conditions and, of course, to save time. This must be avoided. Sufficient time must be allowed for a safe transit to the berth. The berthing operation should also be performed with the greatest of care.

We recently incurred costly berth damage when one of our vessels was being moored to a berth that was positioned parallel to the channel. The vessel had transited the channel at maximum speed to arrive off the berth at high water slack. The vessel then approached the berth at an excessive rate of speed. The master and docking master were both aware of the excessive approach speed but continued their docking maneuvers. The docking master should have discontinued the maneuver and continued up the channel rather than attempting to dock. The master, obviously, should have taken corrective action.

In brief, we support any pilot, master, docking master, or terminal operator who takes a little more time to make the operation safer. This is necessary to insure the safety of the personnel, the environment, and the vessel.

The final subject I would like to address is pilot training and familiarization. I will not cover this subject in detail because we have already heard papers on training. The pilot association must guarantee that the pilots they provide are competent. The pilots must be technically capable of piloting the vessels which call at their port. This is directly related to improving the master/pilot working relationship. It is necessary for the master to establish the competency of a pilot. When the master knows that the pilot is competent and familiar with the important characteristics of his vessel, he will trust the pilot to perform his duties. The better the understanding between the master and pilot, the less chance that either will make

a mistake, and, if a mistake is made, the chances of it being detected and corrected early are better.

One way to improve communication and cooperation on the bridge is to provide training for pilots similar to that provided for vessel masters. Our masters receive training on collision avoidance systems (CAS). They attend the shiphandling program in Grenoble, France before being given command. They also receive maneuvering simulator training at Delft in the Netherlands. Strong emphasis is placed on radar training, and we assign our deck officers to advanced radar training courses every five years. We also have developed an on-board audiovisual training program on navigation safety. The main theme of this program is radar plotting and radar data analysis plus key topics such as electronic aids to navigation, watch keeping practices, and navigating in restricted waters.

Pilots must receive training in the same systems and equipment. This should include work with collision avoidance systems, radar, and doppler sonar systems. The pilot must be able to use this information competently and learn to judge the limitations of each system. As mentioned earlier, we require that our masters be fully trained and qualified to handle the ships they are assigned. Pilots should also be trained to handle various types of ships. This is particularly important since the characteristics of vessels are becoming more diversified; there is greater variation in size, shape, and maneuvering characteristics. Such training should certainly include work with simulators. As requirements dictate, pilots should attend recognized shiphandling schools such as Port Revel, France; Delft, Holland; Southhampton, England; and La Guardia and Kings Point in the United States.

A pilot should not be assigned to a vessel that he has not been trained to handle. To ensure this, a ship owner working with the local pilot association can arrange for a pilot to join a ship of an unfamiliar class at another port for a training trip so that he will become technically capable of piloting the vessel when the ship calls at his port. If this is not possible, a second pilot who is familiar with the ship should be obtained from another area. Unfortunately, the usual case is that pilots are not afforded the benefits of training and familiarization with new or unusual ships. They are placed in a do or die situation in which they are confronted with equipment and maneuvering characteristics they have never experienced before. At a bare minimum, navigation experts representing the ship owner should at least meet with the pilots association to duscuss all the characteristics of the ship prior to her first call at the port.

In conclusion, it is our opinion that the Intergovernmental Maritime Consultative Organization (IMCO) should become the focal point for improving the master/pilot relationship. As most of the participants at this symposium are aware, the Oil Companies International Marine Forum (OCIMF) has already submitted proposals for training, qualifications, and operational procedures for maritime pilots to IMCO. We are in full support of the intentions of the OCIMF to adopt:

- Recommendations of minimum standards for training and qualifications of Maritime Pilots.
- Recommendations on operational procedures for Maritime Pilots.

There are many organizations and individuals in the industry working on the master/pilot problem. We have met with several pilot associations who have prepared recommended procedures to coordinate and improve the master/pilot relationship. OCIMF has made recommendations to its members on a standard master/pilot information exchange form. Also, the Society of Naval Architects and Marine Engineers is working on a similar project. The problem is recognized internationally, and the entire industry is actively working to achieve solutions.

It should be noted, however, that neither ship owners, pilot associations, nor other organizations have been completely successful when working independently. Ship owners always encounter opposition or disinterest when they try to implement their approach. Individual pilots and their associations have encountered resistance in dealing with the masters of some ships. To counter this problem, we recommend that ship owners, pilot organizations and governmental bodies join together and work through a single focal point, IMCO. Initial, and very essential, output from this cooperative process should include:

- A standard Master/Pilot Information Exchange Form
- A Standard Navigational Vocabulary.

These items should become accepted and operational on a worldwide basis. By working through IMCO, we believe the problems can be solved in an atmosphere of mutual understanding and respect.

Cooperative industry efforts and funding are required. All ship owners and pilot associations must realize that adequate funds must be put aside for training, updating skills, and ensuring the competency of pilots throughout the world. When it is possible for a ship owner to hire selected pilots or employ company pilots, they can easily

justify the additional expense of pilot training through demonstrated improvements in navigation skills and shiphandling. Of course, no single shipowner and no small group of ship owners can carry the expense alone. Many ship owners employ vast numbers of compulsory and voluntary pilots engaged in worldwide trade. If we are to succeed, the entire industry must work cooperatively to ensure the competency of pilots on a worldwide basis.

Even the best of people make mistakes. Try as we might, human error or oversight can never be completely eliminated. We can only attempt to detect and correct mistakes early enough to prevent an accident. Industry must continue working toward effective solutions. Success in improving the master/pilot working relationship and improving pilot training programs will help eliminate "one-man-error" and help achieve the common goal of safe and effective navigation.

AFTERNOON DISCUSSION SESSION

CAPT. KAUFMAN: It seems clear to me that there is a very evident effort to have state pilots liscensed by the federal government. If the United States Coast Guard is given full and complete authority over state pilots, how will this enhance safety of navigation? I am directing this question to Admiral Benkert.

ADM. BENKERT: First of all, I believe this issue was outlined quite well by Capt. Quick in his presentation this morning. There are complex aspects of the whole problem of deliniating the roles, responsibilities, qualifications, and legal liabilities of state and federal pilots. Many actors are involved in the controversy, including the United States Congress.

State pilot's associations feel threatened because, from time to time, it has been suggested that all licensing for pilots in the United States should come under the federal umbrella. I suppose the reason that the question was directed to me is that the organization of which I am President, the American Institute of Merchant Shipping (AIMS), has advocated just this position in the past.

AIMS advocated this position in a report published by the Government Accounting Office (GAO) prior to my becomming associated with it, and I personally do not support, and never have supported, the notion of the universal federal licensing of pilots in American waters. I do feel, however, that those pilots and other ships' personnel certified by the Coast Guard should come under continuing scrutiny regarding their skills and qualifications. It is in this sphere that I think federal responsibility should be strongly asserted.

Since I came to the American Institute of Merchant Shipping 13 months ago, I have been urging one particular course of action, and that is dialoque. I believe that company officials, ships' captains, and the American Pilot's Association should sit down together and work out their problems. The sniping and nit-picking that has been going on between the industry and the pilot's associations should come to an end. My discussions with pilots have proven to be fruitful, and I am committed to continuing in this vein so that a meeting of the minds can be achieved on the issues which divide us.

CAPT. KAUFMAN: I think that is commendable, Admiral, but the only thing I believe is what I see in writing. What I see in writing is a concerted effort on the part of shipping interests to pre-empt state pilotage. Although it was not drafted by you, the language in the GAO report seems quite clear on this question.

ADM. BENKERT: What I am trying to say is that the statements attributed by GAO to my organization are not my statements. The report was developed prior to my association with AIMS.

What I am trying to do now is to get all parties on a good working basis so that we can engage in the kind of dialogue that I feel I have had in recent months with your president, for example. I am sorry, but I think we should move to another subject now because not everybody else here is interested.

CAPT. KAUFMAN: The people present here are very interested in this, and I just want to make it clear that this is an area of great and grave concern to the pilots. State pilot associations, which have provided well-trained, committed professionals to service the needs of shipping for 200 years feel threatened by being pre-empted by a federal licensing process.

Capt. Stillwagon commented on the federal licensing process. I happen to share his point of view. Therefore, I will just make a brief personal statement. In addition to my Master's License, I have, at present, valid first-class endorsements for Boston, Martha's Vineyard and Nantucket Sound, New Bedford Harbor, Narragansett Bay from sea to Providence, New York Bay and Harbor to George Washington Bridge, Raritan Bay, and Delaware Bay and River to Philadelphia. I haven't been to those ports in 30 years.

I have spent the last 22 years in the Chesapeake Bay and the Chesapeake and Delaware Canal, and I think it is patently absurd for the United States Government, through its agency, the Coast Guard, to let me carry a valid, lawful license which allows me to pilot in Boston and Providence.

This is what concerns us; would an extension of federal licensing simply expand the kind of laxity which I have just mentioned? It might be stated that this won't happen in the future because there are now tonnage and recency of service requirements. I support these new requirements and further think that the federal government should rescind the endorsements on which I have not served in 20 years. This would be a safe and reasonable course of action.

But I want to repeat my question. If this proposed legislation is enacted, how will the Coast Guard's enforcement of it enhance safety?

ADM. BENKERT: I would ask Admiral Bell to answer this.

ADM. BELL: I think that our moderator pretty much put forward the Coast Guard's position in respect to the licenses we issue. I agree that, if the Coast Guard issues a license to someone, it should be able to hold that person accountable. It is clear that we have become very polarized in this discussion. Let us try, therefore, to endorse Admiral Benkert's point of view, and initiate a better dialogue.

Let me philosophize for a moment. I hear that we have nothing but excellent pilots in the United States. Yet almost every speaker today acknowledged that piloting is not a science, it is an art. I take no issue with that. But, like anything that is an art, individual ability is a crucial factor. Then it follows, logically, that some prople are going to be better pilots than others. It is something that you hold inside you that is almost God-given that makes you an excellent shipmaster, pilot, and shiphandler.

I don't want to start an argument, but we are not all excellent. It follows, therefore, that there are some people that do get a license by meeting the bare minimum requirements and prove later that they are not of the caliber that we need in a pilot. I have trouble endorsing a system that doesn't have the capability of revoking the license of individuals who clearly do not belong in the profession.

That is the philosophy, sir, that I endorse, and it has nothing to do with trying to upset state pilots or federal pilots.

CAPT. KAUFMAN: The point is that the proposed legislation that I have read in the GAO report, in effect, pre-empts state pilots and is very damaging to the state pilot system.

ADM. BENKERT: I know what is in the report. I don't know whether that bill has been put before Congress, but I don't believe it has. To my knowledge, it has not been pushed by anyone.

I repeat what I said earlier, that much of the material in that GAO report is quite dated. The GAO examination of the coast Guard was started quite some time back. As a matter of fact, I can recall that I was contacted by GAO

several years ago when I was Chief of the Office of Merchant Safety. Some of the things that are in that report are a direct reflection of my conversations with the GAO people.

But, I think you have to look at the report in the context of time. I repeat: to my knowledge, nobody has placed the proposal you are referring to before the present Congress. And, to my knowledge, nobody has any plans to do so either.

CAPT. KAUFMAN: There is a well known phenomenon here in Washington referred to as an "iron triangle," where you have a regulated industry, such as trucking or shipping, with a regulating agency as the second leg, and the legislature closing the triangle. We pilots are very concerned about even suggested legislation, because it would not be an "iron triangle," but more like an iron collar that is put around our necks. We are very concerned.

ADM. BENKERT: It is not an "iron triangle," because, in my capacity in the Office of Merchant Marine Safety for the Coast Guard, I had more problems with the legislative process than you could possibly believe.

I want to further defuse this issue by noting that one of the reasons we are here today is certainly to improve our dialogue. All of us should try to address some of the areas in which we each feel that we can do better. I say no more. Next question please.

CAPT. ROWSELL: A few years ago the British Shell fleet had quite a bad year for navigational accidents. An investigation of those accidents showed that in some a dialogue between the master and the pilot was lacking. One aspect of the problem was that, as the ship was entering the most dangerous waters for navigation, the pilot would come on board and the master would completely relax. One would expect that once the pilot stepped on board, the master would remain equally concerned.

Therefore, the maritime branch of Shell then adopted the same type of procedure used by Exxon. I am interested in whether the panel members who are pilots would support, in principle, the concept that they are entitled to expect that the master and the officers closely monitor the passage of the vessel.

CAPT. QUICK: The pilot has got to develop a technique that works on all ships, since he pilots such a wide variety. Ship types, flags, and crew competencies are variables; the pilot is not always stepping aboard a Shell tanker or an Exxon tanker. The ship may fly a Singapore flag and have Ethiopean or Brazilian crew. A pilot appreciates when the ship's personnel monitors his actions,

keeps track of where the ship is, and calls his attention to anything that he may overlook, but he doesn't have any right to insist upon it.

If there is going to be any dialogue between the master and a pilot, it has to be initiated by the master. The pilot can't have a pre-conceived notion of how things should operate, and expect the ship to conform to it. He tries to be as self-reliant as possible, because the only way he will survive in the long run is if he can operate the vessel on those occasions when master and officers offer no assistance.

CAPT. COLLAR: I am sure that you would agree that the pilot should inform the master about the intended track and so forth.

CAPT. QUICK: Yes, but I think that the master has to bring it up and begin the dialogue, because, if the pilot states the intended track, the master may probably show no interest and think that the pilot is a little strange.

Bridge operational procedures have to stem from the ship, not from the pilot. It is not appropriate for the pilot to go aboard and expect or demand an informal dialogue. If the crew want to supply information, fine. The pilot should, and most frequently will, cooperate, but he can not initiate a navigational team effort. That is not his function. He can't be the disciplinarian for bridge procedures for the individual shipowners.

CAPT. SALVESEN: Pilots don't raise any objections if the Captain comes to a pilot and asks specific questions concerning his intended route or restrictions in the area. One recent change is that pilots are being asked to complete information forms. We have had serious problems with this. How do you react to this, Captain Quick?

CAPT. QUICK: I think the pilot is usually flattered if the master is interested in what he is doing, and he will fill out an information form. I don't see any objection to it. However, if I have just boarded in the middle of the night at Cape Henry, it is blowing 40 knots, and there are three ships around me, I will want to wait until I get the ship to a clear spot before we start discussing filling out forms. That is the only thing that might concern the average pilot.

CAPT. SALVESEN: We are beginning, now, to understand that, Captain.

CAPT. ROWSELL: I think we look at the form as just a tool, but if we manage to get rid of the formal things, so much the better.

CAPT. NEELY: I want to make it clearly understood to industry, the Coast Guard, and all other interested parties, that I think I represent, as President of the American Pilot Association, those people who are very interested in the safety of getting ships in and out of port. After all, our livelihood depends upon our safety record. If we cause damage, it not only costs the owner/operator money, it also redounds against the operations of the port. So, basically, any time a pilot goes aboard, he is, in fact, doing his utmost to do the job properly and prudently. He wants to satisfy everybody, the regulatory agency, industry, and, mainly, himself.

I think most pilots are very proud when they walk off a ship that they have done a job well. With regard to the question that came up about the GAO report, it is my understanding from talking with the people in GAO, that this report was indeed prepared over a several year period. The facts and figures in it go only up to 1975. The fact that GAO recommended federal control over the state licensing, naturally, is offensive. I am sure that if the same control was exercised over federal pilots, Jim Stillwaggon would agree with my position.

The main thing that we are talking about today is improving the training of pilots. Industry and the Coast Guard must realize that several years ago pilots were suddenly confronted with new types of ships. I would venture to state that, essentially without exception, new types of vessels began arriving at all pilot stations. I believe that the pilots have actually mastered them. I am very proud of our record of taking care of new classes of ships in a normal fashion.

Let me say a few words now about a subject that was raised earlier, 33 CFR 164. Pilots and the Coast Guard interpret it differently. I am happy to say that I have been working closely with Admiral Bell on attempting to disseminate the basic information about 33 CFR 164.

Also, I would like to bring to the attention of industry that pilots have more problems than simply coming aboard and filling out a form. It has come to my attention, as an active pilot in Houston, Texas, for the last 25 years, that there has been a deterioration in the manning of vessels, especially those of foreign flag. I am not talking about American ships. I am talking about foreign flag ships where the crew cannot communicate with the officers.

Language differences can cause inconveniences and even danger. Teamwork between pilot and ship's personnel may be impossible; there may be wisdom in foreign language training for pilots. As a matter of fact, during the discussions about standards for training and watchkeeping at IMCO

recently, the United States supported the position that English be the official language to be spoken on the bridge in all waters.

I know that this is not going to work. A French master meeting a French pilot and talking over the radio are not going to say "good morning" in English. Obviously, this may be a problem.

There has been no mention during this symposium about improving channels. I would suggest to you that 1979 pilots are actually operating in 1935 channels. I would like to see the industry, the Coast Guard, and everyone else support improvement of channels. They should correspond with the advancing sizes and conditions of ships.

I think that there is a prevailing negative view regarding the channels improvement. Tanker operators are advocating channels deeper so they can get more cargo aboard, but this is not the problem. We need wider channels and fewer curves and dangerous intersections to accomodate the larger ships.

There was mention this morning of an AIMS position regarding pilot licensing that was expressed in a GAO report. Adm. Benkert is correct in saying that statements were taken out of context. I think we are making progress because we are talking to each other, and we have now a draft proposal from AIMS. The American Pilot Association is awaiting the trustees' meeting in October prior to commenting about the proposal. As a matter of fact, I have invited Adm. Benkert to come with us and discuss this so we can resolve some of our differences. I personally think this is a big step in the right direction.

ADM. BENKERT: Captain Neely has brought up a very good point. Harbour pilots and inland water transport pilots must work under very poor conditions as far as the overall condition of port access and egress. Captain Neely's point about channel depths and ship sizes was very appropos.

The Coast Guard very recently put out some proposed regulations for Puget sound relative to navigation, size of vessels, and so forth. One of the areas covered by the Coast Guard proposal has to do with underkeel clearance minimums. One of the observations that the industry has made about the proposal is simply that we would certainly like to see an effort made to improve the conditions of our ports for safe navigation. We look to the Coast Guard for action in this area. Comparing actual port conditions with the charts, for example, reveals considerable discrepancies.

CAPT. HARD: At MarineSafety, one of our clients brings ships into the Savannah River. It was reported by many of the training groups that it was very difficult to maneuver a particular ship through a particular area of the channel. This information was forwarded to the company and on to the port authority. We got some very quick dredging as a result. One of the fastest jobs I have ever seen.

I think, as I mentioned in my presentation, that this is another area in which simulators can be put to use. You can use a simulator to prove to a non-mariner, if you wish, that there is a problem and that it needs to be funded. For example, you could bring a congressman into a simulator and show him that you cannot possibly maneuver a particular channel safely. You can prove it to the man. Whereas, if he had to go aboard a ship, it might take three weeks to rearrange his schedule, and, if you get foggy weather, the ship can't move. The ability of simulators to make problems clearer is remarkable.

ADM. BELL: Concerning the 1930 waterways, I would like to say that pilot ego isn't helping that situation. Time after time, I have run into the statement from professional pilots, "Give me the boat and I will get it there." Many times public inquiries are initiated about conditions of waterways, maximum size of ships or the size of the tow that can use a particular waterway in an effort to ascertain needs for improvement to obtain greater safety. The braggadocio of the pilots--"Give it to me and I will get it there"--is unhelpful in this respect.

The expert is thus obscuring the fact that there are problems with that port that probably could be corrected. Since the professional denies the problem, it is not corrected. Resultant casualties render this approach self-defeating.

This is an area everybody can work in jointly; the issue of a 1930 port for a 1979 ship. We can't let it be masked for any reason. If we work together, we could improve a lot of the waterway and port conditions.

MR. MILLER: I was out in Seattle last year and one of the situations that come to my attention was a vessel collision with the West Seattle Bridge which rendered the bridge inoperative. A new bridge will be constructed. Concomitant with that, there have been some initiatives to change the depth of that channel to enable new shipping to go through. The Corps of Engineers has been studying the waterway and has found that it cannot influence some of its aspects. In fact, the width and certain jogs in the channel, which appear to have had some role in the collision with the bridge, will remain as is.

There is a quesion of safety linked up with this particular channel, and this is just one example. What I am trying to say is that I think the Coast Guard should get involved in this kind of problem. The Corps of Engineers and other people working on it found that they could not get the Coast Guard involved in any way other than that the Captain of the Port had input on decisions related to the type of bridge. But perhaps, as Capt. Hard has said, it is easy in issues of waterway safety to get some action.

DR. GROSE: As I listened to the papers being delivered today, I had some observations . First of all, there is a high level of inertia here. I feel like I am with a bunch of old salts who are not going to change very much. You are going in a certain direction, and there is going to be very little change. The change that has been asked for is primarily external; you want regulations. I have heard the statistics; there are numerous extant laws, codes, and regulations on the books right now. So, if we pass another two, three, five, ten or how ever many have been advocated here, it seems to me that we ought to look at whether they will be effective.

The National Transportation Safety Board just published a report, a special study on hazardous material regulations, and they came up with six reasons why regulations aren't obeyed in the first place. The first is that regulations are complex and difficult to understand. Second, industry interrelationships are also complex. Third, there is economic pressure not to obey them. Fourth, industry personnel often are unaware of the existing regulations. Fifth, there is a lack of available training for inexperienced personnel. And the last one is indifference to regulations.

I would like to see, as a private citizen, concern not so much about whether pilots are worse or better than they have been, or whether we have the best in the world, but more attention to reality. While the number of piloting errors may be steady or even declining, the fact is that now, due to the complexity of the world we find ourselves in, the cost per error is rising. I think this issue provoked this meeting.

And, I just wonder what, besides regulations, we have in mind to take care of this problem.

ADM. BENKERT: I will respond to part of that, sir. Everyone here, at one time or another, and probably on a continuing basis, gets very discouraged with regulations, the regulatory process, the voluminous nature of them, the difficulty of complying, enforcing, et cetera.

Regulatory action, is, unfortunately, a sign of the times, but one of the problems is that I think more input should be directed to the Congress of the United States. That is the body that really pressures administrative agencies, such as the Coast Guard, to regulate. Within the last eight or nine years, there have been a number of statutes passed which have required that regulatory action be implemented by the Coast Guard to improve maritime safety and facilitate other maritime activities.

I am quite sure that, in many cases, the Coast Guard and the industry would have been very happy to have not had new regulations jammed down their throats. I do think that one thing that should be said about this, however, relates to training. You mentioned the idea of a personnel problem, and of course, training may not be a panacea for everything. But in this field, it has proven very beneficial in many areas, and I think that some discussion of the training concepts that were voiced this morning would be very appropos in this area.

CAPT. COUNSELMAN: Captain Salvesen, I am somewhat confused as to the type of training that you would desire. Several captains were sent by Exxon to the Virginia Pilot Association to ride in and out and study under our pilots, and we helped them get their federal license (pilot endorsement) for Hampton Roads.

You presently have a company docking pilot in Norfolk whom you allow to co-pilot in and out of Norfolk. He has not been to Grenoble, which is your school. I am wondering about what I see in these cases. On the one hand, when you ask me to train someone, I feel you are telling me I am capable. On the other hand, I believe you are saying today that I am not capable, that I haven't had the proper training, and I haven't kept abreast of things. Can you explain? In addition, you said this morning that you are perfectly willing to, and think industry should, pay for pilots to go to Grenoble, but you have actively resisted rate incrases.

CAPT. SALVESEN: All I can say is the incidences you have mentioned do not involve the Exxon International Fleet. As far as establishing the rates for pilots, that does not come into our jurisdiction.

CAPT. COUNSELMAN: Well, Maybe I am confused. When a representative of Exxon comes and tells me that I should not get an increase, and another representative from Exxon says I should get additional funds for training, I find it very confusing.

CAPT. TORRENS: I wonder whether it is fruitful for us to spend the whole meeting arguing about federal pilotage rates and rules versus state pilotage rates and rules.

I thought we were going to discuss piloting. Piloting, whether it is federal, state, the master of the ship, or the third mate when he is on watch, is piloting. If we are going to have a bucket of worms, we can talk about piloting all over the world. The pilot that goes across the Escravos River Bar, Niger River Delta, Nigeria, can't even speak English and can't give any commands; he steers a ship, but he will take it up a creek where the branches of the trees sweep the wings of the bridge. But, he gets it in there, and he gets it out. That is one kind of piloting. However, I thought we were talking about piloting in the United States waters, and how it might be in the interest of all parties concerned to improve piloting in American waters, to make it safer.

Now, if we are going to take on how we are going to improve pilotage all over the world, then I think this is too small a forum. I don't think we have got the right people here. As far as piloting in the United States, I think I would like to limit the discussion to that. But I would like Adm. Benkert to describe the purpose of our discussion. Are we trying to influence regulations or legislation?

ADM. BENKERT: No sir. I don't believe that is the point. Although I was not given specific instructions, I will give you my point of view. After listening to the individuals who had been asked to present papers today, my feeling is that the purpose of the symposium is exactly what you voiced. We are here to try and look at, to examine pilotage, particularly in the United States. In addition, we should be seeking possible improvements in the safe navigation of vessels in United States waters. However, with such a diverse group, we are bound to get away from our primary concern at times.

CAPT. TORRENS: I believe we can be less antagonistic here today. It does not serve the industry to have each parochial interest blaming all other interests. I can envision a big casualty, with a big oil spill, surrounded by everybody pointing at one another. The state pilot will be pointing at the federal pilot, who will be pointing at the owner, who will be pointing at the Coast Guard, and the Coast Guard will be pointing at someone else. What purpose would it serve?

If I am wrong, fine. But, I concur with your description of the purpose of this meeting. I hope that the people present can funnel their energies to areas in which we can agree to agree and areas in which we can agree to

disagree. Let us see if we can't come up with something that can help improve the safety of piloting and improve pilot/master relationships.

CAPT. FIORE: I have some questions about the American Pilot's Association, Capt. Neely. Does the association encompass the entire country. Also, with reference to your training programs for your apprentices, is it standardized? If not, are you trying to develop national standards?

CAPT. NEELY: Basically, our pilot programs throughout the United States use different methods. Most of the apprentice programs require more than a few short days or a few short months to complete. There are pilots here today from New York, New Jersey, Philadelphia and Maryland who have served at least seven to ten years in apprentice programs. It takes at least 10 years in those states to actually qualify as a state pilot. Of course, most are given a federal pilot license much earlier because they are able to meet the criteria of the Coast Guard.

In other sections of the country, we have what is known as a deputy program. Many of these are on the Gulf Coast. The deputy programs basically take qualified officers with a deck license and train them under the auspices of a senior pilot. A lot of supervision is given before they are examined by the state boards and reviewed by peers. By using people from the local industry, we have a much better chance to know and evaluate our pilots.

We don't go outside of the industry to find men to train as pilots for a very good reason. If I have a hundred thousand tons of gasoline aboard tonight on the channel, I want to be sure that the ship that I meet carrying one hundred thousand tons of oil will pass safely by. If it doesn't, I will be crab bait by morning.

This raises an issue with respect to the new proposals. As Adm. Bell indicated, it is proposed that we have tonnage increments on our licenses. Every pilot here today has probably stood examination for a first class, unlimited pilot's license on United States waters. I will be personally offended if I ever lost that license. I fought for it just like many of you fought for your degree. It should not be changed.

In addition, industry in the United States basically does not have a sufficient number of bottoms to train men for the increments that have been suggested. How many American bottoms do we have that are in excess of 120 thousand tons? How many do we have over 100 thousand tons? We don't believe that it is wise to go out of the country to

acquire pilots. We should acquire our pilots from our ships; it's the best school we have.

And, I promise you that any pilot organization, in defense of its own livelihood, will not allow a man to get aboard a ship and pilot it, under any circumstances, until he is fully qualified and trained.

CAPT. RICH: There are several of us here today who are participating in the Coast Guard-Marad project that addresses itself to the degree of simulation to be required for certification. This issue is being debated because it will be taken into consideration in future regulations. It is of vital importance to ask that this astute audience give some thought to this matter. This decision should be made calmly and with much deliberation. By background and experience, I have become an advocate of the application of simulation, but I think it should be done in a step-by-step fashion.

Now, to the question. I respectfully ask the panel to draw from their experiences as shipowner, privately employed pilot for a shipowner, state pilot, industrial educator, and representative of the regulatory agency, and comment on how simulation should be used and to what degree it should be used to establish new criteria for certification.

CAPT. HARD: I think the lions have arrived. I can only repeat what I said this morning. There is a great deal yet to be learned about simulation. It is not a panacea. The first thing that you must keep in mind is the level of certification that you are addressing. There is not one simple answer. Different training approaches are required for beginning pilots than are required for experienced pilots. Third mates require more of an undergraduate approach. In fact, there is talk now about using simulators in undergraduate training, which I think is an excellent idea.

However, the type of simulators that would be effective in training third mates would not necessarily be the type of simulator that you need to help a pilot. A pilot who has already been working on his certification with a pilotage organization needs a piece of equipment that is fine tuned to really hone his skills. This would have to be a very sophisticated piece of equipment. To develop a piece of equipment at the level of sophistication, is going to require a great deal more research. We do not have sufficient information or expertise to simulate things like current effects, or squat effects, for instance, and these are occupational hazards faced everyday by pilots. There has not been enough research to permit provision of this type of simulator training yet.

We do have the required technology, however. It is simply a matter of acquiring and programming the knowledge and data. We would need a hydrodynamist, mathematicians, shiphandlers, and simulation experts to put all these together.

As we speculate about this, let me point out that, in our experience, the major first hurdle is communication. An experienced pilot will go into the simulator and say that he has never been on a ship that handled that way; it really should do this. The hydrodynamist then says, "what does that mean?" He needs to know because he has to develop some methematical formula. It takes a lot of time; most of us mariners simply don't know the technical language needed to talk in terms of reference that can be understood by a simulation engineer or a hydrodynamist. Success will require a lot of education and cooperation within the industry itself; we must bring the disciplines together. Bringing simulation to the level of its potential requires a multi-disciplinary approach.

Today, the simulators that are available are very good for familiarization, and I emphasize that word. They will not an expert make. But, they can help train at certain levels. The uses are best judged by the people themselves. The pilot knows when he has done a good job. He knows whether he needs help in a particular channel or in a particular port.

It would be unfortunate if we were to be too contentious. It would be much better if there were enough good faith on all sides. For example, if a government body like the Coast Guard were to ask a pilot about a particular channel, it would be best if they all could sit down and discuss it off the record. The pilot could then honestly give an opinion. Perhaps--yes, there is a problem. We would be much better off if we had a wider channel in this area. To continue the example, if the channel were improved, a shipowner would probably want to bring in a bigger ship. Clearly, there has to be give and take on all sides. I know that there is research being done, for instance, on the possibility of bringing bigger ships into Galveston. Maybe it is possible; maybe it is not. I am not in a position to judge. I do know, however, that it will take good faith and effort by all parties to determine the real limits.

All maritime planning must begin with an economic analysis, with risks being assigned a certain cost. What can you afford? What risks can you afford? What capital investment can you afford? What time interval can you afford to devote to dredge channels and keep them up to date. Is it wise to dedicate resources to bringing in ships of a few more inches draft?

To return to the question. Simulation as a tool is here, but it is going to take a lot of cooperation on the part of a lot of people to bring it to the level of sophistication needed to reap its benefits. It will also take a lot of faith. Remember, this industry of ours is over five thousand years old, yet we have only had mechanical power for the last 100 years. Only the last 15 or 20 years have we had an advanced technology of any sort.

Technological advances have been imposed on the mariner without asking him whether or not he needs them. We have all sorts of sophisticated equipment aboard ships now, and I often wonder if some of them are counter-productive. If we have automated navigation systems that allow a ship to run back and forth for months and months, we can dispense with the helmsman. Then, when will the helmsman practice--when he is bringing a ship up the channel? Obviously, that would be counter-productive.

Too many decisions are made by people, often management, who are not marine-oriented. Decisions are strictly based on economics, negotiations of contracts and charter parties. While I have not been able to give you a specific answer, I hope I have outlined the areas in which we must cooperate if any type of progress is to be made.

ADM. BENKERT: You have given us the state-of-the-art as far as simulators are concerned. Might I ask Adm. Bell or Dr. Gardenier to say a few words about the Coast Guard-Marad study?

DR. GARDENIER: We have a report that has been widely circulated in draft form and is undergoing final review now and should be out within a couple of months, on the role of simulators in maritime training and licensing. It represents the first stage study and was prepared without conducting any actual experiments. The report assesses the capabilities and limitations of simulators and describes how we think they might be used. Needless to say, the report will cause a lot of controversy; there will be many differences of opinion. The report is extensive; it comprises two thick volumes and a smaller, summary level volume.

More recently, we completed a series of experiments to determine what you really need in a simulator. As Capt. Hard said this morning, you do not need all the bells and whistles of reality in a simulator. As Capt. Neely noted, it will be interesting to see if anybody ever does build a simulator that contains everything that a pilot actually uses. I don't think that will happen. However, we are taking a look at some of the crucial elements, such as the cost effectiveness of training, the field of view, and color

versus black and white, as well as some of the other elements of simulator technology.

We will be reporting on the experiments that have been done. However, it will take another three or four months to crank numbers through computers and translate them into human terms. I think we will have some answers by the latter part of this winter that will be published as a second phase report.

The study is programmed to extend through June of 1981. During the third phase of work we will look at how effective simulator training is in allowing people to perform better at sea and whether or not simulator training is retained.

We have had to scale down our research optimism to some extent. We find that we can not do a completely definitive study. Again, as Capt. Hard indicated this morning, it would take a very long time and a great deal of money to do such a study. By June of 1981, however, we hope to have a fairly complete study that will address all of the elements I have summarized.

ADM. BELL: I would also like to point out that we have all been talking about real time, shiphandling simulators. We are using other types of simulators now, though. Everyone has a radar endorsement on their license. To get one, you have to go through a simulator. No one would argue with that. There are many levels of simulation we are contemplating other than the massive type that we have at LaGuardia or CAORF, and they are massive in terms of the time and money involved. For example, when you are teaching cadets the rules of the road at Kings Point or on a school ship, a very simple simulator can be used to give a hands-on feel of what the rules of the road mean.

There are many levels of simulation. The big daddy of them all, of course, is the real time, full blown, everything in it, millions of dollars simulator. But we should not lose track of the fact that such simple things as radar simulators exist and we have been using them.

I think that there is no question that there is a place in the marine industry for simulators. The question is how sophisticated we want to be and what reliance we intend to place upon them. Of course, these issues form a large part of the study. Much emphasis is being placed on human engineering factors.

One of the things that I would like to have someday is a bridge simulator. We should be able to optimize the layout of a bridge. You have all walked on bridges, and you can be pretty sure where the wheel is going to be placed. But, that is about the only thing that is usually on the center

line, someplace near the middle of the bridge. Obviously, the layout of a bridge can greatly enhance or greatly distract from the mariner's ability to safely navigate the ship.

Someday, we are going to be able to investigate the placement for radar. Should the radar be placed so that it is convenient for the man standing watch or for the pilot? Where should the engine controls or the telegraph logically be? I know that human engineering has progressed to the point that we can use it to improve many of our bridges.

CAPT. SALVESEN: We had a great deal of success with simulator training when we had a growing fleet. We went from 90 thousand dead-weight tonners into 190, 250, and 400 and above. Since we did not yet have the ships, we had to utilize simulator training. Also, we were building some LNG ships at that time, and we had simulators for those. Several pilots from both Barcelona, La Spezia and Brega attended the program at our expense. In that case it was a situation in which we could see the net return. They were, after all, going to handle our ships, and there was no other way of them obtaining the necessary training.

CAPT. LARKIN: Capt. Quick has kind of raised my competitive spirit a little bit because he indicated in his comments that the big shipowner, with his insatiable lust for money, drives his ships at inordinate speeds and puts a tremendous amount of pressure on the ship's captain to take some risks that perhaps are not warranted. As I have listened to the dialogue today, I have felt sometimes that we are passing over some of our problems, missing them by a wide margin. I want to talk about this business of ship scheduling and greed because I have been involved in ship scheduling for a very long time, and I can speak with a degree of expertise.

Any operator will tell you that in San Francisco Bay, it takes from two to two and a half hours from the time you pick up a San Francisco Bar Pilot until the ship is docked in Oakland. After a 42-day voyage, this amount of time is insignificant.

In my experience, the only factors we consider in vessel scheduling are the weather at sea and the port conditions themselves. Pilot speed or pilot docking time have nothing to do with any pressures we might place on the captain. In fact, we have an adage in our little steamship company; we say that the schedule is flexible but the ship is not. I might also add that the value of one vessel in our small fleet is incalculable. I speak with some experience; in 1976 we lost the PRESIDENT GRANT against the reef off Keelung. This is only 1979, and, because of the loss of that single ship, the figure on our lost business

opportunities is approaching $400 million. So if anybody, including my boss, wants to talk to me about driving ships, I would be happy to talk.

I would now like to talk about the American President Lines and pilotage on the West Coast. We used to have a round-the-world service. We served the Atlantic Strait, so we went through the Panama Canal, the Suez Canal, ports on the East Coast, the Mediterranian, and so forth. I have a considerable amount of experience in some of these areas but more experience on the West Coast.

On the West Coast, American President Lines deals with Los Angeles City Pilots, San Francisco Bar Pilots, California Inland Pilots, Columbia River Bar Pilots, Columbia River Pilots, Puget Sound Pilots, and, last but not least, Alaska Pilots.

When I was a young lad going to sea, to become a member of the San Francisco Bar Pilots was quite a prestigious event. It was like being promoted to greater than God himself. I have watched the San Francisco Bar Pilots over the course of the years, and I have seen a slow but certain degeneration. In fact, I witnessed a San Francisco Bar Pilot giving up the best part of his job, docking the ship, in order to let somebody else do it.

I feel that for too long on the West Coast, because of certain associations and parties, an appointment as a pilot has had too much to do with family, political affiliations at the State Capitol, or even fraternal organizations. I feel that anything that pilotage meant when I was 18 years old and going out to sea on a Liberty Ship has nothing to do with being a pilot today.

Without pointing a gun at anyone, I feel strongly that the broad spectrum of pilots have failed to stay even with the industry. A polarization has occurred. Pilots have said, well, the only time we should meet with the owner is when we want to talk about rates. The only opportunity I have to talk with the pilots is when we talk about rates. I am not allowed to talk about anything else. I am not asked to participate in the training or education procedures. I am not even asked to familiarize them with what we are trying to do. I know what I am trying to do. I am trying to work for a small American flag steamship company and to survive.

The success rate on the West Coast hasn't been very admirable. Therefore, I think it is time to talk about how we acquire pilots. I know that there is something wrong when I am on a ship doing 22 knots out of Puget Sound, where we have true motion radar, and I watch the pilot turn the knob to headup unstabilized. He does it because that is the

way he wants to operate. I think it is time that pilots learn what a north-up stabilized presentation is. But this pilot has been there a long time, and he has always done it that way, and, by gosh, he is not going to do it any other way. This is not to say that he is evil or has bad intent. It is simply a question of education and training.

There are diverse philosophies and opinions about pilots in California, Oregon, and Washington, and I suspect that our whole pilotage industry is beset with the same sort of problems.

CAPT. PETERSON: I think the gentleman was asking about what are we doing to train our pilots to ensure that they are better pilots. I would like to tell you what we are doing in New York. We have an apprenticeship system that lasts seven and one half years. We take a man into the system when he is between 21 and 23 years old.

The first year he gets AB and lifeboat certificates; he starts on the ground floor. The next year, or within 20 months after entering, he has an inland operators license which allows him to run the motor boats that we use on station to put pilots on and take people off the anchorage.

After that, we have classroom work covering the material needed for a master of pilot vessel and first-class pilots license. The final course takes three years; it is a mandatory course that covers all types of ship handling and ship construction, as well as material for the Coast Guard examination. We get college credits through the University of the State of New York for the courses that we give.

After the seven and one half years he starts as a pilot. The first year, he is a sixth grade pilot. He is allowed to take 22 foot drafts, 8500 tons, in and out of harbor for the first six months. The next six months, he may pilot 24 feet, 10,000 tons. He then becomes a fifth grade pilot, and takes 26 feet and 13,000 tons for a year. He then becomes a fourth grade pilot and may take 30 foot of drafts, 18,000 tons. He then becomes a third grade pilot for two years. He may pilot 34 feet, 33,000 tons. During the second year, he may move up to 36 foot draft, 33,000 tons. He then becomes a second grade pilot which allows him draft unlimited, and 35,000 tons. Finally, after seven years, he becomes a first grade pilot or a full branch pilot as we call it. He has unlimited draft and unlimited tonnage.

The New York Sandy Hook Pilots have been in existance since 1694. Some of the largest ships in the world come into New York. As we have progressed from the small ships to the large ships, we have found that we could handle the large ships because of our training. I do not quite agree that it is necessary to break in on VLCCs to be able to

pilot them. You might have to take one trip just to see what it looks like, but I think we have the expertise and the training to pilot these ships. The gentleman from American President Lines (APL) has said that the only time we confront the industry is when we are looking for an increase. Well, in New York, that is not true. We have lunch with people, and we talk over any problems that they might have. We take people from the industry on educational cruises around the harbor to show them what we do and how we train our apprentices to become pilots. We offer to do soundings of piers for them so that they know exactly what draft they have at their dock. We have very good rapport with the industry in New York. We continue to work on building our image. When we recently asked for an increase in rates, we told them that we were going to send people to the Grenoble school because we get a lot out of it.

In fact, we have found the various schools very useful. We have sent people to Delft, though we don't find it as helpful as Grenoble. I have been to the simulator at LaGuardia and have taken a ship into Milford Haven. I think you could possibly get something out of that simulator. I also have been on the one at CAORF. I think you can get something out of most of them.

The most important thing is the attitude of the pilot when he goes to work on the simulator. Many pilots go to Grenoble with the wrong attitude. They feel they are playing with kiddie cars. Yet, we know that the research and development of these models cost $80 thousand.

We also know that when we get in the simulator, we can experience the reaction of hulls meeting each other in confined waters or a hull going past a bank in a channel creating suction.

When I went to Grenoble, I happened to be breaking in for Perth Amboy, which is a special area in New York where we primarily handle tankers. I had read about bow suction, bow pushing, and stern suction in channels, but at Grenoble I was able to practice compensating for it. After I came back, I had to drift a tanker in the Raritan Bay Channel for three or four miles around the turn at Sequine Point. It was flood tide, but I just played the bow on the bank and was able to make the turn without any problems. At Grenoble you can learn about these things without jeopardizing a vessel.

I hope I have made my point. We have come a long way since 1694. I think we have a different rapport in New York than the gentleman from the West Coast experiences. I can't speak for the other ports, but, in New York, we get together and talk over our problems with the shipping industry. They know they can call us and get results.

ADM. BENKERT: I was the OCMI in New York for some time and I am well acquainted with your training program for the pilots in New York Sandy Hook Marina. I am interested in your opinion. Do you feel that the type of program that you have in New York should be expanded to all ports? Obviously this is one of the areas where there are many differences, depending on the port. Within the United States we may have entirely different concepts about training regimes. What is your opinion?

CAPT. PETERSON: We are willing to meet with people and show them what we have done and what we propose to do in the future. However, there are some ports that don't have the pilot boats that we have. We have a 162 footer and 182 footer, and the apprentices get a lot of experience on those boats. Also, we are able to take them all around the harbor and give them experience with what has to be done in the different channels.

I think improvements can be made in every port. It is simply a matter of setting up the type program that is best for each particular port. For example, not everyone will want to require some college education. We require two years of college, but right now, most of our apprentices have four years of college. Then we train them the way we want them trained. Our pilots serve for 30 years after they complete their training.

Others will have different ideas for their ports. However, that the quality of the pilots can be the same. We all want well-trained pilots; we want to know that the guy coming up the ladder when the ship comes in is going to do the job. I don't know if all programs should be set up exactly like ours. Ours has been running for a long time and other ports may have different needs and problems.

ADM. BELL: Sir, do you have a program for familiarizing your first-class pilots with new innovations such as stabilized radar or the doppler speed logs on larger ships? Is there any way the association tries to aid the pilots in keeping up with the more recent technological advances?

CAPT. PETERSON: Yesterday, we had a cruise with the state commissioners and they asked me the same question. We are thinking along these lines. As a matter of fact, during our annual meetings in January, we showed a film on the interaction of vessels supplied by the Coast Guard.

What we would like to do is to obtain video tape cassette systems to put on the boats. The pilots could then review, from time to time, different video tapes on the new types of radar, doppler systems, and so forth. Although we have some ideas, it is a slow process. We have got to work

very slowly because we have 120 pilots and must convince a lot of them.

CAPT. QUICK: The Marine Superintendent of APL made some statements that made me think a little bit. I may have been addressing the wrong people in this room. Everyone in this room is operating very sophisticated, capital intensive equipment, and that is not the type of equipment that we handle as pilots most of the time. If you are operating an $80 or $100 million ship, you will be very conscious of safety because you know what it could cost you to lose or damage the vessel.

As pilots, however, we handle a broad spectrum of ships, from a $150 million LNG ship to a ship that will probably be turned into the scrapyard tomorrow. Often, ships have no monetary value at all except as scrap. Also, the ships are sometimes part-owned by the captain. He may have a fixed charter. He may have been chartered through Greece to sail out of London to lift cargo out of Baltimore. The ship may barely meet navigation safety requirements. It it doesn't, the captain may be trying to cover up the fact. He may try to overload well beyond the pilots recommendation. Sometimes, I have had to call the Coast Guard and have pilots refuse to move ships because of fires in the engine room. The crew will keep putting the fire out, starting the engine, and going another mile or two before it blows again. We have had cases in which the pilot has called me and had to disguise what he was saying because the Captain was threatening physical violence. I don't think that many of you really know in what bad conditions we often must work. You are used to the best conditions.

We are not dealing with APL or with El Paso. We are dealing with foreign ships that hire agents that work cheap and have a clerk on the dock who has never been to sea but is giving us instructions. The clerk may make $150 a week to carry the mail. Yet he will tell us how to dock the ship, or that we must get underway because they have committments.

These are the things that pilots need protection against. We want to be insulated from the pressure of the agent, the clerk, and the fellow who is not an experienced seaman, the master who owns a piece of the action, or the owner who doesn't care whether his ship flounders because it is insured and only worth scrap value anyway. These things do happen. They don't happen with Exxon. They don't happen with El Paso. But they happen to us fairly frequently.

CAPT. MARTIN: I would like to comment on some of our training programs. We have just finalized the design and are letting a contract this week for a $20 million expansion program at MITAGS.

In answer to one of Admiral Bell's questions, yes, we have a simulator that you can use to teach third mates the rules of the road. We also will have a dual, night visual scene simulator that can be used to teach novice deck officers rules of the road in spotlight projection. We will have a full daylight mission, ship handling simulator. It will have the most sophisticated bridge available. On this bridge, the pilots and the masters will learn how to use all the new technology, including doppler motion indicators and rate of turn indicators.

We have an electronics navigation course in progress now, that teaches all of the new navigational systems that are on the market. If it is available, useable, we can teach you to use it in our school.

Some 1,100 State Licensed Pilots are members of our organization. We use this forum to bridge the communications gap. You speak about masters meeting pilots; they are in the same classroom. They belong to the same organization; they speak the same language; they recognize the same problems; and they trade back and forth from a master's job to a pilot's job. I believe that this is one of the biggest breakthroughs in cracking the nut on training, interfacing of command, and exchange of ideas. The school also serves as a think-tank for innovations.

When I hear statements made such as "I never talk to the pilots unless they are asking for more money," I feel I should point out that in San Francisco, we have an ongoing standing committee run jointly by the Coast Guard, AIMS, and every steamship company in the Bay. They meet twice a month. The Harbor Safety Committee is there, and the sky is the limit. Anything to do with maritime transport can be laid on the table and discussed. It works.

I know this happens in many of the ports in the country. Perhaps there are gaps somewhere in management, that if they are unaware that these forums are available for problem solving. If there were sufficient liaison at the working port level, we would not be at meetings like this. We would have no problems.

MR. BULLARD: I operate tug boats up and down the river, and I would like to point out a couple of things. Number one, every time we get new regulations for the deep sea and the big ships, they spill over into that muddy water (Mississippi River).

There are some good piloting systems, such as in New York and Maryland. So, why do we need more regulations? You are asking the government to add more regulations to the industry, when it is already over-regulated. At least, we are over-regulated on the inland waterways.

On the river, for example, it is irrelevent if the Coast Guard gives every man that works for me a license. A Coast Guard license does not qualify a man to pilot my boat. My pilot is going to train with me and meet my specifications before I turn him loose. You all probably have a driver's license, but you would not expect a trucker to give you a job driving his $50,000 rig without checking your ability to handle it. New York City has a good program, but I would not let a man trained there pilot one of my tugs until I personally reviewed him.

We spend hundreds of thousands of dollars a year fighting regulations that we don't need. Let's get away from that. We have good systems. You are doing more than is expected of you. Don't ask for more regulations.

On the inland waterways today, I have 25 steersmen. They spend a minimum of two to four years in training. I spent seven years in training before I got my license. Even then, they wouldn't let me stand a watch on a tug boat. A license doesn't make you a pilot. A license is no good to you until someone believes you are qualified and gives you a job.

If we ask for more regulations, we will get them. Then they will come along with even newer regulations. The first thing you know, we are all out of business. Yet no one today has even mentioned the economics of the problem. Nobody has mentioned dollars and cents. Who pays for new regulations? The consumer. Believe me, the consumer is not sitting out there saying, "Come on, give them some more regulations so that the price of coal will go up, or so that my electric bill will go up." The consumer will have to pay the bill for the regulations you want but don't need.

ADM. BELL: You have brought up one point that we have alluded to this morning. Many of you have said that your organizations and companies require higher standards than are required for a federal license. This is precisely the philosophy behind that federal document. It is not intended to guarantee, in any way, that the holder can walk aboard, and perform like a first class pilot. It does not guarantee that he is capable of doing anything at all. The philosophy presumes a whole process. It presumes that you, as managers and operators of pilot's organizations, will exercise your normal prerogatives. We assume when you hire an individual, you will check his qualifications. All the license does is get a man in the door. it allows him to say, "Yes, I have met these minimum standards."

I have to agree with you, sir. It does bother me a little when I hear the inference that the federal regulations should ensure, somehow, that the gentleman who holds that piece of paper is a top-notch, number one,

excellent, best-in-the-yard pilot. All it is is a license to go out and try to get a job. To date, it has never been the government's intention to try to make the license reflect competence. The holder is not necessarily someone you should hire blindly and entrust with your best piece of equipment.

The federal licensing program is not intended to achieve the ends that many of the state pilot's associations are designed to achieve for their own people in their own area. I don't think that the industry should ever ask that we set up a licensing program that will allow you to go out to a hiring hall and pick up a pilot who is guaranteed by the federal government. As far as I know, the government does not do that in other industries. The truck driver was a good analogy. Just because a driver has a license to drive an 18 wheeler does not mean that most people would be willing to blindly turn him loose with a $50,000 rig.

CAPT. IVES: Captain A. E. Fiore asked a question earlier about the makeup of the American Pilot's Association. There are over 1,000 state pilots in the United States who are members of the American Pilots Association. They are organized into approximately 60 local associations in the 23 or 24 states that have deep water ports. These local associations are private enterprise organizations, and have historically assumed the burden of training themselves. They train their own men through apprentice systems that rely on experienced mariners.

Now, I would like specifically to address the question of additional training programs for experienced first class pilots. I would like to cite an example of how this can be accomplished through the local associations. We can benefit from the progressive thinking that generally prevails among many of them.

For example, in the Delaware Bay, we had a peculiar situation in which very large ships, with 55 foot drafts, were coming in from sea to meet lighters. Outside of the State of Alaska, we are probably handling the deepest draft ships of any port in the United States. In some cases, these ships were having difficulty finding the Delaware Capes. While I won't go into all the ramifications, we did have numerous strandings at sea, beyond the pilot station. Many of the owners asked for the pilots who would go outside to assist some of the masters who were unfamiliar with the area. With that kind of draft, it is necessary to stay within a relatively narrow sea lane. Our men were quite concerned about the legal ramifications of such an action because they were not certified to pilot at sea. The Coast Guard, unfortunately, was not able to give us assistance in the matter because they do not issue licenses for pilotage

in the middle of the Atlantic Ocean, nor do state commissions.

We decided to solve the problem through education. We worked with the MITAGS school in Baltimore and set up a course of post graduate education on electronic aids to navigation, simple chart work, refresher work on rules of the road, all of the tools and skills that a pilot may need off shore while approaching the pilot station. In the normal course of discharging his duty to take a ship up a river, the pilot does not use these skills. Some of them were quite rusty in these areas. We also incorporated training in Loran C, which was new to our pilots, as well as Omega satellite navigation. To date, we have sent nearly three quarters of our men through this training program. Other associations either have done, or are thinking about doing, the same sort of thing.

By the way, we were quite impressed with Captain Waldo's north-up stabilization. I don't believe that the gentleman from San Francisco would have the same difficulty with one of our pilots. They all like stabilized radar displays.

This is an example of the kind of thing that pilots can do without prodding or government regulations. I think that it is this sort of thing that will perpetuate the system and allow us to continue to give good service to the industry.

CAPT. BRUCH: The GAO produced a report that Congressmen have run away with. The Coast Guard felt that this was very unfair, due to the fact that the person responsible for it was very poorly trained in that type of work. The result of such reports is often more regulations.

As for the VTS in New Orleans, the Coast Guard hired eight professional Pilots. You can rest assured that every time there is an incident, the pilots or the owners want to talk to one of our light men.

For example, one night there was an incident, and an attorney crawled up the light tower; he wanted the VTS operator to sign a statement. When I was asked how he should respond, I made a suggestion that was not very diplomatic. Now, I don't know if the Coast Guard wants it that way, but we feel that the government has a right to defend itself, just as the industry has. It is reasonable for VTS to correct mistakes when they are found and to adopt a defensive posture.

Another comment. I know that Captain Charter went to considerable effort in the Eighth District to try to get feedback to the Coast Guard on the regulation.

CAPT. TORRENS: I am very glad that everything is less antagonistic now. I concur with Peterson in New York, that we have a very good rapport with the pilots. They are very instrumental in the Advisory Committee for VTS.

I trust that a lot of the pilots here are frustrated by the people who were running incompetent ships, and the ship masters, who, at various places in the world, were having to take incompetent pilots. And it has nothing to do with anybody in this room. That may be why there was the appearance of antagonism.

Admiral Benkert made some comments about the ARGO MERCHANT, and tragedies like this, over television, and I concur with him entirely. You cannot regulate some of these idiotic things that happen. So, instead of regulation, as far as piloting is concerned, let me make a couple of suggestions. One is that perhaps the Coast Guard, industry, pilots, navigational interests, and tow boat interests form an Advisory Committee in each port. Its purpose would be to examine port conditions and develop concensus to improve the safety of piloted vessels.

Our Advisory Committee in New York has been doing this mainly on a VTS basis, but I think it could overflow into many other aspects. U.S. ports, navigational aids, the buoyage system, and many other components of close-in ship handling, like Topsy, have just grown. Now, we should work to make it rational and efficient.

I agree with Admiral Bell who said, "Times have changed." Public opinion is different. The atmosphere is different. The ships are different.

Let's look at some of the aids to navigation, the ones that are simple. Should a dumb buoy be in this position, or should it be a lighted buoy? It doesn't cost much money, but it might keep a ship from going aground. Put range lights in lieu of certain other navigational aids. Place fixed structures in certain areas where ice is liable to move the movable structures. These are simple matters. Just go out in a boat and take a look. See what a confusing array of lights are behind the navigational aids. You have got a whole myriad of lights of New York City, and you are trying to pick out a little buoy. It is very difficult.

There is a big bridge, with lights of cars going across it, and fog; forget about trying to pick out certain things. Each port should be looked at by a team from the Coast Guard, or an Advisory Committee of some type, and just try and pinpoint problem areas. Without antagonisms, the Committee would recommend a red buoy here, or a better lighted buoy, or a radar reflector, or a RACON at the

entrance to the port; something that would improve the navigational environment.

I happened to spend a couple of weeks on vacation, and I was navigating a small boat. I was off Bluff Gut, half a mile off, and I couldn't hear the lighthouse. I think all navigational aids, from the small ones right up to the top, should be studied. Maybe it will be found that the equipment is outdated, it is not up to the state of the art today.

I concur with Peterson that cassette players and video cassette aids may assist in training. It could be used by pilots to learn how a Raytheon radar works, or to show how the doppler sonar works. Somebody should approach the manufacturers of audio-visual equipment and provide specifications for the design and development of such equipment.

If the Pilots want to come to our little company, and ride aboard the ship because we have a piece of equipment on there that they may not be familiar with, I would encourage them to come. I think that would be an educational process, and a cooperation between the parties, without making new regulations.

Small improvements can be made and they can prove to be important.

CAPT. FALL: We, too, operate American flag ships. I think we operate more than anybody else. It is ten minutes to five. I have been in this room for a period, of, I guess, seven hours, or so. I was beginning to flounder in my seat, over there. I wasn't sure if we had run aground in the muck of self-interest and parochial attitudes.

I got to wondering, what really am I here for? What answers have I heard that are going to help me, as a ship owner, go to bed at night and feel a little more comfortable that at any of the fifteen U.S. ports we call at we are going to get a competent, first class pilot?

I don't think the U.S. pilots have to take their hat off to anybody in the world, as a group, as a class. But, we do have our problems. We hope by some stroke of luck, that we can avoid getting some of those marginal individuals who certainly, given a choice, we would never want aboard the ship.

But, they are few in number. What we are looking for is the answer to the question, "Do we remain in the sea of complacency, in that we are good, we are professional, and we do our job, or do we try to keep up with the times and

advance our technologies to be ever better than we were the day before?"

I think that our peers in this room certainly have the expertise to give the answer to the question. The gentleman from the South, who made a very pointed speech on government regulations, spoke accurately. My company spent over six and a half million dollars last year to comply with government regulations.

But, if we don't clean our own act up, amongst the pilot associations, among the industry participants, the government is going to do it for us.

Now, how do we grapple with the problem. Do we sit here and philosophize? New York has got an excellent training program. Is what New York is doing, or Baltimore, or the Chesapeake Bay Pilots, or whoever they may be, is that going to cover the mistakes of some other place that we are going to have a casualty in?

It is the environmental impact of that one casualty and the publicity that goes with it that is going to be detrimental to the whole industry. It is going to force changes in the political environment, and we are not going to like it. So I think that in this one short day we are not going to find the answers.

But there ought to be a forum that follows up, which has committed itself to a non-polarization of attitude, because, if we remain polarized, you and I and everybody else that is connected with the industry are going to suffer the consequences.

I would like to ask Admiral Bell a question, if I may. We are talking about proposed rule making. If it goes through, I would ask the question, "How does the inspector, who is going to issue the license, qualify himself to be able to sit there and determine that this man indeed, can be licensed as a first class Pilot?"

Would it be inconceivable to say that if the OCMI in Anchorage, Alaska is going to license a pilot to run through six feet of ice, four and a half months a year, that no simulator, no textbook, or anything else is going to tell him how to do it. I don't see how the inspector is going to be qualified to determine, in a verbal conversation, if the individual can, in fact, accomplish that.

I had the pleasure one time, two years back, to take the OCMI in Anchorage, who had never been through the ice, and I said, "Please accompany me down Cook Inlet". Captain Collar was the pilot on the vessel, as I recall. We had a very

severe cold spell. In fact, the chill factor was 78 degrees below zero.

I took the OCMI up into the forespeak, and let him actually see the panting of the frames as that ship was working its way through the ice. When the pan would open up, the crack would spin off about a mile; the wheelsman never steered the ship--the ice steered the ship. The ship just followed the crack and you waited until you got enough water and you were able to do some maneuvering, and start working again through the ice.

But this is something that the individual has to learn. It is the local knowledge that was mentioned this morning. It appears to me that if the OCMI, or whoever it may be, is going to judge the man who is going to get the license, then he ought to be obligated to have familiarized himself with those waters. Maybe it is 25 trips, himself, that he has to make through it, I don't know. But I cannot accept that getting the license is nothing more than opening the door. Getting the license, by its nature and its mandate, is supposed to mean the man is qualified. And we all know that qualifications come from actual experience, learning, oftentimes, the hard way.

I feel that we have got to put an awful lot of thought into this whole problem of how to manage the licensing of pilots, be they federal or state, and that we ought to have an unbiased review body that is going to give their best input. I also agree that something in the area of a local management/pilot/regulatory group should be established, or a national board that will provide assistance to the Coast Guard. The Coast Guard is charged with a mandate under the Ports and Waterways Act to protect the environment. We should be able to accomplish what we are supposed to do, and that is to have qualified pilots that will be able to con our ships with a minimum number of casualties.

ADM. BELL: There are two points I would like to address. First, I agree completely that the regulatory system should only come into effect when a problem is either observed or perceived. If the people who hire the pilots and the pilots themselves could get together and agree, we would not need regulations. Obviously, we are never going to have uniform standards because we have different coastlines and different harbors. But, it a minimum standard could be established that would serve as a reference point for the industry, I believe you could forestall the involvement of the federal government.

I also agree that people do not look at the well-established, well-run pilot associations. I must admit that when we talk about problems with pilots, we are usually not talking about pilots in those areas. However, everyone

admits that there are different qualifications and standards for the various pilot organizations throughout the Country. They range from some of the finest in the world, to some that most of you here would not endorse on public record.

I think this is one of the problems we have. If we had pilot's associations in all of the states with similar standards for pilot commissions, then there would be less pressure for the federal government to do something.

It is also unfortunately true that since the Federal Government only moves in when there is a perceived problem, the perceived problem is always evaluated by the lowest common denominator. You never pick the highest denominator, when you are addressing a perceived problem.

It certainly would benefit the United States and the ships that call here, if there was a cooperative effort to try to establish more uniform standards. It would be especially beneficial to try to up-grade the areas with lower standards to a level somewhat nearer to the associations that most of you here represent. If you could do that, there would be no reason to fear that the government would walk in on you.

As you are all aware, the licensing procedures of the United States are different from those of the rest of the world. In many of the other maritime nations of the world, the government itself, is involved in supporting, or actually running, the training programs. The government establishes the prerequisites for entry ratings in the field and for up-grading. One of the main prerequisits is that you be trained at a government-operated school.

In the United States, we have, from the very beginning, used more of an Horatio Alger approach. Entry into a formal government training program is not necessary. It is not consistent with the "American way of life". If you can go out and amass the necessary knowledge, the necessary experience, and can demonstrate an amount of service, either by taking a certain number of trips or by spending a number of years on a ship, then you are qualified to take an examination. The examination only touches on a very small part of a large number of subjects. This is the system we use to allow our mariners to demonstrate their qualification to receive a license. Then we have a variety of systems for allowing them to acquire and demonstrate competency.

At this point in time, I am not sure I could endorse the concept of the federal government becoming strongly involved in the training of mariners. I think there are other organizations, management-operated schools and programs, union schools and local associations that are satisfactorally filling this bill.

I am not sure that I would like to see us go to a system similar to those used by other major maritime nations. It is an entirely different philosophy than we have in this country.

Until we want to accept that approach, we will have to settle for the reality of what our piece of paper represents. It means that a man has the minimum qualifications; it is truthfully up to the employer to ascertain whether that individual meets the standards of his company or his organization. Does that address your point, Capt. Fall?

CAPT. FALL: I apologize, if I misled you, but what I was addressing myself to was the provision of some training for the inspector who, in fact, will be giving the license.

We have a joint Coast Guard/industry training program right now which I believe will be beneficial, in the long run, to the OCMI activity. In this program, Coast Guard officers come into the industry for a period of time to learn about the other side of the coan.

I am suggesting that there ought to be a program for the Coast Guard that will ensure that the people who will be responsible for issuing licenses have some experience. I doubt that any pilot's association or company program would be against full cooperation with the Coast Guard in letting their facilities be used for that purpose.

ADM. BELL: I couldn't agree with you more, but there are some interesting practical problems.

Admiral Price, who was formerly in San Francisco and is now in the New York area, is working out a cooperative arrangement with various segments of the industry to allow Coast Guard officers to ride on various classes of vessels, just to gain the type experience you were discussing.

The Coast Guard, just as any industry, does not have the luxury of having a large pool of men, however. It is difficult to dedicate a large number to a single program at any one time, but we will do the best we can.

We have similar efforts in other ports in the United States. Through the cooperative efforts of certain portions of the industry, we have people riding and working within the industry on a limited time fram. Again, the purpose is to try to gain more experience, to try to better understand the problems, and to learn to speak the same language as the mariner.

While this is our intent, there are limitations. As I mentioned, one is the availability of our people and our workload. The other is interesting; it is a question of liability. We seem to have trouble legally getting around. Some companies feel that we should sign a release of liability when we put our people on their ships. For those of you who are not familiar with the intricacies of federal government, you just can't do that. This tends to stymie the program. At least, it did in San Francisco with certain companies. Although I can certainly understand their concerns, the federal government just cannot comply.

CAPTAIN HARD: I would like to address the subject of public opinion. We, in the United States have to face the fact that we are a maritime nation with an unmaritime minded public. The best example of this, over the last few years, is the incident of the ARGO MERCHANT. If I remember correctly, that vessel grounded in December of 1976, and there was quite a hullabaloo in the world press about that incident. There were hearings in Washington the following month, which I attended, where some grand schemes for alleviating the situation were suggested by very prominent Washington people.

That same month, the GRAND ZENITH went down with all hands, off Nova Scotia. I have only seen one article about it. You see, unfortunately, sailors are biodegradeable. They don't pollute. So, nobody cares.

The problem of public opinion is very serious. When something happens, it sells newspapers. In addition, the minute something happens, someone in government is prompted to take some type of action. As a part of our effort to "get our own act together," I would suggest that we mount a good public relations campaign. We must make the public understand the maritime dependency of this Nation, and we must reinstill an understanding of the importance of the U.S. Merchant Marine.

I can remember when I was a young boy, and the QUEEN ELIZABETH made its first commercial voyage into New York harbor. It was a summer evening after the war. People from all over the city turned out to see that vessel arrive. When the vessel sounded its whistle out at Ambrose, people took buses, automobiles and walked; they lined the shore road and the Staten Island beaches, just to watch that vessel come in.

Now, we have a different age. This is the age of the airplane, the age of space travel. There is a public philosophy that is very troubling. In newspapers, we read about public and private funds spent to improve transportaion, such articles are always about highway transportaion or air transportation. But, articles about

funds for waterways, ships, railroads, use a different term, subsidy. This is a very, very critical problem. We must get our message across; we must make it clear that marine, rail, and other forms of transportation are just as important as highways and airplanes.

ADM. BENKERT: On behalf of the Panel, I would like to commend everyone for their interest in the subject. We are grateful for the suggestions and the thoughts that have been shared. Many of our problems need further study. All of our problems need all of our cooperative effort to resolve. Thank you gentlemen.

PILOTING AND VTS SYSTEMS SYMPOSIUM

September 13, 1979

MR. LUNSFORD: Today's moderator is Mr. Gordon W. Paulsen, an admiralty lawyer with Haight, Gardner, Poor, and Havens in New York. Mr. Paulsen is Chairman of the Coast Guard Rules of the Road Advisory Committee. He also is on the Maritime Law Association Committee on Coast Guard and Navigation. Recently, he participated in a National Academy of Sciences study on hazardous materials.

MR. PAULSEN: Our subject today is possibly even more controversial than yesterday's subject. One thing we should perhaps clarify is what we mean by VTS. In most of the world, it stands for Vessel Traffic Systems; in the United States, we used the term Vessel Traffic Services. Inevitably, VTS now stands for Vessel Traffic Service Systems. Whatever the term, we know our subject area.

CAPT. DANIEL CHARTER, USCG

Chief, Port Safety and Law Enforcement Division

Some of the concerns and comments expressed about Vessel Traffic Services are caused by a failure in communication. We need a good understanding of what you are saying, and you need a good understanding of what we are saying.

I believe that much of the problem is in the semantics. Therefore, I will briefly review the background, and try to establish a general structure for the discussions that will follow. Since my paper will be very brief, we will have a lengthy period for questions. As you can see from the agenda, several papers will then be presented that will go into different aspects of VTS, as well as discuss some of the areas that they are going to service.

January 1980 will mark the 10 year point in US Coast Guard VTS operations. So it is appropriate, as well as a pleasure, for me to be able to take part in this symposium. I believe that the opportunity afforded by this forum for an exchange of views and experience can only help our systems to better accomplish their job. Judging by yesterday's piloting session, this should be a stimulating and worthwhile exercise.

The Coast Guard installed an experimental harbor advisory radar in San Francisco in January, 1970. It was not a new idea. Radars in Long Beach and New York harbors, not to mention several European harbor radars, had been in operation for many years. Vessel traffic services go as far back as the 1896 legislation for the St. Mary's River on the Great Lakes.

The Ports and Waterways Safety Act of 1972 was the result of Congressional concern about potential damage to the environment from vessel casualties. This act authorized the Secretary of the Department of Transportation to establish, operate, and maintain vessel traffic services and systems for ports, harbors, and other waters subject to congested vessel traffic. Incidentally, in the 1978 legislation, which amended the Ports and Waterways Safety Act, that same authority was re-enforced.

Congress did not provide guidelines for the Coast Guard to use in evaluating which harbors and waterways might need

vessel traffic services. In fact, it was soon discovered that the perceptions of need reflected the diversity of interest and backgrounds of the entire population. While environmental groups generally were supportive, sections of the marine industry were skeptical. The general population of most of the port and harbor areas was, for the most part, silent. Furthermore, the different groups had differing opinions about what a vessel traffic service was supposed to do. From the start, the Coast Guard has been involved in maintaining a delicate balance among the legitimate concerns of groups with different perceptions.

From the beginning, we took what I believe to be a conservative approach to determining which ports might need a VTS. A very detailed study was completed in 1973 which produced a ranking of ports. Incidentally, I would be happy to provide procurement information to anyone who would like to obtain a copy of that study.

There were, and remain, three major factors in the government's perception of need for vessel traffic services: reduction of accidents to save lives and property; reduction of accidents to prevent a spill which might endanger the environment; and facilitation of traffic, that is, making a more efficient port. We found that only the first factor, saving lives and property, was a quantity that could be measured. We still do not have a means of efficiently evaluating either potential damage to the environment or the facilitation of commerce.

The method used to evaluate potential reductions in numbers of accidents consisted of a detailed assessment of accident data collected through investigations required by law and conducted by our personnel. For each port, every vessel casualty for the years 1967 to 1972 was examined to determine whether a given level of traffic system might have prevented it. Our task was complicated by the fact that the Bridge-to-Bridge Radio Act also became effective in that same year. Therefore, we first had to test each case to see if this innovation might have led to prevention. The fact that several areas of the country were using the Bridge-to-Bridge on a regular basis far in advance of the enactment of the Bridge-to-Bridge Radio Telephone Act also added to the complexity of the analysis.

Our task was not simple. We were, in effect, establishing our own criteria for preventability. We also were not entirely sure what one of our potential VTS's would or could do, since we had not had any systems running long enouth to tell. The whole process was theoretical, but as I stated earlier, very conservative. The result was the following ranking:

1. New York
2. New Orleans
3. Houston-Galveston
4. Sabine-Neches (ICW 265-290)
5. Chesapeake Bay
6. Morgan City (ICW 80-99)
7. Cote Blanche (ICW 107-129)
8. Baton Rouge
9. San Francisco
10. Houma (ICW 50-69)
11. Chicago
12. Delaware Bay
13. Tampa
14. Puget Sound
15. Mobile
16. Detriot River
17. Vermillion River (ICW 155-179)
18. St. Louis
19. Long Island Sound
20. Los Angeles/Long Beach
21. Corpus Christi
22. Boston

Even though we ranked and reviewed the casualty statistics for each of the 22 areas, only the top few were actually seriously considered for implementation of a VTS for a number of reasons.

We are subject to a number of practical constraints in establishing traffic services. First, cost is obviously a constraint. Second, there is a need for uniformity of equipment and services. Our systems in the United States are uniform or nearly uniform in procedures; a vessel can trade in all of our harbors without unreasonable surprise. Foreign vessels are not required to comply with dissimilar regulations, and, of more importance, are not required to carry special equipment for each of our harbors. This philosophy is basic to our approach to VTS. We do not want to require that special equipment be installed on the vessels or carried on board by the pilots. VTS should operate using normal radio equipment.

The practical effect of uniformity is that we are technologically limited to radar, television, and VHF communication, assisted by computers tracking traffic. The need for uniformity and the consequent limitations on technology are sometimes misinterpreted by individual groups in individual ports. Neither may seem as optimal for a single local area.

We have now several years of experience in the ports of San Francisco and Puget Sound. I would like to be able to report to you that accidents have been substantially reduced in these ports. In fact, I cannot. We have had little success in isolating the effect of VTS from all the other dynamic changes in those harbors. There are many confounding factors such as varying port volume and types of cargo, regulatory actions and improvements in the harbor, pilotage practices, and improved accident reporting accuracy.

For San Francisco, the total number of accidents in the VTS area and the total number rated preventable are as follows:

Year	Accidents	Preventable Accidents
69	22	0
70	12	0
71	7	0
72	12	2
73	8	0
74	15	1
75	15	1
76	9	0
77	10	1

The average number of accidents for the "pre-VTS" years is 13.3, while for the "post-VTS" years it is 11.4. The numbers of collisions has dropped, as has the cost of annual damages caused by vessel casualties.

However, anyone with an understanding of statistics knows enough to be skeptical of such numbers, and we feel that more sophisticated analysis, as well as a greater length of time, are necessary before any solid conclusions can be drawn. To reiterate a statistical problem, we must keep in mind that the Bridge-to-Bridge Radio Telephone Act was implemented in the middle of this series of years. This limits the value of the data and complicates the analysis. We hope that data from the larger ports, New York, New Orleans, and Houston-Galveston will yield more meaningful information.

Around the world, one of the most controversial aspects of Vessel Traffic Services is the subject of control of vessels. I know that many pilots and vessel operators are unilaterally opposed to an order from the Coast Guard which amounts to the overriding of the judgement of the person in charge of the vessel. We completely agree that conning the vessel, or as we say in the regulations, "directing the movement of the vessel," is the responsibility of the pilot or master. We have no intention of changing this. It is not, and never has been, our intention to order course and speed changes from our remote position.

On the other hand, Congress was very explicit in granting the power to the Coast Guard to schedule and route vessels, as well as to set various operating limits, such as speed or draft, either on a permanent or temporary basis. I have no doubt that the intent of Congress was to improve the management and flow of traffic in order to reduce accidents. However, in carrying out this function, we do not intend to control the vessels. We do intend to manage the spaces in which they travel. I think that is a very important distinction that should have considerable significance for this audience. The Coast Guard will deal with space management.

As is so often the case, the Coast Guard is in the position of balancing conflicting interests. I believe that our record shows that we have used our authority with considerable discretion. In many cases, our VTSs are acting under the authority of the Coast Guard Captain of the Port. This usually occurs when ports are closed due to weather or accidents. If there are any examples of arbitrary instructions coming from traffic centers, I would like to hear about them. I would add, however, that before you call me talk to the Commanding Officer of the VTS. Establish a line of communication with the VTS, the COTP, and the district staff in the area in which you are operating. If there is something that you feel is unreasonable, bring it to their attention.

In the long term, our intention is to conduct additional study and analysis to determine what measures will improve safety without detracting from harbor efficiency. For the present, we must rely on the judgement of our people in the traffic center to issue orders concerning management of waterway space only when there is a clear safety requirement for them.

Before opening the floor to questions, I would like to give you a very brief report on the status of our systems.

- San Francisco--our first system, became operational in 1972 and is voluntary. It serves primarily as our R&D platform.

- Puget Sound--operational in 1972, is mandatory. We are installing new radars to replace the old ones in Puget Sound and are expanding coverage of the Strait of Juan de Fuca. That expansion should be completed in December, 1980.

- Houston--operational in 1975, will become mandatory in 1980. We plan to expand our television coverage to include the entire ship channel in 1981.

- Prince William Sound--operational in 1977, is mandatory.

- New York is almost complete. As you may have noticed, the Federal Register recently announced a delay in implementation. While there is a delay in the completion of the contract in New York, it should be operational within the next few weeks. Following a period of voluntary operation, it will become mandatory.

- New Orleans--operational in 1977, remains voluntary.

In addition to these coastal systems, we have VTSs in operation at Sault Ste. Marie; at Berwick Bay, Louisiana; and in Louisville, Kentucky, on a seasonal basis.

The remaining ports from our original study cannot support a VTS on the basis of our cost/benefit criteria. Chesapeake Bay, however, is under re-evaluation, as a result of a series of recent casualties, and certain sections of the Intra-Coastal Waterway also are under review. In general, we consider the existing regulations to be sufficient in those ports that do not now have Coast Guard vessel traffic services. I would now like to entertain questions from the floor. We have in the audience Cmdr. Cruickshank from our VTS Branch. He may be able to respond to specific questions about management aspects. With him is his assistant, Mr. Lombard. We have representatives from our Office of Research and Development, who might be able to respond to some of the technical questions.

DISCUSSION

MR. PAULSEN: What is the effect of mandatory versus voluntary vessel traffic systems? Just how voluntary is voluntary, and how mandatory is mandatory?

CAPT. CHARTER: In a voluntary system there is no regulatory constraint on the individuals who participate. If it is a mandatory system, then the regulations spell out which type, classes, and sizes of vessels, as well as which conditions require participation. To participate generally means calling in at a series of checkpoints and following the procedures in the operations manual.

The voluntary system, however, is just that. Checking in is at the option of the user. Of course, we would encourage participation in the voluntary system. There are several systems that have such a high rate of participation that, at present, intend to keep them voluntary. Louisville, Kentucky, during the high water season is a good example. With the present participation rate, we do not, at this time, feel it is necessary to have a mandatory system. This is also true of San Francisco.

CAPT. ROWSELL: Could you define what you meant by "preventable accidents" in the statistics you gave us?

CAPT. CHARTER: We separated the casualties into two groups. We looked at each casualty and asked if a VTS could have contributed to the prevention of the casualty. If VTS would not have then we put the casualty in the non-preventable group. If it could have been prevented by VTS, then we put it into the preventable group. This analysis

was the basis for determining which areas could benefit from a VTS system in the sense that such a system would reduce the number of casualties.

CAPT. ROSWELL: I thought that you said that there were some preventable accidents after VTS was enforced.

CAPT. CHARTER: That is correct. We still have some preventable accidents that occur after VTS is enforced. Perhaps Mr. Lombard, who does most of our data analysis, can explain in more detail the method that is used to examine each area.

CMDR. CRUICKSHANK: Mr. Lombard has done a good deal of the analysis, but I also have worked with the data. There is a great deal of subjective judgement involved, and it is not an easy task. Three people participated in each case evaluation. Using the reports of the investigators, we posited some level of VTS, even a simple vessel movement reporting system. For example, let us assume we are talking about a casualty on the Mississippi River. If we felt that some sort of an advance warning of the traffic around the bend might have prevented the accident, we would have classified it as a preventable casualty. Of course, there is no way to absolutely predict whether or not each accident could have been prevented. It is always a jusdgment call. We have never maintained that all of the casualties that we examined could have been prevented by VTS.

CAPT. ROWSELL: What I don't understand is that there have been some preventable accidents in areas in which I understand VTS has been installed.

CMDR. CRUICKSHANK: We do not maintain that telling the pilot what is around the bend is going to prevent every accident. It is absolutely impossible to have enough information in each case to say, "I am absolutely confident that, if we had told this fellow that there were two out-bound vessels around the bend, the accident wouldn't hve occurred." That is impossible; only God could tell, I suppose. The fact that there are still preventable accidents that occur, I don't think detracts from the analysis.

CAPT. CHARTER: If you have a few moments during lunch or a break, I do have much of the background with me in my briefcase. You are welcome to take a look through the original analysis.

CAPT. ROWSELL: Can I ask you what your assessment is of the value of television, bearing in mind that in presumably critical cases television is not used at all?

CAPT. CHARTER: I can't really answer that. I can't say that, "television would be exceedingly helpful across the board by a given percentage." There are some situations, however, in which I think television can be exceedingly helpful. For example, television can be used on a waterway that would normally not be transited during a period of zero visibility, or visibility reduced to the point where low-light level television would not be of any value. As long as the television is usable at all times that the waterway is used, the television has some value.

We have low-light level television in several areas now. It is in the Houson-Galveston system; it is going into the New York system; and we have plans to put it into the New Orleans system at Algiers Point. In those areas, we feel that television is very helpful in monitoring traffic.

I don't know if you have seen low-light level television or not, but it is really amazing the degree of detail and clarity that you can get, even under conditions of practically no light. This is very helpful, I think, in determining the traffic situation in a given area. It is helpful during the routine management of the space involved and becomes exceedingly critical to the watchstanders in the assessment of casualty situations.

While I wouldn't say across the board that every area of VTS should be covered by low-light television, I think it has a place in the system. I think a visual observer has a place in some systems also. Although it is not a Coast Guard operated system, I am familiar with one in Honolulu Harbor where a visual observer works fine. A man sits up in a tower, has a good view of the approach, runs his flags up, and manages his space very nicely, doing it all visually. So I wouldn't rule out a visual observer as a viable technique for some situations.

MR. MILLER: Risk analysis is usually viewed as a very technical area in which you analyze the number of accidents and the number of exposures and calculate the amount of risk. This is one of the methods that you used in the ranking of these ports. You must have used other methods as well because Puget Sound is number 14, and yet it has received a lot of attention.

There is another area of risk analysis called "perceived risks." We all deal with this because it is a reality of life, and politics has a way of enhancing the value of perceived risk.

I just wonder how the Coast Guard views the handling of perceived risks? We know that the Coast Guard has to handle it because there is political interplay on this issue. Some areas would like to have VTS. In other areas, there is

negative political pressure. Yet, from a taxpayer's point of view, I would like to see some level of consistency. I know this is a hard question to answer, but I would appreciate your thoughts on this.

CAPT. CHARTER: As I mentioned in my paper, the basic analysis that was done for the initial determination of port areas was based strictly on casualty history. At that time, at that stage in the developmental process, that is all we had to work with. We didn't have enough background information to make the type of analysis that you described. We have been pursuing that idea, though, and we are doing several things now in our research and development program that I think will lead to the type of analysis you suggest. We are working to develop assessment of risks using techniques other than the casualty analysis. There is the potential, for example, for a catastrophic occurrence. Casualty figures generally do not reflect such potential. We are trying to address that problem in our research, but it is going to be another couple of years before we have any final answers and can apply any formula or approach that would permit us to reanalyze the areas of concern. Does that answer your question?

MR. MILLER: Not entirely. There is a portion of perceived risk that just doesn't relate to reality. The potential for and the profiles of a catastrophic accident are real and need to be addressed, but that is not what I meant by the perceived risk. I am referring to the six people who happen to live where an accident may occur and who are able to create a lot of political furor and gain political favor. Then the politicans enact laws or interact with the regulatory agency, whichever it may be, all on the basis of a perceived risk. In some cases, there is no real risk at all.

A case in point is the current policy that requires the same procedures for an unloaded LNG vessel as are required for a loaded LNG vessel in the Chesapeake Bay. There are other examples all around us. Puget Sound is, by every definition I know, a low-risk environment. Yet, as we all know, the perceived risk is high. The people in that area clamor for more protection and do so in a political vein. Now, we know that the Coast Guard has to handle this problem. I wonder how you manage it and how you justify activities in areas in which there is not a concomitant actual level of risk.

CAPT. CHARTER: Okay. In 90 seconds or less, Loren Kelley, could you describe what we are doing along these lines? Essentially, we do have to respond to the political process. As we are all aware, there are pressures brought to bear by Congress, but we feel that by staying for the moment with our accident analysis, we are taking a

conservative and easily defendable position. Our R&D program is delving into the other areas. Mr. Kelly, will you give us a quick description of what we are looking at in the research program?

MR. KELLEY: As Mr. Miller's comments indicate, the policy so far has not been necessarily consistent. Therefore, in the R&D program, we have developed a major program in the area of basic simulation research. We use information from our own vessel traffic systems, as well as data from the work done over in Europe. We are trying to get a better handle on the overall flow of traffic within the harbors and a better understanding of the basic traffic itself.

From this baseline of information we expect to conduct a more detailed analysis and develop criteria that will result in a much more consistent policy for the future. We hope to be able to assess consistently the necessity and the effectiveness of VTSs.

MR. PAULSEN: Do you have a cost analysis comparing the cost of a vessel traffic system with, say, the cost of widening a channel? Is cost analysis something that goes into the hopper when you decide whether or not a vessel traffic system would be the remedy for a problem in a particular area?

CAPT. CHARTER: I am not sure that we do exactly what you described. We don't take every possible solution and then weigh total costs, as well as the costs of combinations. We do examine other techniques for improvement, however. For example, you are all familiar with several parts of the country where we use one-way traffic as a control technique; traffic separation schemes are used in other areas. Improvements in aids to navigation are also used. All of these techniques are considered as a part of the overall analysis.

As far as weighing the specific dollars and benefits of different combinations, I am not sure that we do as complex an analysis as we should. I would say that our cost analysis is probably in a rather elementary form at the present time, but it is done.

CAPT. LARKIN: These remarks come from the master of the PRESIDENT JOHNSON, and refer to the Puget Sound VTS. You stated that system is 14th on your list of priorities, and it is mandatory.

The master of the PRESIDENT JOHNSON states, "On departing Seattle, we were complying with the Vessel Traffic Separation Scheme rules, transiting the outbound Strait of Juan de Fuca traffic lanes, when we found the traffic lanes

completely blocked by a heavy concentration of fishing vessels. These fishing vessels had the traffic lanes blocked and hampered navigation along the legitimately established lanes in direct contravention of COLREGS Rule 10, I&J."

The master goes on to say that this encounter occurred Monday, August 27, between 0950 and 1020 hours, Seattle summer time. "We were westbound for Yokohama in the outbound straits and Juan de Fuca Strait separation lanes. Since Shearingham Point, we had been maneuvering around an occasional fishing boat, clearing them with no problem."

"Approaching Buoy J, about 10 miles before, and approximately abeam of the port on San Juan (Island), we commenced to encounter a heavy concentration of fishing vessels in the lanes with their nets out. As we advanced, we found the concentration to be extremely thick, blocking the traffic lanes entirely."

"At this point, I was forced off of my course to the left and into the separation zone on out to the south of the concentration. At the time of the encounter, the visibility was good and the fishing vessels had to be able to see for miles. I gave them several warning signals to alert them of my approach, but could observe no recognition or evasive actions to provide a passage."

There was a Canadian Coast Guard vessel in the area who kept calling the master on the VHF channel 16 and giving him instructions. He was told to go to the left and into the inbound lane. There was no attempt by anyone to assist the master or the pilot or to clear the outbound lane. I was wondering what the posture of the U.S. Coast Guard is with regard to commercial fishing vessels with their nets out in the traffic safety lane.

CAPT. CHARTER: I think my Branch Chief wants to respond to that. If he doesn't fully cover it, I will add my comments.

CMDR. CRUICKSHANK: Let me say that we have a great deal of sympathy with you about this problem. It is a longstanding problem. The parts of Rule 10 that I think you are referring to, give vessels in traffic separation schemes some preference over fishing vessels. Technically, however, this only applies to traffic separation schemes that are adopted by IMCO. In this case, the scheme has not been adopted by IMCO. Therefore, we do have a problem. There are many considerations. The fishing industry is very strong out there. They have been fishing those waters for a long time, just as commerce has been moving through those waters for a long time. Our position is that we are trying to work on it, but it is a real knotty problem.

CAPT. CHARTER: We do have a proposal under consideration by the 13th district in Seattle to extend the COLREGS into all of the waters of that area. No action has been taken on this yet, but we have received several communications from users in that area asking for the extension of COLREGS throughout the Puget Sound waters.

MR. KLEIN: Capt. Charter, in your presentation, you mentioned that one of the goals of the VTS system was to establish systems that would not require additional equipment. Sea Land Services supported VTS systems wherever they have been established. In New York, we took an active part in the cooperative effort to establish the system. However, toward the end of the development phase of the New York VTS system, sectorization became an issue. The plan is to sectorize the harbor, requiring different radio communication channels in each sector. This will cost our organization about $100,000 for radio equipment. Can you really justify sectarization as a necessary part of your program?

CAPT. CHARTER: In other words, what you are saying is, you can only cover one VHF-FM frequency?

MR. KLEIN: We normally would only cover one, using the pilot's radio. I agree with the fact that we need a second channel, but we now will have to install multiple-channel radios. That is expensive.

CAPT. CHARTER: You are aware that FCC has relieved the channel 16 guard requirements?

MR. KLEIN: Yes, I am.

CAPT. CHARTER: Are you saying you can't handle two frequencies?

MR. KLEIN: The sectorization, I believe, is going to require four channels in New York. In New Orleans, it is going to require another four, I believe. The multiple channels are going to require us to buy new equipment. I imagine it is going to be the same for other operators.

CAPT. CHARTER: In general, this has not really been a problem because most vessels already have the equipment available. There is one exception, we have heard several times from pilots who use the hand-held portables. They indicate that they will have trouble meeting the multiple frequences requirement. Someone mentioned earlier today that he had to go out and buy a six-channel transceiver to cover the additional frequency requirements. I would agree that, in some cases, there are equipment cost implications.

I am rather surprised, though, that your basic, installed equipment wouldn't cover these frequencies already. They are the frequencies that had been in general use in the maritime field.

The biggest complaint we had, particularly in the New Orleans area, was about the requirement for a three-frequency guard, the VHF-FM guard on the VTS sector, the channel 13 requirement, and the channel 16 requirement. With relief of the channel 16 requirement, I was under the impression that most of the equipment problems had been overcome. We will take a further look at it, however.

MR. KLEIN: In systems such as we have in San Francisco, and I believe we will hear more about it, voluntary compliance has proven very satisfactory. In a situation such as we have in New Orleans and the Mississippi River Gulf outlets, I think that voluntary compliance has not proven satisfactory. Sea Land has developed a policy where we require our vessels to participate in the system, but our personal feeling is that the voluntary system, as it exists today, is more of a hazard than an assistance. If you don't know what traffic is going to be there, and yet you are halfway into a system, we really feel that it is more of a hazard than it is a help.

CAPT. CHARTER: So we should make it mandatory?

MR. KLEIN: That is our opinion. I would like to hear your opinion. I think that the best way to establish VTS systems is voluntary cooperation from the groundfloor up. The experience in San Francicso and in New York demonstrates that. New York could probably have functioned as a voluntary system. However, in situations where voluntary does not work, I feel that you have got to address the problem.

CAPT. CHARTER: Probably the best example of this is the situation in Houston-Galveston. It has been running as voluntary for several years with a fairly good participation rate, but we are very nervous about it. We feel it should be mandatory because of just the problems that you mentioned.

Our analysis of San Francisco indicates that a mandatory system is not necessary, although that view is not shared by all. I am convinced that it is working well under the voluntary basis, and so we intend to keep that one voluntary, at least as long as it is working properly. But, there are other situations in which I would agree that the voluntary system probably creates more hazards than would exist without the system. The best example is probably Houston-Galveston, and we do plan to proceed with

finalization of the rules for that system on a high-priority basis.

MR. PAULSEN: It could very well be that what is now voluntary could become mandatory by court decision. If a vessel doesn't participate in the voluntary scheme and his failure to participate is a cause of a collision, the court very well could decide that that was contributory fault and hold him liable. Then, the system becomes mandatory, not through the Coast Guard, but by court decision.

NEW ORLEANS VESSEL TRAFFIC SYSTEM (VTS)

Capt. Robert Gardner
Flowers Transportation, Inc.

I. What is VTS?

A. Purpose and Method

The primary function of a vessel traffic service is to serve as a communications conduit among vessels plying the waters of a VTS sector. The function of VTS is analogous to the function of an air traffic control system. The Coast Guard operates the VTS base which serves as the focus of the system. Vessels report their status to the Coast Guard at designated reporting points on the River; the Coast Guard synthesizes this information; and then the information is disseminated to vessels. In this fashion, VTS performs an auxiliary function to the eyes, years, and instruments of the captain and his crew. The function is also additive in that it combines disparate sources and types of information. The goal of VTS is good order and predictability.

The Coast Guard has concluded that the following types of accidents can be prevented by VTS: 1) collisions between two or more running vessels; 2) collisions involving running and anchored vessels; 3) rammings of piers and bridges; 4) rammings of floating objects; and 5) groundings. The estimated effectiveness will differ with the type of accident and will vary with the sophistication of the system utilized.

In sum, VTS attempts to do the same thing a captain would do: gather a variety of information in an attempt to discern the status of the River at any given time. It differs in that the scope of the area from which input of information received is broader and the variety of information received is more extensive. As a result, the capability of the captain to forsee danger and communicate with other vessels should be increased. Safety, the saving of lives and money, will result. VTS will be efficient if these savings are greater than the cost of its implementation and operation. Safety and efficiency will only result from the proper implementation of VTS.

B. Legislative History

The Ports and Waterways Safety Act[1] is the enabling act for the implementation of the VTS systems and regulations. It states that the Coast Guard may establish vessel traffic services with concomitant rules and regulations. The legislative aim was to prevent vessel collisions and, especially, the pollution resulting from such collisions.

The Coast Guard decided to implement VTS in several areas, including New Orleans.[2] It published an Environmental Impact Statement[3] and an Analysis of Port Needs.[4] There have also been Coast Guard[5] and F.C.C.[6] regulations published as a prelude to implementation of VTS in New Orleans.

C. History of Implementation

Harbor radar services have been in use since 1949 when the first shore-based harbor service in the western hemisphere and was established at Long Beach, California. The Port of Liverpool had a similar system in 1948. The foreign ports of Hamburg and Rotterdam have had some form of VTS since 1964. In 1951 and 1952, a harbor radar service was demonstrated in New York Harbor. From 1962 to 1965, a project named Radio and Television Aid to Navigation was used in New York Harbor.

San Francisco Harbor was the sight of the first vessel traffic service. The San Francisco Harbor Advisory Radar Project began in 1970; VTS became operational in 1972. Congress appropriated $1 million to construct a VTS at Puget Sound. The system was operational in 1972. The Galveston-Houston VTS began in 1974 and pioneered low light television as a primary method of surveillance. The New Orleans VTS was scheduled to go on stream in September 1977. There are plans for a VTS at Valdez, Alaska, which will use radar. Less extensive systems have been implemented near Louisville, Kentucky and Morgan City, Louisiana.

D. Operational Design in New Orleans

The 1973 Coast Guard "VTS: Analysis of Port Needs" report ranked New Orleans second nationally in its need for improved vessel traffic management services. The Port annually averaged 165 collisions, rammings, and groundings. This resulted in an annual loss of $7.8 million in direct damage to vessels, cargo, and property.

The New Orleans system will be developed in phases. The first phase involves utilization of a vessel movement reporting system and existing traffic lights. Participation

will be voluntary. This phase will commence later this year. In the second phase, low light level, closed circuit television surveillance coverage of the Mississippi River from mile 89 AHP to mile 112 AHP will be added. In a subsequent phase, radar surveillance of the Mississippi River in the vicinity of the Head of Passes could be added.

The total initial system cost is $3.9 million. Annual operating expenses are estimated to be $1.04 million. The New Orleans VTS will be manned by 7 officers and 40 enlisted personnel.

II. Potential Liability for Failure to Participate in A Voluntary VTS System

A. Who Controls the Vessel?

"It must be clearly understood that the responsibility for the safety of any vessel and its crew remains with the Captain or Master and cannot and will not be assumed by the VTS."[7]

This can mean that (as with aircraft) the captain of the vessel retains ultimate control. This statement cannot operate as an effective disclaimer of liability for the inaccuracy or omission of information distributed by VTS.

There are a few situations in which VTS may affirmatively regulate vessel movement. VTS may prohibit departure from a dock or fleet if the proposed movement of the vessel will contribute to an already existing hazardous condition. The proposed regulations for VTS New Orleans provide that:

> "During conditions of waterway congestion, adverse weather, reduced visibility, or other hazardous circumstances in the VTS area, VTS New Orleans may issue directions specifying times when vessels may enter, move within or through or depart from ports, harbors, anchorages or other waters in the VTS Area. Under these same conditions, VTS New Orleans may issue directions requiring vessels to remain at anchor or mooring or require vessel to anchor or moor..."

It is unclear who will be empowered to make these determinations. VTS can also issue exemptions from specific rules if requested by a vessel. It is likely that Coast Guard control of a vessel involved in a collision will affect the potential liability of shipowners and the Coast Guard.

The initial phase of New Orleans VTS will involve only voluntary participation. VTS is currently voluntary in all VTS areas other than the Puget Sound and Berwick Bay. "Mandatory participation means that all vessels MUST make various reports at specified points in the VTS area... Voluntary participation, on the other hand, would allow any number of vessels to enter the VTS area, any number of which might not be known to the VTS."[8] In short, in a voluntary system, a vessel is not obliged by statute or regulation to report in to VTS or listen to VTS frequencies. The absence of statutory requirement means that there can, by definition, be no civil or criminal sanction for failure to participate per se. The questions addressed below concern the extent to which failure to participate in the voluntary system will influence the liability for negligence and the breach of the duty of due care arising out of a collision under such circumstances.

B. Negligent Non-Participation

1. Statutory Liability

In the preceding paragraph, it was stated that there could be no negligence per se as a result of non-participation in VTS. This means that the following syllogism, the essence of the Pennsylvania Rule,[9] will not apply: 1) Vessel "A" was involved in a collision. 2) Vessel "A" did not participate in VTS; Vessel "A" violated a statute. 3) Vessel "A" is per se liable. The Pennsylvania Rule cannot apply where there has been no statutory violation. Skidmore v. Gureninger, 506 D.2d 716 (5th Cir. 1975). Non-participation in the initial phase of New Orleans VTS cannot be a violation of VTS rules because the text of the rules make participation voluntary.

a. Inconsistent Utilization of VTS

There may also be a hazard in inconsistent utilization of VTS. Some mention also should be made of the hazard involved in partial utilization of VTS. The radar cases indicate that a vessel with the capability to use a safety device is obligated to do so: Federal Ins. Co. v. S.S. Royalton, 194 F. Supp. 543 (E.D. Mich. 1961); M/V ANGELA FASSIO v. Tank Steamer E.W. SINCLAIR, 201 F. Suppl. 700 (S.D. N.Y. 1962); U.S. v. M/V WUERTTEMBERG, 219 F. Supp. 700 (S.D. S.C. 1963); Overseas Maritime Co. v. S.S. PONCE DE LEON, 1972 A.M.C. 2294 (S.D. N.Y. 1972); Afran Transport Co. v. The Bergechief, 274 F.2d 469 (2nd Cir. 1960); Getty Oil v. S.S. PONCE DE LEON, 409 F. Supp. 909 (S.D. N.Y. 1976).

There is a problem, however, in drawing a parallel between the capability to use radar and the capability to

participate in VTS. Radar requires a device used exclusively for radar purposes. VTS uses a radio which the vessel already has and which is used for other purposes. What would be the effect of using a radio which was not equipped to transmit and receive in channels 11, 12 and 14, the VTS channels? Partial utilization may exacerbate the problem faced by a vessel with the "capability" to use VTS. In Pennsylvania R.R. Co. v. S.S. MARIE LEONHARDT, 320 F.2d 262 (3rd Cir. 1963), the court held that the absence of a statute requiring those in charge of a bridge to use radiotelephones did not absolve the operators from a duty to use them if they decided to install them.

> "[T]he absence of such a requirement does not absolve them from the duty of due care in using that means of communication once they have voluntarily adopted it."

The extent to which either the physical capability to use VTS or partial use would constitute such "voluntary adoption" is unclear.

b. The Effect of Universal Non-Participation

Consideration should also be given to the effect of uniform non-participation by the marine industry on the standard of care owed by a vessel involved in a collision. It is submitted that such a uniform boycott would serve to benefit a particular vessel trying to draw together arguments based on the unreliable, unsafe, and non-compulsory nature of VTS. This is not, however, necessarily the case.

Learned Hand clearly stated the axiomatic principle in tort law that custom and usage of trade may evidence the proper standard of care but do not establish it conclusively.

> "Indeed in most cases reasonable prudence is in fact common prudence; but strictly it is never its measure; a whole calling may have unduly lagged in the adoption of new and available devices. It never may set its own tests, however permissive be its usages. Courts must in the end say what is required; there are precautions so imperative that even their universal disregard will not excuse their omission."

The T.J. Hooper, 60 F.2d 737, 740 (2nd Cir. 1932) (Emphasis supplied). See Pennsylvania R.R. Co. v. S.S. MARIE LEONHARDT, 202 F. Supp. 368, 378 (E.D. Pa. 1962). The most that can be inferred from this principle is that the courts may find negligence for non-participation even if there is a

complete boycott of VTS. Whether they will do so is another question.

III. Potential Governmental Liability

A. Analogies to Aviation Law

In the first part of this paper, VTS was compared to air traffic control in its operation and in its goals. VTS serves, in the main, as an informational source. FAA has been held liable for acts and omissions with respect to the dissemination of information. Similarly, the Coast Guard may well be liable for such acts and omissions if they cause or contribute to a collision.

The law can be summed up thusly:

> "It is now well established that when the government undertakes to perform services, which in the absence of specific legislation would not be required, it will, nevertheless, be liable if these activities are performed negligently."

Ingham v. Eastern Air Lines, 373 F.2d 227, 236 (2nd Cir. 1967). Ingham involved negligence for failure to advise the pilot of a weather update. In Hartz v. United States, 387 F.2d 870 (5th Cir. 1968), the FAA was liable for a crash which resulted from a failure to warn of turbulence and a failure to space aircraft at sufficient intervals. See Spaulding v. United States, 455 F.2d 222 (9th Cir. 1972).

It is entirely possible that this exact scheme is applicable to VTS. It is forseeable that when vessels begin to depend upon VTS, the failure on the part of the Coast Guard to supply certain information may cause a collision or a grounding. Similarly, reliance on inaccurate information may lead to the same result. It is also possible that the Coast Guard may be negligent in spacing the departure of ships that have been forced to anchor in bad weather.

B. Analogies in Other Areas

The issue of Coast Guard liability has arisen in other areas which can be analogized to VTS. The Coast Guard is charged with various responsibilities regarding dangerous cargo. In Pennsylvania R.R. Co. v. United States, 124 F. Supp. 52 (N.J. 1954), The Court stated:

> "It would appear that a similar duty reposed in the Coast Guard to protect the public against the loading and storage of explosives under the so-called "Explosives Act",... Once having undertaken

> to exercise such supervision the duty devolved upon the Government to complete it in a manner reasonably free from carelessness.

Id. at 66. The Coast Guard has been found liable for negligently performing a rescue operation. United States v. Sandra & Dennis Fishing Corp., 372 F.2d 189 *1st Cir. 1967). The court, pointing out that the Coast Guard was under an obligation to perform rescue operations, stated that:

> "The government must not induce reliance upon a belief that is is providing something which, in fact, it is not providing."

Id. at 195. Lastly, "the Government must...bear the burden of using due care in the preparation and dissemination of...charts and notices." De Bardeleben Marine Corp. v. United States, 451 F.2d 140, 149 (5th Cir. 1971).

C. Should the Coast Guard Investigate Itself?

The system of investigation of collisions itself has a built-in prejudice factor which disserves the interest of the maritime community. State licensed river pilots are effectively immune from liability unless they are grossly negligent. Under the Water Pollution Prevention and Control Act[10], vessel owners and operators are liable per se for spills unless the spill is caused solely by the U.S. Government or a third party. One need not speculate where liability for pollution will fall if a VTS operator is partially at fault, a state pilot partially at fault, and a towboat master at fault in the slightest degree. While the law in areas of liability other than pollution may be less harsh, it is submitted that the spectre of a federal agency investigating its own misdeeds is foreboding to those with an interest in efficiency and fairness.

IV. A Pragmatic Analysis of the Communications Aspect of VTS

A. The Framework

A Vessel Movement Reporting Service (VMRS) is central to any vessel traffic service. It consists of a VHF-FM communications network that permits direct radio contact with the master of every participating vessel in the VTS area. The proposed regulations provide that each vessel participating in the system must make an initial report 30 minutes of more before entering the system; a movement report upon actually entering the system, as well as each time the vessel passes a reporting point; and a final report whenever the vessel anchors, moors, or leaves the system. The initial report must give the following information:

name of vessel, position of vessel, estimated entry time, point of entry, destination and route, ETA, draft, number of barges, length of tow, dangerous cargoes, and notice of any handling defects. The movement report must provide the vessel name, position, time of passing reporting point, next reporting point, and ETA at next reporting point. The final report will consist of time and place of mooring, anchoring, or leaving the system. In addition, a vessel must make supplementary reports whenever any of the information it has furnished to the Vessel Control Center changes. This will include ETA changes of more than 10 minutes. Vessels must maintain a continuous listening watch on the VTS frequency designated for the geographic area in which the vessel is in operation.

In a port like New Orleans, the number of vessels participating at one time will exceed the number that can be accommodated on a single radio frequency. Because of this, the VTS area will be sectorized; vessels will change frequencies when crossing sector boundaries.

The communications features of VTS outlined above pose no conceptual problem. It is obvious that efficient communication between the vessels and the VTS control center constitutes a vital component in the attempt to increase safety through increased knowledge and predictability. It appears, however, that the practical aspects of the communications aspect of VTS may cut the other way. The implementation of VTS may not well serve the goals of VTS. The communications aspect of VTS have been, and continue to be, the least satisfactory part of the system.

There are essentially three problem areas: 1) The marine community has suffered the loss of three channels. This results in unnecessary and dangerous congestion on the remaining channels. 2) Multiple watch requirements require the captain to monitor an impossible number of frequencies. 3) There will be other difficulties which involve the capability of VTS to effectively handle communications.

B. Loss of Frequencies

The Coast Guard chose not to utilize channels which had previously been assigned to it for communications. Rather, for purposes of national uniformity, and disregarding the nuances of the New Orleans area and its connecting waterways, the Coast Guard chose to take three channels away from the marine industry.

The three channels the Coast Guard took from the maritime industry are channel 11 (156.55 MHZ), channel 12 (156.60 MHZ), and channel 14 (156.7 MHZ). Channel 11 is a commercial channel. A commercial license holder may use

this channel to speak to its vessels. Commercial channels are used for mundane marine activity such as the exchanging of payrolls, taking orders for groceries, and so forth. These channels are used in communicating from land to the vessel. They are used for tow makeup instructions, fleeting operations, and the entire operations of a tremendously busy harbor. Channels 12 and 14 are also used by the Corps of Engineers in directing water traffic through the three locks and the Florida Avenue Bridge.

The withdrawal of three channels for exclusive governmental use may create a hazardous situation. The channels available to the maritime industry prior to VTS were already overcrowded. The inadequate VHF spectrum has been a chronic problem. The denial to the maritime industry of access to three of the channels may serve to exacerbate the unsafe and costly crowding that has been experienced for some time. Crowding may reach an intolerable level, and the Coast Guard may not receive the cooperation it seeks and needs.

Before reassignment of frequencies to VTS, the maritime industry had six (6) channels assigned to it for port operations. Since channels 12 and 14 have been taken, the industry is left with only four channels. This may be an unnecessary hardship--*unnecessary* because, as will be shown, there are additional frequencies available that can be substituted for those taken.

With the loss of Channel 11, only seven commercial channels remain. Those who formerly used 11, 12 and 14 are already being forced onto other already crowded frequencies. Where there were formerly three or four operators on a frequency, there are now ten or twelve. Shortly, as licenses expire, those numbers will increase. Some businesses, such as the unloading of LASH and SEABEE vessels, require continuous dialogue. When such use is made of a frequency, other operations are temporarily put out of business. Chaos may well result from this type of crowding.

C. Multiple Watch Requirements

With the advent of VTS, the captain of a vessel will be required by law to listen to three channels simultaneously. This may mean too many radios in the wheelhouse. The captain will have difficulty deciphering the information coming from three radios at one time. Even worse, there will be an inevitable tendency to reach up and turn off one or more radios.

First, each vessel is required to monitor channel 13 at all times. It is the only navigational channel for the use of all vessels on the waterways of the United States. This

listening wach requirement was established by the Vessel Bridge-to-Bridge Radio Telephone Act. Second, each vessel is required to maintain a listening watch on Channel 16. Channel 16 is used to raise a vessel for the initial contact and for emergency purposes. (Since the symposium, the FCC has deleted this requirement for VTS participants.) Third, when VTS becomes mandatory, each vessel will be required to maintain a listening watch on the appropriate VTS frequency. Fourth, many vessels maintain a listening watch on another channel for public correspondence. In addition, many boat operators require their masters to monitor house frequencies.

Imagine a captain trying to navigate his vessel through a rising, fast-running river. He must make quick critical decisions. The multiple watch requirements hinder or frustrate his capability to do so because important information which should be coming in is garbled. What's coming downriver? Did they say a tanker or a light tow? Simultaneous information can be worse than none. The New York Advisory Committee on VTS has gone on record concerning the multiple watch requirements. They feel that two channels should be the maximum that a mariner is required to monitor while trying to safely navigate a vessel. In October 1975, while in New Orleans, Admiral Barrow said:

> "I would agree, and I am sure that the people in our Coast Guard contingent here would, that for a towboat to try to monitor Channel 16, Channel 13 and a sector frequency would be awfully difficult, if not impossible, in connection with running a good vessel traffic system. I think there has to be some relief on this in order to have a viable system."

The problem of multiple watch requirements is not a discrete problem. It is tied to the shortage of frequencies and the confused method of inter-vessel communication. It seems feasible that vessels can be relieved of the required watch on 16. Section II(1)(d) of the revised draft of the VTS regulations indicated that the Coast Guard will maintain a continuous watch on that channel. The emergency situation is, therefore, adequately covered. The Corps of Engineers has been relieved of the required watch on 16. It appears that the Corps was able to make the narshness of the multiple watch requirements known.

D. Problems in Administration

1. Overlapping Use on 11, 12, and 14

There are other problems stemming from the overlapping use of channels 11, 12, and 14 by VTS and private users

whose licenses have not expired. While the FCC has promised to grant no new commercial businesses on Channels 11, 12, and 14, it will be several years before all the presently outstanding licenses expire and the channels become fully useable by VTS.

The U.S. Code provides that:

> "At all places where Government and private or commercial radio stations on land operate in such close proximity that interference with the work of Government stations cannot be avoided when they are operating simultaneously, such private or commercial stations as do interfere with the transmission of reception of radio communications or signals by the Government stations concerned shall not use their transmitting during the first fifteen minutes of each hour, local standard time."

47 U.S.C., Part 323(a). The maritime industry loses 25 percent of its operating time under this statute.

As a further illustration of complications in VTS communications, consider the Part 323 provision quoted above which states that private operators may not use their radios for the first 15 minutes of each hour if there is interference with a government operation. Sub-part (b) provides that:

> "The Government stations for which the above mentioned division of time is established shall transmit radio communications or signals only during the first fifteen minutes of each hour, local standard time, except in case of signals or radio communications relating to vessels in distress and vessel requests for information as to course, location, or compass direction."

The upshot of this provision is plain: VTS cannot function if private users are on the air. This could be of monumental importance; <u>it has been ignored</u>.

A further problem stems from an arrangement between Coast Guard and the Corps of Engineers. Prior to VTS, the Corps was using channels 12 and 14. The Corps will now <u>only</u> use Channel 14 for receiving initial communications and transmitting information regarding lock and bridge transits. This arrangement is prejudicial to the maritime industry. Now, rather than having the flexibility and use of two frequencies, the entire industry has but one channel for communications regardings locks and bridges. That very channel must then be shared with VTS. The Coast Guard has stated:

"At this point, we are unable to fully evaluate the impact of this arrangement on the VTS until we actually get into operation..."

Assuming there are 270,000 vessel transits of the area yearly, there will be an average of 740 daily vessel transits of the area. The three channels assigned to the VTS will provide 72 hours of air time each day during which communication may take place. Thus, the average vessel in the system will have approximately six minutes each day in which it must establish contact with the Vessel Control Center, give its required reports, and receive whatever information or instructions the Center wishes to transmit. Experienced vessel operators have, after having reviewed the reporting requirements, conservatively estimated that they will have to make 9 or 10 routine reports per transit. This works out to a maximum of about 30 seconds for each routine report, during which time the vessel operator must confirm contact with the Vessel Traffic Center, give his report, and receive acknowledgement of his report along with any communication the Vessel Tratfic Center wishes to relay to him. This time limit may be possible to meet under the best of circumstances, but the Coast Guard has not shown this to be the case. The existence of private users and the Coast Guard certainly make it difficult.

There is, in addition to the efficiency of VTS, a certain fairness which must take into account the morality of terminating private licenses which allow for use of Channels 11, 12 and 14. There is every reason to believe that the Coast Guard will try to evict all users of 11, 12 and 14 when VTS goes onstream. Admiral Fugaro has indicated as much. In Houston, there has been "voluntary" cooperation in keeping those channels free for Coast Guard use. The Houston Ship Channel and Lower Mississippi River, however, are as different as night and day from the viewpoint of traffic and geography. There is every reason to suspect that when a grocery order interferes with a VTS communication, the Coast Guard will attempt to bully everyone off the air. It is likely that the Coast Guard will simply take over operation on 11, 12 and 14. In addition, statistics from the Eight Coast Guard District indicate that nearly 500 vessels would transmit on VTS daily. If each sector handles 20 vessels per hour, it would require 100 minutes of broadcast time each hour to complete the procedure. Since 11, 12 and 14 will only remain available "on a non-interference basis," it is difficult to see how present license-holders will get on the air. Finally, it is likely that the power of VTS radios will be such that, when the Coast Guard presses its button, everyone else will be blasted off the frequency. This would constitute de facto pre-emption of the frequency by the Coast Guard.

2. Other Regulations

There is a possibility of a conflict between VTS regulations and other laws.

Provision 3(b) of the Proposed Regulations provides *inter alia*:

"3. Laws and Regulations not affected.

Nothing in this subpart is intended to relieve any person from complying with***

b. Vessel Bridge-to-Bridge Radiotelephone Regulations (part 26 of this chapter);***"

The above must be construed to mean that VTS regulations are "supplementary to existing regulations" and that compliance with VTS Regulations does not excuse non-compliance with other regulations. Does, however, compliance with other regulations permit or allow deviation from VTS Regulations? In 33 C.F.R., Part 26.06 the following appears:

"Part 26.06 Maintenance of radiotelephone; failure of radiotelephone."

Section 6 of the Act states

"(a) Whenever radiotelephone capability is required by this Act, a vessel's radiotelephone equipment shall be maintained in effective operating condition. If the radiotelephone equipment carried aboard a vessel ceases to operate, the master shall exercise due diligence to restore it or cause it to be restored to effective operating condition at the earliest practicable time. The failure of a vessel's radiotelephone equipment shall not, in itself, constitute a violation of this Act, nor shall it obligate the master of any vessel to moor or anchor his vessel; however, the loss of radiotelephone capability shall be given consideration in the navigation of the vessel."

The foregoing quoted provision recognizes that, despite adequate and reasonable care, breakdowns in equipment are destined to occur, and masters, at their discretion, may proceed. May a master under such circumstances, however, proceed into a VTS area? Since the VTS Regulations are mandatory, if the master cannot announce his presence, what is the result? Is this a matter of pilot discretion? Is the master duty-bound to strictly conform to the VTS Regulations and remain outside the system? If he proceeds

into the system and a collision occurs, will the Pennsylvania Rule apply?

3. How Accurate is VTS?

Other questions concerning the accuracy of the picture perceived by the Vessel Traffic Center arise. The information received from participating vessels will be fed into a computer which will generate an artificial display representing the projected positions of vessels in the VTS area. Certainly, the reliability of this picture is very suspect. There are possible, indeed probable, inaccuracies in every step of the way.

In addition to the fact that vessels with radio failures will not be tracked by the computer, there are many other vessels that will be invisible in a practical sense. Vessels working in barge fleets will not be pictured nor will non-towing vessels under 65 feet. It is readily apparent that vessels falling within both of these classifications are capable of inflicting serious damage in a collision, but the computer will not know where they are.

Furthermore, there is a serious question about how errors will be found which are introduced by the traffic controllers into otherwise accurate vessel reports. Given the speed at which these controllers will have to work, the possibility of human error seems significant. In a system with radar surveillance of traffic, this problem is done away with, but, in the Coast Guard's proposed system, such errors are bound to occur. It is simply a matter of time before some unnoticed error becomes the basis of a serious miscalculation during hazardous conditions. It may well be that there is no way to eliminate such errors, but, in that case, it would seem wise to reevaluate the benefits which are claimed for this proposed VTS system.

Finally, there is the problem of the accuracy of the vessels' reports. Even assuming the best efforts on the part of our vessel operators, we feel that the Coast Guard is imposing an impossible burden upon them to produce accurate reports. A couple of examples will illustrate this. The VTS sectors will be approximately 20 miles long and a vessel transiting a sector will, upon entry, be required to estimate his ETA at the end of the sector. After this report, he will be required to give a supplemental report whenever his ETA changes by more than 10 minutes. Presumably, this means that reported ETA's are to be accurate to within 10 minutes. For a vessel travelling 4 mph, a change in speed of less than 0.1 mph will result in an ETA change of more than 10 minutes. There is absolutely no way that the present level of technology on most vessels can measure such slight increments of speed. To do so would

require an enormous investment in radar-operated speedometers. Furthermore, the use of such equipment would not solve the problem because the vessels are constantly encountering current variations of more than 0.1 mph, and the vessels must, of necessity, change speed in negotiating bends in the river and upon encountering other vessels. As a result, the captain of a vessel will have to make an estimate of his ETA based upon these variables. Since there is no way he can reliably estimate his ETA within 10 minutes, it is a foregone conclusion that he will be forced by the regulations to make amended reports whenever he can make a better estimate. As it is a foregone conclusion that such supplemental reports will be necessary, he will not be able to simply proceed in the customary manner, but will have to continually revise his ETA due to constant variations from his estimate. We understand that accurate reporting is necessary in order for the computer to plot an accurate picture, but we are afraid that an on-board computer will be necessary to provide information of the precision demanded by the Coast Guard.

Let us assume, for the sake of argument, that the captains of the vessels in the VTS system are paragons of navigational ability and that they are able to reliably estimate their ETA at a point 20 miles distant based upon their knowledge of river currents and the various speeds that they will make on bends, etc. When this information is given to the VTS computer, unless it can read the captain's mind, it will project on its display a dot moving at the constant speed necessary to arrive at the next reporting point on the captain's ETA. The computer will accurately show this vessel's position at the time it enters the sector and at the time it leaves. Whether the vessel is where the computer thinks it is in the meantime is simply a matter of chance. This is because the captain generated his ETA estimate by taking into account such things as slowing down for bends and speeding up in between. Suppose the vessel loses 10 minutes at each of 3 bends, intending to make up the time on a straighter stretch of river. The vessel will be a half mile behind the position the computer has plotted for it, but its ETA will not necessarily have changed.

V. CONCLUSION

The foregoing should make certain things clear.

(1) There are many problems with the implementation of VTS as it was initially conceived for New Orleans.

(2) The lack of industry input resulted in a chaotic system, one which ultimately had to be revised, particularly in the area of communications.

The Ad Hoc Committee for Ports and Waterways was a group formed in 1976 to resist the implementation of VTS until the system was reflective of industry input. Since that committee was formed, it has actively worked with the U.S. Coast Guard and Congressional representatives in Washington in an effort to redesign the system. The group initially filed a lawsuit in the United States District Court for the Eastern District of Louisiana styled "Compass Marine, et al. v. Brock Adams, et al." In that case, which ultimately went to the Fifth Circuit Court of Appeals, the court held that non-participation in a voluntary VTS program could not result in sanctions against the pilot; however, liability might result to the owner of the vessel for failure to participate in the system. The Committee has appeared at enumerable Congressional hearings before the Transportation Subcommittee, the Committee on Merchant Marine and Fisheries, and the Subcommittee on Coast Guard and Navigation. As a result of its efforts, some defects in the initial system have been partially corrected. The communications problems, particularly the multiple watch matter, was amended effective July 20, 1979 (47 CFR Part 83; Fed. Reg., Vol. 44, No. 120, p. 36082). Now a vessel is not required to maintain a listening watch on Channel 16 if, and only if, it is participating in the New Orleans Vessel Traffic System.

In addition, the complaints by the Ad Hoc Committee with respect to the congestion on the bridge-to-bridge frequency (Channel 13) resulted in a final rulemaking on May 18, 1979 (Fed. Reg., Vol. 44, No. 98, p. 29073) designating Channel 67 as the new bridge-to-bridge frequency for the lower Mississippi River area in the VTS sectors. The Ad Hoc Committee's criticism of the usurpation of boat operations and commercial frequencies has resulted in the return to the industry of one frequency, Channel 5, and the potential return of Channels 1 and 63. The latter is supposed to take place in September, 1979. Its criticism of the "stacking" of Coast Guard statistics resulted in a study, May 21, 1979, by the Comptroller General of those statistics and a report to the Congress of the United States on the distortion of those figures in support of funding for VTS. Its criticism of the communications systems resulted in a study by General Dynamics on alternate communications systems including LORAN-C and Range Measuring Systems. Recently, the Maritime Administration has commenced a study of the lower Mississippi River traffic and communications problems undertaken by Ship Analytics, Inc.

In May of 1979, Ad Hoc Committee members testified before the Committee on Merchant Marine and Fisheries and the Subcommittee on Transportation, the result of which was the following:

"With respect to the New Orleans VTS, no funds were provided in fiscal year 1979. The Committee believed that additional information was needed concerning the proper location of the proposed Pilottown radar site and that there was a need to look at other systems such as the Range Measuring System or the Loran-C Transponder System which could provide the "real time presence" of radar, but also resolve the communications problems in the New Orleans VTS area.

"As previously indicated, this year the Committee has recommended the $1,000,000 requested for the microwave link at Pilottown. However, the Committee still feels it does not have adequate information on the concerns expressed last year. The Committee, therefore, directs these funds not be obligated until the Coast Guard has completed a comprehensive study of the communications and electronic surveillance needs of the entire New Orleans VTS area. When the study is completed, the Coast Guard can return to the Committee for permission to obligate these funds.

"The Committee believes that it is important that the study be performed by an independent entity which has the confidence of both the Coast Guard and the users of the New Orleans VTS. The Committee feels that, perhaps, a university in the New Orleans VTS area would be appropriate. The Committee also expects whomever performs this study to comply with the provisions of Section 5(b) of the Ports and Waterways Safety Act."

Since that restriction on Coast Guard funding, a committee has been established which is now undertaking a study of the VTS system.

Simply stated, had the government (Coast Guard) consulted with industry, much of what has occurred could have been cured years ago. Indeed, there is hope that a silk purse can be made out of a sow's ear.

NOTES

1 33 U.S.C. 122 et seq.

2 There are vessel traffic services at Valdez, Alaska; Puget Sound; Houston-Galveston; San Francisco; New Orleans; and Berwick Bay.

3 U.S.C.G. (Draft) Environmental Impact Statement Pursuant to Section 102(2) CP.L. 91-190.

4 United States Coast Guard Study Report, VESSEL TRAFFIC SYSTEMS ANALYSIS OF PORT NEEDS (August, 1973).

5 41 Fed'l. Req. #118 (June 17, 1976) pp. 24604-607.

6 47 C.F.R. Ch. 1.

7 U.S. Coast Guard, "Questions and Answers Relating to VTS New Orleans" (June, 1976).

8 U.S.Coast Guard, "Questions and Answers Relating to VTS New Orleans" (June, 1976).

9 The Pennsylvania Rule was established in the case of The Pennsylvania, 86 U.S. 125 (1873). It means that where "a vessel has been found to be in violation of a statute at the time of a collision, the vessel thus case in fault must prove, not only that the fault shown probably did not but also that it could not have contributed to causing the collision." Toney v. U.S., 307 (M.D. La. 1975).

10. 33 U.S.C. Part 1251 et. seq.

DISCUSSION

MR. PLEDGER: I am sure you have heard the acronym, GIGO, i.e., "Garbage in, garbage out." You have also coined another phrase "real-time output from a computer." Addressing the New Orleans VTS, if you have garbage in and garbage out, and you have no real-time output, and you have no surveillance, how do you propose to get good information into a computer so that you can get real-time, good information out without total surveillance of the system?

CAPT. GARDNER: If I wanted a question to be asked, that probably was it. I believe strongly that, given the right tools, the pilot on watch in a towboat, or on a ship or anywhere else is absolutely in the best position to make accurate judgements about navigation. The issue is that we have to give him the best possible tools.

On towing vessels, we have on board depth-sounders, either a digital depth-sounder or a strip chart type. Yet, we don't go down the river eyeballing that depth-sounder constantly. As a matter of fact, it doesn't talk to us, either; it doesn't say "four feet, six feet, three feet, nine feet." You laugh, but getting information by voice is a very crude way to go about it. I am beyond the stage of believing that VTS, or bridge-to-bridge radio will solve all of our problems. I think we should look farther down the road. We need to place the information where it will do the most good, in the pilothouse of the towboat, not in a VTC at the foot of Canal Street.

This can be very easily accomplisned with off-the-shelf equipment. We have looked into the range measurement systems. I have designed a control head of my own that I think provides exactly the type of information that a pilot needs. And he uses it when he needs it, just like he uses the other instrumentation on his console. The information is available, no one has to talk to him. Voice communication is the most outdated method of transmitting navigational information that we have.

I was just involved in an experiment with satellite communications. The state-of-the-art of that type of equipment is incredible. While I am not proposing satellite navigational information systems for the river, a range measurement system is a possible alternative. Such a system could collect all of the information by data, not by voice,

from the vessels. It could plot the exact locations of the vessels. As long as I have been working on the river, I have never known precisely where I am. I have also never known my accurate speed. A range measurement system could automatically poll this information from all of the vessels and feed it back out to everyone. Each vessel would have "a little black box," if you will, on the bridge console. It would provide your speed, your precise location, and the precise location of the next opposing vessel. If you want to know the location of the third opposing vessel, you flip a dial. It also could have voice communications with the VTC. VTC's role, as I would conceive of it in that situation, would be to make sure the equipment operates properly and provide voice communications backup in cases of electronic failure.

MR. PLEDGER: How do you get the information for your system without having some surveillance technique? Currently, the surveillance system in New Orleans VTS consists of one tinted window that looks somewhat over Algiers Point.

CAPT. GARDNER: You don't understand my proposal. RMS is a radio triangulation locating system. It is very similar to Loran-C, only it uses different frequencies. It is much more accurate, and it is built in a mini-chain.

What you would have in VTC is a display like they have now. But, the target on the display would be synthetically placed there by the RMS, the radio onboard the boat transmitting data back saying, "Here I am" constantly. The display would constantly, within plus or minus three meters, show exactly where that vessel is and where every other vessel is in the system.

The obvious problem is that every vessel participating has to have a radio transmitting on the right frequencies on board. That is the obvious problem. A radar is not a synthetic system; neither is low-light television. Both are a step in the right direction, but the electronics still can fail. I am proposing an all-radio time measurement system. RMS would give you precisely the location of each vessel.

Here is an example of what could happen. Let us say my boat is going downstream and I have already talked by clear channel VHF bridge-to-bridge radio. I have already exchanged passing information and know the location of the next four vessels I am going to meet. I also have radar on board as a backup to the RMS. Suppose that some guy has been reported operating in the system with his unit broken. My radio has been totally silent. I think I have talked with everyone. VTC calls me, "VTC to the VRG. We would like to advise you we have an unidentified person or unidentified vessel located between your number two and

number three opposing vessel. At last report he was 1,000 feet off the shore." I am alerted. In this system, the role of VTC would be to watch for those kinds of situations and continue to give me even more information that will help me to pilot my vessel.

CAPT. DONALD GRANT

San Francisco Bar Pilots

In 1952, two groups in the San Francisco Bay area, acting independently of each other, began operating their own limited coastal radio stations. One group, the Port of Stockton, erected a station in that city; installed radio equipment in two draw bridges, 26 and 46 miles below Stockton; and provided their pilots with portable radios. (In those days, this meant a very large unit that operated from water batteries and frequently required repair.) The second group was the Shipowners and Merchants Towboat Co. They installed a 35 MHz station, providing direct communication capability between dispatchers and towboats without intermediates for the first time. This station was also wired to the San Francisco Bar Pilot office and the pilot boats on the station.

In 1959, the 35 MHz system was moved to its present VHF frequency at 156 MHz. This required furnishing the tugboats with the new equipment, but the company considered it to be well worth the investment. In 1963, a second channel was opened, and the Stockton pilots obtained their own five-channel walkie-talkie radios to eliminate the necessity of carrying the heavy portable radios. In 1966, the Bar Pilots equipped all their pilots with walkie-talkies. This extension of the existing system provided uninterrupted communications between the already equipped pilot office and the pilot boats.

There were now three distinct groups using walkie-talkie equipment on several channels. A question arose about the desirability of having the pilots use the same channel used for bridge-to-bridge communications. Several meetings were held, and it was agreed that a single channel would not meet the pilots' needs. The pilots also noted that they often needed information about vessels before they came into the walkie-talkie range. Following a series of meetings held in November 1966, and with the collaboration of the Marine Exchange, a plan was developed. Pilots would report to the Exchange at several reporting stations along the route. The system was called the "Vessel Movement Reporting System,"and it allowed pilots not only to report to the Marine Exchange, but to receive information regarding other vessel traffic moving in the area. The system worked very well for those vessels that had the radio equipment aboard. However, such

equipment was not compulsory at that time, so the system was incomplete. The next step was to install radar to further assist the pilots.

Finally, in 1970, radar was installed at the end of Pier 45 in San Francisco. Both the Coast Guard and Marad worked cooperatively to establish the system which was named "Harbor Advisory Radar," or "HAR." This was the beginning of VTS as we know it today. In May of '73, the Coast Guard established the first actual VTS system on the highest point of Yerba Buena Island in San Francisco Bay. At the present time, there are five VTS systems, and it is my understanding that another one will be in operation in the Port of New York in a couple of months.

A Vessel Traffic System can be an aid or an obstruction to port traffic. In certain instances, I believe the VTS can be an aid to the mariner, and I am speaking for myself when I use the term "mariner" instead of the term "pilot." However, there are a number of problems with VTS. When the mariner advises the VTS of his boarding a vessel or the undocking of a vessel, the person operating the equipment at VTS should be able to inform him immediately about the traffic in his area which could directly affect him in his transit or maneuvering of the vessel. Unfortunately, this is not always the case. The operator may report traffic that has no bearing on the vessel being handled by the mariner. This distracts him and at the same time clutters up the air with useless information. The Coast Guard's system of transferring personnel is another drawback of the current operation. There is also the problem of VTS personnel issuing orders, when in many cases, they do not possess the background or the expertise required by pilots. However, the quality of the information the mariner receives from VTS today is significantly better than that of the past.

It must be remembered that the commercial mariner is a professional. The main objective of his job is the transportation of cargo and/or people as quickly and as economically as possible, while being ever mindful of the safety factor. Safety is the first concern; economics are second. The cost of running a large ship can be extremely high, and each hour counts. Yet, safety and economy often can not be combined with ease; judgements must be made. I believe that the professionalism of the merchant mariner is undersold. Experience alone speaks for them as a group. Also, their training is extensive, and they are governed by the regulations that abound in the maritime industry. The manner in which commercial transportation on water is conducted is tightly controlled. A merchant mariner can literally have his license revoked for mistakes made through negligence or with intent.

It is interesting to contrast the tight control of the merchant marine with the lack of regulations governing pleasure boats. With the weekend boaters and the regattas that are allowed to obstruct the main ship channels, it is a wonder that more accidents do not occur. The weekend sailor is not required to take a "Rules of the Road" test nor to obtain a license. All that is required is that he have enough money to buy a boat and off he goes to terrorize the professional mariner.

It is unfortunate that all of the sophisticated equipment used by VTS has not produced a system that works. In this sense, VTS does not serve the function it was intended to serve. A recent article, "The Close Encounters of San Francisco Bay," written by a Coast Guard officer, puts it very well.

> "The Oakland Estuary sends chills up the spines of all mariners who frequently ply these waters. One sailboat is on a port tack; one is on a starboard tack. Another sailboat is motoring with his sails up, and here comes a power boat going full-bore throwing out a huge wake. The freighter carefully steams up the channel. This area has been called the 'zoo' area, and rightfully so.
>
> Having the battle lines drawn, the conflict ensues. Power boats obstruct sailboats, pleasure craft hamper the navigation of deep vessels. Who referees? What rules do we play by? How long must this go on?
>
> For better or worse, someone thinks of the Coast Guard. The Coast Guard listens and ponders; the Coast Guard points to the "Rules of the Road" and the elaborate Vessel Traffic Systems. They are designed to prevent these close encounters. Somehow, however, there has been a breakdown and the system does not work."

I believe that this article accurately reflects the way the professional mariner feels in many cases. Weekends in the San Francisco Bay area are like those in many other harbors in the other states, although we probably handle some larger vessels. Thousands upon thousands of small craft of all sizes and shapes are sailed by people who have no knowledge of the safety rules and regulations. There is no way that VTS can control these craft; they can only advise the mariner that they are there. The hope is that the professional mariner then will be skillful enough to wend his way through the pleasure craft with a 160,000 deadweight ton vessel.

The procedure used for deciding where to establish a VTS is puzzling. It is my understanding that the Coast Guard has calculated the traffic movements and the total number of accidents for various areas. They now anticipate eliminating accidents by installing expensive, sophisticated equipment.

This has already been done in some areas in which an alternate, less expensive system would have proven to be just as effective. For example, the Houston pilots state that if the money spent to establish the VTS system in Houston had been used instead to widen the channel and put up better aids to navigation, it would have been just as effective, moreover, maintaining a station requires personnel and operating funds. In 1972, it cost $5.8 million to establish the station on Yerba Buena Island. To operate the station and the staff of seven officers and 18 enlisted men requires an annual outlay of $750,000, with an additional $100,000 for a maintenance contract.

I have had several discussions with Coast Guard officers about the need for improved aids to navigation in many areas. Often I have been told that no money has been appropriated. Yet, there are funds to establish new VTS systems. I feel that some of the money allocated for VTS could probably be better spent on improved aids to navigation.

It is unfortunate that the VTS equipment is being designed by engineers who are not consulting practical mariners. It also appears that the current equipment downgrades the mariner as a decision maker. Instead, the system itself is relied upon to make decisions. I believe the system should be designed so that it uses the expertise and the experience of the mariner. In addition, the full cooperation of the private sector of the maritime industry is mandatory. Too often, laws are enacted that are almost impossible to implement, and that make it difficult for both the law enforcers and the private sector. It causes hardships for all concerned.

There is a final critical issue: who should administer VTS? I firmly believe that the VTS should be run by civilian personnel for a number of reasons. First, the civilians who would operate the VTS station would be permanent residents of that area. Second, there would not be the constant changing personnel that is required by the Coast Guard. Further, trained merchant marine officers would be able to build a more cohesive relationship with the mariners, a relationship similar to that which exists between air traffic controllers and airline pilots.

The European Maritime Pilot Association (EMPA) pilots handle two million ships a year, and experience gained in

the European ports, such as Elbe and Wesser, shows that the participation of the mariner in the shore-based radar stations is greatly beneficial to the port community. We have the facilities to train these people, and I think serious consideration should be given to this possibility in the very near future.

Consider this paragraph from the report on the recent Holland "Traffic Symposium."

> "The experience of the EMPA pilots, annnually serving about two million ships, clearly indicates that such high standards are far from being reached, and too often pilots find that the faulty equipment or insufficient manning causes problems for the safe transit to and from the port."

The quote explains the reluctance of pilots to rely on systems that do not take into account the real condition of all of the vessels in the area.

A number of issues have been touched upon in previous papers. One of the recommendations, which I endorse, was that more effective ways of passing and displaying traffic information be found. VHF is not the answer. I also agree with the recommendation that decisions concerning safe maneuvering of an individual vessel should be made on the bridge in close cooperation with the VTS. I believe that the system should be designed to use the experience and responsible attitude of the pilot. It should not rely on the intelligence of lowest common denominator, the shore-based seaman.

There was sufficient evidence presented at the Holland symposium to prove that various VTS systems are vital and beneficial. There will always be areas where they will produce greater safety and efficiency. However, this should not give the venders of expensive pieces of hardware the right to propose systems for areas where the problems do not exist, or do not exist in a form that can be alleviated by a sophisticated traffic system. Port authorities should not be pursuaded into thinking that unless they install a sophisticated and expensive traffic system they are not going to keep up with the times.

To quote another paper from the Holland symposium,

> "Number one, VTS should be designed for a particular area and the operators trained accordingly. To set the minimum standards, there should be cooperation between all involved and their cooperation would advantagably sought by all segments of the maritime industry."

Evidently, there has been a tremendous breakdown in some of these ports.

The legal responsibilities of the VTS systems are clearly spelled out in Title 33, "Code of the Federal Regulations," 160.15. It is stipulated in 33 USC 1226 that whoever violates a regulation issued under Title I of the "Ports and Waterways Safety Act of 1972" is liable for a civil penalty of not more than $10,000. A vessel used or employed in violation of these regulations is liable in rem. USC 1227 stipulates that whoever willfully violates a regulation under Title I of the "Ports and Waterways Safety Act" shall be fined not less than $5,000 or more than $50,000 or imprisoned for more than five years or both.

Gentlemen, I believe that there is no other private enterprise system in the United States that is placed under such a disadvantage by a similar law. A law that can deprive a professional mariner of his livelihood by having his license revoked is certainly cause for grave concern among the members of the maritime industry. The only recourse a mariner has is to go to court, which is time consuming and expensive. I have been unable to learn what would happen should a mariner have an accident which resulted from following instructions given him by a VTS. At one time, the San Francisco Bar Pilots did request an answer to this question. They received nothing in writing from the Coast Guard; they were merely given a verbal statement that probably the Coast Guard would be responsible. Unfortunately, these laws are in effect, but I believe that most people feel they have done more harm than good. It is now difficult to cement the relationship between professional mariners and those who must enforce the laws.

The control exercised by VTS has its advantages at times. For example, if there is an accident or a grounding which would result in an oil spill endangering the environment, VTS and the Captain of the Port should decide whether or not to close the area. In cases where the visibility decreases to the point that it poses a danger to traffic, VTS should determine what action should be taken. However, I do not believe that VTS should exercise complete control in situations where the personnel are not thoroughly acquainted with all of the facts.

Most mariners feel that VTS has too much power over the private sector of the industry. They also feel that, in many cases, the final decision should be left to the mariner working in concert with the VTS. The knowledge the mariner has acquired from years of experience is ignored by VTS personnel in certain areas. Indeed the laws themselves were enacted by people who have not had the responsibility of piloting a vessel. It is not surprising that some ports,

such as New Orleans, show less than full compliance with VTS at the present time.

In summary, I believe that VTS has a place in the industry when it is used by skillful and qualified personnel. The questions in the minds of many mariners are: "How much more are we going to be regulated in our endeavor to save the industry?", and "Do we need all of this sophisticated, expensive equipment when less expensive systems can prove to be equally or even more effective?"

DISCUSSION

MR. SCOTT: Capt. Gardner and Capt. Grant have both made extremely useful points. One of the things that surprises me, however, is that the pilots and other mariners, for whom I have the greatest respect, apparently are almost completely unaware of the problems of the Coast Guard.

As Vice-Chairman of the Department of the Interior's Outer Continental Shelf Advisory Board I was assigned the task of trying to find out how the Coast Guard could meet the considerable responsibilities it was given under the OCS Lands Act Amendment of 1978. I discovered some interesting facts. During 1979, the Coast Guard has had fewer personnel than it had in 1970. The Coast Guard's 1979 budget is essentially the same as its 1974 budget. Many of the statements made today indicate that the Coast Guard assumed an enormous number of additional responsibilities during the 1970s. I think it is unfair to chastise the Coast Guard, to say that they are not doing what they should be doing.

CAPT. FIGARI: As Capt. Gardner mentioned when he talked about communication, we are very fortunate in San Francisco in that there is good communication between the Coast Guard and the industry. Admiral Whalen was in San Francisco at that time, and he called together all of the various people that were concerned and said, "I have to put this system together, but it is going to be your system. Your system has to work for you. They will retire me one of these days, but you will all still be here. You design the system and tell me how it should be done." That is why we have an excellent system in San Francisco.

CAPT. WHITTENBERG: As far as I can determine, the term vessel traffic service system can be used to refer to anything that would help traffic move safely and efficiently. I have heard it said that our vessel aids are 20 years behind the times. Actually, in our area (Mississippi River), the aids that we have are at least 30 years old. In the last ten years, we have only had one additional set of ranges installed in the river. In addition, the lights and aids that are there are not properly maintained.

As far as we are concerned, the most important thing is to take care of this situation first. Any other approach is simply throwing good money after bad. We would be delighted to simply reach the level of sophistication available elsewhere 20 years ago. If we could do that, we could pretty well live with everything else.

I would also like to mention that our safety record has been distorted by the news media. In spite of the expertise

and the knowledge that we have here today, many of you may not be well informed about what actually does transpire in the Mississippi River. You may only be acquainted with what the news media say. We are in the unfortunate position of having negative media coverage. But, our own records, which comprise a very careful ten year study, indicate that our percentage of accidents has remained stable, while our total number of movements have more than doubled. The study was comprehensive; it included the tugboat industry, the ships, the fleet facilities, the docks, the piers, everything in the whole area. I personally feel that we are almost performing a miracle in safely moving all of the traffic that goes up and down that river.

We are not against VTS. In fact, our record shows that we participate more than any other group of mariners. We try to make it work, although we never felt that we needed it. We didn't, but the money has been spent. It is there, and we try to make it work.

Now, we would like to see some money spent on basic aids. For example, we have no upstream ranges, yet we have some crossings that are three miles long. On a hazy night, you have only a compass to tell you where you are going. We have too few RACON reflectors. There is one in Pilottown but there are none on our 145 mile stretch of river. Buoys are always installed some 45 days to two months after the need arises. Also, they are very seldom on station, because the placement of buoys fluctuates with the changes in Coast Guard personnel.

I don't want to sound completely negative, although I guess my remarks have that tone. We have complained, but we don't seem to get anywhere. We don't disagree with Capt. Gardner, for example, that this new electronic gadget may have an important place in the industry, but it is on the bottom of our list of priorities. We need more basic improvements; then we can go from there.

CAPT. GRANT: The GAO report that Capt. Gardner and I mentioned also addresses the improvement of aids to navigation. I look at it and it kind of amazes me. It discusses the three channels they are going to have to monitor down in the Mississippi River. There are five different areas. Sector one will be on channel 11, sector two will be on channel 12, sector three will be on channel 14, sector four will be on channel 11, and sector five will be cnannel 14 plus 13. That is four channels, and we have heard how difficult it is to deal with three channels. I think it is going to be quite a mess.

CAPT. STILLWAGGON: The following incident happened on August 17, 1979, just a couple of weeks ago.

It was a beautiful day and the blue fish were running in New York. Naturally, everybody that had a boat was out there fishing for blues. Of course, the blue fish, being smart, were staying between the red and the black buoys in the channel.

There were at least 150 boats in the area. There also was a ship called the EXXON NEWARK heading into New York, and I was on the 50,000 ton HESS VOYAGER about half a mile behind. Now, as the EXXON NEWARK's pilot came into Ambrose Channel, he could see that there wasn't a spot wide enough for even a small boat to pass through the fleet of fishing boats. He called me on the radio and said, "Jim, you better hold back because I have all these idiots up ahead of me." I said that I could see the problem and I slowed down.

He did what should be done. He called the Coast Guard and asked them if they could give him some assistance. He pointed out that there were at least a 100 boats in the Channel and that all of them were stationary. He blew the danger signal. At that time, we were to make vessel traffic reports on channel 12. But, the young man on 12 said that they had no control of the boats in our way and to go back to channel 13. In the mean time, both of our ships were moving up the channel.

The pilot of the EXXON NEWARK called on channel 13, and, after a lot of discussion, finally spoke to a Lieutenant Commander who said, "Are those boats in your way?" When told that the boats were in the way, he asked if they were commercial or party boats and if the names of the boats in the way could be transmitted.

The pilot responded that he could not get the names of the boats, it was all he could do to handle his vessel. The Lieutenant Commander said that he would be back on the air shortly. After a long time, he did come back to say, "I am very sorry to tell you that there is nothing we can do for you at this time. But, if you get the names of the fishermen, we can go after them."

At this point, the Captain of the EXXON NEWARK got on the radio, "I am the master of the EXXON NEWARK and I am going to make this a formal protest." I cut in and said, "I will join in the protest," as did the captain of the HESS VOYAGER. He also suggested that they start a tape rolling. Of course, we don't know whether or not the transmissions were taped.

In the meantime, we both are changing course, changing course again and slowing down.

Two big tankers are both backing and filling so that Mr. Jones can get his fish. So, we went back to Big Brother.

We both called the Coast Guard again and asked that they please do something about the situation. They said that if we could get the names of any of the fishing boats they would go after them. They also said that they couldn't do anything about boats we couldn't identify.

I went on the air to say that I was a member of the Advisory Committee of the New York Traffic Service. I asked to be informed about who I could talk to about this type of situation. I had a sense of responsibility because I had been trying to sell the vessel traffic service system to everyone. I felt that it was a great thing; just what we needed.

Yet, all of a sudden, we were finding out that, even if we get a vessel traffic service system, we cannot control party boats. In the New York area, I estimate that there are about 733 million boats operated by people who know nothing about the rules of the road but know a great deal about price of boats.

I wonder if the Coast Guard's vessel traffic service systems will only be able to control the party boats and the tankers, but not the little motor boats. I think that is a question that is very important to all of the pilots in the United States.

CAPT. GRANT: I alluded to that. For example, one day I came in on a big tanker and VTS called to say, "Captain, you have a lot of sailboats out there. It is a clear day and all I can see is white." He told me this because he was doing his job in a professional manner, naturally. Yet, there was nothing he could do about it. This is why part of the that system does not work.

DR. RICHARD M. HARRIS

Advanced Systems, MITRE Corporation

I come to these marine meetings as an outsider and I always feel that way for the first two or three minutes. Then it always becomes very familiar to me because I see the same sorts of things in your industry that I see in the aviation industry. Perhaps the marine industry is more vocal, but I am not sure.

I see private sector interests challenging the Department of Transportation (DOT), either the Coast Guard or the FAA, because the agency did not consult them prior to the imposition of a new rule or regulation. Private users cite GAO reports as evidence supporting their point of view, they challenge statistics, and they challenge the criteria for establishing various services or licensing criteria. They cite many special cases or problems which come from efforts to make general rules and principles. They end up going to Congress and to the courts to stop the funding of programs to which they are opposed and to try to encourage policies and programs in which they are interested. This is just as true with what we call the alphabet organizations in aviation, such as the Air Transport Association, the Airline Pilots Association, the Aircraft Owners and Pilots Association, and the various carriers, as it is in your industry.

When we discuss VTS, there seems to be a lack of communication and of common goals and agreement, between the users and the regulators. The government, on its side, needs to respond to the users' needs and goals. The users need to understand the benefits and limits of the available technology and what is available for forming a system. I think that quite often what we find are descriptions of parts of a system, but no one is talking about a total system. Special system aspects to meet special needs are not adequately discussed, nor is there agreement on basic aspects of a VTS that everyone can agree is needed. There are some lessons, in this respect, that the marine industry can learn from air traffic control.

Powered flight was only 75 years old this past December. In the span of one lifetime, aviation has gone from the Wright Flyer to the Concorde, from Kitty Hawk to O'Hare. The U.S. aircraft fleet has gone from one to 200,000, and

many of them are those Sunday sailors, or in this case, Sunday pilots, that you seem to have so much difficulty with.

The development and implementation of air traffic control (ATC) systems has been fostered by very rapid advances in the technology of electronic navigation, communications, radar, and computer systems. ATC has operated for many years with a mandate to employ the latest in technology to provide for public safety and efficient air transport.

The fifty year growth of air navigation and traffic control has taken advantage of all that technology has to offer, but it has fundamentally been motivated by events, such as high commercial accident rates of the 1920's and 1930's, the availability of radar equipment following World War II, the Grand Canyon collision of 1956, and the severe traffic congestion of the late 1960's. Similarly, last year's San Diego collision has initiated new directions in the development of the ATC system.

These pressures have all combined to create the need for Federal regulation and control of aviation. That is a generally recognized need. However, I would observe that the users in aviation have as much concern about regulation as your industry does. There is also extensive interest in the development of new, more sophisticated air traffic control systems.

One should not assume that this regulatory philosophy can, by analogy, be imposed in its totality upon the maritime industry. ATC system growth has occurred in a period of very rapid growth in aviation. Lack of growth in the ATC system would severely limit overall growth in aviation. In aviation, there was no historical precedent for regulatory activities (except in maritime procedures and laws, which quickly lost their relevancy to aviation) and there was no sunk investment in existing systems. In addition, there has been a high public interest in improvement and in safety, and a clear federal role was established with little international concern or involvement. All of these things, plus the newness of the aviation industry compared to the long heritage of the maritime industry, make the two cases very different.

Most importantly, and I think this is a critical point, the fundamentals for the present air traffic control system was established in a climate of industry/government cooperation. In 1947, the Federal Air Coordinating Committee established Special Committee 31 of the Radio Technical Committee for Aeronautics, or RTCA. This committee, Special Committee 31, was chartered to develop recommendations to the government for safe control of air

traffic. The committee's report, "Air Traffic Control", which was completed about nine months later, defined the basic structure of today's air traffic control system. The report may not have anticipated the extensive use of computers today. It did indicate, of course, the technologies to be applied that were then available.

This includes VHF communications, data link communications to the aircraft, VOR (VHF Omni Range), distance measuring equipment, radar, and secondary or transponder-based radar. The report was accepted by Congress and all of the users of the airspace, and has been the air traffic control blueprint of the past 25 years, both domestically and overseas. The converse of all these factors has served to complicate the systematic development of maritime vessel traffic services, or VTS. While a complete comparison of VTS with ATC fails, there remain numerous specific, philosophical similarities that can provide much insight and assistance to maritime authorities as these systems are designed, developed, and implemented.

We have in aviation, I think, an extensive amount of experience in all of the things that you can do wrong in trying to get a traffic control system functioning. The purpose of the ATC system is the safe and expeditious flow of traffic. The system to accomplish this consists of aids to navigation, airways, airports, and runways, communications, surveillance, computer systems, and, most importantly, the pilots and controllers who make the system function. I think, component by component, there are many analogies that can be drawn between ATC and VTS.

The ATC system performs three basic functions--it provides for navigation, collision avoidance, and traffic flow management, or management of the airspace.

Traditionally, navigation has been performed by the pilot, but monitored by the controller, first procedurally and then by the radar system. Under visual flight rules, collision avoidance can be performed by the pilot (perhaps aided by electronics), but this laissez-faire approach fails in moderate to high traffic situations, in situations where high closure rates are involved, and certainly under conditions of reduced visibility in instrument flight. For these reasons, separation assurance (collision avoidance) was recognized early as the primary function of an ATC service in either procedural (position reporting) or radar based systems. Today almost all air transport operations worldwide are flown under the control of an ATC service for the purpose of enhanced collision avoidance. Except in the very lowest of traffic densities collision avoidance is a primary traffic control responsibility. This level of ground based control provides the means for traffic flow management as well. However, traffic flow management

requires that the system have additional structure, procedures, spacing rules, and a good knowledge of aircraft intent--features that are not necessarily needed for basic collision avoidance. While such traffic flow features aid in high traffic densities, they are an encumberance in low traffic situations. The system must therefore have the capability of being tailored to various stages of sophistication as conditions warrant.

System sophistication might range from the simplest of control towers to complicated terminal and enroute centers as a result. The problem of application of these concepts to marine circumstances lies, at least in part, in classical maritime concepts regarding responsibility of the captain and pilot, which appear to limit the ability to transfer command and control for collision avoidance and ship maneuvering to the shore-based authority in the manner in which that transfer has been accomplished in aviation.

However, this difference in concept is really more appearance than reality. It should be recognized that retention of prime responsibility in the hands of the ship's captain applies also to aircraft; yet this has not prevented acceptance of ATC systems based on joint agreements between pilot and controller.

A unique concept of pilot and controller responsibility has evolved over the years in the ATC system. In few areas of the world is the ATC system simply a passive advisory service. In an active ATC service, clearances to navigate along given tracks are requested by the pilot, modified where required, confirmed and issued by the controller, and accepted and executed by the pilot. This is a relatively formal back and forth procedure.

The pilot, if I can quote the Federal Air Regulations, "Is directly responsible for, and the final authority as to his aircraft, but he must adhere to ATC clearances and instructions unless an emergency requiring immediate action exists." This is Federal Aviation Regulation 91; it is very specific and it has been interpreted over the years quite specifically.

I think that one of the questions that was asked this morning and that maybe we could discuss in the panel this afternoon, is what happens if you have a collision while VTS is being employed. We have had plenty of air traffic control assisted collisions over the years. Aviation law, following extensive investigations, has successfully sorted out the issue of responsibility between pilot and controller. Responsibility lies directly with the person, or agency, that is controlling the aircraft.

The apparent overlap of pilot/controller responsibility is, in fact, a logical method by which agreement is reached to achieve safety in flight. There is agreement between the control system and the aircraft.

ATC works because there is mutual knowledge of the intent and route of flight, safe altitude, and so forth, and it works, I might say, even in the presence of a considerable amount of uncontrolled traffic. There is a set of checks and balances in which an ATC clearance, regardless of whether it is initiated by the pilot or controller, must be issued and acknowledged, and then reviewed and accepted by both parties.

There can be a very brief interchange to affect this because the procedures are routinized and they are used regularly. This apparent overlap of responsibilities is not a transfer of authority from pilot to controller, but it is a double check on the safety and efficiency of each new intended action, as represented by the clearance, in the ATC system.

There is apparently no parallel to this relationship in current or proposed VTS concepts. Such systems tend to become advisory services whose role is limited to alerting the captain or pilot to potential conflicts or other hazards. They also become traffic sequencing systems for flow management purposes along loosely defined tracks, similar to a block system. Marine VTS concepts are most analogous to the control operations of small airport traffic control towers, which have been found to be inadequate for high traffic density situations where maneuverability is restricted. Traffic operating without central control and clearances in high density situations has a high risk of congestion and collision. This is true even when individual vehicles are equipped with on-board collision avoidance capabilities. In order that a VTS operate through a similar system of shore-based clearances and vectors, it may require altering the captain/shore controller relationship. I think such alterations, as I mentioned, require greater precision in terms of interpretation and defining of procedures to make it work.

The differences in the traffic control concept between aviation and marine environments are rooted in the historical evolution of each type of system. Marine operations rely first on pilotage, aids to navigation, and rules of the road to resolve conflicts, followed by communications and procedures to order and sequence traffic pairs. Direct intervention by VTS occurs only in emergency situations, when it may be too late. In contrast, direct intervention and positive control are the normal mode of operation in the ATC system to order large groups of air traffic and to provide conflict-free tracks for the

individual aircraft. The ATC system resorts to reliance on pilotage and rules of the road only in the event that the system plan is, for some reason, in error, or in low traffic situations where non-control is more efficient. This approach provides for much higher traffic handling capacity and positive safety assurance. The ability to perform these functions has been greatly augmented by the development of good standard procedures and modern surveillance and computation capabilities. But the foundation of ATC is, I repeat, the concept of the clearance issued, accepted, and adhered to, and that is important if you expect to have or wish to have any kind of active control system. There must be some kind of agreement between the shore system and the vessel.

These philosophical differences were at the heart of discussions of a panel on Vessel Traffic Services at the joint AIAA/SNAME Workshop at Williamsburg last November. The masters and pilots present indicated that they desire freedom of maneuver, what aviators would call "VFR flying." On the other hand, the panel recognized that traffic is becoming more congested in some harbors. Vessels are larger, some cargos have become much more hazardous, and the costs of casualties are skyrocketing. This makes owners, insurers, regulators, and the public more insistent on new, stricter rules, uniform pilotage standards, stringent handling procedures, and the imposition of some form of traffic control system. The general consensus of the group was that the requirement for VTS is a fact, and that the industry should shape and express its needs in the VTS area before a major disaster mandates a partial or impractical system.

What are some of the things that the ATC system experience can provide to the VTS designers and users? Following a discussion of similarities and differences, eight recommendations were made by the group. In the interest of time I am going to abbreviate these slightly.

1. The development of the basic VTS should be expedited. Everyone agreed that something had to be decided on and accomplished fairly soon.

The system should be developed with sufficient flexibility to accommodate long-range improvements in hardware, software, and procedures, so that it will be capable of operational growth and technical expansion. There was considerable discussion of communications procedures that would streamline the transfer of needed information and minimize the traffic on the VHF communications channels. These things have been discussed earlier.

2. There is a lot of experience in ATC of network organizations, standard phraseology, user discipline, and channel brevity that I think could be applied in the VTS area. The use of digital calling techniques (SELCALL) should be explored to relieve some of the channel congestion.

3. Surveillance system development for VTS should be given high priority. Techniques considered must include radar, transponder systems, trilateration systems, navigation retransmission techniques, and hybrid systems combining these elements. There are many different ways to combine the techniques, and they all have different technical and cost tradeoffs for providing surveillance in any of these systems. It is important to emphasize the capability for widespread participation by large and small vessels and by foreign flag carriers entering U.S. harbors. This is a very important consideration which we have had to deal with time and again in aviation. The ability to add data link communication at an early date must be included.

4. The relationship between surveillance and navigation must be considered and evaluated as a part of VTS system concepts. This is necessary to ensure VTS reliability and to further increase the availability of electronic aids to navigation. It has to be carefully considered that in retransmission of navigation, the possibility of one failure could prevent surveillance, and, also impare or eliminate navigation.

5. The Coast Guard should establish the position of VTS watchstander as a civilian and/or military career specialty. It should review the means by which air traffic controllers are trained and certified and by which proficiency is maintained. Parallel consideration should be given to the qualification of harbor pilots to operate in the VTS environment. This has been discussed to a considerable extent earlier.

6. Efficient service from VTS requires that designs and standards be developed for devices to display own-ship traffic information (cathode-ray tube, hardcopy reports, or some other form). These developments must consider the need for such devices, their required functions, the sources of information, human factors, size, and portability. Portability for this kind of equipment is becoming quite prevalent.

8. A review should be conducted to evaluate the use of satellite communications, and possibly, surveillance through transponders as a long range concept. These systems offer a lot but they are also expensive.

A review should be conducted of the possible relationships between master or pilot and the VTS watchstander. There are many parallels between the development of air traffic control regulations and the needs evidenced in VTS systems.

The general recommendations above are technologically oriented. The committee was unable to become very specific. But we did come up with a conceptual recommendation that I think is more important than the others. This is really my message for this symposium.

The greatest lesson from the ATC community is that new technology is worthless unless integrated into a logical, flexible, universally accepted system concept, backed by the force of law and regulation. This was agreed to by all of the workshop participants. Without such a unifying concept, VTS will always be prey to the kinds of things we are hearing here this morning--every better invention, new idea, and "Hey, what if" type of thing. Such ideas are needed and helpful in the concept formulation stage. They should be examined, evaluated, operationally simulated, and tested. There is a time, however, when the Coast Guard and the users will have to get together and draw the line, and agree to settle on a system concept and a certain technology and try to get something accomplished.

If there is ever to be an operationally useful VTS--be it advisory or mandatory--that provides new and useful traffic and safety services to the marine community, the government and the marine industry must sit down together--much like RTCA Special Committee 31 did 25 or 30 years ago--to settle on the concepts, draw up the plans, select the basic technology, and, most importantly, to agree to live by and with the results of their deliberations.

DISCUSSION

CAPT. LARKIN: What about transponders?

DR. HARRIS: Transponders are a part of the VTS system for marine craft. Transponders certainly have a lot of things going for them, not the least of which is that they can provide good, positive identification. They can provide a good, positive return and they also can provide the means for having data-linked communications, if you would.

On the other hand, transponders suffer from the same problems as most other non-radar types of devices. You do not pick up all of the traffic unless all of traffic is equipped, and they can be expensive. The aviation community

has developed transponders that are relatively inexpensive and perform simple functions. You could start at that level and later get more sophisticated devices for larger operators and the larger vessels. I think this is certainly one of the things that should be considered in this area.

CAPT IVES: Comparisons between airline and marine operations are often mentioned. It is a very popular approach for the layman. I doubt if there is a Congressman in the country who has not flown in a commercial aircraft and understands how the system works. We know full well that it would be absolutely impossible to operate the aircraft industry today without air traffic control. It is an all weather operation, covering wide geographic areas. It simply could not function, safety not even being a factor, without it.

I think that we have to realize, however, that the vessel traffic systems for mariners that were developed in Europe were developed by businessmen to enhance and expedite the movement of their vessels. They were not brought about by calamity or the hysteria that we seen to have in this country. I am sorry to say that we are following other people, and it seems apparent that other people are well ahead of us.

In Rotterdam and in other places, the port authorities saw the economic advantage of installing vessel traffic systems to expedite the movement of their cargo and to enhance the port and to obtain a competitive edge. Safety was also important, of course. Safety is a must if you are going to start moving in all-weather conditions. European ports seem to have a much higher proportion of fog then we seem to have in most of the ports of this country. So, the systems did help to ensure safety. However, I think it is important to remember that vessel traffic systems were an expressed response to a need to expedite commerce.

I do not detect that same need in this country. I find it very curious that the industry has vocalized very eloquently this morning their discontent. We seem to think we are being forced to accept something that somebody tells us is going to be good for us. We are saying that is counter to the American system of free enterprise and increased productivity.

My specific question is do you feel that vessel traffic systems are necessary to expedite and will be a benefit to the businessman, as well as an economic boon to the country?

DR. HARRIS: I am not sure I am able or qualified to answer that question, so I won't even try. I think your points are well taken and certainly any consideration of any traffic system has to have specific goals set forth. Those

goals could include not just safety goals but also cost benefit tradeoffs, and the economic benefits of such a system.

CAPT IVES: I have never been a believer in the saying that we are not in business for safety. If we were not in business there wouldn't be any need for safety. We are in business to do business safely. Somehow or other, in this country, the tail wags the dog and safety becomes the all important consideration. Business just sort of tags along behind. It would be very refreshing to see a reversal of that trend.

DR. HARRIS: It is very easy to fall into the trap of searching for some kind of absolute safety level. I hope that we will discuss this further this afternoon.

CAPT. BRUCH: Is it true that transponders, if they get within three miles of each other, they are liable to steal each other's battery?

DR. HARRIS: It is true, but the distance is more like a mile to a half of a mile, depending on the geometry of the situation.

CAPT. BRUCH: Are you familiar with the AIL Cutler Hammer radar that the Coast Guard has that has the leading line programmer capability? It is similar to the air traffic mapper that is used when a plane gets lost. It is very high technology. You can change it on a minute to minute basis for a given situation.

DR. HARRIS: No, I am not familiar with it.

MR. JOHNSON: I think you tempted the audience with your suggestion that there is a procedure for sharing responsibility once a collision occurs which might involve the ATC. Can you give an example and tell how the responsibility gets shared?

DR. HARRIS: If you look at almost any aviation accident in which air traffic control, or aircraft certification, for that matter, becomes involved the government takes a share of the cost of the litigation involved with that accident.

Here in Washington, for example, a little over five years ago, TWA 514 crashed into Round Hill out in the Shenandoah Valley. Although air traffic control was shown generally not to be technically at fault, the procedures used were faulty. The pilot was lulled into a situation in which he believed he was operating in a safe environment. The controller did not inform him of all of the problems involved.

In that case, the government took a very large share of the burden off of the carrier. This is fairly common everytime air traffic control is involved. Certainly, there is a lot of litigation that goes on before hand, and there is a lot of discussion of who to blame. It is hardly ever totally clear cut. But, the government has a policy for and a history of taking a share of that responsibility.

MR. PAULSEN: That is an interesting comment. I think we will be discussing this more this afternoon. I know Mr. Deming will be making some comments concerning the legal responsibilities. The question is really whether the government is willing to share the responsibility or take all of the responsibility in the event of a VTS assisted collision. That is something really to think about.

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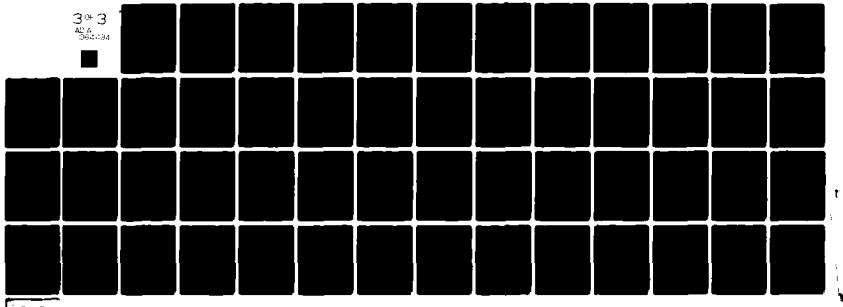

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CAPT. K.C. TORRENS

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If I make any comments that seem to be critical, I hope we can all remember that this is a forum for discussion and not a time to argue. We have to find a happy medium where we can all pull together.

I have asked myself why we need a VTS? My answer is: because times have changed. Things are different. The public demands an end to the pollution of our waters by vessel collisions or strandings and thinks a VTS is required. It is just as simple as that. There are no other reasons. Safety is not a major factor. The MUNCHEN (a LASH barge-carrying ship) went down with all hands, but there was no outcry that we needed a vessel traffic system. The ARGO MERCHANT went aground; no life was lost, but there was a big oil spill. Immediately there was a demand that we do something. About the same time and within a few miles of the ARGO MERCHANT another ship went down with all hands. It hardly made the newspapers. The safety of our vessels and the men aboard them is not the main concern of those who demand a VTS. We will have a VTS because the media and the public have focused on environmentally newsworthy collisions and strandings of vessels and demand something be done.

Congress therefore mandates that the Coast Guard establish a VTS. Whether we like it or not, we lost the ball game when we didn't elect people to Congress that understood our industry and would fight our battles for us. The Coast Guard is strapped for funds, and they have also been saddled with the additional responsibility for providing vessel traffic services. As I see it, at this point, we have no options. The only thing that we can do is cooperate. We must make a concerted effort to come up with a system that is effective and workable. The sooner we are able to do it, the better it will be for everyone. If there is a serious casualty in the near future, then there will be more pressure for more regulations.

Who needs to cooperate? I think that the Coast Guard, the pilots, and the marine industry need to cooperate. We should not be sniping at each other. When we do, it only provides more copy for the newspapers. It does not help our situation. On the other hand each of us should assess how realistically we are facing up to our mutual problem.

For one thing, I believe that the Coast Guard has to look at the situation carefully. The Coast Guard needs to be aware of the economics involved as they proceed on the course they are heading.

The industry should be consulted. Each port should have an advisory committee with regular meetings. Everyone should get their problems out on the table. This is the only way that we can get everone to cooperate and obtain the things that the port needs to make the traffic flow more smoothly. As Admiral Hayes said yesterday, the Coast Guard should not drive tacks with sledge hammers.

I think we can do a considerable amount to improve things. First, we must improve unity, responsibility, and coordination. The oil industry should join with other industries to help achieve this. Pilots, be they federal, state, or both, should stop fighting with each other, join together, and stress commonalities rather than differences. Let's all get on the same wave length and start working in the same direction.

Now, what can we do to improve vessel traffic services? The basic ingredient underlying vessel traffic services is communication; this has been emphasized at this symposium. Communication is the life's blood of the whole system. Communication is the key to effectiveness, but it cannot be overloaded. It must be dependable. The equipment does not necessarily have to be particularly sophisticated, but it must be reliable. The equipment must work 100 percent of the time.

VHF does not require powerful equipment. The distance range of one watt is perfectly adequate. Greater power should only be an option available for unusual circumstances. VTS radio equipment should be equipped with a high power option of 15 or 25 watts that can be energized only when the operator presses a button to transmit at greater than one watt. Normal operation would be at one watt. Most ship radios, I have observed, are always on high power. If everyone would operate on low power, I think that would eliminate a lot of the congestion in the communications wave lengths.

There is a need for better discipline on communications channels. Fishermen and pleasure craft and others congest channel 13 with non-essential chatter. The Coast Guard claims that only the FCC has the authority to regulate the use of radio communications. However, I think that the Coast Guard should attempt to get the authority, and, if necessary, industry should assist the Coast Guard in acquiring the authority to discipline users of VTS frequencies.

In addition to communications, another key part of a VTS system is surveillance. Surveillance eliminates the uncertainty of relying on communications. If a ship reports its position incorrectly, then the VTS system will function incorrectly. It is, in fact, possible that the system would then provide incorrect and potentially dangerous information to other ships in the system. Should this occur, mariners would not be able to trust or accept the VTS and the system would not work. Thus, surveillance is needed to provide back-up information. An error that may be generated in one component of the system would be eliminated by back-up surveillance.

The VTS center should be a repository of all needed navigational information for that area. That is all it should do. The system should not provide superfluous information. Information that the master or pilot requests should be available immediately. If the ship's radar fails, the system should be capable of immediately scanning the vicinity of the vessel, advising it of obstacles, and guiding it. A pilot approaching a blind bend, for example, will want to know whether or not another vessel is approaching; the VTS center should be able to respond quickly and accurately.

I don't agree with the idea that Europeans are 20 years ahead of us in the development of ship traffic management. They have had systems in various ports for many years, but their requirements differ from ours. European systems are designed to serve economic purposes. They are designed to improve efficiency rather than safety; without a VTS ports could be closed for long periods. The Europeans have taken a different approach. They refused to accept channel 13 for bridge to bridge communication. Yet, I think that channel 13, by itself, has brought about the biggest improvement in vessel traffic safety because it has given one master or pilot the capability of being able to talk to the other master and work out a safe procedure for meeting, passing, or overtaking.

Many people feel vessel traffic systems equal vessel traffic control and are similar to air traffic control. They envisage such systems that might include the control of vessel movement on all of the sea lanes of the world. This is not beyond the realm of possibility. But, the mariner is basically against anything that is going to infringe on his right to freely navigate his vessel. Mariners are very independent. This should be kept in mind because it is a basic factor. The mariner is the common denominator of any VTS. If he is not convinced of a system, he will not cooperate, and the new system will not work. In order for him to cooperate, he is going to have to feel there is a need for this service, and I emphasize the word <u>service</u>.

The mariner doesn't want additional regulations. He must feel the need for VTS and develop confidence in it. If VTS misinforms him, he is never going to trust it again. Further, the total VTS package must be supplied with the minimum of additional regulation. The system must not become an additional burden to him while trying to operate of his ship.

There are many misconceptions about VTS. Its main purpose or value is to reduce pollution, not to promote safety as many believe. However, whether its purpose is safety or pollution avoidance, it will probably not be successful in preventing collisions or groundings because Coast Guard studies reveal that the majority of vessel casualties would not have been prevented by VTS. The major causes of casualties are either human error or mechanical failure. VTS may multiply the potential for casualty by adding more people and equipment to the equation. Therefore, I could expect human error and mechanical failure to expand exponentially.

Another common misconception is that an analogy can be drawn between VTS and air traffic control. There is very little commonality between air and sea traffic. Air traffic control is needed because of the dangers inherent in airplane casualties; air casualties are almost always devastatingly destructive of life. Vessel casualties usually are not, especially in the close-in areas that would be served by VTS. There are few similarities.

The maneuvering characteristics of airplanes and ships are vastly different. Ships can turn, stop, and reverse, however, they must follow a channel. Airplanes can turn, of course, and climb and dive in any direction, but they cannot stop. Ships operate on a single plane, the water's surface. Airplanes are not restricted. Vessels can proceed safely in thick fog with zero visibility, while air traffic is grounded in such conditions. There is a vast difference in the speeds of ships and airplanes. Airplanes under traffic control have a singular point of destination, the airport, whereas ships in the same system may have multiple terminal points. In other words, airplanes converge more densely than do ships.

Both air and sea traffic have rules of the road. However, because of the differences mentioned above, especially the human life factor, air traffic control is necessary, while VTS is unnecessary. It should be noted that the number of ships is declining, although average ship size is increasing. As a result, the overall traffic load is decreasing, while the number of airplanes is increasing dynamically.

A vessel is designed to withstand non-optimal conditions and handling. A vessel can ground, and when the tide comes in she can float off. Vessels do sustain brushing collisions with other vessels. They may bump against a buoy or they may come against a dock too hard, but a ship is designed to withstand these shocks. After all, a ship is designed to be seaworthy and withstand the variables of ocean conditions. Aircraft, in comparison, are very fragile; even collisions with large birds can have tragic consequences.

A vessel responds very slowly, whereas aircraft can respond much more quickly. The time sequence for collision avoidance is entirely different. We get back to the fact that a ship really doesn't need a VTS unless it is for economic, anti-pollution, or political reasons. Aircraft require ATC to survive.

I suppose the audience thought that I was going to talk about the New York Vessel Traffic Service. However, information about that service is available, and I don't want to bore you with it. But, I do want to commend the way the Port of New York developed a VTS. Capt. Kessler, Captain of the Port, in New York founded the advisory committee. One of his great skills was his ability to bring agreement out of dissimilar groups. He assembled the state and federal pilots in one room, and, lo and behold, came out with a consensus of the two groups on a variety of issues. Separately, he managed to get a consensus out of a group comprising tanker and dry cargo interests. He helped to resolve hithe to unresolvable issues and did the same thing with the towboat industry.

When the three groups concluded, he ended up with three different panels, all of which agreed on about 90 percent of the issues. They disagreed on about 10 percent. Then, when he finally brought them all together, he produced a very constructive agenda by reminding them of what they had agreed to and suggesting that they focus on the few remaining points of disagreement. Thus, his approach was to identify the areas of agreement and then to tackle the most difficult problems.

The Baltimore-Chesapeake area didn't do quite as well. They assembled everybody in a room, and, after much shouting and arguing, no consensus could be reached. They concluded that the process was not working and gave up after agreeing that VTS was not needed.

In the New Orleans region, the Coast Guard took a different tack and decided to simply impose the VTS without initiating hearings or waiting for local input. That didn't work very well because the maritime community refused to participate.

San Francisco could offer some lessons in the development of a VTS system. Both pilots and vessel owners view the system as a service and are quite happy with it. Pilots, owners, and the Coast Guard worked together to design and implement a system that was modified to meet local needs.

New York is going to come on line soon. The area in which the advisory group disagrees with the Coast Guard is mainly limited to communications. The advisory committee has gone on record, that there is no need to have different communications sectors that require frequency switching as the vessel moves from area to area. All communications could be done on one frequency in addition to channel 13. Let me stress that--in addition to channel 13. Nothing should be on channel 13 except bridge-to-bridge communications. The law says that is the only purpose for channel 13. The Coast Guard should not be on that frequency. They have nothing to do with bridge-to-bridge communications.

If the Coast Guard wants a VTS channel, that is fine. But let it designate only one VTS channel. That should handle all VTS communications if communications are kept to a minimum. To have three VTS channels that require switching back and forth may very well cause a casualty, especially if someone makes an error in selecting the proper channel. Communications, then, are the basic point of disagreement. Perhaps this will be discussed further this afternoon by members of the New York Adivsory Committee.

AFTERNOON DISCUSSION SESSION

MR. PAULSEN: Captain Torrens did not have time this morning for questions so we will start with two or three questions for him.

MR. KLEIN: I have to disagree with Captain Torrens. I think that VTS input does prevent vessels from going aground. We had a situation in the Mississippi River in which 13 tugs went aground in a single area in two weeks. Only two of them reported it, but other boats reported it. With VTS, we were able to do a quick analysis and go up and examine the aids to navigation. We placed two new buoys in an area. Of course, they should have been there for at least ten years, but the point is that the fact that VTS was able to do a quick analysis was a tremendous help. Since then, we haven't had another tug run aground below Sardine Point.

MR. PAULSEN: I think Capt. Torren's point was not that it did not prevent collisions under certain circumstances, but that that is not the prime motivation for installing VTS. Is that Correct? VTS was motivated by oil pollution publicity.

CAPT. TORRENS: Both are correct. I feel that what you really said was prompt communications, and a dedicated Coast Guard crew that replaced that buoy immediately, prevented other vessels from grounding there. The vessel traffic service per se, did not prevent the groundings. However, I can see where VTS might have helped by alerting people immediately that there was a shoal spot in that particular location.

To answer your question, I feel that most collisions and groundings are caused by human error. I haven't run a study on it, because I find that studies are only as good as the people that pay for them; they usually reflect what the purchaser wants. I do have a fairly good seat of pants feel, and my feeling is that almost all cases of collisions and groundings are human error or mechanical failure. In most of these cases, VTS probably would not have prevented the casualties.

MR. KLEIN: We have had statements from members of the industry that indicate that they feel that, when they do

call VTS, they get quicker responses on those kinds of items.

CAPT. GARDNER: It seems to me, Captain, that that is not a function of VTS. That is simply receiving communications and responding to a problem in the river. That can be done through the Captain of the Port network or any other radio network on the waterways.

MR. PLEDGER: You stated that you feel that New York Vessel Traffic System can successfully operate on one channel in addition to channel 13. On what, outside a seat of the pants feelings, do you base this determination? Also, at what point does a communication channel become so saturated that it is no longer effective? Finally, at what time of day and in what sectors of New York Harbor would such saturation occur based on current traffic levels?

CAPT. TORRENS: I base this not so much on the seat of my pants as on a channel 13 VHF radio receiver which I keep on my desk. I know you were involved with the studies, and I do not wish to comment on them. However, it has been forecast that the saturation point would be met, and, therefore, you would not be able to communicate using just the one channel.

During the towboat strike in New York, we had all of the vessels out there, with the obvious exception of the tow boats. Nevertheless, there were many communications taking place on channel 12 and on channel 13. These channels were used by the vessel traffic service we had working in the Port of New York at the time. It was not a Coast Guard operation, and it was not called a service but it was there and it was working. And, it worked on only two channels. I state that, if the tow boats had been in operation, and if everybody had shut up when they didn't have something important to communicate, there would have been no overcrowding of those two channels.

I would like a show of hands of the pilots in the room who agree with me. Do you see the hands? They were all out there at that time listening to channel 13 and 12. We don't believe it was overcrowded.

CAPT. SORENSEN: It is my observation that the suggestions and recommendations of the Advisory Committee to the Coast Guard are not reflected in what we received in the book. Is that your feeling as well?

CAPT. TORRENS: I agree with you to some extent. In making the VTS for the Port of New York, 90 percent of the recommendations of the Advisory Committee were followed. There were certain areas, especially sectorization, in which the booklet does not conform with our opinions. However, as

I stressed at the last meeting, we were an advisory committee. The responsibility for traffic service rests with the Coast Guard. It was put there by Congress. I certainly don't want the responsibility for setting up a traffic service. I love to advise people but I don't want to be responsible.

We advised the Coast Guard and made our contribution. Whether they followed our advice or not, the proof of the pudding will be in the eating.

CAPT. SORENSEN: You definitely were not in favor of sectorization or a three channel system. We agree on those points. However, I was very strongly in favor of a reasonable time of voluntary participation. This was reduced from a proposed two to three months to 13 days, prior to it being put off again for two months.

I wrote some letters to Admiral Price and Admiral Hayes. When I asked why we were only going to have a 13 day voluntary participation I was told that the tug boat strike had occurred during the period set aside for VTS voluntary participation, but we were never told that. The major portion of the members that are going to use the VTS in New York did not have the opportunity to engage in voluntary participation because they were on strike. Again, I realize that you feel strongly about sectorization. I feel very strongly about a reasonable voluntary period and I haven't seen either one of them come out in the book.

CAPT. TORRENS: As far as the voluntary versus mandatory, you have your views and I have mine. I am afraid that my view is that it has to be mandatory now.

DR. GARDENIER: In your talk, Dr. Harris, you mentioned the need to have discipline, a common language, and a very standardized procedure for voice communications. There seemed to be the implication that you meant that to apply to the marine realm as well. I would like to hear a little bit more elaboration on that issue by the panel members who are knowledgeable in that area.

I have recently been involved in studies of accident reports, and the largest identifiable factor in collisions and groundings in U.S. waters where the Coast Guard has jurisdiction is still communications. Although I agree with the speakers that said that the situation has improved since the imposition of bridge-to-bridge radio telephone, we still have a lot of problems. Some of them are human to human, getting an idea from one head to the other head. What do we have to do to get our communication systems working?

DR. HARRIS: Let me talk first from my aviation experience. Through painful experience in aviation, we have

learned over the years that poor communications, misunderstood communications, incorrect communications, lack of communications procedures, any or all of these, create human errors that can lead to very serious accidents.

The problem is really divided into a number of areas. This morning I described the TWA 514 accident that occurred out here a few years back. There were other accidents during that same period that were a result of communications problems, particularly a lack of standardized definitions and understandings between pilots and controllers. Terminology and phraseology, in general, was confusing. One of the things that the FAA, in cooperation with the users, has done in the past five years that I think has been very instrumental in clearing the air in communications, if you will excuse the pun, is to publish a book of standard definitions for all terms that are commonly used in air traffic control, either by pilots or controllers. It is called "The Pilot-Controller Glossary."

It is commonly used now and published in the Airman's Information Manual. It is in the controller's handbooks, and it is in other places as well. Although it is hard to prove that anything like this has ever prevented an accident, I think that it has been a very important factor. One part of communication is simply knowing, through basic training and usage, what terms specifically mean.

Another point that I want to make has to do with the brevity of communications and the use of standardized phraseology and procedures. Out of those same series of accidents, came a complete FAA review of their own controller procedures and their handbooks. The handbooks were changed; a lot of standard phraseology was added. The controllers are required to use this phraseology. It has become so common, that it is easily and specifically understood by the pilots. This contributes to a clear understanding of a clearance or a piece of information passed from pilot to controller. We have been somewhat less successful in terms of getting pilots to use standard phraseology, but communication from the controller to the pilot has been standardized.

I must note that this is not totally enforced in the field. The controllers do use non-standard phraseology quite often. When this leads to what we call a system error, such as bringing two aircraft too close together, a controller can have problems if he did not use the standard phraseology. This tends to reinforce the use of standard phraseology.

Operational necessity, and hard experience with accidents, have led to requirements for standard procedures

for communication. These procedures then, in themselves, become a form of code. They ensure agreement between the pilots and the controllers. When one says something to the other, it is specifically understood. Our major task is to close those gray areas of misunderstanding over time.

It also has a side effect, it leads to brevity on the channel, and this, I think, reduces channel congestion. If you have ever listened to a local control channel for a final approach, the communications on that channel are very brief. The pilot's responses may be two to three seconds long, not much longer than that. Most communications on that channel are six seconds or less. Therefore, you may have several parties on a channel and a lot of information being passed back and forth, with only 20 to 30 percent utilization overall on the channel. All of this, I think, comes about from discipline, an increased understanding on both the part of the pilot and the controller of the need for clarity and brevity.

CAPT. TORRENS: I second your remarks. I feel that the marine industry can learn a lot from the air industry, and that we are too wasteful of time in marine communications. For example, according to the old FCC rules for communications on radio, you have to repeat the name of the vessel twice. You should not have to say, "This is the so and so calling the so and so," two and three times prior to carrying on a conversation. The phraseology could be brief.

I also have some constructive criticism for the Coast Guard. The young seamen are trying to follow all of the regulations and they spend too much time on the air. They say, "This is the Coast Guard Cutter so and so, XYZ 953, I am in the middle of the channel." Well, who cares? They just do it because they have been told to do it.

I think that brevity is the key. In New York Harbor a commonly used term when vessels meet is, "meet you on one whistle." Everyone in the New York Harbor knows that means both vessels should go right. Therefore the one burst suffices.

We also have found in the Port of New York that channel 13 is misused because it is a common channel. For example, each tugboat company has its own house frequency. If boats from different companies are doing a docking operation, they use 13, since everyone has channel 13, instead of going to some other channel. Now, that is not the purpose for channel 13. Channel 13 is bridge-to-bridge and should only be used for exchanging navigational information. Yet, there are a lot of tug boats that use it quite a lot. They should all be off that channel and should use six or use some other frequency.

MR. LEDERER: In connection with this language problem, I would like to relate the language problems to the statistics that the Coast Guard brought up this morning. Statistics are like a bathing suit; what they reveal is interesting, and what they conceal is vital. I want to give you a specific example from the field of aviation.

In Quebec, Canada, the government has recently switched from using English as the only system for air traffic control to bilingual, French and English, air traffic control. English is not required but only recommended.

The reason they decided to bow to their political pressures on this issue is that, in their whole history of the last 25 years of aviation, there has only been one fatal mid-air collision due to the use of bilingual air traffic control. That occurred off the Rio de Janeiro when an American Navy DC4 collided with a Brazilian DC3. The Brazilian was being handled by Portuguese ATC and the American by English ATC.

In 25 years that was the only collision that they could prove resulted from using two languages. The fallacy of that, is that pilots see with their ears. No one knows how many collisions may have been avoided because pilots were listening to each other in one common language, and, therefore, knew where each other was and avoided a collision. I have a dozen case histories reported to me by pilots that demonstrate that point at home. The point that I wanted to make is that I don't think you will ever be able to prove the importance of VTS by your action statistics. You never know how many collisions you have prevented.

Another point about the history of air traffic control, it wasn't started for collison avoidance. It was started to even the flow of traffic into Newark Airport in 1935. it was required by the pilots and it was pilot operated. Later on, when it was used for collision avoidance, the pilots became very sensitive. At that time I was Director of Safety for the government, and I was in charge of all Civil Air Regulations. We had to get the pilots together with the Air Traffic Control people and tell the pilots that this was only a suggested way for them to operate. It was not a command. With that, they agreed to the use of air traffic control.

Finally, I want to mention the influence of the Bureau of Budget and Management in reducing the amount of money that government agencies get. Of course, Congress may override it, but it is a very powerful influence on the allocation for the Coast Guard.

CAPT. FIOKE: About once a week I take the trainees out to New York, to Brooklyn, to Staten Island, or Port

Newark. I worry about the general failure to use whistle signals and the tendency to depend only on voice exchange while passing or overtaking. Also, the high power radios do tend to crowd the air. We hear a lot of distant talk.

As we are working, we have to identify the other vessels through our glasses and describe them on the air. It takes time for two vessels to be sure about their mutual identification. Sometimes errors are made. You may have a number of tows in the same general area, and it becomes rather difficult. I would like some of the pilots to comment on this. For instance, the law calls for the whistle signals. What if we do have a collision after only a voice exchange? Will we be held responsible for not having the whistle exchange?

MR. PAULSEN: If that is contributory fault, yes.

CAPT. SORENSEN: I think he is absolutely right. We are falling into a trap with the radio. We still have the rules of the road with which we should comply. Apparently a lot of us are not doing so. We are just using the radios. Now, we are asking for one whistle or two whistle passing signals. I think it is a mistake. I think we should be complying with the rules of the road and using the radio in conjunction.

CAPT. GARDNER: I think that, in some areas, the whistle signals are absolutely dangerous. In New Orleans, getting back to that lovely port, you may have as many as a dozen vessels in the same geographic location within whistle signal earshot of each other. I have met as many as four abreast and had to go right down between them. Now, which one am I blowing at? If I blow one whistle, I may know which one I am signaling, but does he? Yet they are the ones that need to know. I can see some dangers in this. Many times I do not blow the whistle because I know it might create confusion and undo something that I have very clearly laid out by radio.

CAPT. GRANT: I have a tendancy to agree with Capt. Sorenson. When we first got radar a lot of the mariners went to sleep. They thought that this new little box they had was going to solve all of their problems. However, I think, that the statistics show that there were more collisions around the world after radar than there were prior to having it.

As a pilot, I always blow the whistle, even though I have exchanged information by radio. I think it is a good practice to have because you can be lulled to sleep. I guess there are certain cases, such as the one you alluded to, in which a whistle signal possibly would not be good.

Basically, however, I think you should stick to the rules of the road.

CAPT. TORRENS: I am not a lawyer, but I am sure that, if you finally got into a court of law, that this would be important. I have to agree that in no way would I try to tell anybody to use the radio-telephone in lieu of the sound signals. The law says you have to use the sound signal. I also would say that I would not take the radars off my ships today and hope that they are safer simply because there are collisions in which radars are involved.

If I might just digress a little bit. The Europeans never accepted channel 13. That is why we are saddled with 16. Europe said that channel 16 was to be the calling and distress frequency and that thou shalt always listen to it. They put that through IMCO and through all of the worldwide organizations.

Channel 13 was an American invention. Paul Ives is one of the people that probably should be given credit for it. The Deleware Pilots were the first to use it. Initially, I was against it for exactly the same reasons that are being brought up today. I was afraid that the rules of the road wouldn't be followed because the ships were in radio contact. Therefore, I felt we would be caught up in a legal bind.

I was also afraid that the various nationalities talking over the air could cause confusion. Whereas, a whistle signal is the same in every language. I have turned around 100 percent on this issue, however.

I think that channel 13 probably has averted more collisions than we will ever be able to estimate. There hasn't been confusion. It has been usually used in American waters, and transmissions have usually been in English. I have seen very little confusion. In fact, it has really straightened out a lot of things.

MR. PAULSEN: We have a few questions that were written out following the suggestion I made at the end of the morning session. Capt. Gardner, you have two questions that were put to you.

CAPT. GARDNER: This question comes from Jon Klein of Sea-Land Service and he says, "The games I mentioned in my question to Capt. Charter are incidents reported by the New Orleans office wherein pilots and tow operators refused outright to participate in the voluntary system. They use phony names or call signs and/or report false positions. Sea-Land is well aware of the problems relative to the development of the New Orleans VTS and supports the criticism of the somewhat arbitrary actions by the Coast

Guard in this matter. However, the above mentioned incidents are games and are very serious games. My question is do you not feel that all of the concerned parties should stop these dangerous games and voluntarily comply with the VTS system while we all work collectively to improve or modify New Orleans VTS?"

I agree. It is absolutely horrendous that anyone would involve themselves in a vessel traffic system and use phony names and call signs. Of course, I would not condone anything like that.

As far as the participation rate, I know of few companies who have told their personnel not to participate. Because of the liability involved, they cannot afford to assume the risk. My position is that I have asked the people in my company to participate when and if they feel it is safe to do so.

Now, I am not about to tell people to participate in a system that is likely to cause them to have an accident. Some people are also better at handling the radio. I am not about to tell a man that he has to comply in a voluntary system and relax his legal liability to comply with the monitoring requirement of channel 13. I do feel that the voluntary aspect of any vessel traffic system is as good a yard stick as you possibly can get to measure the effectiveness of that service.

If the service is there, and it truly is a service to the pilot and will help him to get his vessel up and down the river easier and safer, he will flock to it. You will not have to make it mandatory. Although you feel you need 100 percent participation, I think that is an example of the tail wagging the dog. I don't think that a 100 percent participation rate makes the service any better.

CAPT. DEAN BRUCH: The question came up because of a discussion I had with Captain Arnold, President of the Crescent River Port Pilot Association. As the head pilot commissioner for the state of Louisiana, he said that he knew there were a few pilots out there, disguising their voices and what have you. But, he told me that if we can identify any of them, he wants me to call him immediately. I thought you would like to know that.

CAPT. GARDNER: Captain Dean Bruch has asked me the following question. He says, "A segment of the industry has asked for the exclusive rights to channel 77 as a permanent working frequency, effective November 3, 1978, for ship pilot to tugboat communications, as well as communications with support personnel. Anyone else using this channel, or misusing same, is subject to a $2,000 fine. Ship pilots now use several port operation frequencies, namely channels 18

and 19, and channel 6 as a secondary. Consequently, if the law is enforced, no one will be using channel 77." I think you are saying why hasn't the industry cleaned up their act in this matter? The FCC has tried to respond in the name of safety.

This is not a frequency that I requested because I am not involved in ship docking operations, but I do have a couple of comments to make. In New Orleans, we have the maritime frequencies saturated to a point that is unequalled anywhere else in the United States. People there trying to carry on their daily business are searching for anyway to communicate. Yes, there are a lot of things that could be done to clean up these inconsistencies, but I think that it is clearly the role of a regulatory agency.

There is a snowball effect. It is like grabbing one guy in a 500 person riot and asking him to stop the riot. It has started, and you can't stop it individually. But, the police can come in and stop it. I think this is a perfect example of the appropriate role for the federal government. I am not throwing this at the Coast Guard, but the FCC is constantly turning their back on this problem.

Policing and enforcing of the marine frequency regulations is a problem all over the United States. The government has just turned its back on it and refused to do anything. Solving this problem could contribute to solving some of our other problems on the inland waterway.

MR. PAULSEN: There were three written questions put to Captain Charter. One of them goes to Capt. Grant also.

CAPT. CHARTER: Before I respond, I ask for equal time. I have some comments on some of the statements made in the papers read this morning.

This morning it was mentioned that Congress mandated the VTSs. There is only one that is mandated by Congress, and that is up in Prince William Sound. The remainder are authorized by the Congress, but the actual decision to implement is made by the Coast Guard.

Another point, the Coast Guard does have the authority to discipline on channel 13. It is in the Bridge-to-Bridge Telephone Act and I believe the comments that were just made reflected this. Also, as a matter of passing interest, channel 13 has been proposed by several governments as an international navigation safety frequency. The U.S.S.R. has put forward a paper on this at IMCO. Canada also has put in a paper on this at IMCO. The Netherlands has, and Finland intends to do so. It probably will not be too many years before channel 13 is accepted internationally as the bridge-to-bridge frequency.

There have been several comments on common language formats, circuit discipline, and so forth. I hope that all of the mariners out in the audience are aware that there is a standard navigational vocabulary that has been approved through IMCO and is in worldwide use. The common language is English. It uses a standard phraseology, so that some of these problems that you have been discussing will not occur in the future. This is relatively new and was only completed by IMCO about a year ago. Perhaps it is not seeing the complete usage that it should, but I certainly hope that you are all aware of it. If you are not, I ask that you will go back and take a look at it.

I also should mention that, at the meeting of the Subcommittee of the Navigation Safety Subcommittee, IMCO, which ended last Friday, we did take a first look at a format for a standard reporting system, and did agree on a recommended format. The format would be Alfa, followed by something, Bravo, followed by something, Charlie, followed by something, and would be standardized throughout the world.

The first two systems in the world to be subject to this format are systems in the English Channel and in the Straits of Juan de Fuca. I am hopeful that some of the problems that you have been discussing have been under control in the air traffic world for many years and are nearing much better understanding and control in the marine world.

A comment was made this morning that, in certain areas, the Coast Guard has said that they can't help clear the navigational channels. Well, there are federal statutes that prohibit the obstruction of channels. If you run into that situation, you should sit down with your local Captain of the Port and get it squared away. He does have a statute that prohibits that kind of action, and he should be out there enforcing it. So, I would suggest that you put the pressure on to get it done.

One final point, particularly when we are working with a group that comprises both air and marine experts, we should use the word "optional" for the traffic services rather than "voluntary." There is a subtle differentiation that comes into play here. So, for those of you who are air minded, keep in mind that we are talking optional, although in this morning's discussion we were using the word voluntary.

The first written question was submitted by Captain Collar, who could not stay this afternoon. "The masters of the Sea-Land vessels using VTS in Puget Sound complain that too much time is spent by the control center in delivering the required information to foreign vessels entering the reporting zone, due to the language barrier. At times it sounds like a Chinese fire drill. They suggest making

cassette tapes in about five of the major languages, asking the vessel for the required information in their native tongue, but asking them to answer back in English. This may aid in clearing channel 14."

I think that the comments that I just made on the standard navigation vocabulary will be helpful in addressing this problem. I would prefer to see that solution; that is, English as the primary language with a standard navigational vocabulary format. This should, I think, overcome this type of problem. Incidentally, that same body in IMCO is looking at English as the language to be used as the common language on the bridge.

This next question is titled "VTS Development Problems and Operating Support by the Professionals."

"Concern has been displayed today in comments that complain that more professional input should be sought and used in developing solutions for vessel traffic problems. I feel that it is only sensible that more attention should be given to the professionals in the field, that is, those professionals that the systems are designed to aid. For example, relatively inexperienced Coast Guard personnel are involved in the operation of existing systems. Captain Grant suggested, and I support, that the people in the industry are more qualified and better able to develop and control effective and safe VTS systems. The USCG needs the cooperation of the professionals, in the end, to make the systems work. It follows that the USCG should use their advice in the development phase. As Captain Torrens suggested, perhaps meetings can be scheduled to provide an opportunity for input from pilots and other professionals in the marine industry in the development of VTS systems." That was submitted by Paul Hatley, First Class Cadet, USMMA at Kings Point.

I think that this statement is in keeping with the tone that was expressed earlier in the day, with which I agree. I think we need this input. Not only do we need it because it is a necessary element of the Port and Tanker Safety Act, which does require us to consult with and consider the views of the users when we look at development and operation of any system. But, it makes sense from the point of view of safety, as well.

In those areas where there isn't a formal advisory committee, a formal examination could be made. This would serve as a means for exchanging information between the Coast Guard and other parties. Also, in several port areas in the country, there are some fairly effective groups composed of representatives from the government and from industry, that sit down on a regular basis and discuss problems that are of mutual concern. I certainly encourage

this, but we have some limitations in the federal government on what we can sponsor on an informal basis. So, these groups have to be supported by someone other than the government, unless you go the formal advisory committee route. There are some constraints on formal committees that sometimes make for a less effective means of accomplishing the purpose. Often, an informal body, supported by industry or by some association in the port area, is more effective. Perhaps, as someone suggested, this type of gathering might be considered as a means for getting future input as well.

The final question is directed at the panel in general. It is from Captain Roswell of Scallop Petroleum Company, which is a Royal Dutch Shell Company.

"We have had favorable experience with VTS in major European ports and believe that effective VTS in selected ports can enhance safety of navigation. The effectiveness of a VTS will ultimately depend on the expertise of the personnel on duty in the VTS Center.

With this in mind, I would like to ask the following questions: 1) How are Coast Guard VTS duty officers trained? 2) What is the normal tour of duty for Coast Guard VTS personnel in a particular assignment? 3) It is suggested for consideration that the presence of a pilot in the VTS Center ready to offer professional advice may be beneficial, perhaps during the initial operational period of a new VTS, or perhaps on a long-term basis. Would pilots be prepared to accept it?" I will respond to the first two questions.

How are Coast Guard VTS duty officers trained? Basically, at present, it is an on-the-job training assignment. We select personnel who have had some exposure to a related field. Most of our personnel in the VTS watches are people who have come out of Coast Guard vessel assignments in the Combat Information Center. The majority of them are radarmen or similar rates and have had some basic training during their initial schooling on control procedures, communications procedures, and things of that nature. They report on board with that general background, then they undergo an on-the-job training process that varies from VTS to VTS. Some training programs are as short as 6 to 8 weeks, and some are 6 to 8 months in duration. It primarily depends on the complexity of the particular port area. The normal tour of duty for Coast Guard VTS personnel in a particular assignment is three years.

CAPT. GRANT: Speaking specifically of San Francisco, we worked very closely with the various commanders out there. They came to our office several times and asked if they could use our pilot boats to take the enlisted men and the officers out to the pilot station to

qain experience. We extended that courtesy. They established a proqram that includes a ride out to the pilot station for all new Coast Guard personnel in San Francisco. Of course, they also ride around on their own boats to qet a feel of where the port facilities are. They also developed a question and answer pamphlet, which I thought was very, very qood. I took a look at it and felt that I had better qo back and start studyinq, because I couldn't answer some of their questions. As far as I am concerned, as a result of the traininq proqram in San Francisco, some of the people out there are very qood.

In response to the third part of that question, when they started the vessel traffic system in San Francisco, they did ask the pilots if they would voluntarily give their time. Well, a pilot works a lot of weird hours. One day he qoes to work at 4 o'clock in the morninq, the next day he qoes to work at noon. They value their time off. So, I think there was a brief period of a week or two during which some pilots did qo over to the center, that was all. A number of them said that they would use their time off to try to help, but that they would like to qet paid. The Coast Guard did not have any money; so it fell by the wayside.

I do believe, as I stated in my paper, that eventually they should be put under the manaqement and guidance of a professional.

CAPT. IVES: Very early in the VTS game, I was fortunate to not only be Chairman of the Electronic Aids Committee for the APA, but I was also Chairman of SC 67, the Radio Technical Commission for Maritime Services Vessel Traffic Committee.

A policy was adopted as a resolution and voted at the convention and meetinq of the Board of Trustees of the American Pilots Association. We went on record to support the Coast Guard and offered professional advice and the services of pilots whenever necessary in the formulation of vessel traffic systems.

We had in mind the success of the European systems that are 90 percent pilot operated. We felt that this was the only way to operate. There are many reasons for this, and most of them are obvious. But, I think that one of the most important thinqs is somethinq that hasn't been mentioned here today, althouqh Doctor Harris mentioned it in his report on air traffic controllers and pilots.

The mutual respect between people that speak the same lanquaqe is of qreat importance. Seamen speak the same lanquaqe. No matter what their nationality is, they speak the same lanquaqe. I mean in the broad sense of having

similar attitudes and mutual respect for one another. Unfortunately, the Coast Guard personnel, with lower ratings who are on the radio, do not effectively communicate with master mariners. We felt it might be very desirable to have a pilot whom the other pilots trusted in the control center. It would give the man who is receiving the advice a great deal of confidence. For many reasons, principly economic, it is not always possible for a local pilot to give that much of his time.

However, in the larger ports where we have many men in the Association, it has been generally and formally agreed among the associations that men would be made available to assist in this process. I think the Sandy Hook Pilots have contributed a good deal of time in the planning stages, and I would anticipate that they would be available if their services are required in the future.

There will be pilots available for this purpose. We have asked the Coast Guard to include the pilots in this system, and the pilots will be available if they are requested.

CAPT. GRANT: Will the Coast Guard accept the offer that Captain Ives has mentioned?

CAPT. CHARTER: As we discussed today, each individual service is under a separate commanding officer in a different district. So I would not want to speak for each individual commanding officer. But, I know of no general policy that would prohibit it.

Apparently, it was already discussed in some detail in San Francisco. I personally would welcome it. In those areas where you feel you could contribute this, recognizing that it would be on a non-pay status because we don't have funds in the budget to cover it, I would suggest that you approach your VTS through, in your case, the Advisory Committee, and offer this type of assistance to the Commanding Officer.

CAPT. LUTTON: I think there is a misconception about aviation flight control. As has been pointed out, there is a great deal of difference between aviation and the maritime industry.

I certainly agree on the need for professionals and the importance of continuity of VTS personnel. I think this is an appropriate approach, but I personally do not feel that this means you have to get pilots and masters into the VTS system. We don't have that in the flight control. We have FAA controllers and we have pilots. The pilots are not controllers and the controllers are not pilots. It really makes no difference at all whether the controllers know how

to fly an airplane. Most of the controllers have a great deal of empathy with and understanding for what the pilots are doing. That is one of the reasons why they have an FAA program that allows controller to fly as a crew member. Pilots, as a rule, spend some time in the flight center. They understand the controllers. There is a great deal of mutual professional respect.

There are, however, differences in temperament, and I am not sure that the pilot should be down in the control tower or the controller should be up in the air. So, although I am going to step on some toes, I disagree that mates and pilots are only going to listen to mates and pilots. I think that is wrong. In other words, I think there should be a professionalism on both sides, but they are different jobs. They both serve the same community, but they have different jobs.

CAPT. CHARTER: The present VTS watchstander policy, which was established several years ago, is that we would, with one exception, use military personnel for VTS watchstanders. The one exception is Dean Bruch's crew of pilots that come from the Corp. of Engineers at Algiers Light. That system was continued under the Coast Guard and is manned by pilots.

This issue came up in the New Orleans VTS workshop session last April, and it has come up here again today. I think that it is certainly appropriate for us to take another look at this, do a re-analysis, and see if, in fact, this is the appropriate approach. We would seek whatever input you would have on this issue, and then re-examine the problem to see what benefits could be derived from changing the procedures.

CAPT. GRANT: Capt. Lutton, you alluded to the fact that, in aviation flight control, there are two professionals, and they respect each other. But, we are not dealing with the same type of people. We are dealing with enlisted men, not professionals. If they put professionals in our systems, then it would be professional talking to professional.

MR. LUTTON: I fully agree with the need to have professional people in the VTS and to develop a continuity in the personnel. I agree with that. I'm just saying that those people do not necessarily have to be pilots. It could very well be that there is a better approach. They could be professional VTS people. I am simply saying that they do not have to be pilots in order to hold that job.

CAPT. PETERSON: We addressed this in New York, and not even the industry is in agreement about having a pilot. We did feel, after discussing it among pilots, that in the

initial stages, it may be a good idea to have a professional pilot there to fill the operator in on the local knowledge about the ports. We thought that they should have some idea of what the port is actually like.

They do have a billet for a civilian in the VTS Center. But I think it is a GS-11 or 12, which amounts to about $25,000 a year as pay. We don't think it is right to train a pilot 14 years and then put him in a VTS center at a salary of $25,000 a year. But, we do think that, if you are going to have a VTS Center, there should be civilians in it and they should have continuity in the job. Ultimately, it would be best if they stay in that job, or perhaps move to another port, given adequate familiarization time. It is not good to have a Coast Guard man for three years, then ship him out to another station to do something else, and bring in another man to train.

Air traffic controllers are civilians. They stay in that job until they retire, and they stay in either that airport or another airport. If we are going to have a VTS Center, I think we should have civilians in it, and they should stay in that job and provide continuity.

CAPTAIN RICH: I think we are zeroing in on something that we had at one time and have lost. The private sector, our ship owners and ourselves, had an idea and put it into effect seven years ago. It impressed so many of those who regulate us that they grabbed it. In the very beginning, when the San Francisco project was set up, the Coast Guard, in its wisdom, sent one of its prime officers to the maritime institute to go through the system.

One of the things that was the most valuable for the person who went through that course was that, for 30 days he was in the living environment of his professional peers from the industry. That closed a tremendous gap, the communication gap, with peer to peer relationships.

It is unfortunate that we have to be here today seven years after one positive forward step was instituted. Having heard this discussion this afternoon, I am reminded we have not made another step forward. We are not using the tools that we have. It is the common tool of our ship owners and we who man the ships. If you would accept us and send your people to us, your officers and the pilots and masters could be trained together. Those who will be responsible for each other's life and the life of the community could learn from each other. Let's not have the elements training independently of each other, because when you get to the scene of action we will all be strangers. It does not have to be that way.

Of course, we think that, in the best of all worlds, pilots, masters, and vessel traffic personnel would come up together, or at least find a way to have common experiences. We need to establish such a system before this thing grows to the point that the tail is wagging the dog. We have the means to do it.

I hope that, when this report is finalized, the sponsors of the Maritime Transportation Research Board get that message. It is the message that I have been hearing for the last two days. Give us a moritorium on the compounding of new regulations, we will be able to draw on our innate training and ability as seamen in the marine environment to solve our problems.

I hope that we will do what we started to do through the combined efforts of the ship owners and my union. If we do, we can say to the Coast Guard, "Here it is. You don't have to go to tremendous expense. Bring your men to us, and let us grow together."

CAPT. STILLWELL: A few years ago, when I was sailing on the West Coast, I had an opportunity to use the systems that Captain Grant and the inland pilots initiated through the marine exchange in San Francisco. Likewise, I used the system that Jacobson pilots had in Long Beach Harbor. I found both of those systems to be very professionally run, particularly the Jacobson system, because it was all inclusive. I had total reliance and faith in that system because it was being operated by pilots and for pilots.

Since that time, I have had experience with some of the newer vessel traffic systems that have developed. I made a couple of trips to Valdez, and I was not overly impressed with the performance of the controllers in the Valdez system. I haven't operated in New Orleans, but I have operated under some of the foreign systems. I found Euraport to be very, very effective in the way that they control the ships entering that port in zero visibility.

My question is directed to all of the panel members or to anyone else in the forum. Are there any studies, or are there any data, on the relative receptiveness to and effectiveness of the systems that are operated by the pilots for mariners, versus systems that are operated by states and other various political entities for the mariners? Are there any hard data? Is there any kind of information that can be given to us that would indicate whether or not one system is preferred over the other?

CAPT. CHARTER: I tried to answer that this morning. I did point out the difficulties involved. There are multiple variables involved, and we have to work from a

relatively narrow base of statistics. I don't know of any such comparative analysis, and I don't think any are going to be available in the immediate future. At some point in time, I would hope that we would be able to make the comparison as you suggest, but that is several years downstream, at least as far as I know. Now, if someone has some better data than we have, I would like to hear about it.

CAPT. GRANT: Our system is handling a staggering number of ships and it has proven to be a fantastic system. I don't know of any data that have been collected, however. I am hopeful that we can use our system to gather some data that will show that we are effective.

MR. BULLARD: First, I want to apologize to the Coast Guard for all of the flack they are taking here today. I have all due respect for Admiral Caldwell and Capt. Charter and many other people in the Coast Guard. I have had good relationships with them, although very rarely have we seen eye to eye. It is inevitable that we are going to put in some traffic services.

I don't oppose VTS. We have had a vessel traffic service on the Mississippi and the Illinois waterways ever since I've been in boating. Back in the old days, we used to communicate with one another all the way up and down the river. We knew where everybody was and where we were going to meet.

I like having a vessel traffic system. It means that everybody has to comply, and it helps. However, now we have another regulation, and one that was copied from the industry. As the gentleman stated so well just a few minutes ago, the vessel traffic service is nothing new to our industry. We don't navigate the Cincinnati bridges without making contact with the boats above and below. you mentioned Vicksburg harbor--today it has 100 percent participation. There is a gate there. If you don't participate, you can't go through the gate.

Admiral Barrow and I have had a lot of communication back and forth about the vessel trafic system in New Orleans. It is an ill-conceived system. I think deep down in his own mind, he knows it is an ill-conceived system, but he was ordered to put it in as is. Our industry fought it, but the system is still going to be put in place. At least it is going to be modified. It is a cancerous system; it was terminal before. Now, we are just going to lose an arm and a leg, but we are going to be able to live.

CAPT. GRANT: The last question here was handed me by Dean Bruch. It says, "Captain Ben Joyce, Commanding Officer of the New Orleans VTS, would like to know what

other services a pilot normally supplies to vessels other than ship handling and pilotage?"

The fundamental responsibility of the pilot is to pilot the ship and bring it in. Anything extra that we did was not on my license. But, to answer Captain Joyce's question, many times we are the liaison among the masters, the agents, and the owners. We carry messages from the agent to the captains and back again. We keep the captain apprised of all the new regulations issued by the commander of the port. We serve as mailmen. I don't know how many times I have brought clearance papers aboard when a ship is coming down the river, so the ship can go to sea. We also apprise them of changes in the aids to navigation. We apprise them of the Code of Federal Regulations, Title 33, and ask if they have complied with same.

These are things that I think almost all pilot organizations do for the ships. I think it is a normal part of our job. I don't know whether you would call it another service.

CAPT. BRUCH: I recalled that all over the world these were the usual functions of a pilot.

We have been embarrassed. Some of the ship masters state that some of the pilots do not want to give them the benefit of the language knowledge. In fact, I had a Russian who said that he had hoped that the pilot would use the English language for any of his needs, but the pilot would not say anything.

CAPT. GRANT: We handle many Russian ships, and handle Greek ships as do all pilot organizations. I am not talking about nationalities. This language barrier on some of the foreign ships does become a problem. One time, I was on a ship when the chief mate and the captain got into a fight on the bridge. I had to go down and separate them. That is a service that I don't think was on my license. I had to be a bouncer. Nevertheless, I took care of the situation.

These are problems I think every pilot organization has. There is always a type of person in the organization that doesn't want to comply with the rules. But I think they are very few and far between. I think we do give good service to all the ships that come into ports in the United States.

ADMIRAL BARROW: I have sat very quietly and listened for most of the past two days. It has been a great love-in. There are a lot of people here who are of the same mind, who are listening to people of the same mind, and applauding generously. I think there is a lot that has come out of the discussion that will be of great use.

For those of you who don't know me, I should perhaps provide a little bit of background. I was Commander of the Eighth Coast Guard District for four years. I would hate to think that people thought of me only in terms of VTS, New Orleans. A lot of things have gone on in the Eighth Coast Guard District, and in my career, other than VTS, New Orleans.

I felt good and bad at points today. On balance, I guess I came out pretty well, because I did work very closely in drafting the legislation for bridge-to-bridge radio telephone. I testified before the Congress and provided the justification for it, and it came into being. If there is a unanimity of mind here today, it is that the bridge-to-bridge radio telephone has been a great asset to the maritime people in this country. I would agree with that assessment.

In my early days, I worked very closely with the development of sea lanes. I was Chairman of the U.S. Delegation to the IMCO conference in which we drafted the standard for development of traffic separation schemes. Within the Eighth Coast Guard District, there were other things that went on besides VTS, New Orleans. My district implemented three vessel traffic services, and I thought perhaps you might be interested in the other two, as well. VTS New Orleans was third in the chain of events. VTS Houston-Galveston and VTS Berwick Bay came first and are very important systems.

Only one of those was designed by me. The VTS Berwick Bay was conceived and delivered between the months of August of one year and January of the next. Although we did not have the time for a formal committee, we certainly had consultation. I think, by and large, it has enjoyed the support of the marine community.

At VTS Houston-Galveston, we had the benefit of an Advisory Committee that was with us most of the way. I don't think that they participated in the early design of the system, but they certainly played a large role with developing the components and the operating procedures.

With respect to VTS New Orleans, prior to my arrival, we asked that an Advisory Committee be formed. Then, as most of you know, a law was passed which prohibited us from having advisory committees, except in an unusual circumstance. The request from the Eighth Coast Guard District was turned down.

However, I think that the Coast Guard could document an unusual amount of consultation in New Orleans. It certainly began before my arrival and continued on through to the implementation of the system. It is this aspect, I believe,

that has not been well understood. There seems to be some feeling that, because there was not an Advisory Committee, there was no consultation. That is not true. We had the ad hoc committee, but it was just one part of the effort to involve people in discussions on VTS, New Orleans. A vast number of people were consulted about that system.

I am not here today to tell you that VTS, New Orleans, is a perfect system. Certainly, I cannot say that. In the first place, we have not lived with it long enough to tell what its effect has been on the particular navigational situation. There are improvements to be made. Certainly, the ad hoc committee, as well as most of the people in New orleans who have something to do with vessel traffic services, have had their "day in court" figuratively and literally. It didn't turn out to suit some people. I believe that, in the development and implementation of a VTS system, when you end up in court, you've lost something already. Everybody loses except the lawyers.

A couple of other comments have been made, that I also would like to address, although I am not going to get in an adversarial position or challenge any particular statement. I have a comment on the caliber of the people who operate the vessel traffic services throughout the country. I am not too familiar with those outside of the Eighth Coast Guard district. However, I must tell you that most of the people that I have known who work within these systems have been extremely dedicated. The people were selected with great care.

When I was in New Orleans the primary training program on vessel traffic services was on the order of six months. We had some failures in the program. Some people come into vessel traffic services training but do not make it. They are ushered out of the system. By and large, the people who do make it, from the COs on down, are dedicated people. They are there to do a good job. They certainly are not perfect, and I'm sure each of you could point out some very trying circumstances you encountered in dealing with them. But, by and large, I think they are great people who are working hard to do a good job.

On the aviation end of it, I may also point out that the FAA used to get a substantial number of their FAA controllers right from the Coast Guard. I ought to know because I served some 12 years on ocean-stationed vessels, and I could never keep people in my CIC gang because they were always on their way to FAA to control planes. They don't get many from the Coast Guard now, but, at one time, they did.

So, be assured that we have good people in those jobs. People are being trained, and they are going to do a

creditable job. I won't argue the point that, if we could get the right kind of civilians into those particular positions, and keep them there, perhaps we would end up with a better system. However, trying to get civilians at a particular pay grade and keep them in those jobs is also a very difficult problem.

MR. PAULSEN: This morning, Dr. Harris touched on the legal implications of the aircraft traffic control system and alluded to the problems that might arise with vessel traffic systems. The question is whether or not the government could be held liable in the event of negligent action or erroneous information. There also is a more general problem about who is in control.

I think we ought to address ourselves to that question right now. My partner, McDonald Deming, has some thoughts on the problem.

MR. DEMING: To echo Mr. Paulsen's comment on the word voluntary, I certainly agree that legal liability might ensue under voluntary systems. The bases for legal liability are an important factor in legal liability. Available information increases the legal responsibility of the person having that information.

We all know that this occurred with radar in the early cases involving radar before the Coast Guard made it a requirement for all ships. The courts said that, if a ship was equipped with radar, it had to use it when the conditions called for it, and it had to be used with active intelligence.

In other words, the ship owner is responsible, not just for the information that his master, his watch officer, and his pilot have, but for the information which such persons, under the circumstances, should reasonably obtain and have the means to obtain.

The same thing was held by the courts with VHF. Even before the bridge-to-bridge statute, there were cases in which a ship having VHF and failing to use it, when such use would have provided information that would have avoided a casualty, was held responsible.

I recall a case in which a vessel, somewhere on the West Coast, was proceeding towards an exit in a channel, using its VHF, to keep in contact with some type of information center. When the vessel considered that the way was clear, it turned off the VHF. It was found by the court that information it could have obtained, if it hadn't turned VHF off, would have prevented the casualty. A liability resulted.

It seems to me that VTS is another substantial source of information available to the mariner, and that similar results can be expected. In other words, the mariner is responsible for obtaining and using the information that VTS can supply.

The word "preventable" was used a good deal. It strikes me that one very interesting and outstanding example of a preventable casualty is one which I have heard had a great deal to do with providing input for both of the statutes that have been discussed, the bridge-to-bridge statute and the Port and Waterway Safety Act. I am referring to the OREGON STANDARD collision in San Francisco in 1971.

As you recall, those two ships, which were owned by the same owner, both used extremely precise navigation. As a result, they met precisely under the middle of the span of the Golden Gate Bridge. It does seem clear, to me at least, that had the VTS system been in effect at the time, the casualty could have been avoided. There was plenty of water on either side of those ships. That is not a narrow channel. Had either ship done anything different, the casualty could have been avoided.

I understand that the public outrage that resulted rather dramatically led some thousands of citizens of San Francisco to troop down to the company building, build a bonfire, and publicly burn their credit cards. Considerable pressure for the development of the VTS systems stems from that incident alone.

Now, I have said that the added knowledge, among other things, leads to added liability exposure for the vessel interests. But, in my opinion, there is another side of the question. It also leads to added exposure for the Coast Guard. It seems to me that, when the Coast Guard undertakes a service of this kind, the cases indicate that the service must be operated in an effective, careful manner. I submit that this includes the obligation also to make effective use of the information obtained.

Now here, I at least feel that the air controller cases are someday going to prove the precedent. The systems are so new that we really don't yet have a body of legal opinion directly involving surface transportation. But, the air controller cases have developed in the direction that the controller is not permitted to confine himself to technical compliance with the manual. He must make alert use of the information available to him and make and give timely and sufficient warning to aircraft pilots of dangers which he perceives and which they might not perceive.

Now, I fully agree that the pilot remains in command, just as the captain on a ship remains in command.

Nevertheless, the case is now made clear that the air controller has a duty to give a timely warning. This does include collision avoidance. In one case, for example, in determining whether the descent rate was acceptable under the circumstances, it was said that it may be appropriately considered that Allegheny had a right to rely on the controller properly performing his duties in advising the aircraft crew of the presence of any small aircraft in their path. My opinion, at least, is that a similar obligation, if such an occasion should arise, would be held about assistance rendered by the Coast Guard. They have what I think is a duty to inform.

Now, I have some questions for Captain Charter or anyone else in the Coast Guard. They relate to the more controversial issue of the movements of a vessel by the vessel traffic center.

The reading that I have been able to make indicates that great caution was used by the Coast Guard to limit rather carefully their exercise of control in the past. The particular example that I am about to give you, came from the rather early days in Puget Sound. I believe they did not yet have radar, but they could, of course, detect a ship's speed as it reported past certain positions. It is said that there was a custom, that every once in a while, if it was quite evident a ship was proceeding at excessive speed, a comment like "Captain, had you better give consideration to Article 16 of the Rules of the Road?" Eventually, some tactful suggestion to moderate speed was given, but they would not go beyond that point.

Now, I have glanced at the blue book that someone very kindly gave me. The September 1979 Operating Manual for the vessel traffic service in New York states in VTC directions, 6B: "When a vessel is navigating in an unsafe manner, . . . the VTC may direct the vessel's movements." So, there appears to be the power to actually issue navigational orders if the VTC should choose to do so. Now, the operable word is "may."

I don't have the book that I am trying to recall, but it was a different informational book about the proposed New York VTS system. It stated that in a great percentage of the cases, perhaps 95 percent, the function of the VTC would be purely informational. It would provide useful navigational information and information about possible navigational hazards. But, in rare instances, there might be recommendations for navigational actions. In an even rarer instance of an emergency, an actual order might be given to the mariners on the bridge. My question is, what is the current policy? I would be very interested to know whether it is the policy of the Coast Guard to exercise its power, and include recommendations for navigational

maneuvers, or, in an emergency, orders for navigational maneuvers.

CAPT. TORRENS: I can perhaps answer that question because I was Chairman of the Executive Committee of the New York Vessel Advisory committee. Originally the Coast Guard did stay very far away from vessel control. Then, at one point, they said that they were going to establish speed limits for every proportion of the harbor and that they were going to establish a vessel underwater clearance of two feet for every portion of the harbor.

There was a hue and cry that came from the Advisory Committee, and the Coast Guard went back to have a study made. They recanted on this. They decided that, in view of the studies that they made, there was no direct corrolation between speed and accidents. They said that the accidents might be more severe if the vessels are traveling faster, but that there was no solid basis for saying that speed itself was a cause of accidents.

They also said that they recognized the economic problems that would be caused by demanding two feet clearance under every vessel, regardless of where in the port it was. For example, there are a lot of barges that go up in Newtown Creek, and they just suck the bottom. But, it is all just mud. Therefore, they said they would rescind that also.

However, they also said that they had to leave something in because of their responsibility under the Port Waterway Safety Act. Therefore, the Coast Guard said that they would have to take action in certain cases, such as when a vessel is proceeding at an undue speed through the port. Another example, if a vessel which is going into a particular area and they know that there are rocks in that location, and that the draft of the vessel is such that it is going to puncture the bottom, they will have the power, under the Act, to tell the vessel not to proceed.

Captain Charter probably has more information on that, because most everything that happened in New York got bounced off the Washington office one way or another.

CAPT. CHARTER: First, I don't think the issue of control of movement of vessels is new to VTS. If you look at the Magnason Act of 1950 and the implementing Executive Order, as well as the authority contained in 33 CFR 6, we have, for 20 some years, had the authority to direct the movements of a vessel, and to take possession or control of a vessel as necessary.

This was put in terms of safety in the 1972 legislation by adding a few more words. Basically, the original

Magnason Act was security oriented. With the '72 legislation, it became couched in terms of safety. So, when you see words similar to those that you have read in the operating manual, it is not something new or peculiar to vessel traffic centers. This is simply a statement of our authority. That authority has been challenged a couple of times, but, to my knowledge, we still have it today.

I also would like to comment on what I feel is a misconception about the term "control." When we use the term control, we are talking "space management." Let me explain what that means in terms of how it applies to a situation that you might encounter. To do so, I have to go back to New Orleans, because that is my most recent field experience. The type of control that is envisioned here is as follows. Let us say that there is a tanker explosion or fire at Mile 89, the Captain of the Port would close the river from Mile 87 to Mile 91. Now that, in my mind, is a type of control that we are discussing, and the type of control that was intended in the legislation.

I am not going to tell that pilot, who knows a heck of a lot more about handling 160,000 ton vessel with a 6 knot current, how to handle the wheel, how to manipulate the controls, whether to drop the anchor, or not. I am just telling him that that section of the river, for one reason or another, and it certainly better be for good cause, is closed. There is a problem there. Even that is negotiable. To return to a specific situation, this happened after a Baton Rouge pilot had committed himself. He was about two miles above the point of closure at the time of the fire and explosion. He talked to me on the radio and said, "I've got a real problem now, because you don't want to let me by there, and I recognize that there is a problem. But here I am and here's my weight and here's my problem. Is there something we can work out here?" So we did. He slipped on around and we got by with it.

That is the type of control that I envision. We have situations in which we are, perhaps, a little more direct. Again, we are not giving engine orders and helm orders, but we are perhaps approaching that when we say "Proceed to the nearest safe anchorage."

This is done, more often than not, at the request of the pilot. It is an exercise of control authority. I do not deny that, and I think it is a proper exercise of control authority. However, I will bet that if you looked at these cases and analyzed them, you would find that 75 percent or more were done at the specific request of the pilot. He has a problem with that vessel, and he wants you to help him in asserting some degree of control or imposing some authority on the vessel because he is concerned about its safety. He wants some backing for something he is going to do. So we

give him an order to proceed to the nearest anchorage. It is control. I don't think it is the kind of control, though, that gives the pilots here concern or that causes problems for them. If it is, please let me know about it.

You asked if we would accept the liability. I don't think we have any option, personally. Now, my Chief Council is not here today, so I can give my opinion. We are in the courts on port and waterway safety matters on a regular basis answering charges about our negligent actions that resulted in, or contributed to, a casualty situation. I cannot see any difference with a VTC, if the Vessel Traffic Center provides advice that is negligent or erroneous and it leads somebody into a casualty situation. I guess we could fall back on sovereign immunity, but isn't that gone these days? I don't think we can even do that anymore. So, I think we are going to be in the courts. I don't think there is any question about it.

CAPT. GARDNER: I am not an attorney, but from what I've been able to understand from court cases, I would have to agree with Capt. Charter. Even with the most liberal interpretation of negligence, a Vessel Traffic Center is liable, whether it be operating under specific statutes, or under regulations, or even in the absence of regulations, as in the case of New Orleans VTS. There are a couple of court cases that bear this out.

They are both airline cases. Ingham versus Eastern Airlines says that it is now well established that when the government undertakes to perform services which, in the absence of specific legislation would not be required, it will, nevertheless, be liable if these activities are performed negligently. In the Ingham case, the air traffic controller involved failed to advise the pilot of a weather update.

In Hartz versus the United States, the FAA was liable for a crash which resulted from a failure to warn of turbulence, and also a failure to space aircraft at sufficient intervals. Also, there is the case of Spaulding versus United States that upheld the same notion.

I think the largest exposure in the case law for liability was in a case involving the United States versus Sandra and Dennis Fishing Corporation. This was a case in which the Coast Guard was found liable for negligently performing a rescue operation. The court pointed out that the Coast Guard was under an obligation to perform rescue operations and stated, and I quote, "The government must not include reliance upon a belief that it is providing something which, in fact, it is not providing." To me, the same reasoning would apply in a case involving New Orleans Vessel Traffic System.

I believe, from the onset, that the Coast Guard should be careful not to imply that they are capable of providing a qreater service via the New Orleans Vessel Traffic System than they are, in fact, providing. If a vessel comes out of the canal, and you explain VTS to him, and he relies upon a false assumption that VTS is going to provide him with total quidance, I think the Coast Guard could have some far reaching liabilities. By the way, I don't think the Coast Guard has implied this.

CAPT. GRANT: I would like to clarify that one point that was made about the two Standard Oil tankers that had collided in San Francisco. At that time, we had already established a radar at the Pier 45 working in conjunction with bridge-to-bridge communication. The unfortunate thing was that the outbound ship had turned his radio from that channel to the company channel. He was telling them how many barrels of lube oil he had unloaded. The inbound ship was trying to get in touch with him, but because he was talking to the company, the accident occurred.

I agree with Capt. Charter. I have no problem with VTS. Not too long ago in San Francisco, we had a situation in which a barge of gasoline was coming down on ebb tide and smacked into the bridge. Fortunately, the barge was pretty well constructed, but it did spill a tremendous amount, about 40,000 to 50,000 gallons, of gasoline on the water around the San Rafael bridge. They closed the area as they had every right to. I think they are justified in doing some of these things to protect the environment.

There have been other cases in which they have issued orders with which we haven't agreed. However, fortunately, we have been able to work these things out. By working in concert with the Captain of the Port and VTS, in many instances, you can solve some of the problems.

CAPT. QUICK: We never seem to have any problems when we are talking to people at the level of Capt. Charter. We always agree on what control means and how it is going to be exercised. We always agree that it is not going to intervene in the master/pilot relationship on the bridge of a ship. However, when we get to the VTS operational level, and deal with the enlisted men who are communicating for the lieutenant, we find that they don't always see it the same way. They read what they've got in the little blue book, and they take it literally. They are the people with whom we interface. They are the ones who are working the system and applying the rules. They are the ones with whom we have problems. When we talk with an Admiral or a Captain we can agree on the limits and the definitions, but, when we get to the working level, we find out that the people who are operating it are interpreting it in a different way. That causes a problem for us.

For a pilot, one of the worst dilemas he can be in is not to have a VTS qive him a direction to do somethinq. If they take control away from him, he is absolved. He simply wipes his hands of the situation. However, when you get a recommendation that is contrary to your best opinion, then you have to decide whether or not to ignore the recommendation of the VTS, whether or not to follow your own instincts. Then, if you have an accident, you have iqnored a recommendation and you're hunq. If you don't have an accident, you are still qoinq to be asked why you iqnored a recommendation of the VTS center.

So, whether it is an order, or whether it is a recommendation, really doesn't make too much difference. A pilot will have a problem with either.

CAPT. KOBURGER: I thouqht you miqht all like to know what your future probably will look like. Althouqh we are 20 or 30 years behind Britain and the rest of Western Europe, this incipient war between the pilots and the vessel traffic system people still qoes on, at least in Britain. It has qotten to the point where the pilots have built an office for themselves that obstructs the view of the VTS down the river. So, for 20 or 30 more years, we are qoinq to be discussinq this.

Now, the Port and Tankers Safety Act of 1978, among other thinqs, speaks to off-shore vessel traffic management. This issue has been debated in the Enqlish channel area for about five years. It looks like a similar debate is coming here. There have been some comments about people not being able to make themselves heard. There will be a conference in Yorktown in November. A whole day will be spent talking about off-shore vessel traffic manaqement, principally the technical options. If anyone is interested, they may see me about this.

The last thinq I have to say is something that has been said by many people today. Gentlemen, to quote Patrick Henry, "We either hanq toqether or we hanq separately."

MR. PAULSEN: We miqht also say "United we stand, divided we sprawl."

MR. FEE: In the flurry of bills that came after the ARGO MERCHANT oil spill, there were a number of bills that included a requirement for installinq transponders on ships. When the law finally came out, there was no recommendation for transponders. There was, however, a recommendation for a two year study to be done on ship surveillance. A report was to be made by the Secretary of Transportation to the Conqress on the results of that study.

I would like to ask Captain Charter, or perhaps some of the other people from the Coast Guard, what the goals of that study are, what progress has been made, and what are the potential implications for VTS in the future?

CAPT. CHARTER: If you come to the seminar at Yorktown on the 6th and 7th of November, that will all be answered. Very briefly, the Section 3 study that you are referring to is a study of shore-based monitoring systems. The objectives are spelled out in the statute itself. It is to determine the capabilities, limitations, and effectiveness of shore-based systems to monitor vessel traffic in the fisheries management zones, including course, speed, and vessel identification. That is its basic purpose.

As you indicated, it is a two year study. The two years will be up in October of '80. the study is being conducted by the Transportation Systems Center in Massachusetts under a Coast Guard contract. So far, we have funded it at approximately, $125,000. The decision on the remaining funding will be made in the not too distant future. I would estimate the study will probably reach the neighborhood of four hundred thousand dollars.

We hope that the study will meet the mandates of Congress by examining the cost effectiveness of alternative systems that might be eligible for consideration to carry out this function. I would point out, however, that at this stage it is not anything more than a study. In the statute that you refer to, the problem was addressed, but it was addressed in the form of a study. There are other portions of the statute, however, that relate to management or control. These parts do affect vessel management in the zone off our coastal waters.

Another portion of the statute refers to the port access route study. Sometimes there is confusion between the monitoring study and the port access route study. Many of you have probably been contacted by Coast Guard representatives that are involved in the conduct of the port access route study.

Basically, this study is examining the existing port access routes, or traffic separation schemes in our coastal waters. It is examining traffic patterns and traffic densities to determine whether or not there are needs for additional port access routes. Ultimately, the study will be used to put these into effect. Once they are put into effect, under authority of the act, they will then pre-empt other uses of that body of water. An area that is designated as an area available for vessels, will be there for the exclusive use of navigation.

Now obviously, this requires quite a bit of coordination and consideration of the concerns of the off-shore petroleum industry. The largest obstruction to navigation is caused by the exploration and exploitation of off-shore oil and gas. So, this is an ongoing study. This one has an open-ended time frame, as far as the Congress is concerned. However, we have set some internal time constraints ourselves. Basically, the major port areas will be addressed within the next year.

MR. PAULSEN: One other subject that perhaps we should address this afternoon is the matter of the comparison of the nautical vessel traffic system and aircraft control systems. There was some discussion yesterday, particularly by Captain Hard, about the differences between nautical and aeronautical problems in traffic control. Captain Hard, would you want to expand on that a little bit?

CAPT. HARD: Before I do, I would like to address myself to a point that Captain Quick made. I have been on board a vessel in Valdez, Alaska, when we were ordered to set a specific speed and not exceed it. When we did exceed it by half a knot, we were chastized by the watch officer. I did not know the grade or rank of the person involved. When it comes down to the nuts and bolts, whether it is the intention of the Coast Guard or not, in the field, orders are being given from these control centers.

CAPT. CHARTER: There are established speed limits in many waterways in the United States. I don't deny that; they have been around for a long time. Most of them were carried over from the Corps of Engineers when we picked up the Corps of Engineers' waterway safety functions. A couple of the speed limits have been established by the Coast Guard. I think the St. Mary's River speed limit was originally established by the Coast Guard.

I don't, however, view enforcing a speed limit the same as giving engine orders to the pilot or master. We leave it up to you how you want to meet that speed limit. We will establish the limits based on our analysis of what is safe under the existing waterway configuration, density of traffic, and things of that nature. I would hope that they are not telling you to bring her down to 65 rpm, for example, because I would perceive that as an improper action on our part in controlling vessel traffic.

CAPT. HARD: Well I'm not a pilot, and I don't think I should speak on behalf of the pilot. I am just relating an incident. I can tell you that, though, if I were the master of that vessel, I would certainly have had something to say to that traffic controller. No consideration was given for the speed of movement of the water or the

effective speed of the vessel through the water. It was simply a matter of calculation. they simply said that our speed was, in the opinion of the person running the system, excessive. In my opinion, that is exercising a lot of control over a vessel.

I don't want to get into a debate, however. I would like to ask a question and then follow it with a comment. Dr. Harris, would you clarify a comment that you made to the effect that "with air traffic control systems, there is a degree of transfer of control of the movement of the aircraft from the pilot to the ground." Could you clarify exactly what that means?

DR. HARRIS: What I was referring to, the air traffic control system, works on the basis of a contract, if you will, an agreement, between the pilot and the controller that a certain action is going to be undertaken, unless there is some substantial emergency reason or some other thing that causes the pilot to deviate from the plan.

Now the contract can be generated by either side. The pilot can request that he be allowed a certain action; this is the usual case. He files for clearance from A to B, through certain parts of the route. Once he agrees to that, he goes ahead and flies his clearance up to the stated limits of the clearance. The controller will take active control of the aircraft, if you will, under certain circumstances, in the terminal area, for example. This is usually in the form of vectoring. That is, the controller gets the aircraft from A to B by giving the pilot courses and speeds. You are not normally used to this in the VTS environment.

So there are occasions, and they occur quite frequently and with great regularity, where the controller actually is taking control of the aircraft by giving it a speed command, giving it a heading, telling it to navigate a certain radial or to a certain point, or telling it to hold in a pattern. The controller is actually taking control of the aircraft, changes the progress of that aircraft, and is responsible for what happens.

At some point, you get the aircraft back to what we call normal navigation, where the aircraft is on a route and is flying at its own speeds according to the pilot's own desires, in compliance with a clearance. So, in fact, the air traffic control system does take active control of the aircraft under a great many of circumstances. But, it is always a situation in which there is an agreement between the pilot and the controller. There is a handshake, if you will, between them. The pilot knows what is being done to him and the controller is, in fact, doing it in order to accomplish a certain plan. Control is handed back and forth

between the two by standardized procedures quite regularly and quite easily.

CAPT. HARL: Based on that, I would like to follow up on what I alluded to yesterday. I think anyone who has had to be on the bridge of a ship in any capacity of responsibility, whether it be pilot, master or cadet, begins to realize the degree to which that vessel is subject to the forces of nature. It has a great deal to do with the ratio of power, as I mentioned yesterday.

We do not have this overwhelming ability to react to judgments made in other places. For instance, a lot of reference has been made to the inland waterways, specifically the Mississippi River. I can envision a very difficult situation. Say you are coming down bound with a tow, and someone at a traffic station says hold. Now an aircraft can go into a holding pattern; an aircraft can touch down, and take off again, if there is an obstruction at the end of that runway. But, a vessel cannot.

I have to differ with those who have said that there isn't a need for an understanding on the part of the man in the VTS center for the real problems inherent in trying to handle the vessel. I don't care what type of vessel it is. It is distinctly different. There is a uniqueness about the marine environment. We are trying to safely navigate vessels on a very difficult medium. We are on the interface of two fluids. That is the roughest area to navigate. Even in space travel, you are in one medium, in a hermetically sealed container in which all of your systems can operate the same as they would on Earth.

I have been on ships where they have installed computers on the bridge, and even the company technicians could not keep them working. How can we expect them to work on voyages of three or four months? I am faced every day with vendors telling me how each new piece of equipment is going to be so good, that it should be installed on a simulator. The claims made for collision avoidance systems, for example, are a poor and misleading representation.

A ship has to operate day in and day out in all types of weather, after many, many days, sometimes weeks of confinement; in high, high humidity; and exposed to salt air. Imagine what this does to electronic equipment.

Time and time again I hear, "Well if it works in the aviation industry, it ought to be able to work in the marine environment." I have to take the position that that is not necessarily true. Each case has to be investigated. I am not saying that it can't be true, but we cannot blindly assume a positive relationship.

There is a study being conducted jointly by Marad and the Coast Guard up at the research facility at Kings Point. I have read the draft of the first stage of this study. I have put in writing two very clear reservations that I have about that study. The first is, that is has been assumed that, because you can study the physical behavior of a pilot in an aircraft and thus judge how well he is doing the job, you can study the physical behavior of a pilot or a watch officer and tell how well he is doing in a job. I submit that that is false. I have watched many pilots. Some will tell jokes, some will not say a word. Some pace back and forth, some never leave one spot. They all do the job very well. Different masters react differently.

Assuming that there is some relationship between the two jobs, about which I have reservations, how can the training routines that are proven for aircraft personnel be proposed for marine pilots? On aircraft, you have many backup systems, and you have to have instantaneous reactions to problems. How can the qualifications for that job be compared to the qualifications needed by a man who has got to try and anticipate what might happen miles and miles ahead of him, which, in the marine time frame, might be hours?

The marine pilot finds himself committed to a river, or committed to a channel. There is no way that he can avoid the fishing fleet that might be up there four bends away.

I am really saying that we cannot blindly apply to our business, to the marine business, that which has proven successful in other areas. We are unique. However, I would certainly hope that, as has been stated here many times, we all understand that we have something to gain by cooperating. We cannot have things just assigned to us. We cannot have judgments made by people who really do not have the experience to make those judgments. I am not trying to cast doubts on the motives of anyone in this room, or on any of the organizations in this country. But, I do feel there is a lack of understanding of our problem.

CAPT. CHARTER: First, I would like to correct the statement I made. I said there are many waterways in the U.S. with speed limits. There aren't many. There are a few with regulatory speed limits. There will be more to come. Some are under consideration right now in the rule making process. I'm sure there will be more in the future.

DR. HARRIS: Captain Hard, I believe that you missed the point of my paper almost entirely this morning. I was not talking about equipment. I was not talking about air traffic control procedures, or the transfer of those procedures to the marine environment, or anything of that sort at all.

I was talking about cooperation between the industry and government. I think that is something that I have seen very little of here today. I think there needs to be more of it, if you expect to have a VTS that will function.

CAPT. HARD: If I have given the impression that I am against cooperation, I want to set the record clear, I am not. I think it is vitally needed. However, I do want to address the point that you have just made. I am more than willing to sit down and talk with anyone who is willing to listen to me. But, I have not found many people willing to listen to me. Last night someone said to me, "We've been able to get people to the moon. As soon as you people accept the fact that science can help you; that is all that there will be to it. We will settle all your problems." We simply can't live with this attitide.

I know we have sent people to the moon. But at what cost? How many people were involved in the effort? We have an economic industry. If we are going to devote the effort and the resources that were devoted to the aerospace industry, we could probably solve every problem that has been mentioned here in the last two days. But, we cannot do that; our funding is very limited.

We must take what we do have and really listen to each other. Someone must listen to the fears and problems of the pilots. There are some very real problems just with the various legal interpretations. Apparently, it is not going to matter very much what the legal background or employment agreement was between the particular pilot and the owner or the agent. I agree that a cooperative spirit is necessary, but this means that both sides have to listen.

I remember when I was on active duty in Vietnam during 1968. We would read the news reports on the Chicago riots and the convention. What impressed me and my civilian and military colleques was that all of the protestors were arguing that the establishment should listen to them, yet they were not listening to anybody else.

Listening is a two-way street. It means trying to understand the other man's position, not just listening to what he is saying. If we can find the resources and if we can begin to make use of what has proven effective in other industries, then the application of technology will be beneficial. However there are constraints, and we just cannot blindly apply technology from other industries unless we have the funds to adapt it. That is my only point.

DR. HARRIS: I think there is one additional point to be made. It is quite likely that the resources would be available if there were a plan to apply them. This requires that the industry and the government get together and

develop such a plan. It requires, as you say, both listening and talking, and knowing what is available in other areas. I think the technology can do almost anything you ask of it, if you know what it is you want to ask.

CAPT. HARD: The technology is here to do an awful lot of things. We have to have the faith in it, and we have to fund it, and use it properly.

CAPT. QUICK: I would have to say that I agree wholeheartedly. We do have a very, very big communications problem. I am sure we are all going to leave here and go back to our own worlds. We each live in a different fashion than most of us understand.

Yesterday, I was trying to put a lot of distance between the pilot and the ship owner, and I don't think most of the ship owners here realize why. They do not ride the type of ships I ride, and they don't see the type of conditions under which I have to work. They probably don't understand why I do not want the ship owner to control the pilot. If I was working for Shell Oil, Exxon, Farrell Lines, or American Export all of the time, I would have no problem at all. However, I have many problems trying to live with some of the ship owners I encounter. I won't even work for many of them.

On the issue of communications, there is very little dialogue between the pilots and the ship owners. Pilots just talk to steam ship agents, who are not seamen and not owners. Agents have very narrow interests. Yet, we only communicate with them, by and large. This creates a real problem for us.

Pilots used to have good rapport with the Coast Guard. We used to have many good dialogues. Unfortunately, this is no longer the case. The Administrative Procedures Act requires that the Coast Guard not carry on conversation with a private interest group, like the ship owners or the pilots. I think it puts them in an impossible position. How in the world can they regulate in a vacuum? Now, they have to develop material in house, put it out in a publication, and request public comments for the record. No longer can they sit down over lunch and have a discussion about how to solve a problem. I think maybe the government or the executive department, or whoever was responsible for prohibiting advisory boards, ought to rethink their approach and examine the kinds of problems they have created.

As we saw when Admiral Bell gave his presentation, there are limits on what he can say and what he cannot say. If the topic is a proposed regulation, much of it must remain undercover. This seems kind of crazy.

CAPT. STILWELL: There has been a lot of talk here about cooperation between the industry and the regulatory agencies, such as the Coast Guard. Cooperation is something that requires the mutual respect of the individuals involved. A master with four stripes on his sleeve or a Coast Guard captain with four stripes on his shoulders, each of them can compel the persons working for them to do or to carry out a certain act. This could be construed as cooperation. But, if these things are done reluctantly, it is by no means cooperation.

However, if all the parties involved have the mutual respect of one another, then cooperation is surely guaranteed. Now, as I see it, a part of the problem is that the Coast Guard has had a lot of restraints put on it with respect to how they can conduct their business with industry. Many facets of the industry are willing to open a dialogue, but it is legally prevented. I think that it is absolutely essential to have cooperation, but to have it will necessitate making some changes in the administrative policy.

We are all here to achieve the same end. We want ships to be operated safely, because safety is good economically. Anytime a ship is put out of service or involved in an incident, it is poor economics. Bad publicity is poor economics, and bad safety is bad publicity.

I would say that it is necessary that everybody open a dialogue, that there be more meetings of this type, that all facets of the industry be invited to participate, and that the Coast Guard and industry keep open ears and be aware of each other's problems.

MR. PAULSEN: I think that there has been plenty of communication going on these last two days, and it has been good for all of us. There has been a lot of talking and a lot more listening. I think that there has been understanding. The Academy and the Board have done a real service to the maritime industry by sponsoring this particular session.

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This Symposium provided a forum for discussion between the Coast Guard, pilots, and shipping interests of their differences of opinion on Piloting Practices, Coast Guard Pilot Regulation, and Coast Guard Vessel Traffic Control. The primary issues on piloting were federal and state licensing standards, pilot training, use of simulators in training, pilot autonomy. The VTS discussion focused on criteria for establishing VTS systems, waterway surveillance, communication problems, and industry advisory committees. On both topics, the qualifications and training of the involved Coast Guard personnel were discussed extensively.

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