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This status report is intended to serve as a handbook for the U.S. Project Officer MWDDEA-N-67-G-4207 in CY 1990.

The key events of CY 1989 are discussed and key events of CY 1990 and CY 1991 are briefly outlined. This is followed by detailed documentation on meetings held and conclusions reached.

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DATE: January 2, 1990

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Status Report

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Sincerely,

Heinz A. Gorges
President

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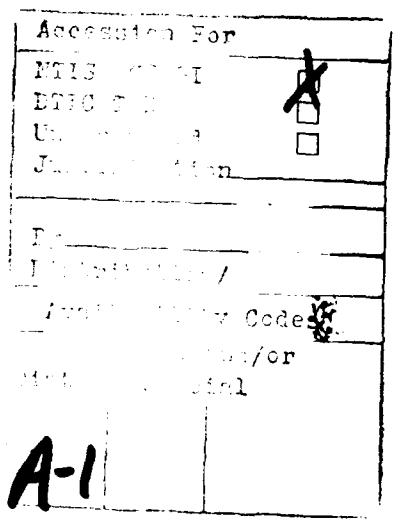
STATUS REPORT

JANUARY 2, 1990



Abstract

As in previous years, this Status Report is intended to serve as a handbook for the US Project Officer in CY 1990.

The key events of CY 1989 are discussed and the key events in 1990 and 1991 are briefly outlined. This is followed by detailed documentation on meetings held and conclusions reached.

TABLE OF CONTENTS

1. Summary of Activities during CY 1989

1.1 Changes within the Long Range Plan
(DEA 4207 Subproject 1)

During the year it was decided to take a serious look at the multitude of tasks in the four task groups of Subproject 1. This resulted in a decision to eliminate those tasks, where there was no promise that a cooperative effort would materialize in the near future. The tasks that were retained were divided between tasks with ongoing activities and those with a definite potential for future activities.

The active tasks are:

- in the field of propeller noise radiation:
  (old ~~1.4~~) Vibration Response of Plate-Like Structures
- in the field of ship's hull radiation:
  (old ~~2.2~~) Noise Reduction through Coatings
- in the field of induced noise radiation:
  (old 3.~~1~~) Active Elastic Mounting
- in the field of sonar self noise:
  (old 4.~~1~~) Sonar Dome Baffle Design and Material for Surface Ships

The following tasks are open subject to future developments in Germany and the US:

- in the field of propeller noise radiation:
  (~~old 1.2~~) Advanced Design Methods for Quiet Propellers
- in the field of ship's hull radiation:
  (old 2.1.2) Round Robin Tests
- in the field of induced noise radiation:
  (old 3.2) Highly Damped Springs

The tightening of the long range plan shall not exclude the formation of new tasks. Before including new tasks, however, it is essential to assess the funding situation in both countries.

Additions to the long range plan shall be the subject of discussions at the meetings between the US Hydroacoustics Committee and the German Project Officer in May 1990. It is also anticipated that new ideas for cooperative R&D will emerge as a result of the 1991 Symposium.

1.2 Administrative Changes in Germany

The Armaments Division (Rü) and the Development and Supply Division (BWB) of the German Ministry of Defense are subject to some re-organization.

There shall be two major components:

- one dealing with technology development
- the other dedicated to project management

The time schedule on this organization is slipping into early 1990; there are even speculations that the whole thing might fizzle.

As a consequence, it is unknown at this stage which office in the MOD will provide the German Project Officer and will administer the funding. As usual, this becomes largely a personality question, which requires a close watch.

To make matters worse, it is safe to expect budget cuts in defense R&D in the coming years.

1.3 Subproject 2

As in the past Subproject 2 is proceeding very well.

1.4 Trilateral Staff Agreement

Work on Task Group 4 (Machinery Noise Transmission Path Investigations) is projected to last well into late 1990 or 1991.

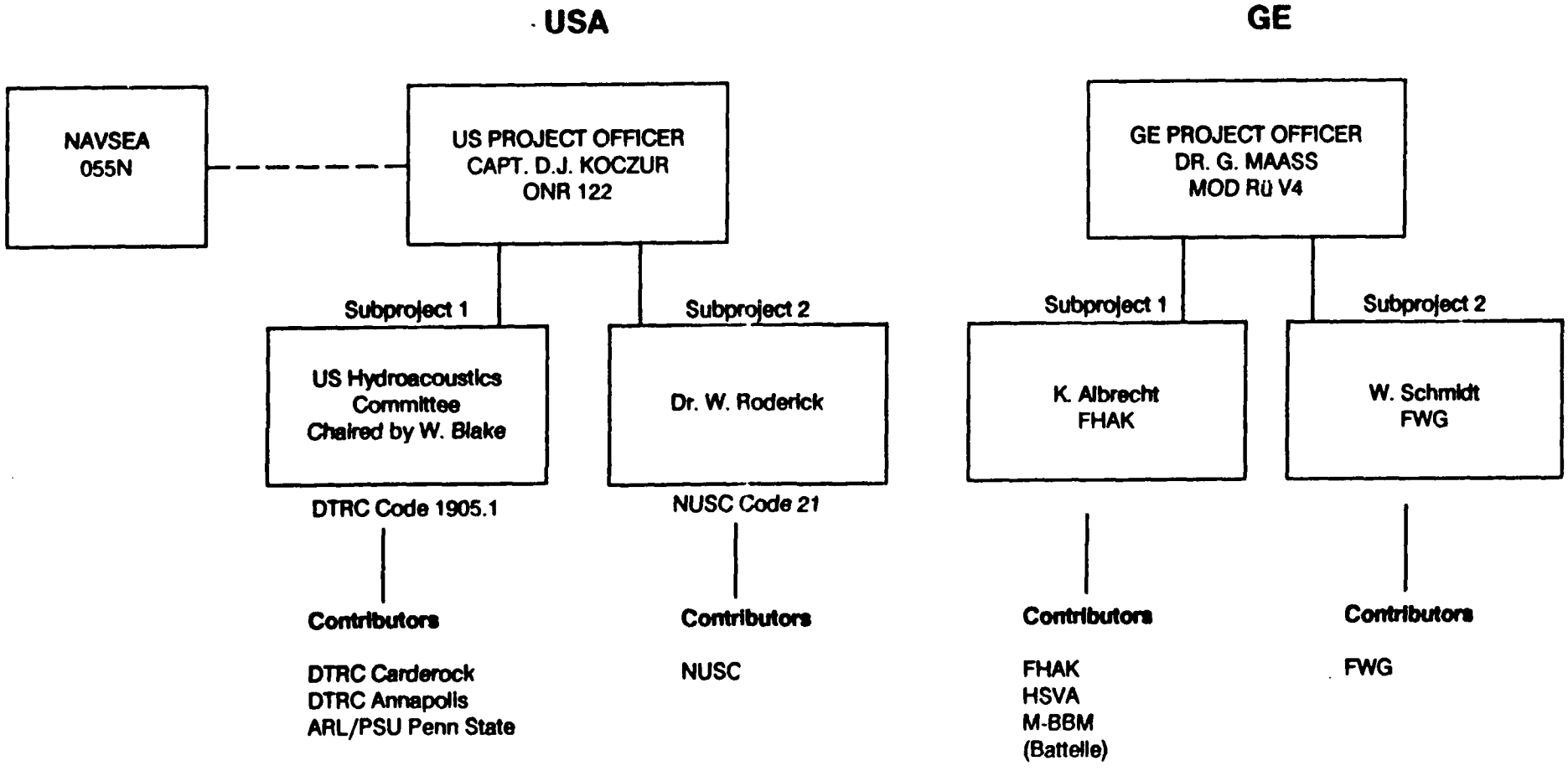
2. Forthcoming Events

January 1990
DEA Subproject 2: Participation of German FWG staff in the "Glover" trials

May 1 through 8, 1990
DEA Subproject 1: Facility visit by German Project Officer to the US. Meeting with the US Hydroacoustics Committee, May 2, 1990.

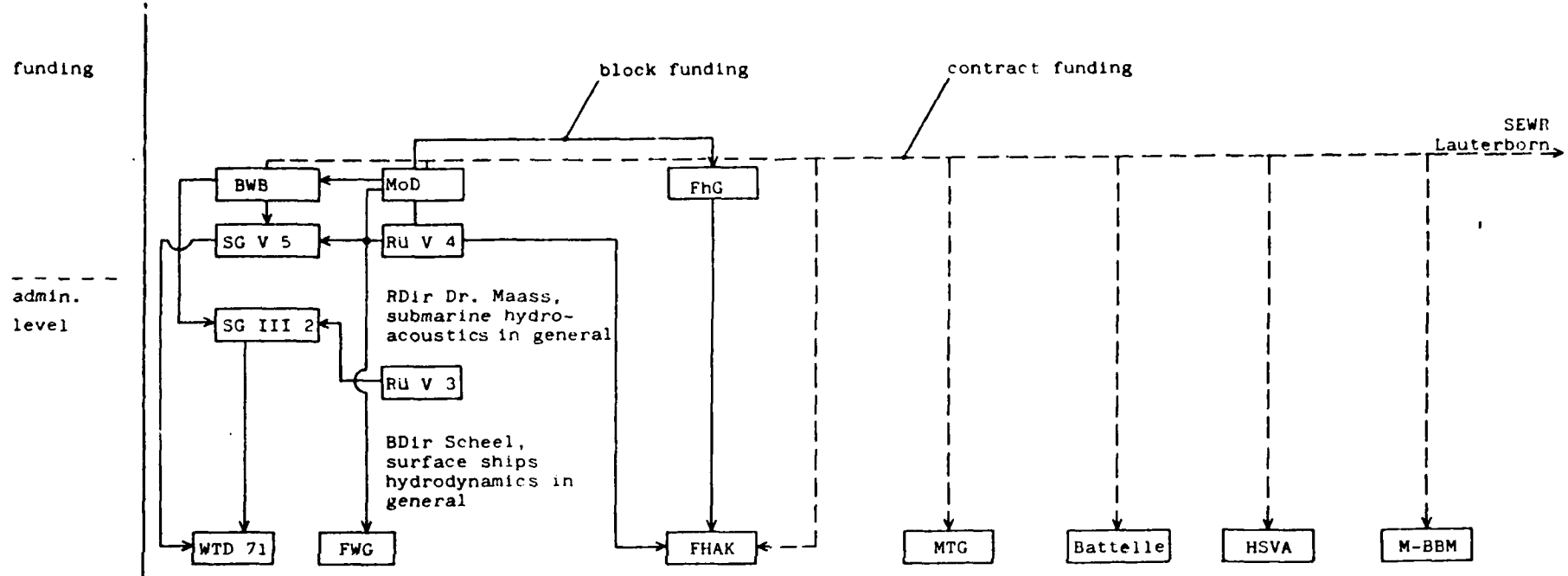
1990 Steering Group Meetings
Oct. 4 on the TSA in The Hague
Oct. 5 on the DEA in Bonn

September 16 through 23 or 24, 1991
Seventh Hydroacoustics Symposium in Munich



Informal Organization
DEA 4207

STRUCTURE OF HYDROACOUSTICS AND DEA IN GE



mission	noise range	underwater noise propagation	structural noise, ship and propulsion noise, coatings, sonar-self-noise, propulsor acoustics, propeller design, cavitation noise	ship design, design studies, sonar-self-noise	R & D	hydrodynamic propeller design	consulting engineering acoustics
facilities	noise range		VITESSA, STRUCTURA, pulse tube, transmission and reflection lake facility		pulse tube	HYKAT, conventional cavitation tunnels	spring facility, foundations facility
outstanding topics in DEA	compliant coatings	subproject 2	skew-propeller design, PRAIRIE, Masker, Round-Robin-Tests, CAMS, baffles		springs, Round-Robin-Tests foundations		active elastic mountings, compliant coatings

T R I L A T E R A L S T A F F A G R E E M E N T (T S A)

Status September 1989

	USA	FRG	NL
Overall TSA	Project Officer: Capt. D.J. Koczur ONR122	Project Officer: Dr. G. Maass, MOD RüV4	Project Officer: Ir. E.W.H. Keizer, MOD Marin
	Technical Project Officer:	Technical Project Officer: K. Albrecht, FHAK	Technical Project Officer: Ir. E.W.H. Keizer, MOD Marin
Task 2 Cavitation	Task Leader: Dr. D.E. Thompson ARL/PSU	Task Leader: H.-J. Baiter, FHAK	Task Leader: J. van der Kooij, Maritime Research Institute
Task 4 Transmission Path	Task Leader: D.E. Goldsmith, DTRC, Annapolis	Task Leader: Dr. W. Zoller, Müller-BBM	Task Leader: H.F. Steenhoek TPD TNO-TH

April 25, 1989

DEA 4207
Subproject 1

Visit by German Project Officer

Minutes of the Meeting of the
U.S. Hydroacoustics Committee
April 18, 1989
Office of Naval Research

Introduction

As in the past, the German Project Officer, Dr. G. Maass and the Technical Subproject Officer, K. Albrecht of FHAK, also undertook facility visits to discuss some of the agenda items in greater detail.

They visited:

DTRC Carderock on April 18, 1989 a.m. (coordinator Dr. W. Blake)

DTRC Annapolis on April 19, 1989 (coordinator L. Argiro)

NUSC New London on April 24, 1989 (coordinator Dr. Radlinski)

The Agenda follows in essence the structure of the Long Range Plan.

The conclusions reached at the meeting and in subsequent discussions are described in the following minutes and a tabular summary attached as Appendix A.

Agenda:

1. Report by the German Project Officer on the Long Range Plan and on progress on individual tasks in Germany.

2. Detailed discussion on individual tasks:

   (1.2) advanced design methods for quiet propellers
   (2.1.2) round robin tests
   (2.2) noise reduction through coatings
   (4.1) sonar dome baffle design and material for surface ships

3. Discussion of the Long Range Plan

4. New tasks and modification of existing tasks

5. Presentation by the German Project Officer on the 1991 Symposium:

   - o Topics for Sessions
   - o Topics for Workshops
   - o Time schedule for Abstracts and Manuscripts

6. Status of the Trilateral Staff Agreement

7. Miscellaneous

Attendees:

FRG	G. Maass	MOD R V4
	K. Albrecht	FHAK
USA	W. Blake	DTRC 1905
	Capt. T.S. Brady	ONR 122
	B. Douglas	DTRC 0113
	R. Ford	DTRC 1920.2
	D. Goldsmith	DTRC 2740
	H. Gorges	Consultant to ONR
	R. Lowell	NAVSEA 55N
	F. Peterson	DTRC 1544
	D. Venditti s	DTRC
	Y. Wang	DTRC 274

Minutes of the Meeting

K. Albrecht (FHAK) provided an overview of the German R&D effort within the scope of the Long Range Plan.

1.1 Sound Generation by Air Emission into Cavitating and Non-Cavitating Flow

Germany will continue to work in this area. Current plans are to study two hydrofoils (one will simulate propeller type load conditions) on the "VITESSA." Air emissions will take place with and without cavitation. Tests will, possibly, be completed in 1989.

The U.S. has no parallel effort. GE will keep U.S. informed on the progress made in this and future R&D tasks.

1.2 Advanced Design Methods for Quiet Propellers

GE had submitted a list of issues proposed for a cooperative effort. This proposal involved substantial contractor participation.

As stated on previous occasions the U.S. had favored a cooperative broad base program.

The German proposal for this reason and in the light of GE contractor participation was found not to be in the best interest of the U.S.

W. Blake and F. Peterson submitted a counter proposal as follows:

"* The exchange should not address immediate problems.

* Thus it should focus on a longer term basis. In particular it may consider:

  * Tip vortex cavitation and the use of blade sections in propellers
  * U.S. has some information for a combatant propeller that could be discussed. HSVA probably could be involved. U.S. authorities must decide on attendance of participants outside navy employees of either country.
  * Emphasis should be on experimental work rather than on numerical work. Numerical work is commonly discussed in open symposia. Focus on model and full scale data.
  * Experimental methods, e.g. laser probing, are of special interest.
  * Discussions of new directions in experimental work to address cavitation problem, e.g. TVC problem, are greatly encouraged."

After discussions with the cognizant MOD staff in Germany the German Project Officer will prepare a response for discussion at the 1989 Steering Group Meeting.

1.3 Analytical Prediction of Propeller Cavitation Noise

K. Albrecht reported on the increasing cooperation with Prof. Lauterborn in the dynamics of non-linear systems including bubble populations and single bubbles.

1.4 Vibration Response of Plate Like Structures

K. Albrecht reported that this task is essentially progressing as planned. ARL/PSU is in the process of developing a program and GE will start work at the same time as the U.S.

W. Blake indicated that DTRC(C) will stay in contact with ARL/PSU and provide guidance and assistance as needed.

2.1 Mechanisms of Hull Radiation and its Reduction

2.1.1 Subtask 1 "CAMS"

G. Maass stated that the introduction of "CAMS" into GE Navy vessels was still not settled. K. Albrecht stated that FHAK plans to undertake some "CAMS" related work.

2.1.2 Subtask 2 Round Robin Tests

The U.S. is far behind in providing a final report on the U.S. tests. The GE urges an early completion of this report; both countries have dedicated a large amount of resources on this program and a joint report should be issued as soon as possible.

W. Reader will prepare the U.S. report and complete it before September 30, 1989.

Preparation of the joint report will then be discussed at the 1989 Steering Group Meeting.

2.1.3 Subtask 3 Scale Model Prediction

D. Vendittis explained that the U.S. approach differs very fundamentally from the GE approach. It involves a basic study of parametric dependence and aims at an analog computer model. (The cylinder test program discussed earlier has been abandoned; it was found to be too expensive.)

A status report could possibly be completed after summer 1990 and may be presented at the 1991 Symposium.

2.2 Noise Reduction Through Coatings

Full scale tests on the uncoated "Porpoise" were carried out in the U.S. and a report on these trials exists. It will be transmitted to the GE Project Officer via channels.

K. Albrecht emphasized that all GE documentation on full scale coatings have been transmitted in their entirety to the U.S.

Tests on a partially coated "Porpoise" are in preparation. It is hoped that these data can be transmitted to GE provided that the classification of the reports permit transmission under the auspices of the Data Exchange Agreement.

2.3 Onboard Noise Monitoring Systems

On April 19 D. Goldsmith of DTRC(A) provided a brief overview of the updating in progress at the U.S. monitoring system.

He focused on two major aspects:

- o the reduced data collection package
- o the "expert system," an onboard computerized analysis system

This is of some importance to the GE Project Officer who is in the process of establishing the operational requirements for a monitoring system in the GE Navy.

Discussions on this subject will continue as these requirements develop.

3.1 Active Elastic Mountings

B. Douglas reported on some delays encountered in the miniaturization of the U.S. test equipment. He will, however, be available in September/October 1989 to conduct tests at the GE host laboratory at M.BBM in Planegg, near Munich. It was noted that the M.BBM contract terminates December 31, 1989; consequently, it was highly desirable to finish the final report prior to that date.

3.2 Highly Damped Springs

At the facility visit to DTRC(A) W.I. Young reported on the present concept of U.S. R&D in the field of springs. It was concluded that it was not the time yet to conduct an expert meeting in the near future. It is expected that the U.S. by 1990 has achieved a high level of experience and that the subject could be introduced as a topic at the 1991 Symposium.

4.1 Sonar Dome Baffle Design and Material for Surface Ships

This task was the subject of intense discussion at the Committee Meeting as well as at DTRC(A) (April 19) and at NUSC (April 24).

The key documents under discussion were the original proposal prepared by GE in 1987 and the subsequent response by Radlinski, prepared in 1988.

In May 1989 FHAK will transmit to NUSC a detailed proposal for the total task. This proposal will be reviewed by NUSC and DTRC(C) and, after appropriate discussion with FHAK, be incorporated in a document to be submitted prior to September 15, 1989 for the discussion at the 1989 Steering Group Meeting.

This document will, in essence, present a task by task outline and time schedule to be performed by FHAK, NUSC and DTRC(C).

4.2 Effects of Coatings on Sonar Self Noise

This task was the subject of a presentation by G. Maidanik at DTRC(A) on September 19. He described his plans of developing analytical means for the determination of wave propagation through coatings.

It was agreed that the U.S. and GE would continue discussions on this subject and at the appropriate time develop a joint R&D program.

5. Some Brief Overviews on Tasks under the Trilateral Staff Agreement (TSA)

5.1 Task Group IV (Machinery Noise Transmission Path Investigation)

a) Task 2 (Optimization of Low Weight Foundation)

D. Goldsmith reported on the March 9 meeting and stated that the U.S. report will be available end of April 1989.

b) Task 3 (Finite Element Analysis)

He also reported that FEA data on the Delft foundation were exchanged and that GE has encountered some schedule problems.

Completion of the final joint report is scheduled for May 15, 1990.

A progress report will be prepared for discussion at the 1989 TSA Steering Group Meeting.

c) Task 4 (Duplicate of TPD Foundation)

Each nation will investigate the feasibility of constructing and testing its own duplicate of the TPD foundation.

The results of the feasibility study will be available by August 1, 1989. If feasibility was confirmed, then detailed plans for Task 4 will be formulated.

5.2 Task Group II (Propeller and Appendage Noise)

The joint report will not be available before fall 1989. It is hoped that it can be completed by September 15, 1989 so that it can be presented at the 1989 Steering Group Meeting.

6. Discussion of the 1991 Symposium

Germany will be the host country for the Eighth Hydroacoustics Symposium. It is going to be scheduled for early or mid June 1991 and will be held in Hamburg.

It will contain four sessions of paper presentations, dealing with the four main groups of the Long Range Plan.

K. Albrecht reported that he has surveyed the GE facilities and found that German contributions will be available for all four sessions.

As in the preceding Symposia, workshops will be held in selected areas. Discussions at these workshops will be chaired by a U.S. and a GE chairman. They will document the discussions and summarize them. Specific recommendations will be made if they lead to new tasks within the DEA and a general extension of the overall program.

K. Albrecht invited suggestions from the U.S. as to the topics to be discussed in workshops and proposed two topics for consideration:

- o alternative concepts of propulsion
- o techniques for noise measurements on surface ships with acoustic arrays and the evaluation of changes in the noise spectrum.

The U.S. Project Officer will send out an advance notification to all members of the U.S. Hydroacoustics Committee:

- o to call for papers
- o to provide a firm schedule for titles, abstracts and manuscripts to be submitted
- o to submit topics for workshop topics

The Symposium will follow the traditional schedule with sessions and workshops from Monday through Thursday, to be followed by a Steering Group Meeting on Friday morning.

A facility visit to HSVA will be conducted, which will include an inspection of the new large HICAT tunnel.

7. Long Range Plan

The U.S. and GE Project Officers agreed that the Long Range Plan was still valid in its present form and did not require any modification.

8. Miscellaneous

8.1 Electromagnetic Levitation and Bearings

The GE Project Officer, G. Maass, inquired whether the U.S. is conducting any R&D work in the field of electromagnetic levitation and bearings. If so, it might be of mutual interest to incorporate a task of this nature into the DEA.

D. Goldsmith acknowledged that the U.S. might be interested in general terms.

He will survey the U.S. status in related research and prepare a position paper on this issue prior to September 15, 1989 for potential discussion at the 1989 Steering Group Meeting.

8.2 Other Topics

German participation at the Advanced Propulsor Concept was the subject of discussion at DTRC(A) in the morning of April 19.

Minutes of this meeting will be issued separately.

DRAFT
October 21, 1989

DATA EXCHANGE AGREEMENT DEA 4207

Minutes of Steering Group Meeting
Bonn, October 13, 1989

A. Participants:

US	Capt. D.J. Koczur	ONR 122
	Heinz A. Gorges	Consultant to ONR
GE	Dr. G. Maass	Rü V4

B. Agenda:

1. Introduction of new US Project Officer
2. Status Report
   2.1 Subproject 1
   2.2 Subproject 2
3. New Activities
4. Review Long Range Plan
5. 1991 Symposium
6. Spring 1990 Visit GE Project Officer and Staff
7. Miscellaneous

C. Minutes:

The minutes do not follow the sequence of discussions as listed in the agenda.

1. Review of Long Range Plan (Subproject 1)

The Project Officers agreed to review the tasks within the Long Range Plan with the intent to eliminate tasks which had been inactive for an extended period.

With this in mind the meeting reviewed the tasks as listed in the most recent summary of July 26, 1989 (see Appendix A) and separated the tasks into three groups

- o active tasks
- o tasks open to further discussion
- o tasks to be eliminated

2. Categorization of Tasks (Subproject 1)

2.1 Active Tasks:

- o Propeller Noise Radiation
  (1.4) Vibration Response of Plate Like Structures
- o Ship's Hull Noise Radiation
  (2.2) Noise Reduction through Coatings
- o Machinery Induced Noise Radiation
  (3.1) Active Elastic Mountings
- o Sonar Self Noise
  (4.1) Sonar Baffle Design and Material for Surface Ships

For a status report on the active tasks see Section 3.

2.2 Open Tasks:

These tasks will be considered at the meeting of the US Hydroacoustics Committee on November 7, 1989 with regard to US activities and/or long range interest. If there are no activities and/or interest these tasks should be eliminated. They are:

- o Propeller Noise Radiation

  (1.1) Mechanisms of Sound Generation by Air emission into cavitating and non-cavitating flow. The Germans are continuing their R&D effort. As of July 26, 1989 there was no ongoing work in the USA on this topic. Unless the US can make a cooperation contribution, then it is recommended to eliminate this task.

  (1.2) Advanced Design Methods for Quiet Propellers. This task has been the subject of intense discussions due to a German request for contractor participation and the US desire to seek cooperation in experimental endeavors rather than attention to immediate problems. The US would like to see a more active role for HSVA in this task. At this time, it is questionable whether the German MOD is in a position to fund work at HSVA. Until this issue can be resolved this task should be kept open.

- o Ship's Hull Radiation

  (2.1.2) Round Robin Tests. This task is still incomplete: the final report to be prepared is still outstanding and will not be completed before the end of CY 89. After the completion of the final report discussions should be held, whether this task should be continued for non-normal incidence. In the light of these discussions a decision should be made, whether this task is active or should be eliminated.

- o Machinery Induced Noise

  (3.2) Highly damped springs. The Germans are continuing testing of available designs of steel springs. Whether this task should be activated, depends entirely on whether a compatible effort exists in the US.

2.3 Tasks to be eliminated

Due to the lack of activities and/or interest, it was agreed to eliminate the following tasks:

- o Propeller Noise Radiation

  (1.3) Guidelines for Propeller Design to obtain acceptable overall cavitation noise performance

- o Ship's Hull Radiation

  (2.1.1) CAMS
  (2.1.3) Scale Model Prediction
  (2.3) Onboard Noise Monitoring Systems

- o Sonar Self Noise

  (4.2) Effects of Coatings on Sonar Self Noise

2.4 Summary

Of a total of 13 original tasks:

- o 4 are active
- o 4 are open to discussion
- o 5 have been eliminated

It was agreed that the elimination of a certain task did not preclude the presentation of papers or discussions at workshops in this particular field at the 1991 Symposium.

A new task summary in the same format as that of July 26, 1989 will be prepared after a decision on the open tasks has been reached.

3. Status of the active tasks (Subproject 1)

- o Propeller Noise Radiation

  (1.4) Vibration Response of Plate-like Structures: Don Thompson of ARL/PSU has submitted a statement on the US experimental and analytical procedure. At the forthcoming ASME winter meeting the German contributors will meet with Don Thompson and agree on the German contribution to match the US statement of work. The outcome will be presented at the Spring meeting with the German Project Officer in Washington.

- o Ship's Hull Radiation

  (2.2) Noise Reduction through Coatings. The Germans have transmitted to the US all documentation dealing with coatings for German surface ships. It was agreed that the results of the uncoated "Porpoise" tests would be transmitted by the US to Germany. This has not taken place yet. The question arises whether results of the coated "Porpoise" tests are available and will be transmitted to Germany. This will be a subject of discussion at the US Hydroacoustics meeting on November 7, 1989.

- o Machinery Induced Noise Radiation

  (3.1) Active Elastic Mountings. M.BBM has received a contract to continue work on the testing. Bruce Douglas is expected to conduct the US tests about mid 1990 at the host laboratory, M.BBM.

- o Sonar Self Noise

  (4.1) Sonar Dome Baffle Design and Material for Surface Ships. A detailed program plan for the German and the US contributions has been prepared (see Radlinski's letter of September 7, 1989 and Albrecht's reply with minor modifications of October 2, 1989). The program plan includes a working visit by Dr. Bohn of FHAK to NUSC in 1990.

4. Subproject 2

Subproject 2 is proceeding successfully as in the past. The German Status Report is attached as Appendix B.

The "Glover" experiment is scheduled now to begin January 11, 1990 with actual tests planned for the period from January 15 through 26, 1990. FWG will provide onboard instrumentation and cooperate on the joint data analysis. It is expected that a joint report will be available by mid Summer 1990.

During the visit of the US Project Officer in Kiel, FWG stressed that the development of Long Range cooperative plan is important to them. With this in mind, they would like to strengthen the communication link between NUSC and FWG.

5. Signal Processing. NOSC interest in cooperation

NOSC has expressed interest in participating in a cooperative effort in signal processing. The German Project Officer stated that the key agency involved in this area is not FWG but the Institute for High Frequency Physics in Werthoven (Dr. Ziegenbein). He suggests that NOSC write directly to him so that he can make suitable arrangements for detailed discussions in Werthoven. It appears that the ship oriented DEA 4207 is not the correct vehicle for a cooperative effort in this area.

6. New Activities

The German Project Officer reported that Germany is supporting a joint effort between FHAK and WTD 71 in Edenförde to study model techniques to measure target strength. The key question is how model measurement techniques can be simplified to provide reliable target strength data. He suggested that a cooperative task may be established, wherein NUSC could contribute full scale comparisons.

The US Project Officer replied that he will explore the potential for such cooperation, although he foresees some difficulties.

7. Symposium 1991

The German Project Officer proposes to hold the Symposium at FWG in Kiel during the period from June 3 through 7, 1991. FWG is a secure facility and offers all services required for the conduct of a classified meeting.

Current plans are to dedicate Monday (3) through Thursday (6) to sessions with prepared papers and a number of workshops.

Session and workshop chairmen will prepare a review of the meetings and workshops with suggestions for future activities, to be discussed at a "mini steering group meeting" on Friday (7). All other participants will have an opportunity to visit FWG and/or WTD 71 on Friday (7).

On the following Monday (10) a facility visit is proposed to HSVA, which will include a tour of HYKAT, the new large cavitation tunnel. It is also proposed to hold a supplemental unclassified session in Hamburg, to which contributors of the IFS and academia will be invited.

K. Albrecht of FHAK has prepared a "laundry list" of German papers which may be available by 1991. D. Venditti of DTRC(C) has been appointed to serve as coordinator of the US contributions to the Symposium. The German list will provide him with some insight into the subject areas of interest to the Symposium.

It is also proposed to invite Prof. Lauterborn of TU Darmstadt as a key note speaker at an evening meeting (similar to the Strasberg review at the Annapolis Symposium 1987).

The German Project Officer will send out invitations for papers in time so that first proposals for papers can be submitted by January 15, 1990 together with suggestions for session and workshop chairmen.

8. Visit by German Project Officer Spring 1990

The traditional visit by the German Project Officer accompanied by K. Albrecht of FHAK is tentatively scheduled for the period from April 30 through May 8, 1990.

A preliminary visit schedule reads as follows:

Tuesday	May 1	Visit to DTRC Annapolis
Wednesday	May 2	Visit to DTRC Carderock a.m.
		Meeting with US Hydroacoustics Committee p.m.
Monday	May 7	Visit to NUSC New London
Tuesday	May 8	Debriefing in Washington a.m.

9. Next Steering Group Meeting

The next Steering Group Meeting is scheduled for Friday, October 5, 1990 to be held at the MOD in Bonn.

1. REDUCTION OF PROPELLER NOISE RADIATION

DATE July 26, 1989

TASK AND POINTS OF CONTACT	GE STATUS	US STATUS	NEXT ACTION ITEM
1.1 Mechanisms of Sound Generation by Air Emission into Cavitating and Non-Cavitating Flow GE: Bartels FHAK US: Blake DTRC(C)	Tests on hydrofoils to be completed possibly in 1989.	No current R&D effort.	GE will keep U.S. informed of R&D effort and results
1.2 Advanced Design Methods for Quiet Propellers GE: Maass MOD Rü V4 US: Blake-Peterson DTRC(C)	GE has submitted a list of outstanding issues involving participation by a contractor.	U.S. submits alternative proposal of broader R&D scope.	GE will respond to new U.S. proposal and discuss at 1989 Steering Group Meeting.
1.3 Guidelines for Propeller Design to Obtain Acceptable overall Cavitation Noise Performance GE: _____ US: _____	No current activity under DEA 4207.	No current activity under DEA 4207.	
1.4 Vibration Response of Plate-Like Structures GE: Bartels FHAK US: Thompson ARL	Investigation of Flat Plate with rigid clamping on one end.	Investigation of Flat Plate with end plate.	Blake will support the program and establish level of help to be provided by DTRC(C). U.S. to advise on their program schedule for GE to start their program.

2. REDUCTION OF SHIP'S HULL NOISE RADIATION

DATE July 26, 1989

TASK AND POINTS OF CONTACT	GE STATUS	US STATUS	NEXT ACTION ITEM
2.1 Mechanisms of Hull Radiation and its Reduction	Subtask 1: CAMS Model tests completed. GE: Wittek FHAK	Full scale tests on "Athena" available to GE. Most recent tests not releasable. Advice on "pit falls" feasible. US: Roger Ford DTRC	GE position on CAMS application still unresolved. FHAK to propose future work in continuation of CAMS.
	Subtask 2: Round Robin Tests GE tests and reports completed. GE: Brebeck FHAK	Subtask 2: Round Robin Tests U.S. report in preparation. US: Dlubac DTRC(C)	U.S. report to be completed by October 1, 1989. Continuation of work for non-normal incidence requires discussion and resolution after receipt of U.S. report.
	Subtask 3: Scale Model Prediction Technology exists. GE: Albrecht FHAK	Subtask 3: Scale Model Prediction U.S. has selected a fundamental approach aiming at an analogue computer model. US: Vendittis DTRC(C)	It is proposed to present a Status Report on the U.S. effort at the 1991 Symposium.

2. REDUCTION OF SHIP'S HULL NOISE RADIATION (cont'd) DATE July 26, 1989

TASK AND POINTS OF CONTACT	GE STATUS	US STATUS	NEXT ACTION ITEM
2.2 Noise Reduction through Coatings GE: Wittek FHAK US: Venditis DTRC(C)	Existing know-how documentation transmitted to U.S.	First full scale tests on uncoated "Porpoise" have been completed.	A first report on the U.S. tests will be transmitted to GE through channels. Report has not been received yet. Transmission of data from future tests to be discussed at Steering Group Meeting.
2.3 Onboard Noise Monitoring Systems GE: Albrecht FHAK US: Capt. Brady ONR	Surface Ship Equipment know-how transmitted to U.S.	A brief report on U.S. plans to update system was provided by Goldsmith DTRC(A) on April 19, 1989.	The GE Project Officer will utilize these inputs to determine the potential for a cooperative program in the light of GE operational requirements.

3. REDUCTION OF MACHINERY INDUCED NOISE RADIATION DATE July 26, 1989

TASK AND POINTS OF CONTACT	GE STATUS	US STATUS	NEXT ACTION ITEM
3.1 Active Elastic Mountings GE: Zoller M.BBM US: Douglas DTRC(C)	M.BBM will serve as host laboratory for tests.	Douglas plans to conduct tests at M.BBM, Spring/ Summer 1990.	Results should be available by end 1990.
3.2 Highly Damped Springs GE: Albrecht FHAK US: Goldsmith DTRC(A)	Continued testing of available designs of steel springs.	U.S. has started a program on highly damped springs.	No expert meeting planned before end of 1990. Possibly a subject for inclusion in the 1991 Symposium.

4. REDUCTION OF SONAR SELF-NOISE

DATE July 26, 1989

TASK AND POINTS OF CONTACT	GE STATUS	US STATUS	NEXT ACTION ITEM
4.1 Sonar Dome Baffle Design and Material for Surface Ships GE: Albrecht, Bohn, Wittek FHAK US: Radlinski, NUSC	GE has submitted proposal at Symposium 1987 on July 11, 1989	Venditis/Radlinski will review GE proposal and present integrated US/GE program schedule.	Joint proposal by FHAK, DTRC(C) and NUSC will be discussed at the Steering Group Meeting October 13, 1989.
4.2 Effect of Coatings on Sonar Self Noise	Planning Phase for partial coating tests on models	Maidanik proposes to develop analytical methods to examine wave propagation in coating layers.	No immediate action contemplated. Discuss further at 1989 Steering Group Meeting.

Status report 1988/89 on the DEA 4207 Subproject 2:

I. Activities within the DEA 4207 Subproject 2 since Sept.88 :

1. DEA-meeting at NUSC/New London, 23 July - 29 July 89
Participants were P.D.Koenigs/NUSC and BOR B.Nützel/FWG
This meeting was held to prepare for the future GLOVER-experiment concerning the FWG-participation.It was agreed that the FWG contribution in the experiment includes the following activities:

o Principle investigation of surface reverberation from the convergence zone(Doppler-shift,frequency smearing,backscattering).

o Data analysis will be done by FWG(comparison of results with models will be a task of NUSC).The objective is to publish a joint report.

o Operating the FWG-recording system as a backup to all environmental acoustic data.

A proposal was made by NUSC to send the appropriate scientist from NUSC to FWG to run the models,which have already been installed on FWG-computer by NUSC-exchange scientist Dr.J.Syck.

2. The common report on the 1988-GLOVER experiment was finished and is now going through NUSC administration before publishing.

3. The common JASA article by B.Nützel,H.Herwig,P.D.Koenigs,J.M.Monti:"The Influence of near-surface bubbles on acoustic backscatter" has gone through FWG- and NUSC-administration and will be forwarded to the reviewer of the JASA.

4. Exchange scientist
The exchange scientist Dr.J.Syck of NUSC will go back end of September 89 to NUSC after spending one year at FWG.He was involved in the GLOVER data analysis and the writing of the joint report by B.Nützel and J.Syck:"Convergence Zone Surface Reverberation Experiment Using Shallow and Deep Sources.".He also ran computer models for estimating source levels and beam patterns of parametric transducers.

II. Future Plans

FWG is invited to participate in the next GLOVER-experiment which will probably take place in December 89 in the North Atlantic.

DRAFT

Nov. 20, 1989
US Eyes Only

DEA 4207. Subproject 1
US Hydroacoustics Committee
Minutes of the Meeting held
at the Office of Naval Research
on November 7, 1989

A. Attendees:

Capt. D.J. Koczur	ONR 122 US Project Officer
Capt. R.L. Lowell	NAVSEA 55N
D. Vendittis	DTRC 1906
B. Douglas	DTRC 1961
D. Goldsmith	DTRC 274.2
H.A. Gorges	Consultant to ONR

B. Agenda:

1. General Report on the 1989 Steering Group Meeting

2. Subproject 1. Review of Current Tasks and the Long Range Plan

   2.1 Active tasks
   2.2 Open Tasks subject to discussion
   2.3 Eliminated tasks

3. Future Tasks of Interest to the US

4. 1991 Symposium

5. Spring 1990 Visit by the German Project Officer

6. Miscellaneous

C. Minutes:

The meeting concentrated on the minutes of the Steering Group Meeting on DEA 4207 held in Bonn on October 13, 1989.

In particular, it addressed the question of which tasks should be continued and which should be eliminated.

Tasks to be eliminated

The list of tasks eliminated at the Steering Group Meeting was approved and a further task was added for elimination:

Task 1.1 Mechanisms of Sound Generation by Air Emission into Cavitating and Non-cavitating Flow

Currently open tasks

After a discussion of task 1.2 (Advanced Design Methods for Quiet Propellers) the meeting agreed with the language of the minutes of the Steering Group Meeting. That is to say that participation by HSVA in this program is considered as an important element. If no funds can be allocated in Germany for experimental work at HSVA, the US is not very interested in the conduct of this task and it should be eliminated.

Task 2.1.2 (Round Robin Tests) is incomplete. The final report to be prepared by the US is still outstanding. At the moment it is uncertain whether the final report will be prepared by W. Reader or J. Dlubac. A decision on this will be reached by Thanksgiving. The report will be available in time for discussion with the German Project Officer in May 1990 in Washington, DC.

On this occasion the question will be discussed whether this task should be continued for non-normal incidence.

Task 3.2 (Highly Damped Springs) will be the subject of an expert meeting at the end of 1990. At that time a decision will be reached whether there is sufficient substance for a cooperative R&D effort.

Summary:

Of the original 13 tasks in the long range plan

4 are active
6 have been eliminated, and
3 are kept open awaiting further development.

Status of current tasks:

(1.4) Vibration Response to Plate-Like Structures

A brief discussion established that the specimens tested were simple flat plates. Details and results of this task will be discussed at the meeting of the Hydroacoustics Committee with the German Project Officer in Spring 1990.

(2.2) Noise Reduction Through Coatings

Capt. Lowell stated that the report on the uncoated Porpoise was being edited for transmission to Germany. This should be available within a week or two.

The question arose whether absolute or relative dB values should be transmitted. The ship is not a combattant and the coating is conceptual. There are no restrictions regarding the distribution of absolute levels to other nations. Consequently, there was no apparent reason to restrict transmission of data to Germany to relative rather than absolute levels.

The report on the coated Porpoise tests is not complete yet. Data transmission to Germany will be discussed after a review of the completed report.

(3.1) Active Elastic Mountings

It was agreed that Bruce Douglas should go to M.BBM at his earliest convenience to avoid further delays and contractual complications.

(4.1) Sonar Dome Baffle Design and Material for Surface Ships

The status is fully reported on in the minutes of the Steering Group Meeting. Bohn of FHAK is scheduled to start work at NUSC early in 1990.

Future Tasks

A general discussion followed regarding the development of future tasks within the context of a Long Range Plan. It was observed that many tasks proposed for incorporation into the long range plan did not materialize because funds were not available.

For future discussion it is therefore proposed that prior to discussions at a bilateral level each nation ensures that there is a high probability to obtain funds for a cooperative R&D program.

This approach will be communicated to the German Project Officer. It is proposed that both countries exchange suggestions for new tasks before the end of January 1990 so that they can be knowledgeably discussed at the 1990 Spring visit by the German Project Officer.

1991 Symposium

It was pointed out that participation at the Symposium in Kiel would impose an impossible financial burden upon the US contingents. Kiel's accommodations are expensive and the per diem would not suffice to cover the daily expenses.

The US therefore strongly suggests to conduct the Symposium in a larger city where the per diem is adequate to cover hotels and meals.

Mr. Albrecht of FHAK has been alerted to this dilemma. It is expected that the Symposium will be relocated to either Hamburg or Munich.

The German Project Officer will prepare an invitation for papers together with a time schedule for:

- o nomination of session and workshop chairmen
- o suggestions for workshop topics
- o submittal of abstracts and final manuscripts

and information on the format of manuscripts and illustrations, to meet German production standards.

This invitation will be sent to D. Vendittis for distribution to the US participants.

It is again proposed to issue the Proceedings at the Symposium itself and to provide a supplemental volume in the Fall of 1991 which will contain comments and recommendations developed during the Symposium itself.

Spring visit by German Project Officer

The traditional Spring visit by G. Maass and K. Albrecht is planned for the period form May 1 through May 8, 1990.

A preliminary schedule can be found in the minutes of the Steering Group Meeting.

The meeting with the US Hydroacoustics Committee is scheduled for the afternoon of Wednesday, May 2, 1990 at the Office of Naval Research.

Distribution

COMNAVSEASYSCOM, Code 55N (CAPT R.L. Lowell Jr.)
DTRC(C), Code 19 (M. Sevik)
194 (W. Blake, Acting)
1906 (D. Vendittis)
1905.4 (D. Feit)
1920.2 (R. Ford)
1961 (B. Douglas)
1544 (F. Peterson)
DTRC(A), Code 27 (L. Argiro)
274 (Y. Wang)
274.2 (D. Goldsmith)
NUSC/NL, Code 32 (W. Roderick)
332 (R. Radlinski)
ONR, Code 113 (A. Diness)
121 (J. Hansen)
1132SM (A. Tucker)
Vineta, Inc. (H. Gorges)

Draft October 22, 1989

Trilateral Staff Agreement
Minutes of the Steering Group Meeting
Bonn, October 12, 1989

A. Agenda:

1. Status Reports

   1.1 Task Group 2
   1.2 Task Group 4

2. New Tasks

3. Miscellaneous

B. Participants:

Germany	Dr. G. Maass	MOD Rü V4
Netherlands	P.J. Keuning	NL MOD Marine
	H. Hasenpflug	NL MOD Marine
USA	Capt. D.J. Koczur	ONR Code 122
	H.A. Gorges	Consultant to ONR

C. Minutes

1. The Minutes for the 1988 Steering Group Meeting were found correct and were accepted.

2. Status Report Task Group 2
(Propeller and Appendage Noise, Bubble Noise)

There exists now a Table of Contents for the final report, which follows essentially the guidelines established in Ottobrunn in May 1988.

There exists also a time schedule for a draft report to be completed by November 1989. Manuscripts have still to be provided by Baiter and Bartels in Germany and Thompson and Billet in the US.

Informal meetings are scheduled in the US as follows:

- Week of December 4, 1989 in DC with Baiter and van der Kooij

- o Week of December 11, 1989 in San Francisco with Thompson, Billet, Baiter, Bartels.

Regarding Conclusions (Chapter 5) and Recommendations (Chapter 6) all three countries are invited to submit suggestions before December 1989. These two chapters are important, if work in Task Group 2 is to continue.

Current trends seem to indicate that interest in further cavitation research is waning and that increasing attention is focussed upon radiated noise due to onboard machinery.

It was agreed to review the findings of the Final Report and its recommendations at the 1990 Steering Group Meeting and decide whether to close Task Group 2 out or to continue.

3. Status Task Group 4 (Machinery Noise Transmission Path Investigations)

3.1 Task 2 (Description of Analysis Methods for Optimizing Machinery Foundations with Respect to Low Weight and Good Acoustic Performance)

Task 2 will be completed on November 1, 1989. D. Goldsmith of DTRC(A) will forward the final report on the mobility measurements.

3.2 Task 3 (Finite Element Analysis of a Foundation Structure)

The current status is as follows:

Each nation has completed its analysis and forwarded it to the US. The US will prepare comparison plots according to D. Goldsmith (letter of September 26, 1989). This action should be complete by November 1, 1989.

Van Bakel (NL TPD/TNO) will prepare a draft report on this task and submit it for comment to the US and Germany by February 1990.

German and US comments should be received prior to April 1, 1990. It should then be possible to issue a final report in the NL by May 1990.

To meet this schedule it is essential that the NL receives the German report by November 1989. The German Project Officer promised to see whether the German report can be accelerated to meet this target date. Zoller should contact von Bakel directly to facilitate the preparation of the joint report.

The findings so far were summarized as follows:

The frequency range extended from 0 to 2500 Hz. Discrepancies were observed at frequencies in excess of 1200 Hz. The German and the Dutch analysis showed comparable results, whereas the US differed substantially.

The deviations are due to the large number of elements handled by the US and to damping assumptions.

3.3 Task 4 (Duplication of TPD foundation and experimental investigations in US, Germany and NL)

The NL Project Officer stated that the NL would prefer a "round robin" test series rather than duplication, which was favored by the US and Germany.

The final compromise will be discussed between Goldsmith, van Bakel and Zoller early next year. The meeting agreed that the conduct of this task is of great importance. The Dutch are most interested in structural investigations, particularly in the 500 Hz region (machinery noise). The importance of boundary conditions (free vs fixed) is stressed.

The Dutch will fund their effort and start in 1990. Germany cannot fund their part before 1991. The US Project Officer will explore the US situation upon his return, but considers funding likely.

Umsetzen für 1991.

4. Conclusions

It was agreed to continue with Task Group 4 and to decide on continuation or closing of Task Group 2 at the 1990 Steering Group Meeting.

5. Next Steering Group Meeting

The 1990 meeting is scheduled for October 4, 1990 and will be held in The Hague.

Agenda for the Meeting of

US Hydroacoustics Committee

November 7, 1989

14:00 hours at the Office of Naval Research

Room 915

1. General Report on the 1989 Steering Group Meeting

2. Subproject 1. Review of Current Tasks and the Long Range Plan

   2.1 Active tasks
   2.2 Open Tasks subject to discussion
   2.3 Eliminated tasks

3. Future Tasks of Interest to the US

4. 1991 Symposium

5. Spring 1990 Visit by the German Project Officer

6. Miscellaneous

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332 (R. Radlinski)
ONR, Code 113 (A. Diness)
Code 121 (J. Hansen)
1132SM (A. Tucker)
Vineta, Inc. (H. Gorges)

Facility Visits by Capt. D.J. Koczur
U.S. Project Officer for DEA 4207
and the Trilateral Staff Agreement (TSA)

1. Purpose and Objectives: To become familiar with the facilities and the active contribution to the DEA and the TSA prior to the two relevant Steering Group Meetings. Emphasis during this visit was placed on the investigation of hydroacoustic phenomena. The key facilities from this point of view were:

In the Netherlands:

Marin (Ede, Wageningen)

In Germany:

Research Institute for Underwater Sound and Geophysics (FWG) (Kiel)

Military Engineering Center for Ships and Naval Weapons (WTD 71) (Eckernförde)

Hamburgische Schiffsbau Versuchsanstalt (HSVA) (Hamburg)

Fraunhofer Institut für Hydroakustik (FHAK) (Ottobrunn, Lake Ammersee)

Müller-BBM (M.BBM) (Planegg)

2. Brief Summary Report on Individual Facility Visit

2.1.1 Association with TSA:

Marin has been a major contributor to Task Group 2 of the TSA (Propeller and Appendage Noise, Bubble Noise)

2.1.2 Key Personnel

Dr. J. van der Meulen, Deputy Head, R&D Division
Ir. A. Koops
Dr. W. van Gent
J. van der Kooij

2.1.3 Highlights

- A general visit of the Wageningen complex and at Ede were conducted. Of particular interest for future cooperation is the Depressurized Towing Tank at Ede.

- o Cooperation in fundamental cavitation research with the University of Twente (Prof. Wijngarden), Lauterborn (TU Darmstadt), Baiter (FHAK).

- o Development of analytical techniques to study the genesis and collapse of cavitation bubbles on (two-dimensional) air foils.

2.2 FWG Kiel

2.2.1 Association with DEA 4207

The FWG is the key facility involved in Subproject 2 of DEA 4207. FWG provides the Technical Subproject Officer. Cooperation is closest with NUSC; it goes back to 1972 starting with BALEAR, and expeditions in the Baltic. In recent years cooperation has been concentrating on work on the North Sea platform and participation in the GLOVER trials.

2.2.2 Agenda and key personnel

Welcome Address Director's Office	Dr. K. Hartard Dr. J. Piest Dr. H. Baur Dr. B. Scholz
Introduction to FWG Activities in Underwater Acoustics (review)	Dr. H.G. Schneider
Activities in the Geophysical Branch (review Bilateral (US/GE) Experiment SAXON-FPN	Mr. Lobemeier
"NORDMEER 87". A Sea Trial with International Participation	Dr. J. Sellschopp
A Survey of Common Investigations within the DEA 4207.	Dr. H. Herwig
Joint Experiments with NUSC on Near-Surface Backscattering	Mr. B. Nützel
RV PLANET	
General Review and aspects to future cooperation	
FWG-Participants:	Dr. Baur, Dr. Herwig, Mr. Nützel, Dr. Scholz, Dr. Schneider, Dr. Hartard

2.2.3 Highlights

o Key capabilities:

Geophysics

Surface
- Remote Sensing of Seasurface Parameters
  Light, Radar, Infrared, Satellite, Aircraft

- Breaking of Waves
  Mechanism, Scattering at Interface

Medium
- Measuring and Interpretation of Ocean Structure
  High Resolution Thermistor Chain, Area Survey

- 1 dim. Modelling of Ocean Stratification
  Atmospheric Influences, Advective Terms

Bottom
- Environmental Foundations of Mine Warfare
  Mineburial, Minehunting Side Scan Sonar

Underwater Acoustics

- Sound Propagation, Reverberation, Noise
  Measuring, Interpretation, Area Coverage, Data Banking

- Acoustic Modelling
  Development, Adaptation, Studies

- Fundamentals of Information Transmission
  Frequency Spread, Spatial Coherence

- High Angular Resolution Techniques
  Experiments and Theory

- Acoustic Systems
  Arrays, Barriers, Transducers

- Interfaces
  Reflectivity, Noise, Bubbles

o Short Term Cooperation: Continuation of GLOVER tests under consideration; commencing Jan. 11, 1990; actual tests Jan. 15 through 26, 1990. FWG will supply onboard instrumentation and support joint data analysis (completion date summer 1990).

o Long term program development should await the return of the new director, Peter Wills from SACLANCEN.

- o NOSC San Diego has expressed interest in cooperation with Germany in the area of signal processing. DEA 4207 in ship oriented and not an ideal vehicle for this subject. Moreover, in Germany this activity is concentrated at the High Frequency Institute in Werthoven (Dr. Ziegenbein).

2.3 WTD 71 Eckernförde

2.3.1 Association with DEA 4207:

WTD 71's participation in the DEA is at best peripheral. The facility visit did, however, provide an insight into German full scale testing capability for the acoustical performance of surface ships and torpedoes.

2.3.2 Agenda and Key Personnel

Welcome	Simka
Introduction to WTD 71 Video clip on WTD 71	Dr. Troeger
Acoustic target strength	Christiansen
Methods of measurement of acoustic target level	Arens
Transfer to acoustic measurement range "Aschau"	
Visit of acoustic ranging installations	Arens

2.3.3 Highlights

- o Aschau acoustic range for surface ships and submarines.

2.4 HSVA Hamburg

2.4.1 Association with DEA 4207

HSVA is an important authorized establishment under DEA 4207. In close cooperation with FHAK in Ottobrunn it is a major contributor to Subproject 1, particularly in the area of cavitation research and propeller design and testing.

2.4.2 Agenda and key personnel

Introduction to HSVA	Dr. Payer
Propeller Developments at HSVA	J. Blaurock

HYKAT Description J. Friesch

Hydroacoustics Developments Dr. Pollmann

Topics of mutual interest; how can HSVA contribute to the aims of DEA 4207. Cooperation with LCC.

Tour of HSVA facilities

Further actions

2.4.3 Highlights

- o HYKAT Hydrodynamics and Cavitation Tunnel (2.8 x 1.6m^2 test section, 11.5 to 12 m/sec velocity
- o Laser Doppler Anemometry (LDA) in tunnels, towing tanks, full scale ships
- o Potential comparision of similar propellers in LCC, HYKAT and other facilities to evaluate scaling procedures
- o Development of highly damped propeller

2.5 FHAK, Ottobrunn and Lake Ammer

2.5.1 Association with DEA 4207, Subproject 1 and TSA

The Director of FHAK, Mr. K. Albrecht serves as Technical Subproject Officer for Subproject 1 and supports in this function the German Project Officer at Rü V4. In this capacity FHAK provides the capacity of conducting hydroacoustics R&D within its own institute and facilities, and provides technical oversight over work performed by other contributors, such as e.g. M.BBM, Battelle, HSVA, etc. FHAK is also involved in Task Group 2 of the TSA.

2.5.2 Agenda and key personnel

October 9

Welcome and Introduction to FHAK	K. Albrecht
Acoustics of Propulsion for Naval Vessels	Dr. F. Bartels
Structure-Borne Noise and Water-Borne Noise	Dr. Bohn
Cavitation Acoustics	H.-J. Baiter

Visit to Field Station Wartaweil/Ammersee
(Participants FHAK: K. Albrecht, Dr. F. Bartels,

Dr. H.-U. Bohn, Dr. D. Brebeck)

October 10

Past, Present and Future Activities in DEA 42?7
(Participants FHAK: K. Albrehct, H.-J. Baiter,
Dr. F. Bartels, Dr. H.-U. Bohn, Dr. D. Brebeck,
Dr. P. Tilmann, Dr. S. Zurnatzis)

2.5.3 Highlights

- o Research Vessel VITESSA for propeller cavitation and propeller noise investigations.
- o Research Barge ("STRUCTURA") for measurements of the reflectivity and transmission of noise on coatings
- o SM 5, a scale model for the study of structure-borne noise transmission
- o Analytical capabilities in cavitation research and propeller design

2.6 Mueller-BBM Planegg near Munich

2.6.1 Association with DEA and TSA

M.BBM has contributed to the DEA and the TSA (Task Group 4) in the field of structure borne machinery noise transmission, active mounts and on-board monitoring.

2.6.2 Agenda and key personnel

Welcome	Dr. Stüber
General survey on Müller-BBM history and activities	H.A. Müller
General survey on activities in marine/navy acoustics at Müller-BBM	Geicke

Suggested special topics

Compensators

Acoustic Monitoring

Structureborne sound transmission from resiliently mounted machinery

Active Mounts

Target strength

Participants, Müller-BBM

Dr. Burkhard Stüber
Mr. Helmut A. Müller
Mr. Klaus Geicke
Mr. Joachim Scheuren
Mr. Hermann Wunder
Dr. Werner Zoller

2.6.3 Highlights

- Test Stand for active elastic mountings
- Testing of resilient mounts
- On-board acoustic monitoring equipment for submarines

3. Concluding Remarks

The visited facilities were selected with current US interests in the DEA in mind. The following facilities should be visited at a later stage to complete the picture:

in Germany:

- Institute for High Frequency Physics Werthoven (near Bonn)
- North Sea Platform FPN 1
- Institute Prof. Lauterborn; TU Darmstadt

in the Netherlands:

- Technical Physical Service TPD/TNO Delft

DER BUNDESMINISTER DER VERTEIDIGUNG
Rü V 4

Bonn, 06.12.1990
0328/12-4392

Postfach 1328
D 5300 Bonn 1
Federal Republic of Germany

From: German Project Officer
MWDDEA-N-67-0-4207

To: U.S. Project Officer

Subj.: Subproject 1
United States/Federal Republic of Germany (US/FRG)
Seventh Hydroacoustics Symposium under above MWDDEA

1. I propose the Seventh Hydroacoustics Symposium to be held during the week of September 16 through 20, 1991 at the location of the Hochschule der Bundeswehr (Academy of the Federal Forces) in Neubiberg near Munich.

Visits to other establishments are scheduled for the week of September 23, 1991, to include a visit to the new cavitation tunnel (CTHAT) at Hamburgische Schiffbau-Versuchsanstalt (HSVA) in Hamburg.

2. I have appointed for coordinator and chairman on our side

Mr. K. Albrecht
Fraunhofer-Institute for Hydroacoustics (FHAK)
Waldparkstraße 41
D 8012 Ottobrunn
Federal Republic of Germany.

I understand that

Dr. D. Venditttis
David Taylor Research Center
Code 1906
Bethesda, MD 20084

will act as the US coordinator for the symposium.

3. The key topics of the symposium will be finalized during the meeting of the GE Project Officer and K. Albrecht with the US Project Officer and the US Hydroacoustics Committee on about May 2, 1990. For immediate action - such as "Call for Papers" - it was agreed already to include the following topics:

Session: Reduction of Propeller Noise Radiation
Reduction of Ship's Hull Noise Radiation
Reduction of Machinery Induced Noise Radiation
Reduction of Sonar-Self-Noise

Workshops: Alternative Concepts of Propulsion
Techniques for Measuring Surface Ship Noise
Signatures.

UC suggestions for further workshops are invited.

I suggest that all communications relating to the symposium will be directly between Dr. Venditti and Mr. Albrecht.

Dr. Maass

Copy to:
FHAK, K. Albrecht

A "Laundry List" of German Contributions to the

7th Hydroacoustics Symposium 1991

PAPERS TO BE PRESENTED

1) Propeller Noise Radiation

Recent Development in Measuring Material Parameters with a Tube Facility	FHAK
Highly Damped Propellers	HSVA
Hydroacoustic Measurements with HYKAT (Data Processing)	HSVA
Dependence of Ship Noise Radiation on Propeller Parameters (Blade Number, Geometry, Speed of Rotation)	FHAK
Cavitation Noise Scaling: Status and Questions	FHAK
Acoustical Far Field Directivity and Vibration Pattern of Propeller Eigenmodes in Air	FHAK
Finite Element Calculation of Vibration Modes of Damped Propeller Blades	FHAK
Influence of Skew upon Propeller Noise Characateristics in Wake Flows	FHAK
Joint Vibration Program	FHAK/ARL
Cavitation Noise Damping by Air Emission on Hydrofoils	FHAK

2) Hull Noise Radiation

Structural Noise/Water Noise in the Near Field	MTG
Recent Development in Measuring Material Parameters with a Tube Facility	FHAK
Determination of the Sound Speed in Materials by Measurements of Thin Plate Samples in a Free Field Facility	FHAK
Damping in Ship Structures: Measurements with a Steel Ship Model	FHAK

	Structure Borne Noise and Radiated Underwater Noise of a German Patrol Boat: Comparison of Full Scale and Model Measurements	FHAK
	Underwater Sound Radiation of Steel Plates Excited by Isotropic Noise	FHAK
3)	Machinery Induced Noise	
	Recent Results with Elastic Mounts	Battelle-Institut
	Structure Borne Sound Isolation	M-BBM
	Gear Acoustics	Funk (Univ Bw).
	Computational Methods for Noise Transmissions	M-BBM
4)	Sonar Self Noise	
	Structure Borne Noise Distribution and Propagation in the Shell and Effects on the SONAR Self Noise as a Function of the Mode of Operation	MTG
	Numerical Parameter Studies for Layered Acoustic Materials of Baffles	FHAK
	Flow Noise	M-BBM
	Baffle Program Results	FHAK/NUSC

WORKSHOPS

Alternative Concepts of Propulsion

Techniques for Measuring Noise Signatures with Acoustic Arrays

Evaluating Signature Changes