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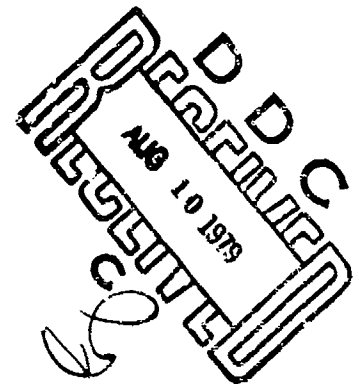
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FINAL REPORT - PREMOBILIZATION
OF R/V INDIAN SEAL

Texas Instruments Incorporated
Equipment Group
P.O. Box 226015
Dallas, Texas 75266

31 May 1979
Final Report for Period 1 Jan. 1979 - 31 March 1979



Prepared for

NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY
Ocean Advanced Development Office
NSTL Station, Bay St. Louis, MS 39529

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A summary is presented of the premobilization effort conducted by Texas Instruments Incorporated to prepare the R/V INDIAN SEAL for later mobilization by another contractor for LRAPP operations during 1979.		

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INTRODUCTION:

Premobilization of the R/V INDIAN SEAL, conducted by Texas Instruments Incorporated was designed to accomplish certain tasks prior to the mobilization task which began on 27 March 1979. The premobilization effort consisted of several planning and design tasks, equipment purchases and refurbishment and modifications to the ship.

Premobilization was conducted from 1 January 1979 (effective date of contract) through 26 March 1979. The ship entered Burton Shipyard, Port Arthur, Texas on 12 March 1979 and arrived at Pier 14, Galveston, Texas on 27 March 1979.

Specific premobilization tasks performed by Texas Instruments under this contract include:

- Creation and submission to LRAPP of a Preliminary Mobilization Plan for R/V INDIAN SEAL.
- Definition of technical information required for design of recording capability for ship's gyro, RPM, wind velocity, etc.
- Evaluation of proposal deck loading to ensure compliance with stability requirements.
- Development of requirements, schedule, estimated costs and plan to refurbish certain items of deck equipment.
- Creation and submission to LRAPP of a maintenance plan for the onboard processing equipment.
- Creation and submission to LRAPP of a training plan for the technical crew.
- Development and submission to LRAPP of a technical crew rotation plan.

- Development and submission to LRAPP of a logistics support plan.
- Installation of the hydraulic power unit for the PAR/ACODAC equipment and connection of the unit to the crane.
- Modification of one 20-foot ISO van for use as a machine van.
- Refurbishment of the air compressor and purchase of fire extinguishers.
- Removal of wood decking, tow winch and other equipment from the deck of the INDIAN SEAL.
- Modifications to the ship.
- Construction of an after control station.
- Installation of AMF and PDR transducers.
- Run electrical power from the engine room to the main deck.

The remainder of this report will provide descriptions and more detail of the premobilization tasks performed by Texas Instruments.

MOBILIZATION PLAN:

A Preliminary Mobilization Plan for R/V INDIAN SEAL, dated 23 January 1979 was prepared by Texas Instruments (TI) and submitted to LRAPP. The plan is included as Appendix A to this report. The approach proposed consisted of the following four phases:

- Phase I: Planning/Design
- Phase II: Dry Dock
- Phase III: Premobilization
- Phase IV: Mobilization

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The plan included preliminary deck layout drawings for hydraulic and air lines, electrical power, cooling water lines, fuel lines, and intercom station locations. It also included sketches of a mounting device for the AMF directional transducer and the after control station. Schedules for each phase were included as were recommended equipment refurbishment tasks. Estimated costs for mobilization were developed and presented to LRAPP at a series of meetings held in Plano, Texas and San Diego, California.

In addition to the preliminary mobilization plan, TI submitted a set of sketches providing more detail of the following items:

- 0-1 deck between the vans and the ship's 0-1 deck
- False deck structural plan
- After control station
- AMF directional transducer mounting device
- Intercom station schematic

Copies of these drawings are included as Appendix B to this report.

PERT charts of the premobilization and mobilization effort, as proposed by TI, were prepared and submitted to LRAPP and the A & E group. A copy of the final revision of the PERT chart is included as Appendix C.

A set of five detailed deck layout drawings was prepared and submitted to Undersea Research Corporation for final drafting. These drawings were as follows:

- No. 1 - Deck Equipment Layout
- No. 2 - Compressed Air Lines and Engine Control Lines Layout
- No. 3 - Firefighting and Cooling Water Layout

- No. 4 - Hydraulic, Fuel, 0-1 Deck Layout
- No. 5 - Intercom, Electrical Power and Deck Lighting Layout

DEFINITION OF TECHNICAL INFORMATION:

Information required for design of the recording capability for the ship's gyro, RPM and wind velocity was obtained and submitted to the TI Systems Integration program personnel and to other contractors, as appropriate. These instruments were connected to the recorders during the mobilization phase.

STABILITY CALCULATIONS:

The final LRAPP deck loading was evaluated by Robert Schuler, Naval Architect to ensure compliance with stability requirements. Based on Mr. Schuler's calculations, the U.S. Coast Guard issued a stability letter certifying acceptability of the deck loading. A copy of the Coast Guard stability letter is included as Appendix D to this report and is posted on the bridge of the R/V INDIAN SEAL.

DECK EQUIPMENT REFURBISHMENT PLAN:

A plan to refurbish the crane, PAR/ACODAC winch, hydraulic power unit and other deck equipment was included in the preliminary mobilization plan (Appendix A). Estimated refurbishment costs were submitted to LRAPP and were subsequently revised and resubmitted. The final refurbishment plan prepared by TI was submitted by TI letter proposal No. 230-66-3019 and was incorporated into this contract.

MAINTENANCE PLAN:

A maintenance plan for the onboard processing equipment is presently being written and is planned for submission under separate cover. The plan specifies the periodic preventive maintenance schedule and operations to be performed on the equipment. Individual maintenance manuals for each piece of equipment are referenced for the actual procedures to be performed.

TECHNICAL CREW TRAINING PLAN:

A training plan for the technical crew has been developed and will be submitted under separate cover. The plan presents a comprehensive approach to training the technical crew to ensure their competence for the LRAPP program. It is based on the individuals' primary duty assignments aboard the ship and takes into consideration their previous experience and training. The plan is divided into the following phases:

- Precruise phase
- Sea trial phase
- At-sea phase
- Headquarters training phase

Training consists of formal training courses, such as those offered by Hewlett-Packard, as well as on-the-job training conducted at TI on the Systems Integration, PAR/ACODAC and LAMBDA III Array programs.

TECHNICAL CREW ROTATION PLAN:

A rotation plan for the technical crew has been developed and will be submitted concurrently with this report. The plan provides for rotating the crew in order to maintain a competent crew aboard the ship at all times. The functional assignments of the individuals are taken into consideration to provide the proper expertise at all times. Each crew member will spend approximately two months out of each three aboard the ship.

LOGISTICS SUPPORT PLAN:

A logistics support plan has been developed and will be submitted concurrently with this report. The plan provides information for support of the ship out of Galveston, Texas. A supplemental plan will be issued at a later date for operations out of Bermuda.

INSTALLATION OF HYDRAULIC POWER UNIT:

The hydraulic power unit which supplies power to the PAR/ACODAC handling equipment and the crane was installed aboard the ship while it was in drydock. The unit was inspected, new filters were installed, several hoses were replaced and plumbing was run from the unit to the crane (furnished and installed by TI).

MACHINE VAN:

A 20-foot ISO shipping container furnished by LRAPP, was converted for use as a machine van. Lights, electrical wiring and work benches were removed from the old machine van and installed in the container. A storage cabinet was built inside the container and electrical power tools (lathe, drill press, etc.) were installed on the work benches. A personnel door was installed in the side of the container during mobilization. The completed van was used to ship miscellaneous gear from Plano to the ship.

REFURBISHMENT/PURCHASE OF EQUIPMENT:

The air compressor used on previous LRAPP exercises was refurbished for use on the INDIAN SEAL. New tanks were installed and a new 10-hp motor was installed, along with a new starter/control switch.

The GFE life raft used on previous exercises was inspected, reprovisioned and repacked for 1979 operations.

Halon fire extinguishers in the following sizes were purchased:

- 2 each 5 lb.
- 5 each 9 lb.
- 1 each 17 lb.

The extinguishers were installed later during the sea trial phase of the operations.

REMOVAL OF DECK EQUIPMENT:

While the ship was in the shipyard, the following items of equipment were removed from the deck: wood and steel decking, tow winch, cargo rails, tugger winch, mud valves and fuel meter. The items were transported to Sealcraft's storage yard for safekeeping. The main deck was painted prior to the time the ship left the shipyard.

SHIP MODIFICATIONS:

The following modifications to the INDIAN SEAL were made (during shipyarding) as part of this contract:

- o Fuel gauges were installed in the forward four fuel tanks and the tanks were cleaned. The gauges were required because the fuel sounding tubes were covered by the vans and LAMBDA winch and are inaccessible.
- o A speed log was installed in an existing valve.
- o Two berths were removed from Stateroom No. 5, as directed by LRAPP.
- o All fuel tanks (except day tanks) and the engine room were gas-freed.

AFTER CONTROL STATIONS:

An after control station was built and installed just forward and starboard of the overboarding device. Controls provided are throttle control for each engine and an emergency stop button. Pneumatic and electrical lines were run from the engine room and connected to the station (as part of this contract) after the ship reached Galveston. After installation of the LAMBDA winch, Sealcraft installed a duplicate set of controls in the winch cab. The controls were tested at the dock and again at sea during the early sea trials prior to actual use during exercises.

TRANSDUCER INSTALLATIONS:

An AMF omnidirectional transducer (for use with the AMF acoustic releases) was mounted to the hull of the ship. A U-shaped bracket was built for the unit and signal leads were fed through a stuffing tube and routed to the instrumentation laboratory.

Another bracket was installed beneath the ship for installation of a 12 kHz PDR transducer. The four 3.5 kHz transducers (furnished by TI) previously on the ship were removed, cleaned, tested and reinstalled. The mounting bracket had been damaged, but was repaired prior to reinstallation of the transducers.

An AMF directional transducer mounting device was built and installed on the starboard side of the ship, just forward of van No. 1.

ELECTRICAL POWER:

Electrical power lines were run from the engine room, through stuffing tubes in the engine room escape hatches to the main deck and were tied-off for later connection during the mobilization phase. Lines brought up consist of the following:

- 2 each for the hydraulic power unit
- 2 each for deck lights
- 2 each for the power van
- 1 each for air conditioning water pumps

CONCLUSION:

The pre-mobilization effort conducted by TI was completed within the specified time (except where noted otherwise) and within budget. Mobilization started on 27 March 1979, as scheduled, and proceeded as planned.

APPENDIX A

PRELIMINARY MOBILIZATION PLAN FOR R/V INDIAN SEAL

PRELIMINARY MOBILIZATION PLAN FOR R/V INDIAN SEAL

Texas Instruments proposes to provide the effort necessary to mobilize the R/V INDIAN SEAL for use as the primary test platform for LRAPP beginning 27 March 1979.

APPROACH

The mobilization task will be accomplished in the following four (4) phases.

Phase I: Planning/Design

This phase will provide for the planning, deck layout, stability study, scheduling, subcontractor interface, and equipment refurbishment (Attachment A). Completion of this phase will be 28 February 1979.

Phase II: Dry Dock

This phase will start on 1 March 1979 when the R/V INDIAN SEAL enters a fifteen day dry dock period and provides for pre- acceptance survey, supervision of the dry dock task of installing PDR/AMF transducers, speed detectors, and plumbing for saltwater to be used for cooling and safety.

Phase III: Premobilization

This phase will begin 20 March 1979 and provide for the installation of the items listed in Attachment B. This phase will be completed 26 March 1979.

Phase IV: Mobilization

This phase will begin 27 March 1979 and be completed on 4 April 1979 and provide for the major mobilization effort. Attachment C itemizes the Phase IV effort.

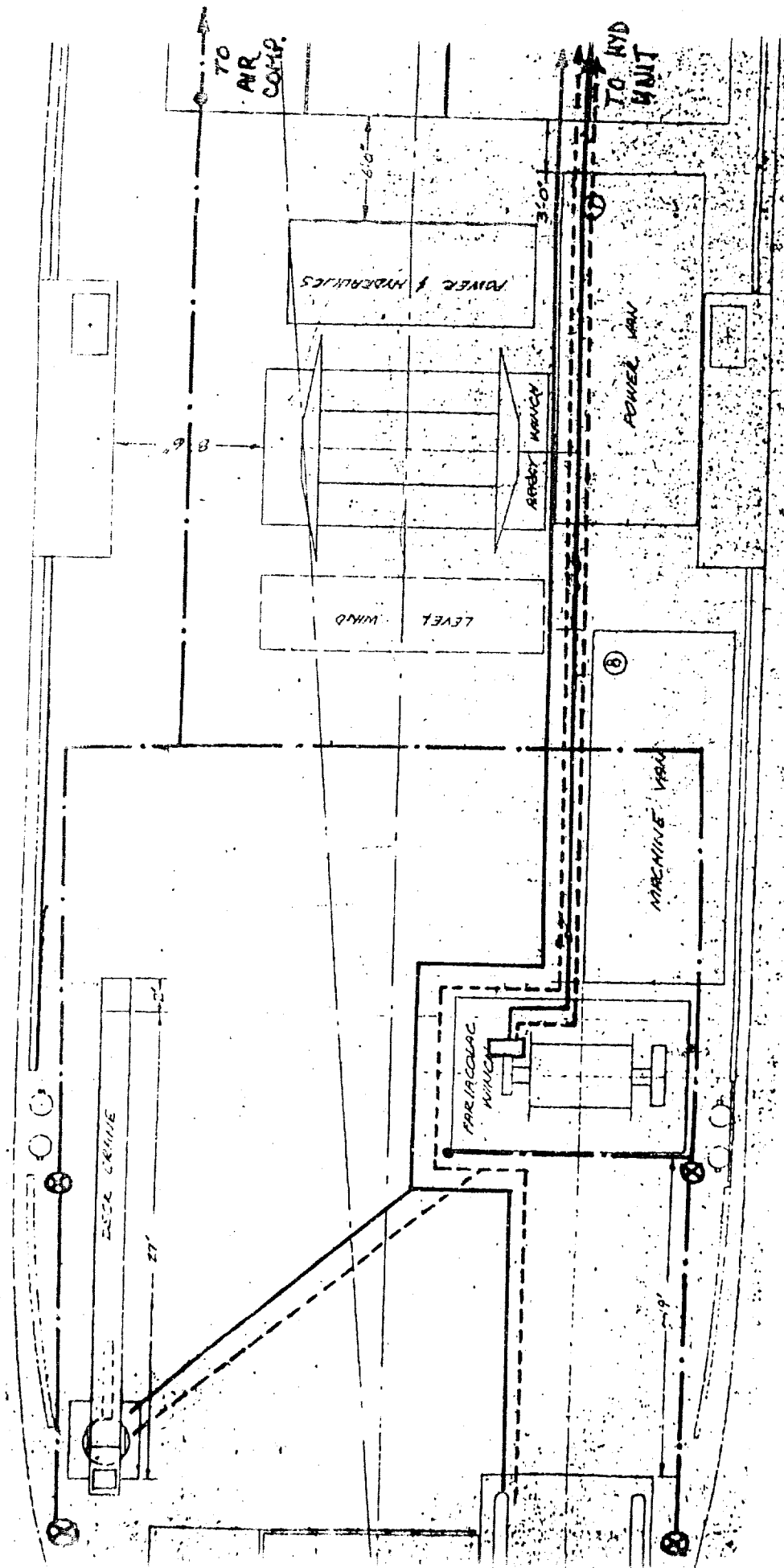
The deck layout with hydraulic, electrical, and pneumatic layouts are shown in figures 1 and 2. Positions for deck lights, air tuggers, etc. are also shown.

Figure 3 shows a proposed design for a device for extending and retracting the AMF acoustic release transducer. It consists of a large pipe welded to the side of the ship, with an inner pipe (to which the transducer is attached) which can slide within the outer pipe. The outer pipe extends from the rail (main deck or 0-1 level) to the chine. The inner pipe has spacers which keep it centered within the outer pipe and a three-pronged device (see view A-A which serves as a stop in

the extended position and to orient the directional transducer in the same direction each time it is extended. In the extended position, the transducer will be below the lowest point of the ship's keel. The device will be welded to the starboard side of the ship, forward of the 40-ft. vans.

Figure 4 is a drawing of an after control station for installation near the stern, preferably between the A-frame and overboarding device. It is a box containing the speed control levers and an emergency stop button. The deck of the unit is raised so that any water splashed onto it will drain off quickly. The cover is hinged and has a watertight gasket to keep the unit dry when not in use. The unit will be mounted to the main deck, with a six inch pipe support pedestal and will be waist-high to the operator standing on the false deck.

Schedules for each phase of the mobilization are shown on the eight pages following Figure 4. A separate schedule is shown for each phase.



————— HYDRAULIC SUPPLY
 - - - - - HYDRAULIC RETURN
 - - - - - AIR LINE
 ⊗ AIR TUGGER
 • AIR TOOL

A-4

Figure 1. Deck Layout

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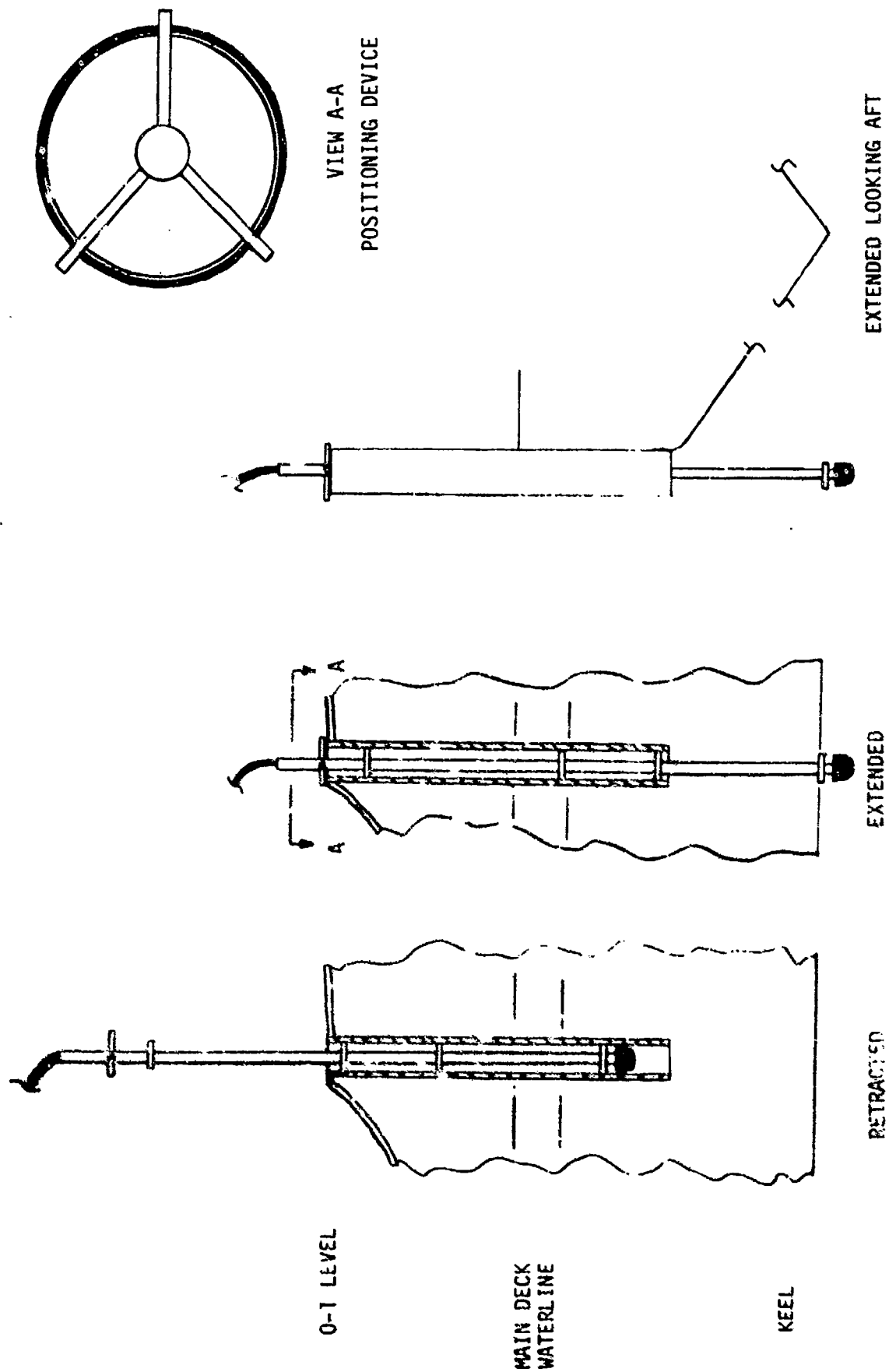


Figure 3. AMF Transducer Mounting Device

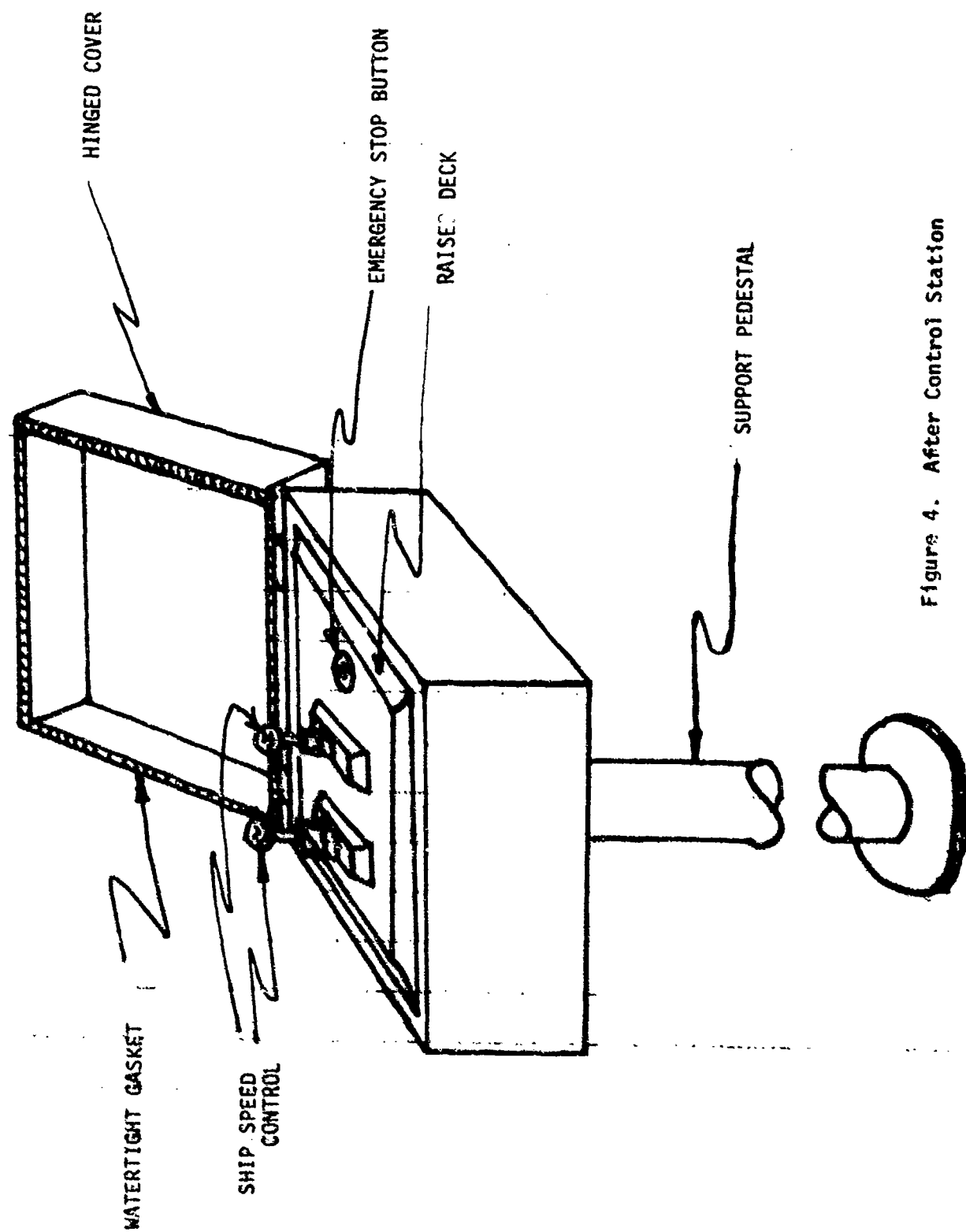


Figure 4. After Control Station

Phase I: Planning/Design (February 1979)

1 of 3

SCHEDULE CHART		TEXAS INSTRUMENTS		PROGRAM		PROGRAM MANAGER		STATUS DATE													
IDENT. NO.	TASKS	1	2	5	6	7	8	9	12	13	14	15	16	19	20	21	22	23	26	27	28
	DESIGN:																				
	PDR TRANSDUCER MOUNT																				
	AMF TRANSDUCER HOUSING																				
	SPEED DETECTOR MOUNT																				
	SIDE RAILS FOR SHIP																				
	FRAMES FOR RAISED DECK																				
	AIR TUGGER MOUNTS																				
	LIGHTING MOUNTS																				
	AFT CONTROL STATIONS																				
	VAN AIR LOCK																				
	01 LEVEL WALKWAY																				
	01 STORAGE DECKS																				
A-8	01 LEVEL HAND RAILS																				
	LAYOUTS/DRAWINGS:																				
	VAN PLACEMENT																				
	HYD. POWER UNIT																				
	LAMBDA WINCH																				
	PAR WINCH																				
	A-FRAME																				
	AIR COMPRESSOR																				
	AFT CONTROL STATION																				
	DECK STORAGE																				
	RAISED DECK																				
	LIGHTING																				

LEGEND:

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SCHEDULED EVENT

▼

COMPLETED EVENT

◇

REVISED SCHEDULE

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TECHART 71-13892-8

Phase I: Planning/Design (February 1979)

2 of 3

E CHART "1" - 15001-0		TEXAS INSTRUMENTS		PROGRAM		PROGRAM MANAGER		STATUS DATE		2 OF 3											
NO.	TASKS	1	2	5	6	7	8	9	12	13	14	15	16	19	20	21	22	23	26	27	28
	LAYOUTS/DRAWINGS: CONTD.																				
	HYDRAULIC LINES																				
	AIR LINES																				
	ELECTRICAL WIRING																				
	SALTWATER PLUMBING																				
	FUEL LINES																				
	SPRINKLER SYSTEM																				
	PLANNING:																				
	STABILITY STUDY																				
	LOGISTICS																				
	PORT AUTHORITY (GALVESTON)																				
	SEALCRAFT																				
	WELDERS																				
	ELECTRICIAN																				
	PLUMBERS																				
	AGE'S																				
	CRANE SERVICE																				
	TRANSPORTATION																				
	DETAILED RIGGING PLAN																				
	REFURBISH:																				
	PAR WINCH																				
	HYD. POWER UNIT																				
	A-FRAME																				
	CRANE																				
	AIR TUGGERS																				

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PHASE III: REMOBILIZATION (MARCH 1979)

SCHEDULE CHART		TEXAS INSTRUMENTS		PROGRAM		PROGRAM MANAGER		STATUS DATE	
IDENT. NO.	TASKS	20	21	22	23	26			
	(PIER 34 GALVESTON)								
	PLACE & WELD TO DECK:								
	CRANE	▽▽							
	POWER UNIT	▽▽							
	PAR WINCH	▽▽							
	A-FRAME	▽▽							
	AIR COMPRESSOR	▽▽							
	XBT LAUNCHER & RECORDER	▽▽							
	CONNECTIONS:								
	HYDRAULIC LINES	▽							
	ELECTRICAL POWER	▽							
	ARRAY FILL FLUID PLUMBING	▽							
A-12	AIR LINES	▽							
	ARRAY FOAM SYSTEMS	▽							
	BELOW DECK ITEMS	▽							
	PLACE & WELD:	▽							
	AIR TUGGERS	▽▽							
	ANCHOR TROUGH	▽▽							
	ANCHOR LAUNCHER	▽▽							
	LIFE RAFTS	▽▽							
	O1 LEVEL LADDERS	▽▽							
	DECK LIGHTING	▽▽							
	ARRAY FOAM SYSTEM	▽▽							
	ARRAY OVERBOARDING DEVICES	▽▽							

PHASE IV MOBILIZATION (MARCH 1979)

SCHEDULE CHART		TEXAS INSTRUMENTS		PROGRAM		PROJECT MANAGER		STATUS DATE			
IDENT. NO.	TASKS	27	28	29	30	31	1	2	3	4	5
	PIER 12B										
	PLACE ARRAY WINCH										
	PIER 14										
	WELD ARRAY WINCH										
	PLACE & WELD ALL VANS										
	MAR'SAT ANT.										
	ELECTRICAL INTERCOM. TO VANS										
	FUEL & COOLING LINES TO VANS										
	PIER 34										
	INSTALL:										
	FALSE DECKING										
	01 LEVEL WALKWAY										
	VAN AIR LOCK										
	01 LEVEL STORAGE DECK										
	SUS LOCKER										
	SUS LAUNCHER										
	DAVIT										
	ARRAY TRAY										
	ELECTRICAL INTERCOM. TO VAN										
	HAND RAILS										
						</					

LEGEND:  SCHEDULED EVENT  COMPLETED EVENT  REVISED SCHEDULE

PHASE IV MOBILIZATION (MARCH 1979)

SCHEDULE CHART		PROGRAM	PROGRAM MANAGER					STATUS DATE				
IDENT. NO.	TASKS		27	28	29	30	31	1	2	3	4	5
	PIER 41											
	INSTALL:											
	FUEL TO ARRAY WINCH											
	WIRING GYRO/RPM/HEADING											
	WIRING PDR/SPEED/WIND											
	NAVIGATION TO BRIDGE											
	ARRAY SPRINKLER SYSTEM											
	INTERCOM SYSTEM											
	DECK LIGHTING											
	INSTRUMENTATION INTERCON.											
	MARISAT INTERCONNECT											
	PAINT ALL RAILS AND WELDS											
	INSTRUMENTATION CHECKOUT											
	LOAD TOW CABLE ON REEL											
	CONNECT TOW CABLE TO VAN											
	LOAD HF/VIMS ON REEL											
	LOAD MF SECT. ON REEL											
	LOAD PAR/ACODACS											
	LOAD ANCHORS/BOUYS/ETC											
	LOAD PAR HANDLING EQUIP											
	RECEIVE:											
	FUEL/LUBE											
	ARRAY FLUID											
	COMMISSARY											

LEGEND: ▽ SCHEDULED EVENT ▴ COMPLETED EVENT ◇ REVISED SCHEDULE

ATTACHMENT A

Refurbishment is required for the following items:

1. PAR/ACODAC

Winch

- Replace hoses
- Clean, repair worn parts, install new seals and rewire control valve
- clean and regrease bearings, chain and other mechanical components
- repair/replace control valves
- refurbish brake band and hydraulic cylinder
- connect to power unit, run, adjust valves, chain, etc. for optimum performance
- clean and paint the winch.

2. HYDRAULIC POWER UNIT

- Clean tank and refill with clean hydraulic fluid
- Inspect electric motors and repair as necessary
- replace hoses
- disassemble, clean and inspect pumps and repair (new seals, replace worn parts) as necessary
- bench test pumps for pressure and flow
- replace filter elements
- refurbish electrical J-box and wiring
- clean and paint
- connect to winch, and other load to test operation.

3. A -FRAME

- Disassemble, inspect, replace seals, resurface pitted shafts on hydraulic rams (if new rams are required, additional funding will be required)
- replace hoses
- realign pivots
- paint
- test operation of rams.

4. CRANE

- replace hoses
- clean and inspect cable (replace if necessary)
- free control levers
- clean and paint

5. AIR TUGGERS

- clean and inspect
- replace worn parts and seals, as necessary
- paint
- replace cables, as necessary
- connect to air source and operate to verify proper operation.

6. GFE LIFE RAFTS

- open containers and inspect
- repair as necessary
- repack life rafts.

The machine van will require the following modifications:

1. Install personnel door
2. Build and install work benches, storage bins and shelves
3. Install lathe, drill press and other tools in van
4. Install lights, outlets, electrical wiring
5. Store spare equipment in van
6. Paint

Purchase new air compressor, intercom system, davits, fire extinguishers, speed dectectors, heat exchangers for power vans, deck lights.

ATTACHMENT B

PREMOBILIZATION ITEMS

1. Install PAR/ACODAC Winch - weld to deck; connect to power unit; connect controls operate and test.
2. Install Crane - weld to deck; connect to power unit; operate and test.
3. A - Frame - weld to deck, connect to power unit; connect controls; operate and test.
4. Install Hydraulic Power Unit - weld to deck; connect electrical power; connect to winch, crane and A-frame; operate and test.
5. Install Air Compressor - build support structure and cover; weld to deck; connect electrical power; run air lines to air tuggers and tool outlets; operate and test.
6. Install Array Overboarding Device - install on stern and weld to deck.
7. Install Anchor Trough - weld to deck.
8. Install Anchor Launcher - weld to stern.
9. Install Array Fire Fighting System Below Deck Items - install below decks; install plumbing, pumps, power etc.
10. Install GFE Life Rafts - weld support frames to deck.
11. Install Air Tuggers - build mounts and weld in position; mount air tuggers on mounts; connect to air compressor; operate and test.
12. Install Oil Retention Fences - cut component parts from stock material; weld in place on main deck.
13. Install Below-Deck Components of:
 - Electrical power system - purchase electrical cable; connect cable to ship's J-box; run cable through deck.
 - Fuel and cooling water for power van and winch - connect plumbing from ship's seawater system to "soft patch" on aft deck.
14. Install Aft Control Stations - Purchase valves, switches, etc.; connect wiring to ship's control systems; run wires to deck; install aft station near overboarding device and connect wiring; operate and test this station; run wires for control station in winch cab; tie-off wires for connection during mobilization.
15. Install Array Fill Fluid Plumbing - install plumbing, pumps and wiring; run plumbing to deck connections; stop-off for connection to winch during mobilization.
16. Increase Height of Side Rails - the increased height of the deck (due to false decking) will require the side rails to be raised along

the entire port side and along the starboard side where people will be working- such as aft of the machine van. It is planned that solid railing such as is presently on the ship will be installed to also offer protection from waves.

17. Turn Ladders Inboard - remove ladders from O-1 deck to main deck- turn inboard to provide more room for vans; weld in position.

18. Scuppers

- Install hinged "doors" on scuppers to decrease amount of water flowing onto deck.

ATTACHMENT C

MOBILIZATION ITEMS

1. Install Vans -
 - Place foundations and the four, 40-ft. vans and the power van on the main deck, using the container crane
 - Using jacks, level and adjust vans for proper alignment
 - Shim foundations and weld in place
 - Install boots between vans
 - Install the two, 40-ft. vans on the 0-1 level
 - Connect electrical power to vans, and interconnect power
 - Operate air conditioners, lights and other electrical circuits, check for proper operation, correct any deficiencies
 - Place machine van and foundations on deck
 - Weld machine van foundations to deck
 - Connect electrical power to machine van, check operation, correct any deficiencies
 - Interconnect power van and laboratory vans
2. Install LAMBDA Winch and Power Unit
 - Place winch and power unit on main deck, using the container crane
 - Weld to deck
 - Install control cab
 - Install engine controls in cab to ship systems
 - Install fuel and cooling water to power unit
 - Operate and verify proper operation of all subsystems
3. Install LAMBDA level wind
 - Place level wind on main deck and weld in place
 - Connect hydraulic lines from level wind to power unit
 - Operate and verify proper operation of level wind
4. Install Wind Velocity Indicators
 - Install aerovane on pedestal above wheelhouse
 - Install indicator
 - Run wiring from aerovane to indicator and to batch computer
 - Test operation
5. Install Antennas
 - Install Marisat antenna on pedestal already on ship
 - Install other antennas
 - Run cables from antennas to equipment
 - Adjust and test operation
6. Install Deck Lighting
 - Fabricate mounts for lights
 - Weld mounts in place
 - Install lights to mounts
 - Run wiring to lights and connect
 - Test operation and illumination of deck
 - After second sea trial, change position of lights and install additional lighting, if necessary

7. Install Wiring to Provide Gyro, Engine RPM and Magnetic Heading Signals
 - Connect wiring from sensors to the batch computer
 - Test and verify proper operation
8. Interconnect Instrumentation in Vans
 - Run instrumentation and other wiring
 - Test and verify proper connection
9. Instrumentation Checkout
 - Perform Acceptance Test per the Acceptance Test Procedure developed by the Systems Integration Program
10. Install Navigation and Other Readouts on the Bridge
 - Install display units for the integrated navigation system, NATOBS, etc.
 - Connect display units to sensors, computers and other system components
 - Test and verify proper operation per Acceptance Test Procedures
11. Install SUS Launcher and Storage Locker
 - Place launcher and storage locker in position and weld in place
12. Install Storage Deck Above the Two 40-ft. Port-Side Vans
 - Build support structure for deck panels
 - Install deck panels (same as false deck panels) in support structure
 - Build railing around storage deck
13. Install Radio Direction Finding Equipment
 - Install antenna
 - Run wiring to display unit in laboratory and/or bridge
 - Test and verify operation
14. Install Davit for Storage Deck
 - Weld davit in position on corner of port-side van
 - Connect power (electrical or pneumatic) to davit
 - Test and verify operation
15. Install Array Tray
 - Place mounts for tray in position and weld to deck
 - Assemble tray to mounts to verify proper fit
 - Remove tray and store
16. Load PAR/ACODAC Equipment
 - After completion of deck installations, load the PAR/ACODAC equipment and store in preparation for the first sea trial.
17. Put LAMBDA Tow Cable on the Winch
 - Move ship to Pier 14, if not already there
 - Position reel on dock, aft of ship
 - Fasten forward end of cable to winch reel
 - Reel the tow cable onto the winch, maintaining as much tension in the cable as possible
 - Connect tow cable to instrumentation
 - Verify proper operation, per Acceptance Test Procedure

18. Install False Decking
- Fabricate components of support structure: legs, stringers, etc.
 - Weld support structure to main deck
 - Install deck panels in support structure
 - Fit false decking around vans, winches, etc. to provide good footing and safe operation

Note: Installation of false decking could begin during the Premobilization Phase, after installation of PAR/ACODAC winch, crane and A-frame

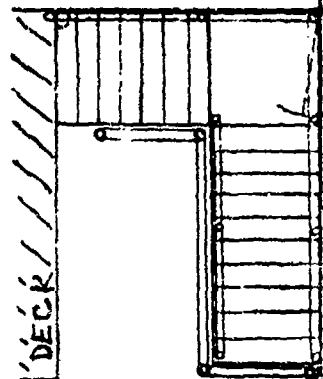
19. Install Array Foam and Sprinkler Systems
- Install systems on array winch, if not previously installed
 - Connect ship seawater supply to sprinkler
 - Install switches to activate systems
 - Verify proper operation of systems
20. Install Intercommunications System
- Fabricate mounts for intercom system
 - Position intercom stations on deck, in the vans and on the bridge as shown in Figure 2
 - Run wires to all stations
 - Test and verify proper operation
21. Install XBT System
- Install launcher on starboard quarter
 - Connect signal cable from launcher to recorder
 - Test and verify proper operation
22. Paint
- Paint all welds and new metal
23. Build Walkway from O-1 Level to Vans
- Build walkway to span the space between the O-1 level and the top of the 40-ft. vans on the main deck
 - Install rails on the walkway
24. Air-Lock Entry to Instrumentation Vans
- Fabricate air-lock chamber
 - Install to forward end of the Transition Van

APPENDIX B

DESIGN SKETCHES

DWG NO

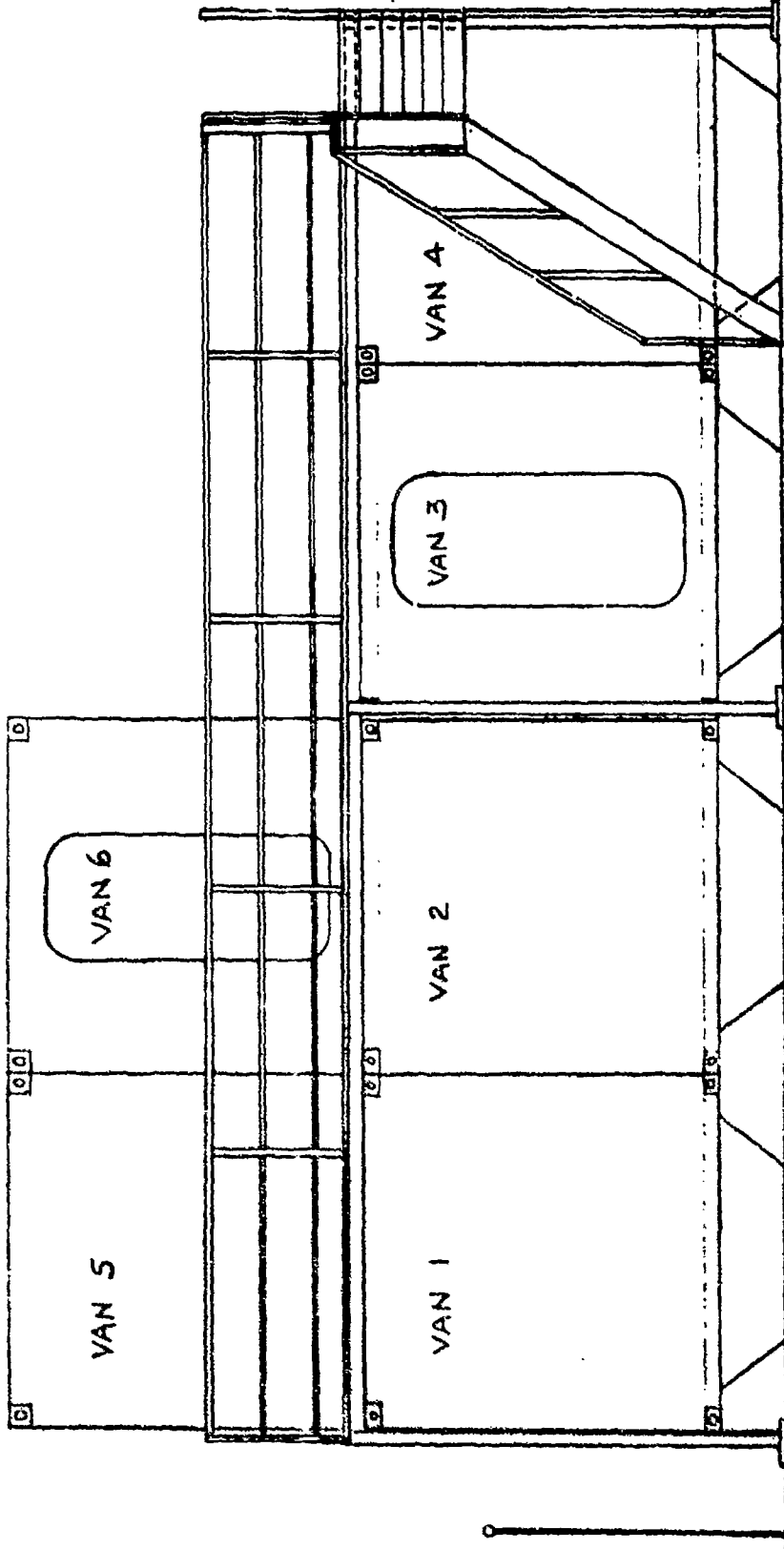
SH



B

B

A



VIEW A-A

TEXAS INSTRUMENTS
INCORPORATED
DALLAS, TEXAS

DATE 2-12-79

ISSUE DATE

SIZE A FSCM NO 96214

DRAWING NO TMM -1

SCALE 1/4" = 1'

0-1 DECK

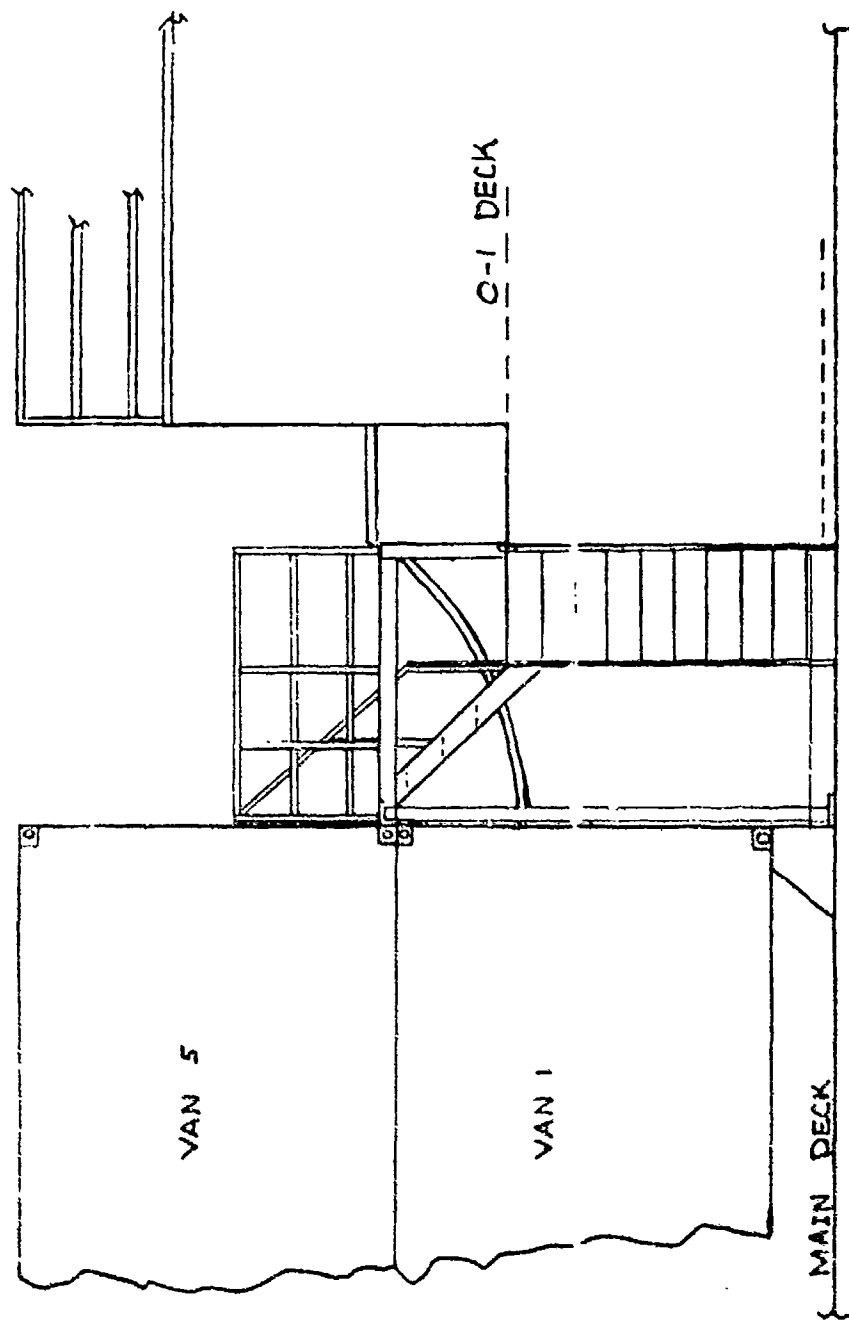
SHEET

1 OF 2

B-2

DWG NO

SH



VIEW B-B

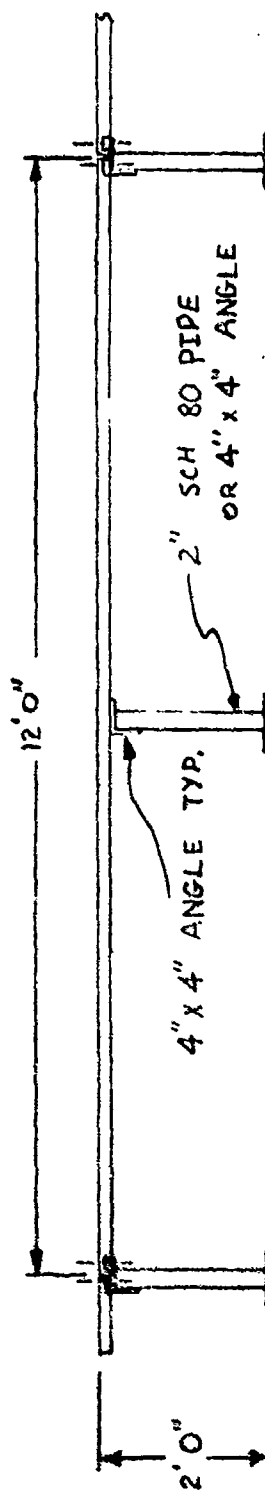
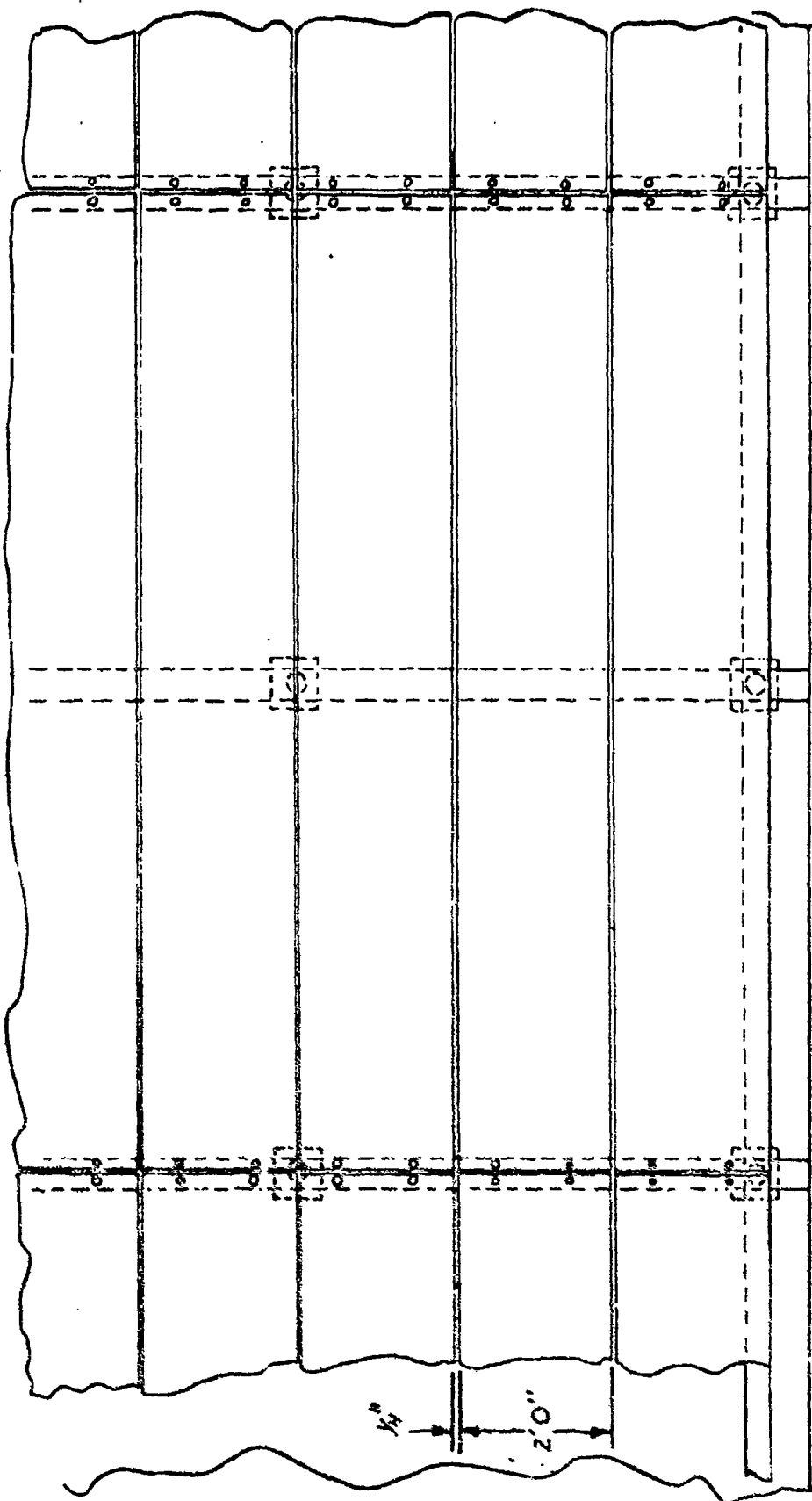
 TEXAS INSTRUMENTS DALLAS, TEXAS	DRAWN <i>X. M. M.</i>	DATE 2-12-79	SIZE A	FIGURE NO 96214	DRAWING NO TMM-1	REV
	ISSUE DATE	SCALE $\frac{1}{2}'' = 1'$	0-1 DECK	SHEET 2 OF 2		

B-3

PWS NO

SH

7



TEXAS INSTRUMENTS
INCORPORATED
DALLAS, TEXAS

OWN
T.A.D.
ISSUE DATE

DATE
2-12-79

SIZE
A 96214

FSCM NO

DRAWING NO
TMM-2

REV

SCALE 1/2" = 1'

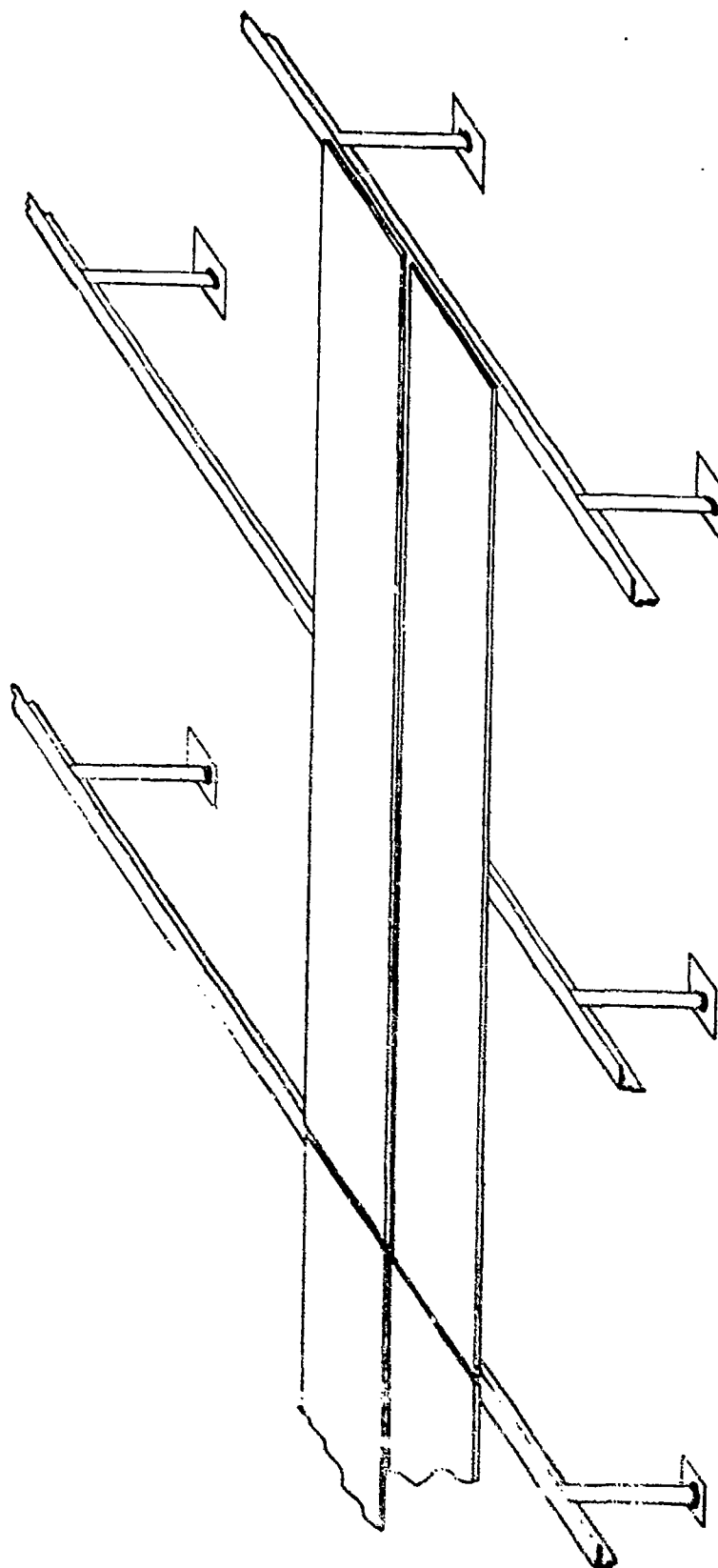
FALSE DECK

SHEET 1 OF 2

B-4

DWG NO

501

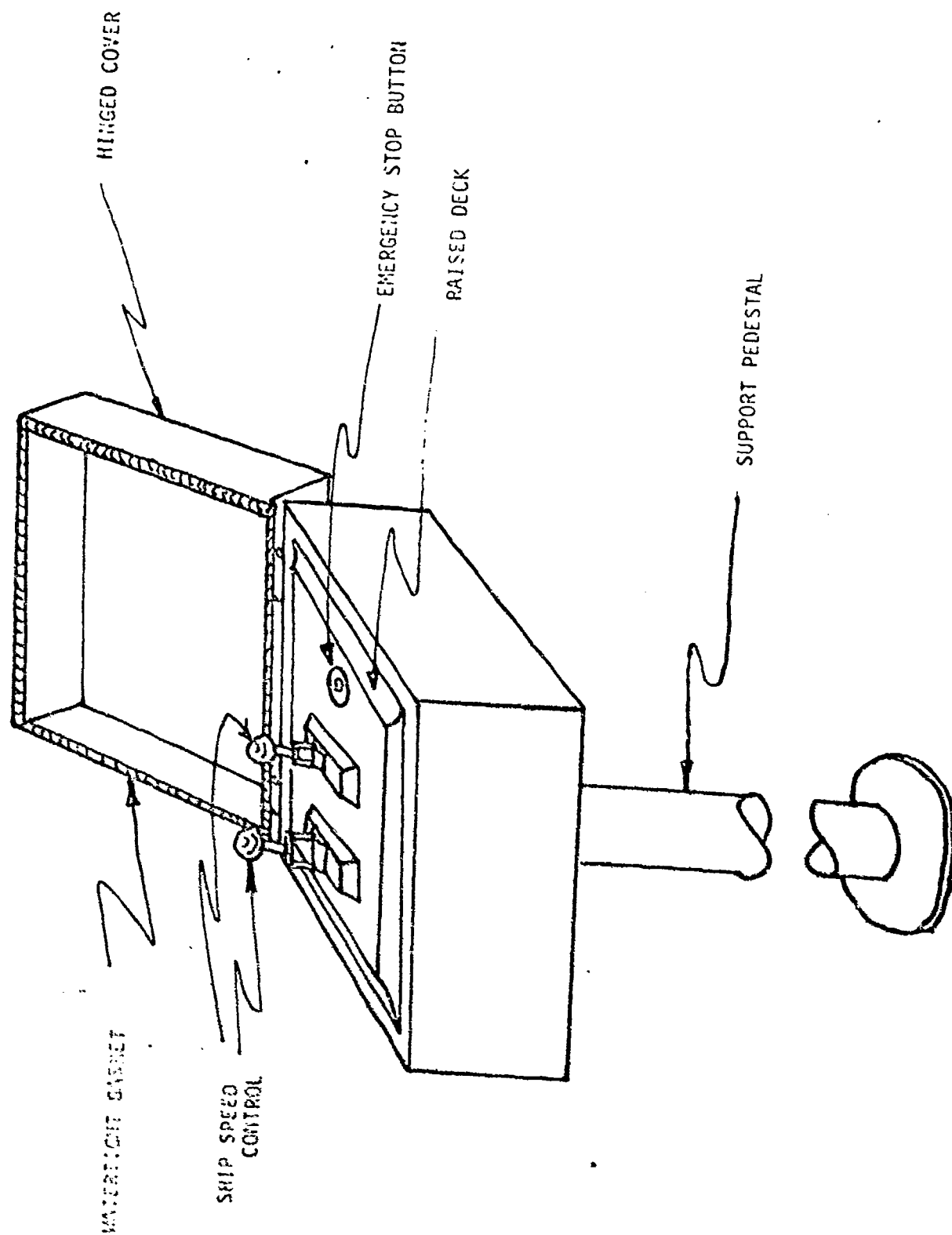


A

 TEXAS INSTRUMENTS AN INSTRUMENT DIVISION OF TEXAS INSTRUMENTS	DRAWN <i>T. H. M.</i>	DATE 2-12-79	SIZE A	P. NO. 96214	DRAWING NO. TMM-2	REV
	ISSUE DATE	SCALE NONE	FALSE DECK	SHEET 2 OF 2		

B-5

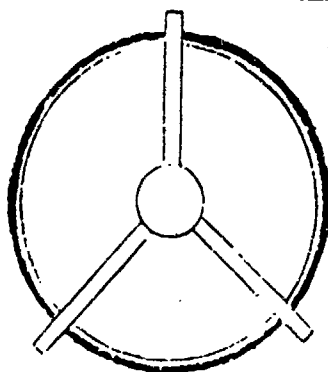




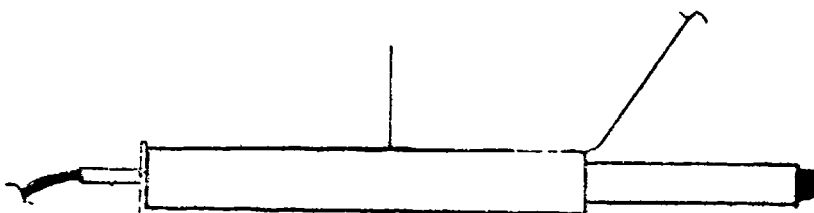
 TEXAS INSTRUMENTS	DATE 1-22-79	SHEET A	PART NO 96214	DRAWING NO TMM-3	REV
	ISSUE DATE	SCALE NONE	AFT. CON. STA.	SHEET 1 OF 1	REV

DWG NO

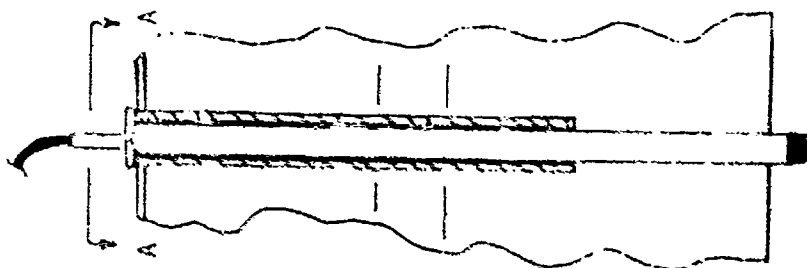
51



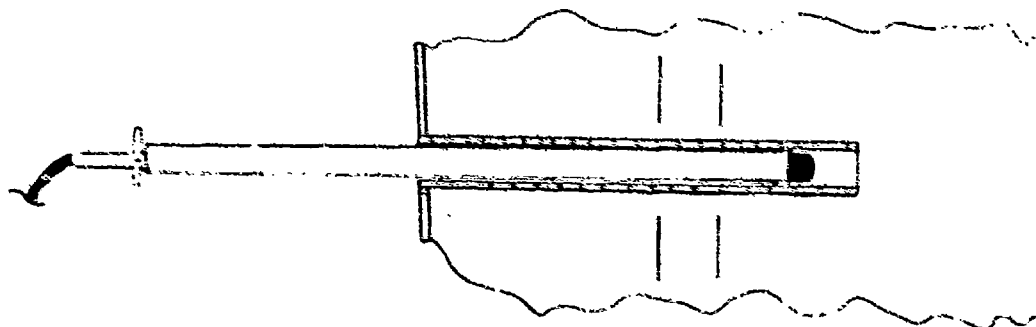
VIEW A-A
POSITIONING DEVICE



EXTENDED LOOKING AFT



EXTENDED



RETRACTED

HULL DECK
WATERLINE

KEEL

TEXAS INSTRUMENTS
CORPORATION
DALLAS, TEXAS

DATE
1-22-79

DATE
1-22-79

SIZE
A

96214

TMM-4

REV
1
2-13-79

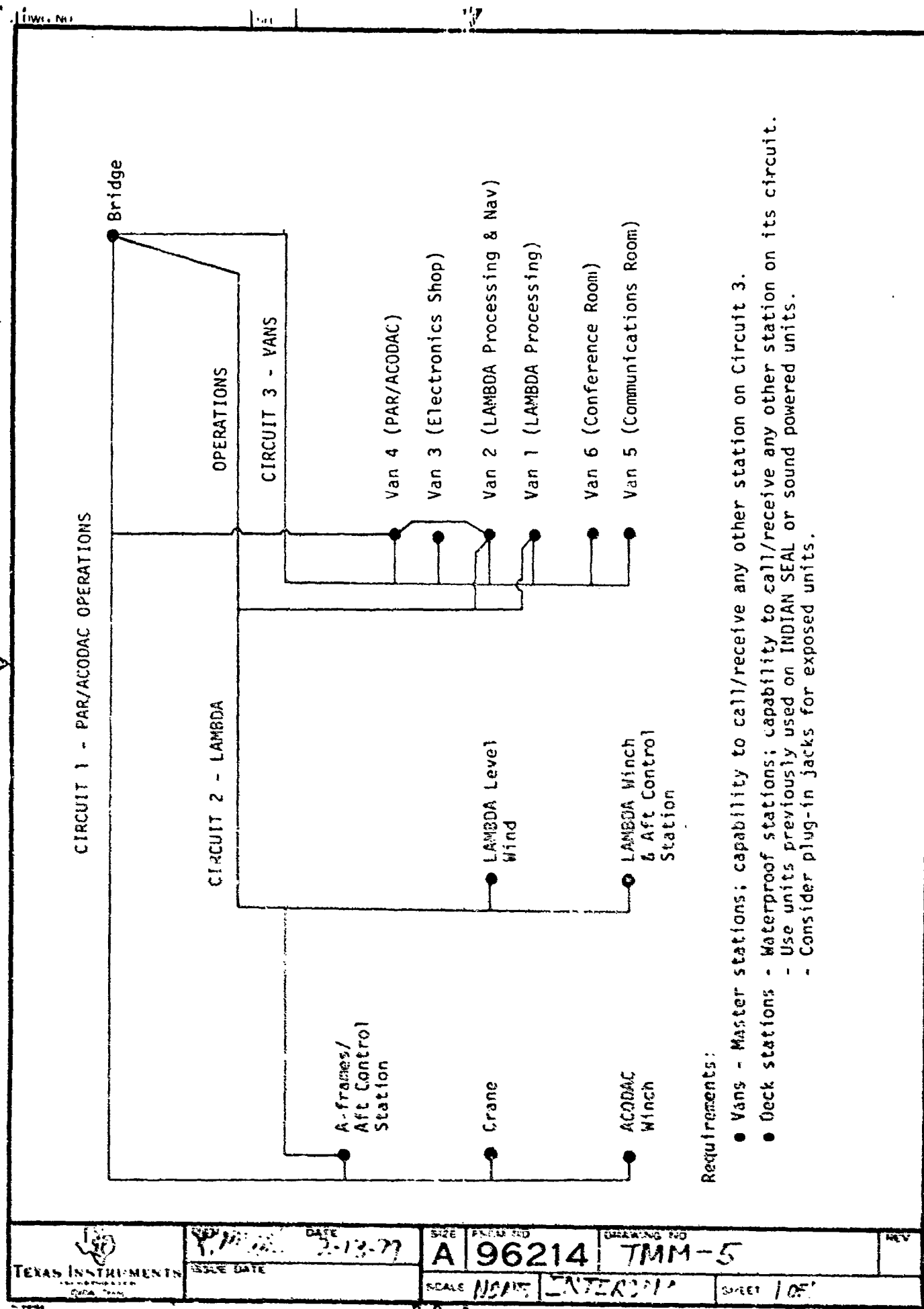
SCALE
NONE

AMF

TRANS DUCER
MOUNT

101517

1/CF/



 TEXAS INSTRUMENTS CORPORATION DALLAS, TEXAS	DATE 2-12-77	SIZE A	PART NO. 96214	DRAWING NO. TMM-5	REV. 1
	ISSUE DATE	SCALE NONE	INTERIM	SHEET 1 OF 1	

APPENDIX C

MOBILIZATION PERT CHART

MARCH

7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

FRI

MON

FRI

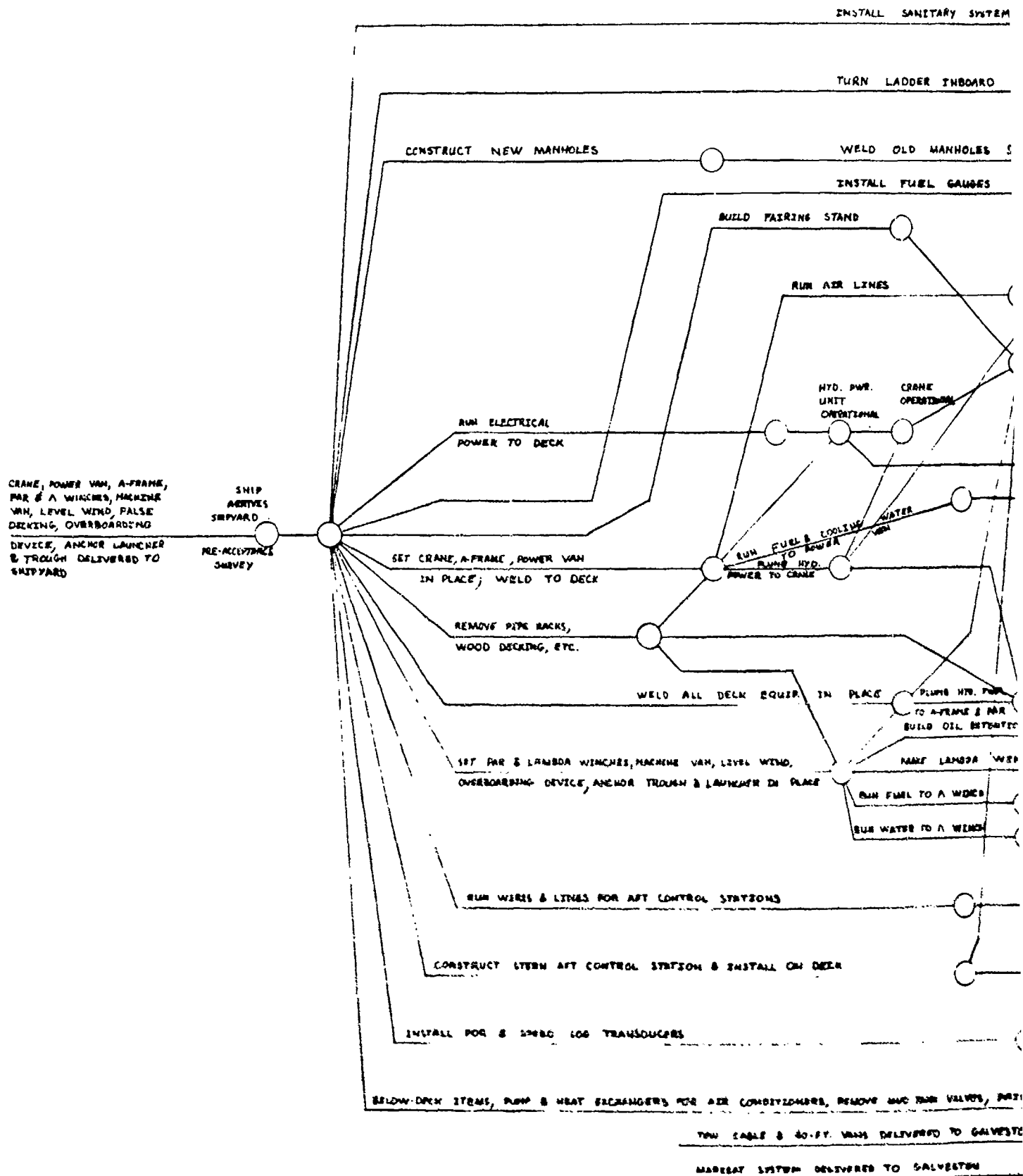
MON

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C

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A



8

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6

5

↑

26
MON

27

28

29

30
FRI

31

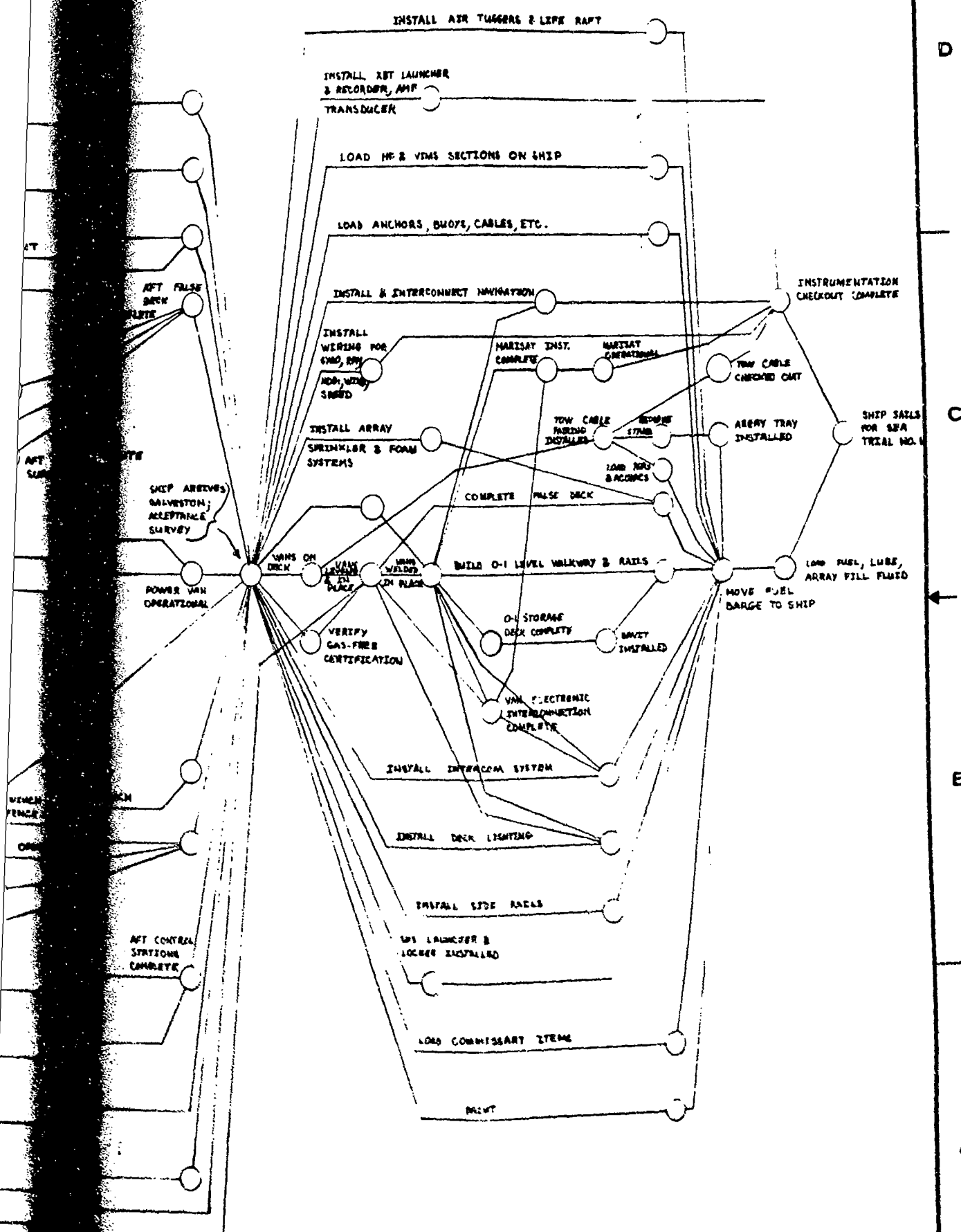
1

2
MON

3

4

5

6
FRI

TEXAS INSTRUMENTS	TIME: 2-4-72	D 96214	MOBILIZATION	PERT
3	C-2	2	1	2

APPENDIX D

U.S. COAST GUARD STABILITY LETTER FOR R/V INDIAN SEAL

APPROVED

U.S. Coast Guard
Port Arthur, Texas

15 May 1979

15 May 1979

U.S. Coast Guard
Port Arthur, Texas
15 May 1979

STABILITY INFORMATION FOR
M/V INDIAN SEAL, O.N. 557401

A stability test supervised by the U. S. Coast Guard was performed on the M/V INDIAN SEAL, O.N. 557401, at Port Arthur, Texas, on 22 May 1974. On the basis of this test, and a deadweight survey performed on the subject vessel at Wilmington, California on 2 July 1974, stability calculations have been performed. Results indicate that the stability of the M/V INDIAN SEAL, as presently outfitted and equipped, is satisfactory for operation in Ocean Service provided the following restrictions are strictly observed:

1. A maximum of 217 long tons of deck cargo may be carried aboard this vessel. Deck cargo includes all semi-portable trailers, quarters, laboratories, winches, and other seismographic or oceanographic equipment temporarily or semi-permanently installed on the afterdeck. With this deck cargo, up to 130 long tons of below deck ballast, or liquid or dry cargo may be carried.
2. Below deck cargo and ballast shall be carried in accordance with the table which follows. Additional cargo or ballast in the third column is optional provided the maximum tonnage given is not exceeded. Cargo shall not be carried in ballast spaces exempted from gross tonnage.

Deck Long	Required Ballast	Maximum Additional Below Deck Tonnage - Long Tons
Less than 217	None	347 Minus Deck Cargo

3. The mean draft shall not exceed 14 feet 4 inches. Trim should be minimized and shall always result in a freeboard of at least 22 inches at the stern.
4. The maximum vertical center of gravity permitted for deck cargo as stowed is 6.0 feet above the deck. Such cargo must be positively secured against shifting in a seaway prior to leaving protected waters.
5. There shall never be more than one pair of partially filled tanks of each liquid at any one time.
6. Cross-connections between all port and starboard wing tanks shall be kept closed at all times when underway.

15 May 1979

STABILITY INFORMATION FOR
M/V INDIAN SEAL, O.N. 557401

7. Main deck hatches and weather doors to the forecastle and machinery spaces shall be kept closed and fully secured at all times when underway, except when actually used for transit under safe conditions.
8. Main deck freeing ports shall be maintained operable and completely unobstructed at all times.
9. Bilges shall be kept pumped to minimum content at all times.
10. The Master should make every effort to determine the cause of any list of the vessel before taking corrective action.

It shall be the Master's responsibility to maintain the vessel in a satisfactory stability condition at all times. The Master shall notify the load line assigning authority and the Coast Guard of any alteration which significantly affects the stability of the vessel.

This stability information sheet shall be posted under suitable transparent material in the pilothouse of the subject vessel so that both pages are visible. This stability information supersedes any material previously furnished the vessel.

APPROVED

Special Agent in Charge

U.S. Coast Guard

275-001

U.S. Coast Guard



DEPARTMENT OF THE NAVY

OFFICE OF NAVAL RESEARCH
875 NORTH RANDOLPH STREET
SUITE 1425
ARLINGTON VA 22203-1995

IN REPLY REFER TO:

5510/1
Ser 321OA/011/06
31 Jan 06

MEMORANDUM FOR DISTRIBUTION LIST

Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT
(LRAPP) DOCUMENTS

Ref: (a) SECNAVINST 5510.36

Encl: (1) List of DECLASSIFIED LRAPP Documents

1. In accordance with reference (a), a declassification review has been conducted on a number of classified LRAPP documents.
2. The LRAPP documents listed in enclosure (1) have been downgraded to UNCLASSIFIED and have been approved for public release. These documents should be remarked as follows:

Classification changed to UNCLASSIFIED by authority of the Chief of Naval Operations (N772) letter N772A/6U875630, 20 January 2006.

DISTRIBUTION STATEMENT A: Approved for Public Release; Distribution is unlimited.

3. Questions may be directed to the undersigned on (703) 696-4619, DSN 426-4619.

A handwritten signature in black ink, appearing to read "B. F. Link", is positioned above the typed name.

BRIAN LINK
By direction

Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT
(LRAPP) DOCUMENTS

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Declassified LRAPP Documents

Report Number	Personal Author	Title	Publication Source (Originator)	Pub. Date	Current Availability	Class.
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977.	Sanders Associates, Inc.	790109	ADC017579	U
ARLTR7924	Mitchell, S. K., et al.	VOLUME IVB. DATA POINTS 10, 11 AND 12 RAW DATA ANALYSIS OF ACOUSTIC BOTTOM INTERACTION IN BEARING STAKE (U)	University of Texas, Applied Research Laboratories	790223	ADE001369; NS; ND	U
TTU1886502F	Eichenberger, D.	REPORT FOR CHURCH STROKE II OCEANOGRAPHIC SERVICES	Texas Instruments, Inc.	790326	ADB036751; ND	U
Unavailable	Unavailable	FINAL REPORT, 1 NOVEMBER 1976-31 DECEMBER 1978	Xonics, Inc.	790430	ADB037987	U
Unavailable	Mitchell, T. M.	PREMOBILIZATION OF R/V INDIAN SEAL	Texas Instruments, Inc.	790531	ADB039703	U
Unavailable	Hays, E. E.	ACODAC AMBIENT NOISE PROGRAM	Woods Hole Oceanographic Institution	790601	ADB040404	U
LRAPPR79029	Unavailable	INTRODUCTION TO THE LRAPP ENVIRONMENTAL-ACOUSTIC DATA BANK (U)	Naval Ocean R&D Activity	790601	ADB041066; NS	U
USRD NO. 4807	Unavailable	MEASUREMENTS ON AQUADYNE MODEL AQ-1 ELEMENTS FOR THE UPGRADED LAMBDA ARRAY	Naval Research Laboratory	790802	ND	U
Unavailable	Ellis, G. E.	SUMMARY OF ENVIRONMENTAL ACOUSTIC DATA ANALYSIS	University of Texas, Applied Research Laboratories	790814	ADA073876	U
BR U0048-9C2	Unavailable	TAP III FINAL REPORT (U)	Bunker-Ramo Corp. Electronic Systems Division	790901	ND	U
ORITR1245	Moses, E. J.	OPTIONS, REQUIREMENTS, AND RECOMMENDATIONS FOR AN LRAPP ACOUSTIC ARRAY PERFORMANCE MODEL (U)	ORI, Inc.	790917	NS; ND	U
Unavailable	Colborn, J. G., et al.	EVALUATION OF STANDARD OCEAN CANDIDATES	Pacific-Sierra Research Corp.	800301	ADA087304	U
Unavailable	Kirby, W. D.	ENVIRONMENTAL ACOUSTIC SUPPORT FOR FLEET OPERATIONS AND NATO	Science Applications, Inc.	801112	ADB052623	U
Unavailable	Unavailable	SUMMARY OF ENVIRONMENTAL ACOUSTIC MEASUREMENTS, MODELING AND ANALYSIS	University of Texas, Applied Research Laboratories	801215	ADB053770	U
Unavailable	Renner, W. W., et al.	SURFACE DUCT, ROUGH SURFACE SCATTERING, AND CUSPED CAUSTIC IMPROVEMENTS FOR FACT	Science Applications, Inc.	810301	ADA126250	U
Unavailable	Wilson, J. H.	WIND-GENERATED NOISE MODELING	Science Applications, Inc.	810401	ADA190143	U
Unavailable	Goit, E. H.	TOWED ARRAY PERFORMANCE PREDICTION SYSTEM - VERSION 1.2	Science Applications, Inc.	810701	ADB059397	U
3	Unavailable	FINAL REPORT	University of Texas, Applied Research Laboratories	810721	ND	U