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SONAR TEST AND TEST INSTRUMENTATION SUPPORT.(U)
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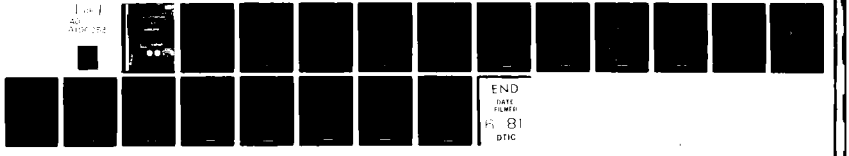

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

(U) Applied Research Laboratories, The University of Texas at Austin (ARL:UT), was awarded Contract N00140-76-C-6487, sponsored by the Naval Underwater Systems Center, New London Laboratory (NUSC/NL), effective 1 June 1976. Some of the work under this contract represents a follow-on effort to previous work sponsored by NUSC/NL under Contract N00140-74-C-6316.

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TABLE OF CONTENTS

I. INTRODUCTION

Applied Research Laboratories, The University of Texas at Austin (ARL:UT), was awarded Contract N00140-76-C-6487, sponsored by the Naval Underwater Systems Center, New London Laboratory (NUSC/NL), effective 1 June 1976. Some of the work under this contract represents a follow-on effort to previous work sponsored by NUSC/NL under Contract N00140-74-C-6316.

The work under Contract N00140-76-C-6487 was originally divided into six task areas that focused on technical support in areas of sonar technology:

I. AN/FQM-10(V) Sonar Test Set Field Support
II. Transducer Repair Facility Test Site Field Support
III. AN/WQM-5 Sonar Test Set Field Support
IV. Special Purpose Passive Sonar Systems Support
V. Sonar Instrumentation Test and Evaluation
VI. Study of Towed Line Array Acoustical Testing at Transducer Repair Facilities

By Modification P00019, four additional tasks were added, as follows:

VII. AN/SQM-( ) Sonar Noise Measuring Set Development
VIII. AN/WQM-5 Series Sonar Test Set Development
IX. Sonar Dome Maintenance Documentation Support
X. AN/BQQ-5 Power Supply Development

This report is Quarterly Progress Report No. 6 under Contract N00140-76-C-6487, for the period 1 September - 30 November 1977.

There were no expenditures on Contract N00140-76-C-6487 during this report period for

(1) AN/FQM-10(V) Sonar Test Site Field Support,

(2) Transducer Repair Facility Test Site Field Support, and

(3) AN/WQM-5 Sonar Test Set Field Support.

II. TRF, AN/FQM-10(V), AND AN/WQM-5 FIELD SUPPORT

All funds under this contract designated to the technical and material support of Transducer Repair Facility (TRF) test sites, AN/FQM-10(V) Sonar Test Sets, and AN/WQM-5 Sonar Test Sets were expended early in 1977. Follow-on support is now being provided under Contracts N00140-76-C-A022 and N00024-77-C-6035.

III. SPECIAL PURPOSE PASSIVE SONAR SYSTEMS SUPPORT

A technical memorandum, "A Signal and Noise Analysis of Frequency Domain Equalizers, Part I: Theoretical," ARL-TM-77-12 of 15 June 1977, was distributed during this report period. The funds remaining are sufficient only for completion of documentation. Part II of the above report and a technical report, ARL-TR-78-9, "Frequency Domain Equalizer Study," will be issued at a future date.

IV. SONAR INSTRUMENTATION TEST AND EVALUATION

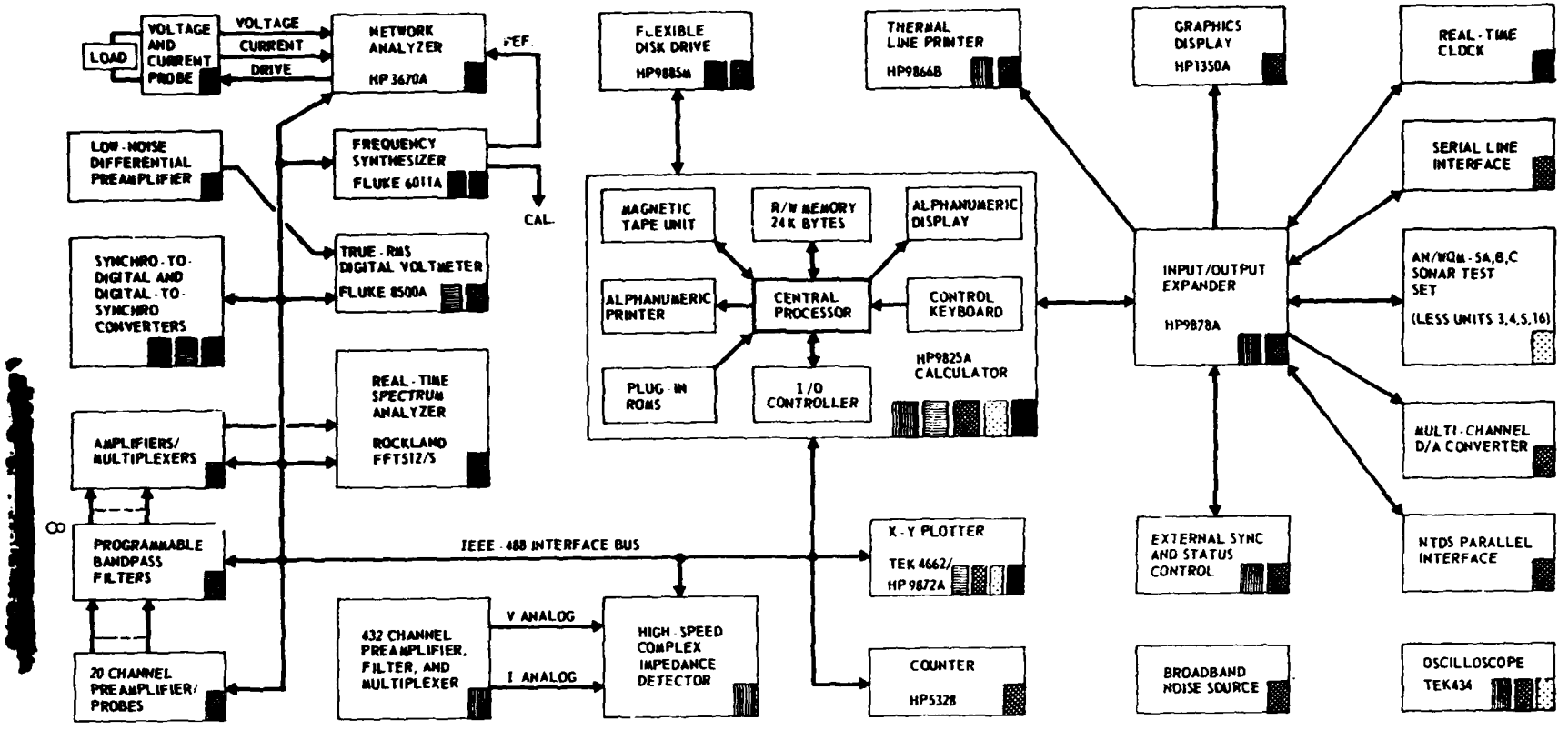
A. Introduction

Work under this task previously reported has involved only the development of a replacement instrument for the AN/SQM-5 Sonar Noise Recorder. The development of this test set has been absorbed into the development of a larger test set that is referred to as the AN/WQM-( ). In addition, ARL:UT has begun a task in support of the Sonar Alignment and Calibration Site (SACS), with particular emphasis on AN/SQS-35/38 system testing.

B. AN/WQM-( ) Development

Figure 1 shows a preliminary block diagram of the family of test sets known as the AN/WQM-( ). The legend on the figure shows that five different subsets of the total test set can perform the functions of five present pieces of test equipment. The goal of this development is to make this AN/WQM-( ) test set extensive enough that it can encompass essentially all present sonar testing requirements.

Design of the AN/WQM-( ) is proceeding slowly at ARL:UT because of the priorities of other work, such as the AN/WQM-5 Field Change Program. It is expected that development of this new test set will be accelerated in early 1978.



COLOR CODE INDICATES THE COMPONENTS REQUIRED
TO PERFORM FUNCTIONS OF EXISTING TEST INSTRUMENTS

- PMS-216/SD216 ARRAY APERTURE TESTER
- SQM-5 SONAR NOISE RECORDER
- WQM-7 SONAR TEST AND EVALUATION EQUIPMENT
- WQM-5C SONAR TEST SET
- ADMITTANCE PLOTTER

FIGURE 1

AN/WQM-( )V SONAR TEST SET

C. SACS Support

The Sensor Alignment (and) Calibration Site (SACS) at Long Beach, California, was previously supported by ARL:UT under Contract N00024-77-C-6035. Since October 1977, a small support effort has been funded under Contract N00140-76-C-6487.

The main project concerns the final test at SACS of the AN/SQS-26CX Sonar Controller. The device allows the SACS computer to remotely control the mode and frequency of the sonar aboard the ship being tested and increases the overall data rate of a SACS test.

The hardware for the sonar controller was delivered to Naval Ocean Systems Center (NOSC), San Diego, California, in July 1977. Some documentation and development of the computer software required to take advantage of the controller hardware was incomplete. The software is to be written by SACS personnel in consultation with ARL:UT.

USS DOWNES (FF 1070) was scheduled to be tested at SACS during the period 24 November - 3 December 1977. Work on the software has proceeded in an attempt to be ready for testing during the visit of USS DOWNES.

D. AN/SQS-35/38 Testing

ARL:UT has been requested to study some testing problems experienced with the AN/SQS-35 at Fleet Operational Readiness Accuracy Check Sites (FORACS). Some of the gyro problems and ODT pattern problems are the same as those experienced and measured at SACS. The beam pattern problems are also seen on AN/SQS-38 hull mounted sonars. This project had just begun as of the end of this report period. The technical manuals for the AN/SQS-35 and AN/SQS-38 systems were received, and previous SACS reports are being reviewed to gain information from earlier experiences at SACS.

V. ASSISTANCE WITH EXPANSION OF TRF CAPABILITIES TO INCLUDE NEW TRANSDUCERS

A. Introduction

ARL:UT originally worked under Contract N00024-75-C-6070 to technically assist Naval Sea Systems Command (NAVSEA) with expanding the capabilities of the Navy's three Transducer Repair Facilities (TRFs) to encompass repairing the sonar towed line arrays (TLAs) used with the AN/BQQ-5, AN/BQQ-6, AN/SQR-18, AN/SQR-19, and AN/BQR-25 sonar systems. This effort has continued under the subject contract. Funds were expended on this task during this report period. This technical assistance was in cooperation with ARL:UT's task under Contract N00024-77-C-6035, which requires delivery to the TRFs of all plant equipment necessary for repairing and testing the TLAs.

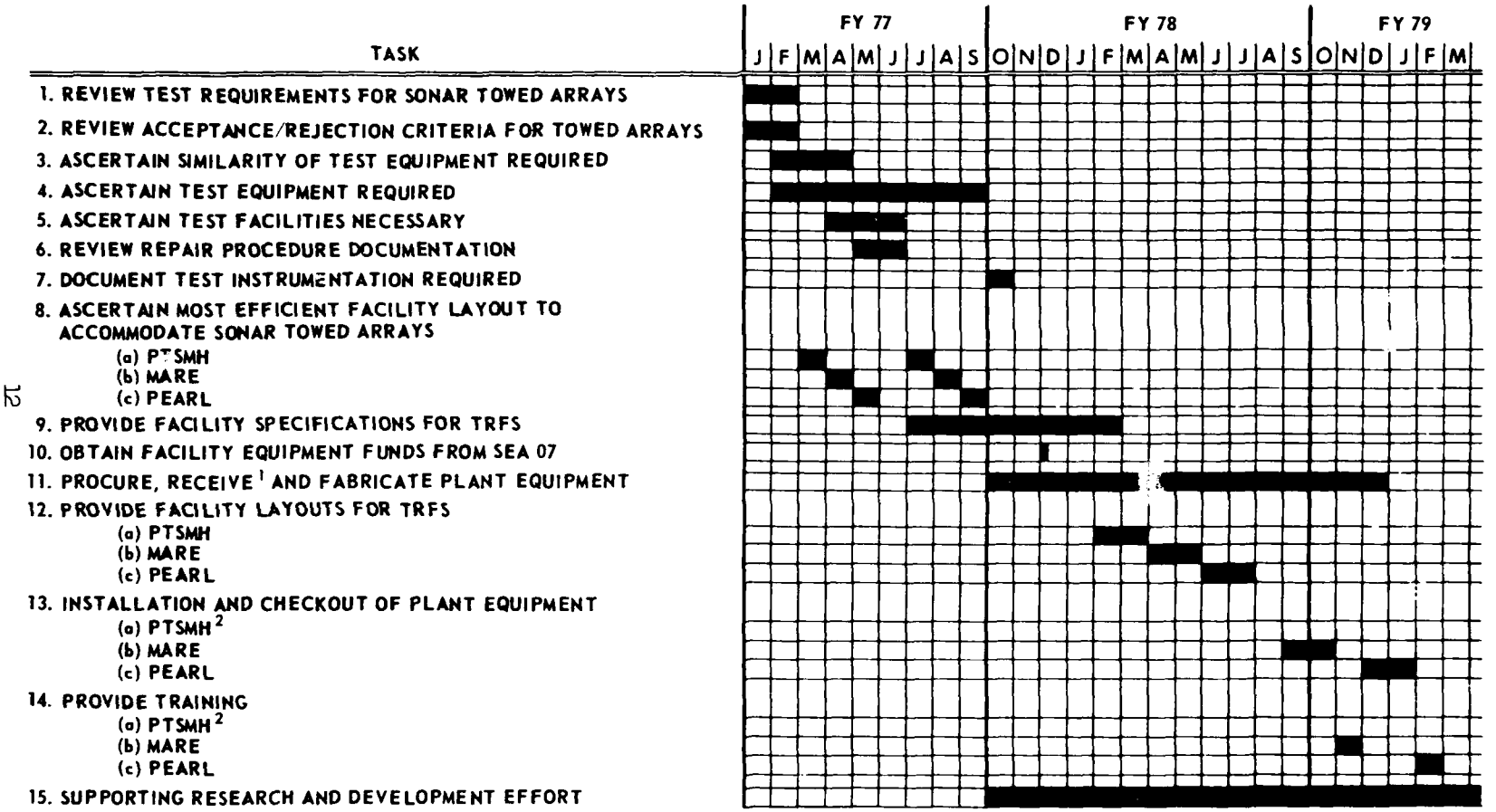
B. Current Progress

As shown in Fig. 2, NAVSEA and ARL:UT revised the TLA milestone chart at the NAVSEA Program Review, which was conducted at ARL:UT during the week of 5 December 1977.

C. Liaison with Shipyards

Visits to NAVSHIPYDs PTSMH and PEARL were made in December 1977 to finalize the facility layouts for these TRFs to ensure the most efficient configuration to repair and test the TLAs. Figures 3 and 4 show these revised facility layouts as approved by each respective TRF.

MILESTONES FOR NAVSEA TOWED LINE ARRAY REPAIR AND TEST CAPABILITY FOR TRFS



[1]MILESTONES DEPEND ON PROMPT DELIVERY OF EQUIPMENT BY MANUFACTURERS

[2]PTSMH MILESTONES DEPEND ON COMPLETION OF MILCON P - 157 SCHEDULED TO START IN FY 79

FIGURE 2

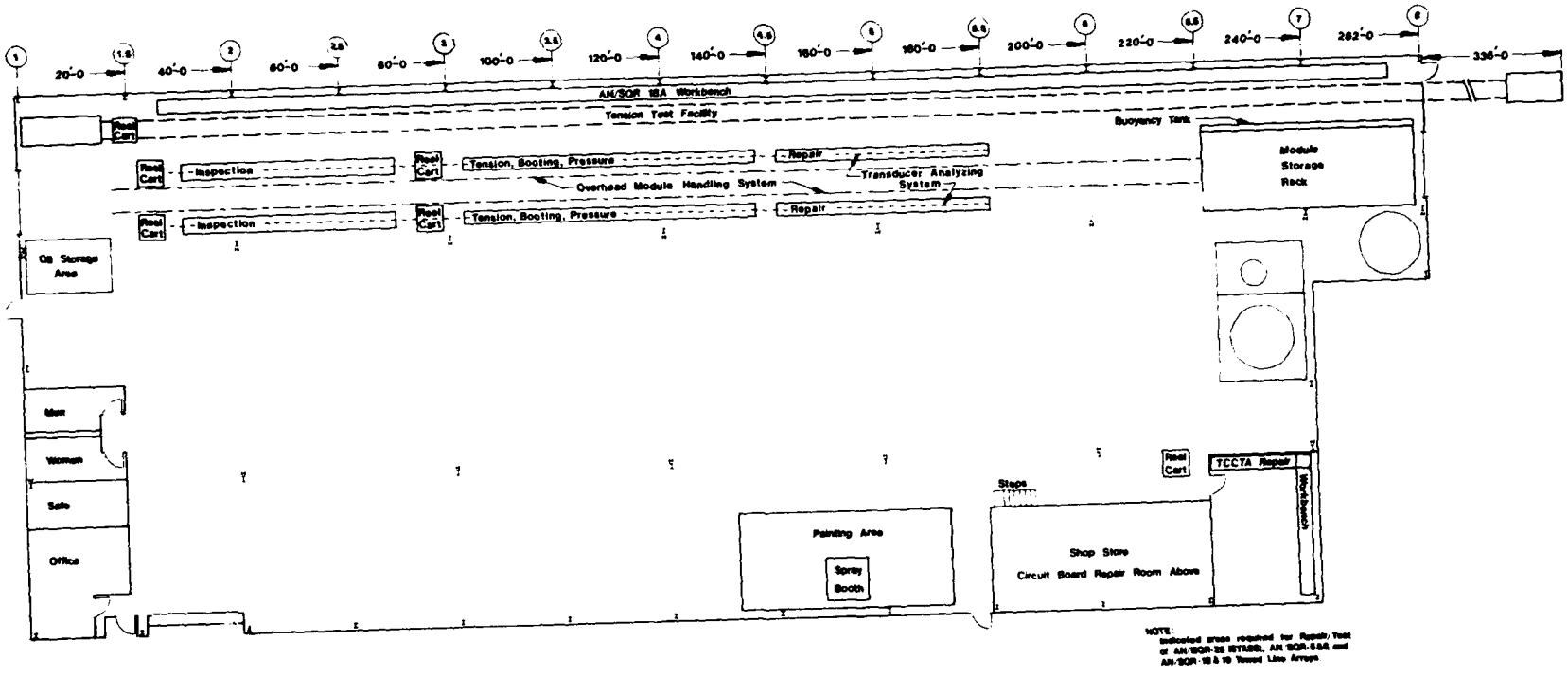


FIGURE 3
PTSMH TRF
PROPOSED TRANSDUCER REPAIR FACILITY MCON (P-157)

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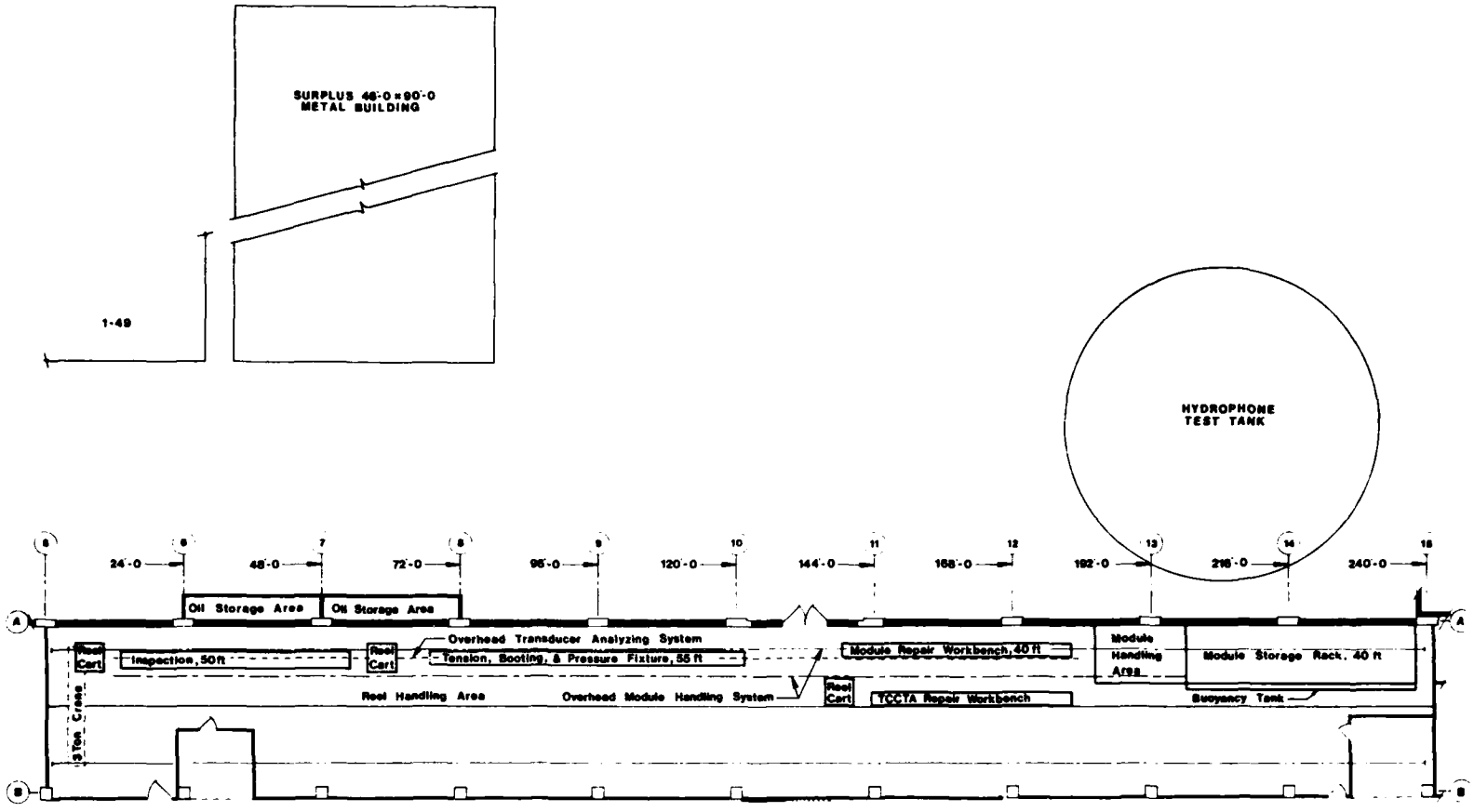
RSA-ORS
1-18-78



NOTES:
1. Indicated areas required for Repair/Test of AN/BQQ-5&6 and AN/SQR-19 Towed Line Arrays

EAD-17A5

FIGURE 4

PEARL TRF

PROPOSED BLDG. 214 TOWED LINE ARRAY REPAIR AREA

DS-77-1274

VI. DOCUMENTATION SUPPORT

Volume II of the Sonar Handbook, "AN/SQS-26 Steel and Rubber Sonar Domes," NAVSEA 0967-LP-412-3020, was distributed during September 1977. A revision to Volume III, "SQS-38 GRP Domes," is scheduled. Input for this revision is required from the Coast Guard and should be forwarded to ARL:UT by NAVSECNORDIV in the near future.

VII. AN/WQM-5 PROCUREMENT AND FIELD CHANGE PROGRAM

A. AN/WQM-5 Field Change Kits

The first programmable signal generator (Unit 3) produced by C-Tech, Inc., was delivered to ARL:UT on 18 October 1977. This unit was checked out thoroughly by ARL:UT personnel, with the assistance of Mr. T. Fitzgerald of C-Tech, Inc., during the period 18-21 October 1977. The first article testing resulted in the development of a concise factory checkout procedure and a verification that the unit will meet the requirements set forth in the technical specification. The unit was shipped back to C-Tech, Inc., on 17 November 1977 for minor reworking of the interconnection wiring and five of the printed circuit boards. Delivery of the first complete AN/WQM-5A kit is expected in early January 1978.

ARL:UT has received all of the off-the-shelf items from Hewlett-Packard that make up the remainder of the field change kits.

The technical manual changes required by the AN/WQM-5 Field Change Program have not proceeded as rapidly as required. In an effort to accelerate progress on these items, ARL:UT personnel traveled to Dallas, Texas, on 3 November 1977 to investigate the possibility of obtaining technical writing assistance from Kentron International, Inc. As a result of this meeting, it was learned that Kentron could provide the assistance needed by ARL:UT to produce manuals for the AN/WQM-5A/B/C systems. By 30 November 1977, ARL:UT had retained Kentron as consultants to assist with the technical manual preparation.

B. Procurement of the AN/WQM-5A Sonar Test Set for Spain

Delivery of the AN/WQM-5A Sonar Test Set to the Spanish Navy has been delayed by a number of factors. The burn-in of the set cannot begin until a production model of Unit 3 has been received. Thus, it is not anticipated that the burn-in can begin until early January 1978. It also will not be possible to ship the unit to Spain until technical manuals are available. As of 30 November 1977, no firm schedule was available for the technical manuals.

VIII. AN/BQQ-5 SWITCHING POWER SUPPLY

A. Introduction

ARL:UT was tasked under Contract N00024-74-C-1069 by NAVSEA Code 660F to perform a study of the current switching power supply, built by IBM, which is used in the AN/BQQ-5 sonar system. Continuing under Contract N00140-76-C-6487, this basic study progressed to a new design proposed by ARL:UT that should make the feasibility requirement of 100,000 h MTBF a reality.

B. Current Progress

Final modifications were made on the ARL:UT Modular Power Supply Type 4B (MPS-4B) including main loop current shutdown and a BIT output. A preliminary trip on 12 September 1977 to FLEASWTRACENPAC, San Diego, California, indicated the supply would function properly in all cabinets (four) that used an MPS-4B supply. The ARL:UT MPS-4B supply was then taken to the IBM facility in Manassas, Virginia, where it began an extended burn-in period. At a meeting at IBM, during the period 13-15 September 1977, Messrs. B. Singleton, B. Mesick, P. Combs, and K. McGough of IBM; P. Asman of NAVSEA; and K. Butler and B. Shaw of ARL:UT discussed what cabinets the ARL:UT supply would be used in and for how long. Special tests were also conducted during this time to see whether the ARL:UT MPS-4B had any of the problems that had plagued the previous Trio and IBM supplies. No problems were encountered during this time. The ARL:UT MPS-4B has over 400 h of burn-in with no problems as of November 1977.

During this report period, parts for five MPS Type 9 and three MPS Type 1 supplies were ordered and the mechanical configuration was worked out. The delivery date was set for the end of March 1978.

A trip to NAVSEA during the period 2-4 November, by Mr. B. Shaw of ARL:UT, was made to discuss the development of the ARL:UT MPS-4B design. In attendance were CAPT Gilchrist (SEA 660), and Messrs. D. Baird, J. Archer, B. Daney, P. Asman et al., all of NAVSEA. The talk by Mr. Shaw was to familiarize CAPT Gilchrist with the development at ARL:UT of the improvements in reliability and construction.

13 March 1978

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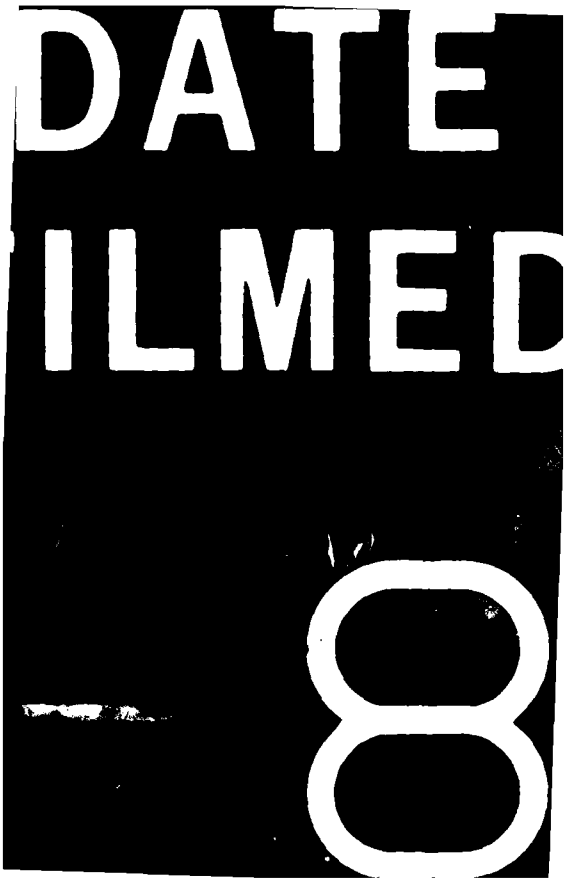
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