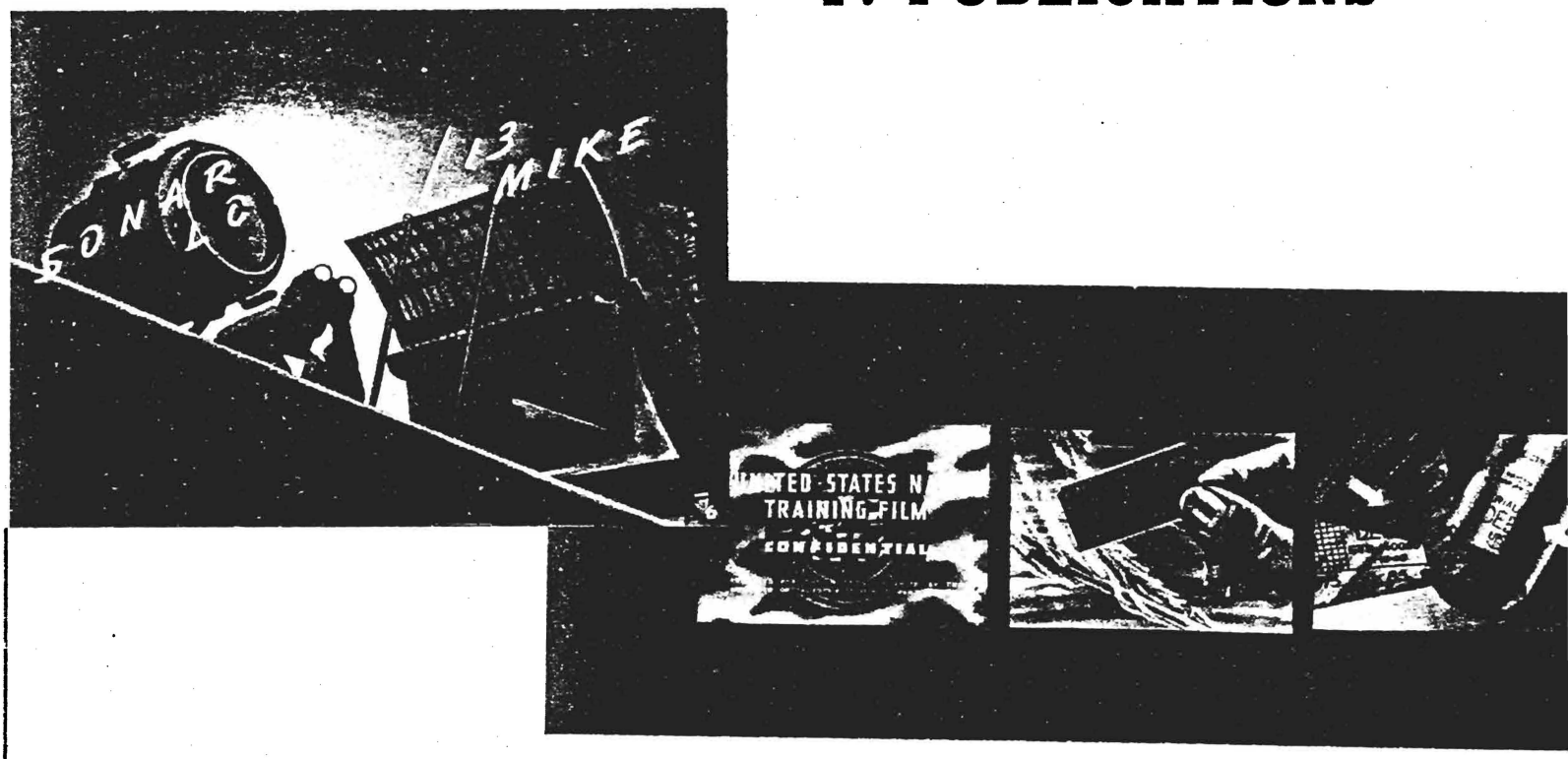
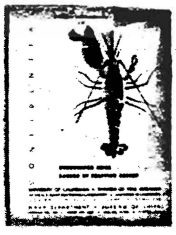
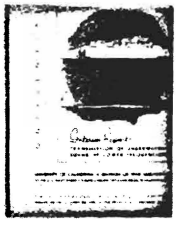
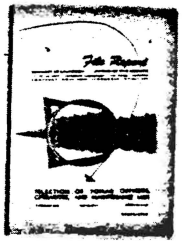
F. PUBLICATIONS









I. general

During the course of the Contract with NDRC and later with the Bureau of Ships, UCDWR prepared a variety of written material for distribution to other NDRC agencies and to many naval activities. This material ranged from typewritten memoranda, dealing with technical details of research and development and given very limited distribution, to official printed Navy pamphlets and manuals, widely disseminated throughout the Fleet. The work on official manuals has been described in Chapter Five. This section, therefore, deals chiefly with publications reporting the research, development, and training activities of UCDWR.

At the beginning of the Contract with NDRC, no procedure for reporting the results of research and development was established. The scientists and engineers responsible for individual projects prepared periodic memoranda on their work, either on their own initiative or at the request of the Director. These memoranda were then forwarded to the New York office of NDRC for further distribution if warranted.

The increasing research activities of UCDWR soon made this procedure inadequate. Some uniformity in reporting the results of research was established in January of 1942, and in October of that year a special group was formed to handle the editing and reproduction of memoranda and reports. The original Reports Group consisted of an editorial secretary and three typists, who also operated a mimeograph machine. The functions of the group were to edit all reports and memoranda for errors in grammar and style, reproduce reports by typing or mimeograph, maintain adequate records, and effect authorized distribution (the system of numbering reports was instituted at this time). The group also prepared and reproduced all Laboratory forms and circular letters. The Reports Group, being a service group for all divisions of the Laboratory, was not placed under any of the research or development divisions, but reported directly to the Director or to his Assistant. Photographs and photostats for reports were furnished by the Photographic Department, which was under the Engineering Division. When reproduction of some reports by the ozalid method was instituted, the Photographic Department also furnished this service.

As distribution increased, with wider dissemination to Navy activities, the need for more careful preparation of reports became evident. Many of the scientists and engineers concerned with research, development, and training had difficulty in presenting the results of their work in clear and easily understandable language. The staff of the Reports Group at that time had neither the time, writing ability, scientific background, nor the detailed knowledge of research and development projects needed for a complete rewriting of the drafts submitted by the scientific personnel. An increasing load therefore fell upon the administrative personnel—the Group Leaders, Assistant Directors, and the Director—for the writing or rewriting of reports. To relieve this load, scientists who showed particular aptitude for presenting the results of research were transferred from their scientific activities to the preparation of reports. Where such persons were not available or could not be spared from research, professional writers were obtained and assigned to the research divisions. Since these men were naturally not already familiar with the work, they had to extract the essential information from the scientists or engineers concerned and then prepare drafts for review by the Group Leader and Assistant Director.

A further difficulty was the lack of facilities for adequate presentation of the information. The Reports Group did not include artists or layout specialists, was not closely coordinated with the Photographic Department, and had no methods of duplication other than mimeograph and ozalid. The lack of these facilities was not particularly serious for brief technical reports designed for a limited audience of scientists or engineers, but when the information was distributed to a larger audience, many of whom were not intimately concerned with the details of research or development, experience showed that the degree to which the material was read, assimilated, and used depended largely upon the way it was presented.

In the case of manuals and training aids for the Fleet, this problem was partially solved by the establishment of the two special groups mentioned previously: one in New York for the preparation of sonar maintenance manuals, and one in San Diego for the production of manuals and visual aids explaining the use of the bathythermograph and the effects of water conditions on the performance and operational use of sonar gear. The New York group, of course, was in no position to assist

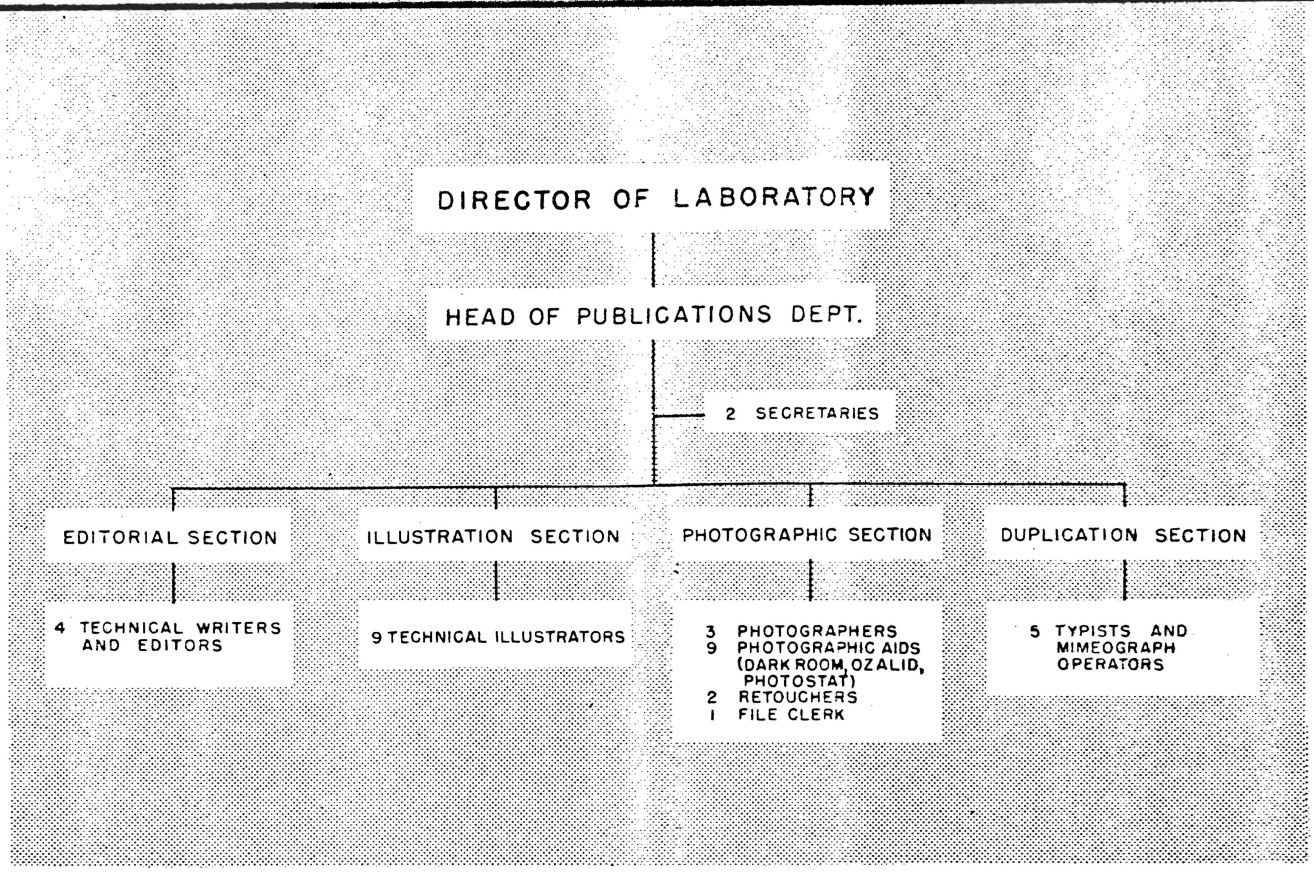
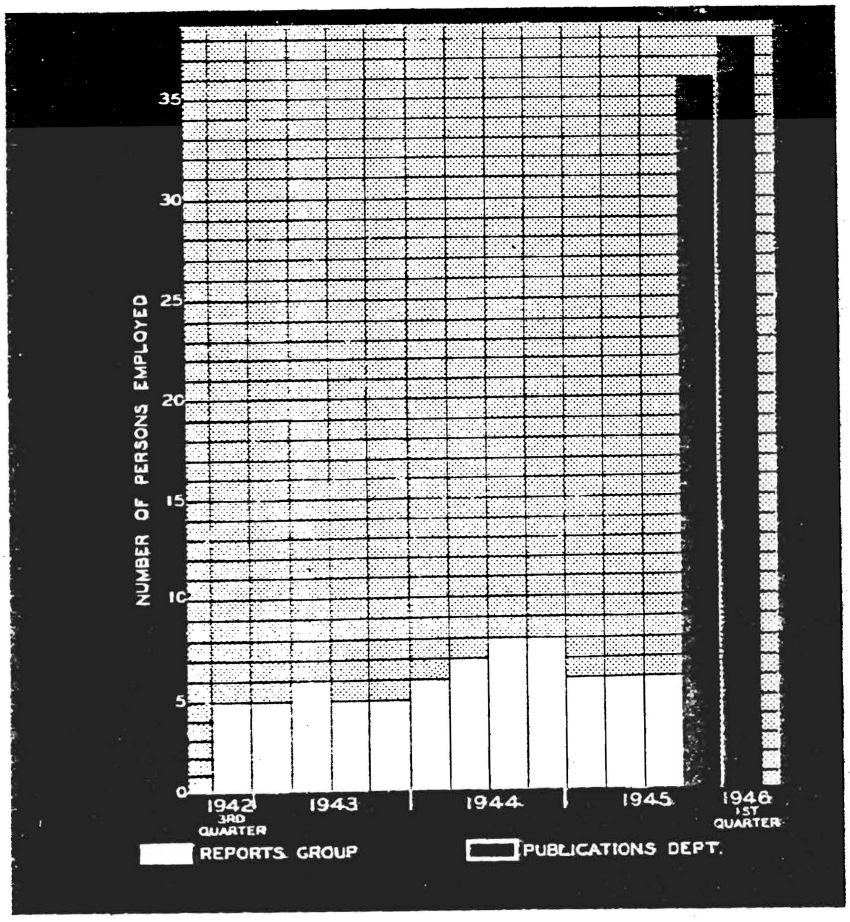


FIGURE 9.4. ORGANIZATIONAL SET-UP OF PUBLICATIONS DEPARTMENT AS OF 1 OCTOBER 1945.

FIGURE 9.5. NUMBER OF PERSONS EMPLOYED BY THE REPORTS GROUP (LATER PUBLICATIONS DEPARTMENT) BY QUARTERS.



with publications prepared at San Diego. The group at San Diego included writers and artists capable of handling reports and similar publications, but during the period of hostilities their work on official manuals and training aids was considered of higher priority, and the group was not large enough to undertake more than a minor amount of work on UCDWR's reports. With the termination of hostilities, however, the need for training material for the Fleet became less pressing, while the number of reports increased markedly as the end of the Contract approached. This group was therefore consolidated with the Reports Group and the Photographic Department, and a Publications Department was established (see Figure 9.4). The number of personnel engaged in the handling of reports is indicated, on a quarterly basis, in Figure 9.5.

This enlarged department was able to handle the flood of reports written during the closing months of the Contract and to improve their general appearance; but time and personnel were still not sufficient to rewrite the texts in terms of audience level, and very little effort could be devoted to layout and illustration except on those reports scheduled for rather wide distribution.

II. procedures

The procedures finally adopted for the preparation and reproduction of reports and similar publications may be summarized as follows:

(1) First draft prepared by the engineer or scientist in charge of the project, or by a writer working with him.
(2) Review by the cognizant Assistant Director.
(3) Revision by author if needed.
(4) Approval by the Assistant Director.
(5) Editing by the Publications Department; editorial changes checked with the author or the Assistant Director to insure technical accuracy.
(6) Layout (if warranted by the distribution and importance of the report) and preparation of final illustrations (also checked for technical accuracy).
(7) Final approval by the Associate Director and Director.
(8) Duplication by ozalid, mimeograph, multilith, or offset lithography (determined by the importance of the report and the proposed distribution).
(9) Initial distribution to activities authorized to receive all reports.
(10) Final distribution, after Bureau of Ships' approval, to other activities interested in the specific report.

III. publications issued

A bibliography of all publications prepared by UCDWR is given in Appendix A. Figure 9.6 shows, by quarters, the number of individual publications prepared, while Figure 9.7 shows the total number of pages. Detailed data are lacking for the period prior to October 1942, but comparatively few reports were issued before that date.

IV. recommendations

Like many other UCDWR activities, the Publications Department grew at random. Even at the end of the Contract, the preparation of publications was not as well centralized as now appears desirable. The original plan of assigning writers, draftsmen, and artists to the scientific divisions was not efficient, and led to some duplication of effort. The results of the gradual centralization of this work indicate that the most effective organization is one in which the greater part of the publication activity is centralized in a single department, with a trained staff of writers and editors, illustrators, photographers, and personnel familiar with duplication processes. It is essential that the writers have sufficient scientific background to be able to comprehend readily the complex engineering and research projects and to discuss intelligently details of the work with the responsible scientists and engineers. At the same time, they must be able to interpret the results of such work to audiences which frequently may have little or no scientific training. The artists, similarly, must be able not only to produce accurate graphs, drawings, and diagrams, but also to adapt complex theoretical concepts to illustrations, cartoons, and sketches which will amplify and clarify the textual material. A publications group comprising from 30 to 40 persons would appear to be required to serve a laboratory of the size of UCDWR adequately.

FIGURE 9.7. TOTAL NUMBER OF PAGES IN PUBLICATIONS PREPARED BY UCDWR. THE GREATEST VOLUME OF REPORTS WAS PRODUCED AFTER MARCH 1946 AND COULD NOT BE INCLUDED IN THESE GRAPHS.

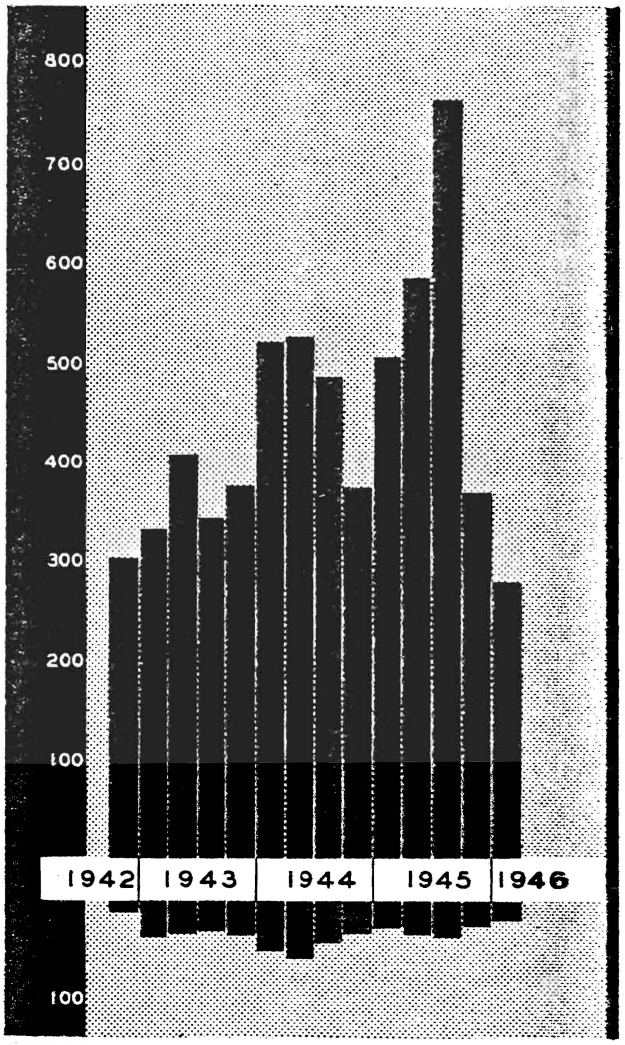


FIGURE 9.6. NUMBER OF PUBLICATIONS PREPARED BY UCDWR.

APPENDIX A

technical bibliography

GENERAL

COMPARATIVE LISTING OF NAVY PROJECT AND NDRC FILE OUTLINE NUMBERS

COMPARATIVE LISTING OF BUSHIPS TASK PROBLEM AND NDRC FILE OUTLINE NUMBERS

BIBLIOGRAPHY (ANNOTATED)

APPENDIX B

patent bibliography

APPENDIX C

personnel roster

appendix a TECHNICAL BIBLIOGRAPHY

general

During the course of UCDWR's operations, a considerable number of reports were prepared and variously distributed. These differed widely not only in technical content and detail but in the manner of reproduction as well, as is described elsewhere (see Chapter Nine, Section F).

All the reports and memoranda included in the bibliography are available in UCDWR's files, the custody of which was transferred to the U. S. Navy Electronics Laboratory, San Diego, toward the end of the contractual period. During the very early months of the Laboratory's operation, distribution of UCDWR reports was very limited and only the major ones were forwarded to Section 6.1, NDRC, where they are presumably still available. As time went on, more and more reports (including all those with UCDWR numbers) were sent to Section 6.1, which forwarded certain of them to the Coordinator of Research and Development for Navy distribution. After 1 March 1945, copies of all reports prepared for external distribution were forwarded to the Chief of the Bureau of Ships, Code 940, who authorized distribution to other activities if this was considered desirable. The reports sent to Code 940 included all of those bearing UCDWR numbers published after the transfer date.

During the final months of the Contract, definitive completion reports were issued of programs and devices developed by UCDWR and not already fully reported. As most of these were published after 1 April 1946, the closing date of this report, they perforce are not included in the following bibliography; copies, however, will be available in the files of UCDWR-NEL and Code 940, BuShips. Beginning several months before the cessation of hostilities with Japan, when it began to appear that UCDWR could expect to terminate its activities in the not-too-remote future, increasing emphasis was put on the preparation of these completion reports. Between V-J Day and 30 June 1946, this became the principal task of UCDWR, and the groups engaged in writing the material were greatly augmented by hiring persons, such as writers, artists, and stenographers, and by assigning engineers to full-time report writing. With the relaxing of the forces of patriotism, the War Manpower Commission and, to some extent, the Selective Service, many staff members who had been intimately associated with the work left the Laboratory to accept other positions or to return to school. These departures had a crippling effect on the writing program, and several reports were abandoned because there was no one remaining on the staff with sufficient background to write them.

In considering the various ways in which the UCDWR reports could be compiled into a bibliography, primary emphasis was placed upon subject matter and the ease with which an individual item could be located. Because UCDWR adopted and used the File Outline of Work of Section 6.1, Division 6, NDRC (as subsequently modified by UCDWR for use while operating under Navy auspices), throughout the period of operation, and also because most of the material was filed in accordance with the subject index of that outline, the bibliography which follows is arranged in corresponding fashion. Reports which deal with miscellaneous types of equipment or test devices whose use was general are listed at the end of the bibliography under "Miscellaneous".

However, the use of the outline without further aids would be somewhat clumsy. Therefore, in an attempt to supplement the primary bibliography based on the File Outline, two additional listings are included herein. The first is a comparative listing of NDRC File Outline numbers and the Navy Project numbers assigned by the Coordinator of Research and Development during the period of OSRD auspices. The second is a comparative listing of the NDRC File Outline numbers and the Task and Problem number assignments made by the Bureau of Ships after sponsorship of the Contract had been transferred to that activity.

The staff of UCDWR also made substantial contributions to the Summary Technical Reports published by NDRC, Division 6. The Summary Technical Reports include detailed descriptions of much of the work accomplished at UCDWR and should be consulted, in addition to the reports in the bibliography, for details.

In addition, since the use of the File Outline for a bibliography framework does not provide for the listing of various types of periodic progress reports, these are briefly described below.

MISCELLANEOUS

progress reports

This group of reports includes those prepared in the early period of the Contract when no other formal progress reporting system had been established. Copies can be found in files of UCDWR-NEL and NDRC, Section 6.1.

BRIEF PROGRESS REPORT ON THE NDRC PROJECT AT POINT LOMA, V. O. Knudsen, 20 August 1941.

PROGRESS REPORT ON RESEARCH WORK AT UNIVERSITY OF CALIFORNIA, V. O. Knudsen, 1 December 1941.

REPORT ON THE FUNDAMENTAL RESEARCH PROGRAM AT THE UNIVERSITY OF CALIFORNIA, V. O. Knudsen, 8 December 1941.

A BRIEF STATEMENT OF THE PROGRAM OF THE SERVICES GROUP, K. S. Van Dyke, 8 December 1941.

REPORT ON THE DEVICES OR ENGINEERING DEVELOPMENT PROGRAM, K. S. Van Dyke, 31 December 1941.

PROGRESS REPORT FOR JANUARY AND FEBRUARY 1942, UCDWR, PART I, PART II, V. O. Knudsen and K. S. Van Dyke, 27 February 1942.

MEMO TO DR. J. T. TATE, CHAIRMAN SECTION C-4, REGARDING THE PROGRAM OF THE WEST COAST LABORATORY AND ITS INTEGRATION WITH THE OTHER ESTABLISHMENTS AND INTERESTS OF THE SECTION, G. P. Harnwell, 14 April 1942.

BI-MONTHLY REPORT, 2/25-4/25/42, J. M. Adams, 25 April 1942.

REPORT ON WORK IN APRIL 1942, 1 June 1942.

REPORT ON WORK IN MAY 1942, 29 June 1942.

REPORT ON WORK IN JUNE 1942, 21 July 1942.

ANNUAL REPORT OF UCDWR, NDRC, 7/1/41/-6/30/42, J. M. Adams, 30 June 1942.

BI-WEEKLY

progress reports

UCDWR published a series of bi-weekly progress reports, covering all laboratory activities, for the period beginning 29 June 1942 and ending 3 February 1945. These were forwarded to NDRC, Section 6.1, for distribution to various Navy, NDRC, and other research activities. File copies are available in the files of UCDWR-NEL and NDRC, Section 6.1.

MONTHLY

progress reports

During the period of BuShips' auspices of the Contract, UCDWR published four series of Monthly Progress Reports (Series I, Sonar Data; Series II, Sonar Devices (Confidential); Series III, Sonar Devices (Secret); Series IV, Training Aids). These covered the period from 1 February 1945 to 1 March 1946 when NEL assumed cognizance of UCDWR's scientific program. The UCDWR numbers assigned to this series were prefaced by the letters MR and followed by a dash and the Roman numeral indicating the particular series, as MR 304-III. These were distributed to Navy and civilian activities approved by the Bureau of Ships, and copies may be obtained from the UCDWR-NEL files or from BuShips, Code 940.

SELECTION AND TRAINING

progress reports

The selection and training activities of the various laboratories associated with Division 6 of NDRC published three series of progress reports. Copies are maintained in the UCDWR-NEL and the NDRC, Section 6.1 files. These reports were compiled by UCDWR and issued as follows:

1. PSYCHOLOGICAL SELECTION AND TRAINING GROUP BI-WEEKLY REPORT. This series covered the period from 11 January 1943 to 4 October 1943 and the number assigned was preceded by the letters ST, as ST5.
2. TRAINING GROUP INFORMAL CIRCULAR LETTER. This series was issued monthly for the use of civilian personnel only, and its issuance was correlated with the Quadra-Weekly Progress reports described below so that an issue of one of the two series appeared every two weeks. This series covered the period from 3 October 1943 to 10 June 1944 and the number assigned was preceded by the letters CL, as CL9.
3. TRAINING GROUP QUADRA-WEEKLY PROGRESS REPORT. This series, in contradistinction to the Circular Letter series, was prepared for both civilian and naval personnel. It covered the period from 17 October 1943 to 24 June 1944 and the number assigned was preceded by the letters PR, as PR9.

OCEANOGRAPHIC SECTION

progress reports

In the early period of the Laboratory's existence, the Oceanographic Section published a series of monthly progress reports. These covered the period from July 1941 to June 1942, after which time the reporting was accomplished through the regular bi-weekly reports. Copies of these are available in the files of both UCDWR-NEL and NDRC, Section 6.1.

comparative listing of navy project and ndrc file outline numbers

NS— 97 SELECTION AND TRAINING OF SOUND OPERATORS. Navy Liaison Officer Capt. R. Bennett, Code 910, BuShips.

80.00, 91.00, 91.10, 91.11, 91.12, 91.13, 91.14, 91.20, 91.21, 91.211, 91.212, 91.212.1, 91.214, 91.215, 91.216, 91.22, 91.221, 91.222, 91.223, 91.23, 91.230.1, 91.231, 91.233, 91.237, 91.239, 91.248.1, 91.249, 91.26, 91.261, 91.262, 91.263, 91.40, 91.41, 91.411, 91.412, 91.43, 91.50, 91.60, 91.70.

NS—139 TESTING AND CALIBRATING FACILITIES FOR UNDERWATER ACOUSTIC DEVICES. Navy Liaison Officer, Capt. R. Bennett, Code 910, BuShips.

01.10, 01.11, 01.12, 01.13.

NS—140 ACOUSTIC PROPERTIES OF THE SEA BOTTOM, AND RANGE AS A FUNCTION OF OCEANOGRAPHIC FACTORS. Navy Liaison Officer, Comdr. R. Revelle, Code 940, BuShips.

01.30, 01.31, 01.32, 01.33, 01.331, 01.332, 01.35, 01.40, 01.41, 01.42, 01.60, 01.70, 01.71, 01.72, 01.73, 01.74, 01.75, 01.76, 01.80, 01.90, 01.91, 01.911, 01.912, 01.913, 01.92, 01.921, 01.922, 01.93, 01.94, 01.95.

NS—141 ACOUSTIC PROPERTIES OF WAKES. Navy Liaison Officer, Capt. R. Bennett, Code 910, BuShips.

01.50.

NS—142 BASIC IMPROVEMENT IN ECHO-RANGING GEAR. Navy Liaison Officers, Capt. R. Bennett, Code 910, BuShips; and Comdr. J. C. Myers, Code 940, BuShips.

01.10, 01.22, 02.00, 02.10, 02.11, 02.12, 02.13, 02.14, 02.30, 02.31, 02.311, 02.311.1, 02.311.2, 02.311.3, 02.311.4, 02.312, 02.313, 02.314, 02.315, 02.316, 02.32, 02.33, 02.331, 02.332, 02.333, 02.40, 02.41, 02.411, 02.412, 02.413, 02.42, 02.43, 02.44, 02.45, 02.451, 02.452, 02.453, 02.454, 02.455, 02.456, 02.50, 03.50, 71.00.

NS—144 ECHO REPEATER TARGET. Navy Liaison Officer, Capt. C. L. Engleman, Code 983, BuShips.

66.00, 91.236.

NS—152 SHIPBOARD ATTACK TEACHER (SASAT A). Navy Liaison Officer, Capt. R. Bennett, Code 910, BuShips.

91.234.

NO—163 COOPERATION WITH THE NAVY IN SURVEYS OF AMBIENT UNDERWATER NOISE CONDITIONS IN VARIOUS AREAS. Navy Liaison Officer, Comdr. R. Revelle, Code 940, BuShips.

01.30, 01.31, 01.32, 01.33, 01.331, 01.332, 01.35, 03.00, 03.30.

NS—164 SUBMARINE EVASION DEVICE—ELECTRONIC NOISEMAKER FOR SIMULATING SUBMARINE SOUNDS. Navy Liaison Officers, Comdrs. L. R. Daspit and G. W. Underwood of Code 5815, BuShips; Mr. F. M. Varney, Code 335, BuShips; Comdr. C. C. Smith, Cominch (Read.).

09.30, 09.40, 09.41, 09.411, 09.412, 09.42, 09.421, 09.422, 09.43, 09.44.

NS—173 CONSULTING SERVICES ON SASAT MARK III EQUIPMENTS (SASAT A). Navy Liaison Officer, Capt. C. L. Engleman, Code 983, BuShips.

91.234.

NO—181 INVESTIGATION AND DEVELOPMENT OF NEW METHODS OF ECHO-RANGING CONTROL. Navy Liaison Officer, Comdr. M. J. Murphy, BuOrd.

01.22, 66.00.

NS—195 CONSULTING SERVICES ON MODEL OAS AND OAU PRACTICE TARGETS TO BUSHIPS ON WESTERN ELECTRIC CONTRACTS. Navy Liaison Officer, Capt. R. Bennett, Code 910, BuShips.

91.236.

NO—195 DEPTH CHARGE PATTERN RECORDER. Navy Liaison Officer, Comdr. E. J. O'Donnell, BuOrd.

91.232.

NS—221 SILENT ECHO-SOUNDING EQUIPMENT. Navy Liaison Officer, Capt. R. Bennett, Code 910, BuShips.

09.21, 09.22.

NO—226 SHIPBOARD SUBMARINE ATTACK TEACHER. Navy Liaison Officer, Lt. W. E. Joor, Jr., BuOrd.

91.243.

NS—233 PRIMARY LISTENING TEACHER. Navy Liaison Officers, Capt. C. L. Engleman, Code 983, BuShips; and Comdr. C. C. Smith, Cominch (Read.).

91.241.

NS—240 CONSULTING SERVICE ON SHIPBOARD ANTI-SUBMARINE ATTACK TRAINER (SASAT B). Navy Liaison Officer, Capt. R. Bennett, Code 910, BuShips.

91.235.

NS—245 ADVANCED LISTENING TEACHER. Navy Liaison Officers, Capt. R. Bennett, Code 910, BuShips; and Comdr. C. C. Smith, Cominch (Read.).

91.242, 91.247.

NS—252 PREPARATION OF SUPPLEMENTS TO SONAR INSTRUCTION BOOKS. Navy Liaison Officer, Capt. C. L. Engleman, Code 983, BuShips.

91.00, 91.413

NS—293 NAD BEACON. Navy Liaison Officers, Comdrs. L. R. Daspit and H. E. Ruble, Code 5815, BuShips; Comdr. G. A. Norton, Code 335, BuShips.

09.45, 09.451, 09.452, 09.453, 09.454, 09.455.

NS—297 DETECTION OF SMALL OBJECTS BY MEANS OF UNDERWATER ACOUSTIC DEVICES. Navy Liaison Officer, Capt. R. Bennett, Code 910, BuShips.

02.13, 02.131, 02.132, 02.133.

NS—308 SONAR-SURFACE AND SUBMARINE BATHYTHERMOGRAPH INSTRUCTION PROGRAM. Navy Liaison Officer, Comdr. R. Revelle, Code 940, BuShips.

91.248, 91.80.

NS—316 CONSULTING SERVICES TO BUSHIPS ON MODEL NAC SOUND BEACONS AT THE SOUND EQUIPMENT CORPORATION, HOLLYWOOD, CALIFORNIA, UNDER NAVY CONTRACT NXsr-60065.
Navy Liaison Officers, Mr. L. D. Whitelock, Code 945, BuShips; and Mr. R. C. Carpenter, Code 945, BuShips.

09.412.

NS—324 SONAR GROUP OPERATOR TRAINER.
Navy Liaison Officer, Comdr. J. C. Myers, Code 940, BuShips.

91.213.

NS—329 DEVELOPMENT OF A DEVICE WHICH PROVIDES AUTOMATIC TARGET POSITIONING ON DEAD RECKONING TRACER FROM AN INPUT OF TARGET RANGE AND BEARING. Navy Liaison Officer, Capt. E. L. Schlief, Code 634, BuShips.

85.00.

NS—339 RECOGNITION RECORDER FOR USE IN TRAINING OPERATORS TO RECOGNIZE VARIOUS SHIP AND TORPEDO NOISES.
Navy Liaison Officer, Comdr. J. C. Myers, Code 940, BuShips.

91.246.

comparative listing of bushipstask-problem and ndrc file outline numbers

TASK NO. 1—SONAR COUNTERMEASURE DEVICES

PROBLEM NO. 1A—NAD SOUND BEACONS, 3", 6", 10"
09.40, 09.45, 09.451, 09.452, 09.453, 09.454, 09.455.

PROBLEM NO. 1B—NAD SOUND BEACON, 8"
09.454.

PROBLEM NO. 1C—
09.46.

PROBLEM NO. 1D—NAC SOUND BEACON
09.412, 09.44.

PROBLEM NO. 1E—X-NAG SOUND BEACON
09.423.

PROBLEM NO. 1F—X-NAH SOUND BEACON
(SEE PROBLEM NO. 7B)
09.413.

TASK NO. 2—PHYSICS OF UNDERWATER SOUND

PROBLEM NO. 2A—TRANSMISSION AND SCATTERING
01.40, 01.60, 01.70, 01.71, 01.72, 01.73, 01.74, 01.75, 01.76, 01.90, 01.95.

PROBLEM NO. 2B—PROPERTIES OF WAKES
01.50.

PROBLEM NO. 2C—REFLECTION OF SOUND FROM TARGETS
01.80.

PROBLEM NO. 2D—SMALL OBJECT DETECTION—PHYSICS
(SEE PROBLEM NO. 4A)
02.133.

PROBLEM NO. 2E—MASKING OF ECHOES BY REVERBERATION
01.41.

PROBLEM NO. 2F—MASKING OF ECHOES BY NOISE
01.42.

PROBLEM NO. 2G—UNDERWATER NOISE MEASUREMENTS
01.31, 01.33, 01.331.

PROBLEM NO. 2H—PROCESSING AND ANALYSIS OF BT DATA
01.913, 01.93.

PROBLEM NO. 2MI—TRANSDUCER DESIGN AND PERFORMANCE
01.10, 01.20, 01.22.

TASK NO. 3—QLA SONAR EQUIPMENT

PROBLEM NO. 3A—QLA SONAR—CONSULTATION
(SEE PROBLEM NO. 5I)
02.15, 02.454, 02.456.

PROBLEM NO. 3B—QLA SONAR—RESEARCH & DEVELOPMENT
02.454, 03.50.

PROBLEM NO. 3C—QLA SONAR—CENTER BEARING INDICATION
02.454, 02.455.

PROBLEM NO. 3M2—CONTOUR BOTTOM SCANNER
02.134.

PROBLEM NO. 3M3—SECURE ECHO SOUNDER
09.22.

TASK NO. 4—SMALL OBJECT DETECTION

PROBLEM NO. 4A—SMALL OBJECT DETECTION—RESEARCH & DEVELOPMENT (SEE PROBLEM NO. 2D)
02.131, 02.15.

PROBLEM NO. 4B—SMALL OBJECT DETECTION—EVALUATION
02.132.

TASK NO. 5—TRAINING AIDS

PROBLEM NO. 5A—GROUP LISTENING TEACHER
91.247.

PROBLEM NO. 5B—SASAT C
91.235.1.

PROBLEM NO. 5C—PRACTICE ATTACK TARGETS
91.236, 91.236.1.

PROBLEM NO. 5D—BATHYTHERMOGRAPH TRAINING
91.80.

PROBLEM NO. 5E—NAVY TRAINING ASSISTANCE
91.14, 91.230.1, 91.239, 91.248, 91.263, 91.50.

PROBLEM NO. 5F—ADVANCED LISTENING TEACHER
91.242.

PROBLEM NO. 5G—GROUP OPERATOR TRAINER
91.213.

PROBLEM NO. 5H—RECOGNITION GROUP TRAINER
91.216, 91.246.

PROBLEM NO. 5I—QLA SONAR TRAINER (SEE TASK NO. 3)
02.456.

PROBLEM NO. 5J—GROUP OPERATOR TRAINER (QDA—QKA)
91.213.

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02.136.

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bibliography

I. DETECTION

A. acoustic detection—00.00

1. sonar performance studies–01.00

1.	THE EXTINCTION OF SOUND IN WATER, C. Eckart	31 AUG 1941
2.	SUMMARIZED RESULTS OF FLOW MEASUREMENTS ON VARIOUS MATERIALS, N. J. Holter	8 SEPT 1941
3.	TRANSMISSION OF SOUND THROUGH FLAT PLATES, E. M. McMillan	15 OCT 1941
4.	DEPTH OF CROSSING OF TWO LIMITING RAYS, Lt. R. Revelle	10 JAN 1942
5.	A METHOD OF MEASURING THE VELOCITY OF SOUND IN SOLIDS, B. G. Eaton	1 FEB 1945

(A sample of metal is made into a rod, either square or round, and several inches long. The frequency for a half wave length in the longitudinal direction of the rod is then measured by loosely coupling a driving crystal to one end and a probe at the other, and noting the frequency for maximum pickup at the probe. The accuracy of the method depends upon the looseness of coupling.)

a. testing and calibrating facilities–01.10

1.	REPORT ON A PROPOSED METHOD OF INCREASING THE SENSITIVENESS OF UNDERWATER ACOUSTIC RECEIVERS, W. G. Cady	22 OCT 1941
2.	COMMENTS ON "UNDERWATER IMPEDANCE MEASUREMENTS" BY R. L. BROWN AND J. R. PELLAM, H. T. O'Neil	12 AUG 1942
3.	MEASUREMENTS ON CRYSTAL TRANSDUCER CP1-1 NO. 770, C. J. Burbank, NO. C1	4 SEPT 1943
4.	MEASUREMENTS ON CRYSTAL TRANSDUCER CS1-1 NO. 586, C. J. Burbank, NO. C2	7 SEPT 1943
5.	MEASUREMENTS ON CRYSTAL TRANSDUCER CS2-1 NO. 593, C. J. Burbank, NO. C3	9 SEPT 1943
6.	MEASUREMENTS ON CRYSTAL TRANSDUCER AX58-A NO. 37, C. J. Burbank, NO. C4	15 SEPT 1943
7.	MEASUREMENTS ON CRYSTAL TRANSDUCER AX58-A NO. 38, C. J. Burbank, NO. C5	15 SEPT 1943
8.	MEASUREMENTS ON CRYSTAL TRANSDUCER AX58-A NO. 39, C. J. Burbank, NO. C6	16 SEPT 1943
9.	MEASUREMENTS ON CRYSTAL TRANSDUCER GD8-1 NO. 595, C. J. Burbank, NO. C7	24 SEPT 1943
10.	MEASUREMENTS ON CRYSTAL TRANSDUCER GD4-2 NO. 769, C. J. Burbank, NO. C8	28 SEPT 1943
11.	MEASUREMENTS ON CRYSTAL TRANSDUCER CN7-1 NO. 591, C. J. Burbank, NO. C9	29 SEPT 1943
12.	MEASUREMENTS ON CRYSTAL TRANSDUCER CW-78178, C. J. Burbank, NO. C10	14 OCT 1943
13.	MEASUREMENTS ON CRYSTAL TRANSDUCER CA1-1 NO. 218, C. J. Burbank, NO. C11	16 OCT 1943
14.	MEASUREMENTS ON CRYSTAL TRANSDUCER FC1-1 NO. 600, C. J. Burbank, NO. C12	27 OCT 1943
15.	MEASUREMENTS ON CRYSTAL TRANSDUCER CN6-1 NO. 581, C. J. Burbank, NO. C13	1 NOV 1943
16.	MEASUREMENTS ON CRYSTAL TRANSDUCER CN8-1 NO. 596, C. J. Burbank, NO. C14	1 NOV 1943
17.	MEASUREMENTS ON CRYSTAL TRANSDUCER CN8-2 NO. 597, C. J. Burbank, NO. C15	2 NOV 1943
18.	MEASUREMENTS ON CRYSTAL TRANSDUCER GB5-1 NO. 350, C. J. Burbank, NO. C16	2 NOV 1943
19.	MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER, C. J. Burbank, NO. C17	8 NOV 1943

(Report C17 presents the complex impedance of the COG-50153 transducer, and also directivity patterns for frequencies from 5 through 90 kc and field response charts both with and without accompanying fairing. The transducer is 3 feet long and 2 inches in diameter, with a sponge rubber fairing over one half and the end protruding about 4 inches from the unit.)

20.	MEASUREMENTS ON CRYSTAL TRANSDUCER CR41 NO. 583, C. J. Burbank, NO. C18	9 NOV 1943
21.	MEASUREMENTS ON CRYSTAL TRANSDUCER GD6-1 NO. 766, C. J. Burbank, NO. C19	10 NOV 1943
22.	MEASUREMENTS ON CRYSTAL TRANSDUCER CR6-1 NO. 598, C. J. Burbank, NO. C20	11 NOV 1943
23.	MEASUREMENTS ON CRYSTAL TRANSDUCER CR8-1 NO. 599, C. J. Burbank, NO. C21	11 NOV 1943
24.	MEASUREMENTS ON CRYSTAL TRANSDUCER GC2-1 NO. 590, C. J. Burbank, NO. C22	11 NOV 1943
25.	MEASUREMENTS ON M. I. T. STREAMLINED CRYSTAL MICROPHONES NO. 1 AND NO. 2, C. J Burbank, NO. C23	12 NOV 1943
26.	MEASUREMENTS ON CRYSTAL TRANSDUCER CR1-1 NO. 943, C. J. Burbank, NO. C28(S)	17 NOV 1943

27.	MEASUREMENTS ON CRYSTAL TRANSDUCER CD2-1 NO. 263, C. J. Burbank, NO. C25	18 NOV 1943
28.	MEASUREMENTS ON CRYSTAL TRANSDUCER CS2-3 NO. 1122, C. J. Burbank, NO. C24(S)	19 NOV 1943
29.	MEASUREMENTS ON CRYSTAL TRANSDUCER CP4-1 NO. 942, C. J. Burbank, NO. C26	19 NOV 1943
30.	MEASUREMENTS ON CRYSTAL TRANSDUCER CP6-1 NO. 1127, C. J. Burbank, NO. C27	20 NOV 1943
31.	MEASUREMENTS ON CRYSTAL TRANSDUCER GD10-1 NO. 1121, C. J. Burbank, NO. C29(S)	4 DEC 1943
32.	MEASUREMENTS ON MAGNETIC VIBRATOR TYPE TRANSDUCER MEF1-1 NO. 1136, C. J. Burbank, NO. C30(S)	6 DEC 1943
33.	MEASUREMENTS ON CRYSTAL TRANSDUCER—TYPE JK NO. CBM733 J275, C. J. Burbank, NO. C31	15 DEC 1943
34.	MEASUREMENTS ON QB TRANSDUCER CBM78115 NO. 41, C. J. Burbank, NO. C32	17 DEC 1943
35.	MEASUREMENTS ON CRYSTAL TRANSDUCERS CW78205 NOS. 43, 72, 77, 80, C. J. Burbank, NO. C33	18 DEC 1943
36.	MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER TMS 85, C. J. Burbank, NO. C34	20 DEC 1943
37.	MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER H NO. 9, C. J. Burbank, NO. C35	21 DEC 1943
38.	MEASUREMENTS ON CRYSTAL TRANSDUCER GD14-1 NO. 1137, C. J. Burbank, NO. C36(S)	30 DEC 1943
39.	MEASUREMENTS ON CRYSTAL TRANSDUCERS CW78205 NOS. 112, 122, 124, 127, C. J. Burbank, NO. C37	6 JAN 1944
40.	MEASUREMENTS ON CRYSTAL TRANSDUCERS JK4926 AND GD11-1 NO. 1143 IN JK HEAD, C. J. Burbank, NO. C38	11 JAN 1944
41.	MEASUREMENTS ON THE SPIRAL MAGNETOSTRICTION TRANSDUCER, C. J. Burbank, NO. C39	12 JAN 1944
42.	MEASUREMENTS ON CRYSTAL TRANSDUCERS CW78205 NOS. 12, 19, 26, 55, 111, 136, C. J. Burbank, NO. C40	15 FEB 1944
43.	MEASUREMENTS ON CRYSTAL TRANSDUCER CT1-1 NO. 945, C. J. Burbank, NO. C41	16 FEB 1944
44.	MEASUREMENTS ON CRYSTAL TRANSDUCER CN8-4 NO. 1187, C. J. Burbank, NO. C42	6 MAR 1944
45.	MEASUREMENTS ON CRYSTAL TRANSDUCER C23 NO. 707, C. J. Burbank, NO. C43	7 MAR 1944
46.	MEASUREMENTS ON CRYSTAL TRANSDUCER FG2-1 NO. 1130, C. J. Burbank, NO. C44(S)	18 MAR 1944
47.	CALIBRATION OF EQUIPMENT USED IN THE USS SUMNER EXPEDITION, C. J. Burbank, T. F. Johnston, NO. C45	21 MAR 1944
48.	MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER A-6, C. J. Burbank, NO. C46	21 MAR 1944
49.	TRANSMISSION OF SOUND THROUGH SCREENS OF LUCITE, POLYSTYRENE, PLEXIGLASS, AND NEOPRENE-COVERED WIRE MESH, C. J. Burbank, NO. C47	12 APRIL 1944
50.	ACCURACY OF SWEETWATER MEASUREMENTS, J. H. Martin	15 APRIL 1944
51.	MEASUREMENTS ON W E B MAGNETOSTRICTION TRANSDUCER CBM 78214 NO. 2, Calibration Group, NO. C48	20 APRIL 1944
52.	MEASUREMENTS ON SOUND BEACON, Calibration Group, NO. C49	22 APRIL 1944
53.	MEASUREMENTS ON B. T. L. CRYSTAL TRANSCEIVERS NO. 1 AND NO. 2 (40KC) UCDWR NO. 1916 AND NO. 1917, Calibration Group, NO. C50	27 APRIL 1944
54.	MEASUREMENTS ON CRYSTAL TRANSDUCERS CP10-1 NO. 1217 AND GA2-5 NO. 1692, Calibration Group, NO. C51	1 MAY 1944
55.	MEASUREMENTS ON MAGNETOSTRICTION HYDROPHONE H-12, Calibration Group, NO. C52	17 MAY 1944
56.	MEASUREMENTS ON TYPE 135 ASDIC MAGNETOSTRICTION TRANSDUCER, Calibration Group, NO. C53	18 MAY 1944
57.	MEASUREMENTS ON CRYSTAL TRANSDUCERS—TYPE CY4 NOS. 1225, 1226, 1237, 1654, Calibration Group, NO. C54	18 MAY 1944
58.	MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER, ATM2-1 NO. 1703, NAVY PROJECT NS-139, Calibration Group, NO. C55	8 JUNE 1944
59.	MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER, CCEM-1 NO. 1707, Calibration Group, NO. C56	9 JUNE 1944
60.	EFFECT OF NRL ANTI-FOULING PAINT NO. 364, USED ON DOMES, Calibration Group, NO. C57	22 JUNE 1944
61.	MONITORING CBM78165A PROJECTORS INSIDE 54-INCH DOMES, Calibration Group, NO. C58	23 JUNE 1944
62.	PRELIMINARY REPORT ON TEMPERATURE STRUCTURE OF SWEETWATER LAKE, JUNE 24, 1944, E. C. LaFond, G. H. Gould	27 JUNE 1944
63.	MEASUREMENTS ON CRYSTAL TRANSDUCERS—TYPE CY4 NO. 1777 THROUGH NO. 1781, Calibration Group, NO. C59	8 AUG 1944
64.	MINIMAL REQUIREMENTS FOR CLASS A CALIBRATION, J. H. Martin	14 AUG 1944

65. CALIBRATION OF SOME AX-58 AND AX-58A HYDROPHONES SUPPLEMENT TO CALIBRATION OF EQUIPMENT USED IN THE USS SUMNER, Calibration Group, NO. C60 — 18 AUG 1944

66. MEASUREMENTS ON CRYSTAL TRANSDUCERS CN8-7 NO. 1718, CN8-8 NO. 1717, CN8-9 NO. 1716, Calibration Group, NO. C61 — 21 AUG 1944

67. MEASUREMENTS ON CRYSTAL TRANSDUCER, TYPE CY4 (SECO) SAMPLE NO. 1 (CONTRACT NXsr-60065) NAVY PROJECT NS-316, Calibration Group, NO. C62 — 4 OCT 1944

68. MEASUREMENTS ON CRYSTAL TRANSDUCER CQ4Z-3 NO. 1838 (B), Calibration Group, NO. C63 — 21 OCT 1944

69. FLUCTUATIONS IN SOUND TRANSMISSION OBSERVED AT SWEETWATER LAKE, C. W. Ufford — 27 OCT 1944

70. MEASUREMENTS ON A C11-A1 HYDROPHONE WITH AN ELLIPSOIDAL AND A SPHERICAL REFLECTOR, Calibration Group, NO. C64 — 30 OCT 1944

71. MEASUREMENTS ON QCN-4 MAGNETOSTRICTION TRANSDUCER (CBM 78184 NO. 23 AND SPEP 6-12), Calibration Group, NO. C65 — 9 NOV 1944

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73. MEASUREMENTS ON CRYSTAL TRANSDUCER GE2Z-1 NO. 1892, Calibration Group, NO. C67 — 14 DEC 1944

74. MEASUREMENTS ON CRYSTAL TRANSDUCER GE2Z-2 NO. 1893, Calibration Group, NO. C68 — 15 DEC 1944

75. MEASUREMENTS ON CRYSTAL TRANSDUCER, TYPE CY4 (SECO) SAMPLE NO. 2, Calibration Group, NO. C70 — 28 DEC 1944

76. MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER KDM1-3 NO. 2263, Calibration Group, NO. C69 — 29 DEC 1944

77. MEASUREMENTS ON CRYSTAL TRANSDUCER, JB4Z-1 NO. 2191, Calibration Group, NO. C71 — 6 JAN 1945

78. MEASUREMENTS ON CRYSTAL TRANSDUCERS CS3-1 NO. 2268 AND CS3-2 NO. 2275, Calibration Group, NO. C72 — 10 JAN 1945

79. MEASUREMENTS ON 10-INCH NAD BEACON, Calibration Group, NO. C73 — 29 JAN 1945

80. MEASUREMENTS ON CRYSTAL TRANSDUCERS GD16, Calibration Group, NO. C74 — 12 FEB 1945

81. INVESTIGATIONS OF THE THERMAL STRUCTURE OF SWEETWATER LAKE, B. E. Holtsmark — 16 APRIL 1945

82. MEASUREMENTS ON CRYSTAL TRANSDUCERS CS2Z-1 NO. 2283 AND CS2Z-3 NO. 2279, Calibration Group, NO. C75 — 30 APRIL 1945

83. MEASUREMENTS ON CRYSTAL TRANSDUCER, TYPE CY4 (SECO)—SAMPLES NO. 3, 4, 5, (CONTRACT NXsr-60065), Calibration Group, NO. C76 — 3 MAY 1945

84. MEASUREMENTS ON CRYSTAL TRANSDUCER, TYPE CY4 (SECO)—SAMPLES NO. 3A, 4A, 5A (CONTRACT NXsr-60065), Calibration Group, NO. C77 — 10 MAY 1945

85. MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER XQHA, Calibration Group, NO. C78 — 23 MAY 1945

86. MEASUREMENTS ON CRYSTAL TRANSDUCERS—TYPE BG2, Calibration Group, NO. C79 — 23 JUNE 1945

87. MEASUREMENTS ON CRYSTAL TRANSDUCERS—TYPE BF6, Calibration Group, NO. C80 — 28 JUNE 1945

88. EFFECT OF BAKER CASTOR OILS ON NEOPRENE, F. X. Byrnes — 9 AUG 1945

89. RECOMMENDED STANDARD PROCEDURES FOR THE PRESENTATION OF CRYSTAL TRANSDUCER CALIBRATION DATA, G. D. Camp — 8 SEPT 1945

(1) reference laboratories–01.11

(2) standard hydrophones and projectors–01.12

1. BEAM PATTERNS FOR THE JK FACE OF A QC-JK COMBINATION PROJECTOR, G. Duvall, R. Carhart — 20 OCT 1942

(3) calibration research–01.13

b. transducers (in general)–01.20

1. PROPERTIES OF ROCHELLE SALT, W. G. Cady — AUG 1941

2. NOTES OF CONFERENCES ON THE "ST. CLAIR" SOUND GENERATOR, H. T. O'Neil — 16 SEPT 1941

3. THE BEHAVIOR OF ROCHELLE SALTS IN TRANSDUCERS, K. S. Van Dyke — 3 DEC 1941

4.	PROGRESS REPORT NO. 2, UNDERWATER SOUND, 11-4-41 TO 12-10-41, M. C. Henderson (Contents: I. Bubbles as absorbers. II. Rochelle salt projectors as harmonic generators. III. (A) Reflections from sponge rubber, steel sheets, and Balsa wood at various angles and frequencies. (B) Transmission through steel sheets. IV. Calibration and properties of the W-U transducer. V. Output levels of various microphones: C-13, C-7, WE 630-A, and WU. The work reported is explanatory rather than quantitative.)	10 DEC 1941
5.	THE EFFECT OF VARIATIONS IN AMPLITUDE OVER THE FACE OF A TRANSDUCER, F. N. D. Kurie	13 DEC 1941
6.	PRELIMINARY DRAFT: EQUIVALENT CIRCUITS FOR ELECTROMECHANICAL TRANSDUCERS, E. M. McMillan	10 JAN 1942
7.	GYROSTABILIZER FOR TRANSDUCERS, F. N. D. Kurie, F. Pierce	14 JAN 1942
8.	APPLICATIONS OF C-13 TRANSDUCERS; QUESTIONS REGARDING, J. N. A. Hawkins	22 JAN 1942
9.	PRELIMINARY DRAFT: PIEZOELECTRIC TRANSDUCERS (PART I), E. M. McMillan	26 JAN 1942
10.	SOME MEASUREMENTS OF THE IMPEDANCE OF A BRUSH C-13 MICROPHONE, A. M. Thorndike	17 FEB 1942
11.	IMPEDANCE MEASUREMENTS ON ROCHELLE SALT RESONATORS, G. E. Duvall	26 FEB 1942
12.	POWER FACTORS AND INPUT IMPEDANCE OF ELECTRICAL CIRCUITS EQUIVALENT TO CERTAIN CRYSTAL TRANSDUCERS, D. K. Froman	6 MAR 1942
13.	OUTLINE OF RESEARCH PROGRAM AND PROGRESS REPORT, PIEZOELECTRIC STUDIES GROUP, D. K. Froman	9 APRIL 1942
14.	SOME PROBLEMS CONCERNED WITH CAVITATION, A. M. Thorndike	6 MAY 1942
15.	A MULTIDIRECTIONAL REFRACTION MICROPHONE, N. Most	23 JUNE 1942
16.	DYNAMIC DISPLACEMENT METER, C. H. Kean	26 JUNE 1942
17.	A HIGH INTENSITY UNDERWATER SOUND GENERATOR, S. C. Baden	24 JULY 1942
18.	EXPERIMENTS ON CAVITATION IN THE RANGE 10 KC TO 50 KC, A. M. Thorndike	10 AUG 1942
19.	VINYLITE-COVERED 6 CONDUCTOR SHIELDED CABLE, T. F. Burke, J. W. Sampsell	5 OCT 1942

(1) element studies–01.21

1.	EXPERIMENTAL STUDY OF ROCHELLE SALT; PRELIMINARY PROPOSALS, D. K. Froman	4 JAN 1942
2.	OUTLINE OF THE PROPOSED MEASUREMENT ON ROCHELLE SALT, C. H. Kean	4 JAN 1942
3.	NEED FOR MEASUREMENTS OF PIEZOELECTRIC PROPERTIES OF ROCHELLE SALT, A. M. Thorndike	4 JAN 1942
4.	HEATING IN ROCHELLE SALT DRIVEN AT HIGH POWER, A. M. Thorndike	12 JUNE 1942
5.	INVESTIGATION OF THE POWER HANDLING ABILITY OF 45° X-CUT AND Y-CUT ROCHELLE SALT CRYSTALS, F. X. Byrnes, NO. M175	30 NOV 1943
6.	INVENTION REPORT NO. PC-4 sr-30 PAT 22—DYNAMIC DISPLACEMENT METER, C. H. Kean, OSRD Invention Disclosure NO. 352, Navy Case NO. 3751, Application Serial NO. 518,157 filed	13 JAN 1944

(a) 45° y-cut rochelle salt crystals–01.211

(b) x-cut rochelle salt crystals–01.212

1.	THE DIELECTRIC PROPERTIES OF X-CUT ROCHELLE SALT, A. M. Thorndike	6 MAR 1942
2.	PROGRAM OF RESEARCH ON X-CUT ROCHELLE SALT CRYSTALS, D. K. Froman	19 MAR 1942
3.	MEASUREMENTS ON THE DIELECTRIC PROPERTIES OF X-CUT ROCHELLE SALT, A. M. Thorndike	30 MAR 1942
4.	IMPEDANCE OF ROCHELLE SALT, G. E. Duvall	23 JUNE 1942
5.	DYNAMIC DISPLACEMENT METER, C. H. Kean	26 JUNE 1942
6.	DISPLACEMENT DATA ON 45° X-CUT ROCHELLE SALT CRYSTALS, C. H. Kean	30 JUNE 1942
7.	THE USE OF X-CUT ROCHELLE SALT IN TRANSDUCERS, G. E. Duvall, D. K. Froman, C. H. Kean, A. M. Thorndike	4 JULY 1942
8.	FUNDAMENTAL STUDIES ON X-CUT ROCHELLE SALT, D. K. Froman	15 JULY 1942
9.	A NOTE ON THE POLARIZATION THEORY OF ROCHELLE SALT, C. H. Kean	3 AUG 1942

(c) magnetostriction units–01.213

(d) miscellaneous–01.214

1. INVENTION REPORT NO. PC-4 sr-30 PAT 92—CEMENTING PIEZOELECTRIC CRYSTALS TO RUBBER, F. M. Uber
2. TRANSMISSION OF SOUND THROUGH FLAT PLATES, E. M. McMillan — 15 OCT 1941
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4. INVENTION REPORT NO. PC-4 sr-30 PAT 66—ACOUSTIC IMPEDANCE ELEMENT (TRANSDUCER BACKING PLATE), T. F. Burke, OSRD Invention Disclosure NO. 3902, Navy Case NO. 5368, Application Serial NO. 599,740 filed — 15 JUNE 1945

(2) design studies–01.22

1. INVENTION REPORT NO. PC-4 sr-30 PAT 19—VARIABLE FREQUENCY TRANSDUCER, A. R. Champion, OSRD Invention Disclosure NO. 1057, Navy Case NO. 4050
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5. INVENTION REPORT NO. PC-4 sr-30 PAT 99—REINFORCED ACOUSTIC WINDOW, F. M. Uber
6. CHARACTERISTICS OF SOME TRANSDUCERS MADE BY UCDWR CRYSTAL LABORATORY, W. B. Beckley, NO. U23 — 6 MAY 1943
7. INVESTIGATION OF THE POWER HANDLING ABILITY OF 45° X-CUT AND Y-CUT ROCHELLE SALT CRYSTALS, F. X. Byrnes, NO. M175 — 30 NOV 1943
8. INVENTION REPORT NO. PC-4 sr-30 PAT 9—TRANSDUCER CONSTRUCTION AND METHOD, F. N. D. Kurie, OSRD Invention Disclosure NO. 286, Navy Case NO. 3716, Application Serial NO. 514,290 filed — 14 DEC 1943
9. SOME NOTES ON ACOUSTIC BOUNDARY-VALUE PROBLEMS AND THE HUYGENS-FRESNEL-KIRCHHOFF APPROXIMATIONS WITH APPLICATIONS TO THE PRESSURE FIELD OF TRANSDUCERS AND TO REFLECTION FROM ROUGH SURFACES, G. D. Camp — 12 JAN 1944
10. "FRONTING" PLATES FOR CRYSTALS, G. D. Camp — 27 JAN 1944
11. THE QUENCHING OF UNDERWATER SOUND PROJECTORS, C. Eckart, NO. M178 — 16 FEB 1944
12. DISSIPATION OF ENERGY IN CRYSTAL TRANSDUCERS—PART A, G. D. Camp — 19 FEB 1944

    (A qualitative argument is given, suggesting that the acoustic energy density inside a transducer may be considerably higher than one would expect from the intensity just in front of the diaphragm; this warns against too hasty exclusion of a proposed mechanism from consideration.)

13. DISSIPATION OF ENERGY IN CRYSTAL TRANSDUCERS—PART B, G. D. Camp — 25 FEB 1944

    (The theory of longitudinal and shear waves in a viscous medium is briefly summarized in appendices. These results are used to obtain order of magnitude estimates of the fractional dissipation corresponding to the internal generation of shear waves and the reflection-conversion of longitudinal to shear waves, two mechanisms discussed qualitatively in Part A. The importance of these mechanisms has since been demonstrated experimentally—see STV on crystal transducers.)

14. INVENTION REPORT NO. PC-4 sr-30 PAT 15—UNDERWATER TRANSDUCER, D. E. Ross, OSRD Invention Disclosure NO. 388, Navy Case NO. 3773, Application Serial NO. 523,887 filed — 25 FEB 1944
15. DISSIPATION OF ENERGY IN CRYSTAL TRANSDUCERS—PART C, G. D. Camp — 28 FEB 1944

    (Some experiments suggested by the discussion in Parts A and B are outlined. These and many others have since been performed.)

16. EQUIVALENT CIRCUITS OF CRYSTAL TRANSDUCERS, MODIFIED TO INCLUDE THE INFLUENCE OF DISSIPATION AND ATTACHMENTS—PART I, G. D. Camp — 14 MAR 1944

    (The great practical value of an equivalent circuit representation is stressed, and the possibility of including the effects of dissipation and attachments is indicated. The general character of this circuit is deduced and experiments for measuring the new parameters so introduced

are suggested. This memo is interesting historically, since it is the forerunner of the variational treatment later developed. However, this subject is treated much more thoroughly in the STV.)

17. EQUIVALENT CIRCUITS OF CRYSTAL TRANSDUCERS, MODIFIED TO INCLUDE THE INFLUENCE OF DISSIPATION AND ATTACHMENTS—PART II, G. D. Camp — 18 MAR 1944

(The equivalent circuits of attachments are given and these are combined with that for a dissipative single crystal as discussed in Part A, to obtain a complete equivalent circuit for a loaded single crystal. The much more complicated problem, of finding an equivalent circuit representation of an actual crystal transducer, is briefly discussed and an experimental program is suggested. Much of this experimental work has since been done and useful results obtained. However, much more still remains to be done.)

18. CRYSTAL TRANSDUCER RESEARCH PROGRAM, G. D. Camp — 17 JUNE 1944

19. REPRESENTATION OF TRANSCENDENTAL IMPEDANCES WITH CONSTANT OR SLOWLY VARYING LCR ELEMENTS, G. D. Camp — 29 AUG 1944

(This is a brief memo developing results used in the memo on the LCR simulator (Representation of Transcendental Impedances with Constant, or Slowly Varying LCR Elements, Camp, 29 August 1944.) It shows that the individual terms, in the partial-fraction or "resonance denominator" series representations of certain transcendental functions, can be interpreted as the impedance of a parallel circuit composed of constant LCR elements.)

20. REPRESENTATION OF REAL TRANSDUCERS WITH ELECTRICAL NETWORKS COMPOSED OF CONSTANT OR SLOWLY VARYING LCR ELEMENTS (THE LCR SIMULATOR), G. D. Camp — 30 AUG 1944

(Continuous elastic systems, when represented by circuits with a finite number of loops, always have elements which are transcendental functions of frequency; this is because an algebraic impedance cannot have an infinite spectrum of resonances. Computations are therefore very tedious, especially where dissipation is involved since in this case the arguments of the transcendental functions are complex. This memo proposes an electric circuit, the LCR simulator, for doing these computations rapidly, and develops the design formulas for this circuit. This circuit was built shortly afterward and has furnished very valuable results with a minimum of labor.)

21. EFFICIENCY AND IMPEDANCE OF CRYSTAL TRANSDUCERS, D. C. Kalbfell — 11 OCT 1944

22. DIRECTIVITY PATTERN COMPUTER, G. D. Camp — 12 OCT 1944

(Electrical circuits for computing directivity patterns are discussed. Time did not permit further work on this, and the rapid computation of directivity patterns from an assumed velocity distribution is still an unsolved problem.)

23. DIRECTIVITY PATTERNS CORRESPONDING TO NON-UNIFORM VELOCITY DISTRIBUTIONS, G. D. Camp — 23 OCT 1944

(Probe microphone measurements indicate that, at least, in air, the velocity pattern over the motor of actual transducers is far from uniform. This memo is a theoretical study of the influence of these non-uniformities on the directivity pattern.)

24. SERIES AND PARALLEL RESONANCE, T. F. Burke — 18 DEC 1944

(Written as the result of a conference in which it developed that there was common misunderstanding of simple circuits. Memo merely reviews elementary circuit theory available in many textbooks, and lists some useful formulas.)

25. DEPENDENCE OF FINITE-WIDTH PHASE ON FREQUENCY, G. D. Camp — 2 JUNE 1945

(The total change in phase suffered by a wave in traveling once along a rod or crystal of fixed length, is the argument of the transcendental impedances appearing in its equivalent circuit. This quantity is proportional to frequency in thin rods, but increases more rapidly in rods or crystals of finite width. In this memo, the dependence of the total phase increment upon frequency and radius of gyration of the cross-section is calculated and displayed by a set of graphs.)

26. INVENTION REPORT NO. PC-4 sr-30 PAT 66—ACOUSTIC IMPEDANCE ELEMENT (TRANSDUCER BACKING PLATE), T. F. Burke, OSRD Invention Disclosure NO. 3902, Navy Case NO. 5368, Application Serial NO. 599,740 filed — 15 JUNE 1945

27. SEVERAL APPLICATIONS OF THE RECIPROCITY THEOREM, T. F. Burke — 2 JULY 1945

(Written as the result of research for the Research and Development Group of the Transducer Laboratory. Makes use of Reciprocity Theorem to develop several expressions not readily obtained by integration. Two major results are given: (1) A relation for the diminution in radiated intensity caused by lobe-suppressing any plane radiator. (2) An algebraic expression for the directivity index of any radiator involving two unknown parameters; particularly useful for plane arrays.)

c. underwater sounds and noise (listening methods)—01.30

1. SONIC DETECTION OF AN AIRPLANE FROM A SUBMARINE, H. U. Sverdrup — 5 JAN 1942

2.	MEMORANDUM ON MEASUREMENTS NECESSARY TO THE DEVELOPMENT OF METHODS OF UNDERWATER LISTENING, F. A. Everest, W. V. Houston	13 MAR 1942
3.	BRIEF REPORT ON PROGRESS OF LISTENING WORK UP TO 4-23-42, F. A. Everest	24 APRIL 1942
4.	TRANSMISSION MEASUREMENTS WITH SIGNAL/NOISE RATIO LESS THAN UNITY, F. A. Everest	12 OCT 1942
5.	METHODS SUITABLE FOR THE CALIBRATION AND USE OF AN OCTAVE-BAND SOUND LEVEL METER, R. W. Young, NO. M32	10 FEB 1943
6.	SURVEY OF UNDERWATER SOUND—REPORT NO. 1, INTRODUCTION, V. O. Knudsen, R. S. Alford, J. W. Emling (Critical summary of measurements on background noise and the acoustic output of ships.)	26 FEB 1943
7.	SURVEY OF UNDERWATER SOUND—REPORT NO. 2, SOUNDS FROM SUBMARINES, V. O. Knudsen, R. S. Alford, J. W. Emling (Critical summary of measurements on background noise and the acoustic output of ships.)	31 DEC 1943
8.	SURVEY OF UNDERWATER SOUND—REPORT NO. 3, AMBIENT NOISE, V. O. Knudsen, R. S. Alford, J. W. Emling (Critical summary of measurements on background noise and the acoustic output of ships.)	6 APRIL 1944
9.	SURVEY OF UNDERWATER SOUND—REPORT NO. 4, SOUNDS FROM SURFACE SHIPS, V. O. Knudsen, M. T. Dow, J. W. Emling (Critical summary of measurements on background noise and the acoustic output of ships.)	15 JUNE 1945

(1) detectable sounds of ships and submarines–01.31

1.	MEASUREMENTS OF THE SOUNDS OF SUBMARINES BY THREE INDEPENDENT MEASURING SYSTEMS (COLUMBIA, HARVARD, MIT), V. O. Knudsen, L. J. Sivian	1 MAR 1943
2.	UNDERWATER SOUND OUTPUT FROM SUBMARINE CHARGING BATTERIES, Listening Section, NO. M43	4 MAR 1943
3.	SOME UNDERWATER SOUND MEASUREMENTS ON TWO AIRCRAFT CARRIERS, Listening Section, NO. A1	27 APRIL 1944
4.	FURTHER UNDERWATER SOUND MEASUREMENTS ON AIRCRAFT CARRIERS, Listening Section, NO. A3	12 MAY 1944
5.	UNDERWATER SOUND MEASUREMENTS ON AIRCRAFT CARRIERS, Listening Section, NO. M212	15 MAY 1944
6.	UNDERWATER SOUND MEASUREMENTS ON AIRCRAFT CARRIERS (MAY 24 AND JUNE 1, 1944), T. McMillian, H. J. Oorthuys, NO. A14	2 JUNE 1944
7.	UNDERWATER SOUND OUTPUT OF CRUISER, DESTROYER, AND AIRCRAFT CARRIER, Listening Section, NO. SM268	28 OCT 1944
8.	CALIBRATION OF UNDERWATER SOUND LEVEL METER AND ANALYZER, H. J. Oorthuys, NO. A48	15 NOV 1944
9.	SUBMARINE SOUNDS RECORDED FOR MARE ISLAND NAVY YARD, Listening Section, NO. M277	18 NOV 1944
10.	SOUND CAVITATION TESTS ON USS SPRINGER (SS414), Listening Section, NO. M283	20 DEC 1944
11.	BACKGROUND NOISE IN THE SUPERSONIC RANGE, T. F. Johnston	3 FEB 1945
12.	UNDERWATER SOUND OUTPUT OF USS SPOT (SS413), Listening Section, NO. M296	1 MAR 1945
13.	UNDERWATER SOUND OUTPUT OF THE USS TINOSA (SS283), Listening Section, NO. M303	5 MAR 1945
14.	POINT LOMA SHIP-SOUND MONITORING STATION, Listening Section, NO. M321	25 MAY 1945
15.	AIR-BORNE NOISE MEASUREMENTS ON THE AGC-5, Listening Section, NO. M356	28 AUG 1945
16.	PRO-SUBMARINE PROGRAM AT UCDWR, W. B. Beckley	28 SEPT 1945

(2) detectable sound of underwater ordnance–01.32

(3) background noise–01.33

1.	METHODS SUITABLE FOR THE CALIBRATION AND USE OF AN OCTAVE-BAND SOUND LEVEL METER, R. W. Young, NO. M32	10 FEB 1943
2.	UNDERWATER SOUNDS OF BIOLOGICAL ORIGIN, M. W. Johnson, NO. U28 (An early summary, amplified but not superseded by later reports.)	15 FEB 1943

3. DATA FOR THE DESIGN OF INDUCTANCES WOUND ON MOLYBDENUM PERMALLOY CORES, R. S. Gales, NO. M37 — 25 FEB 1943

4. BLANKING AND SCREENING BY SURFACE WAKES, Wake Studies Group, NO. M38 — 5 MAR 1943

5. AMBIENT NOISE MEASUREMENTS IN THE WESTERN PACIFIC—USS SUMNER EXPEDITION, R. H. Fleming, F. A. Everest — 13 SEPT 1943

6. UNDERWATER SOUND OUTPUT OF THE USS TINOSA (SS283), Listening Section, NO. M303 — 5 MAR 1945

7. AIR-BORNE NOISE MEASUREMENTS ON THE AGC-5, Listening Section, NO. M356 — 28 AUG 1945

(a) ambient noise–01.331

1. SEASONAL AND DIURNAL WATER-NOISE VARIATIONS, SAN FRANCISCO HARBOR ENTRANCE—SUPPLEMENT TO WATER NOISE SURVEY, SAN FRANCISCO, F. A. Everest, R. W. Young — 13 JUNE 1942

2. WATER BACKGROUND NOISE IN SAN DIEGO AREA, F. A. Everest, R. W. Young, G. P. Welch — 22 AUG 1942

3. DEEP-SEA WATER BACKGROUND NOISE, Listening Section, NO. M34 — 8 FEB 1943

4. PRELIMINARY SURVEY OF CERTAIN BIOLOGICAL UNDERWATER SOUNDS ON THE EAST COAST OF NORTH AMERICA, M. W. Johnson, NO. U63 — 25 MAY 1943

5. UNDERWATER AMBIENT NOISE SURVEY—BAHAMAS AND EAST COAST OF FLORIDA, R. H. Fleming, D. A. Proudfoot, NO. M80 — 29 JUNE 1943

6. A SURVEY OF BIOLOGICAL UNDERWATER NOISES OFF THE COAST OF CALIFORNIA AND IN UPPER PUGET SOUND, M. W. Johnson, NO. U100 — 10 SEPT 1943

7. SOME AMBIENT WATER NOISE MEASUREMENTS IN THE 13TH NAVAL DISTRICT, Listening Section, NO. M120 — 15 OCT 1943

8. BACKGROUND NOISES OF BIOLOGICAL ORIGIN, M. W. Johnson — 19 OCT 1943

9. SOME AMBIENT WATER NOISE MEASUREMENTS IN THE 14TH NAVAL DISTRICT, Listening Section, NO. M122 — 22 OCT 1943

10. UNDERWATER NOISE AND THE DISTRIBUTION OF SNAPPING SHRIMP WITH SPECIAL REFERENCE TO THE ASIATIC AND THE SOUTHWEST AND CENTRAL PACIFIC AREAS, M. W. Johnson, NO. U146 — 15 JAN 1944

    (Definitive report on the areas in which snapping shrimp exist.)

11. SUPPLEMENT TO SOME AMBIENT WATER NOISE MEASUREMENTS IN THE 14TH NAVAL DISTRICT, Listening Section, NO. M122a — 22 JAN 1944

12. THE PREDICTION OF AMBIENT NOISE LEVEL IN OR NEAR SHALLOW WATER, M. W. Johnson, F. P. Shepard, NO. M205 — 21 APRIL 1944

13. DISTRIBUTION OF AMBIENT NOISE LEVELS, Listening Section, NO. A9 — 20 MAY 1944

14. DIRECTIVITY OF SHRIMP NOISE, T. F. Johnston, NO. A27 — 11 AUG 1944

15. FOURIER ANALYSIS OF SNAPPING SHRIMP IMPULSES, T. F. Johnston, NO. A28 — 14 AUG 1944

16. NOISE PRODUCED BY SNAPPING SHRIMP, T. F. Johnston, NO. A36 — 14 SEPT 1944

17. THE EFFECT OF SHRIMP NOISE ON AUDIBILITY OF UNDERWATER SOUNDS, R. S. Gales, NO. A46 — 9 NOV 1944

    (Shrimp noise very effectively masks ship, submarine and torpedo sounds above 1.5 kc for sonic listening.)

18. AMBIENT WATER NOISE IN THE CENTRAL AND SOUTHWEST PACIFIC BASED ON OBSERVATIONS MADE BY W. E. LOOMIS, M. W. Johnson, T. F. Johnston, NO. M284 — 28 DEC 1944

    (Final report on results of an expedition sponsored by BuOrd, BuShips and NDRC.)

19. UNDERWATER EVENING NOISE IN THE HAWAIIAN AREA, Listening Section, NO. M299 — 1 MAR 1945

    (Report of noise made by an as yet unidentified marine animal.)

20. UNDERWATER NOISE CAUSED BY SNAPPING SHRIMP, Sonar Data Division, NO. U337 — 20 AUG 1945

    (Final comprehensive report on the subject.)

(b) self noise–01.332

1. QC PROJECTOR WATER NOISE MEASUREMENTS (USS RATHBURNE), F. A. Everest, D. J. Evans — 24 FEB 1942

2. SELF-NOISE OF PC BOATS, T. F. Johnston, NO. A16 — 10 JUNE 1944

3.	SELF-NOISE OF THE S-23, T. F. Johnston, NO. A41	5 OCT 1944
4.	STATUS REPORT ON SELF-NOISE MEASUREMENTS OF SONAR INSTALLATIONS, Sonar Data Division, NO. M385	29 DEC 1945

(4) masking of ship sounds by noise–01.35

1.	A RECORDING CHANNEL FOR THE LABORATORY, J. N. A. Hawkins	AUG 1941
2.	PROPOSAL FOR STUDYING THE MASKING EFFECT OF WATER NOISE ON UNDER-WATER SHIP SOUNDS, F. A. Everest	10 APRIL 1942
3.	ALTERNATIVE METHOD OF MEASURING A SIGNAL-TO-NOISE RATIO LESS THAN UNITY, R. W. Young	22 OCT 1942
4.	OUTLINE OF PROPOSED LISTENING MASKING PROGRAM, F. A. Everest	13 AUG 1943
5.	NOTES BASED ON CONFERENCE OF 5 MAY 1944 ON PSYCHOPHYSICAL PROBLEMS OF ECHO RANGING AND LISTENING, C. Eckart	16 MAY 1944
6.	SOME CONSIDERATIONS PERTAINING TO SYSTEMATIC MASKING OF SHIP SOUNDS, R. S. Gales, NO. A11	23 MAY 1944
7.	PROPOSED METHODS FOR MONITORING SONIC OUTPUT OF SUBMARINES, L. W. Sepmeyer, R. S. Gales, NO. A13	31 MAY 1944
8.	MASKING EXPERIMENTS: REPORT NO. I, Listening Section, NO. U229 (The first of a series on this subject, being devoted to apparatus, techniques and definitions.)	28 JUNE 1944
9.	MASKING EXPERIMENTS: REPORT NO. II, Listening Section, NO. U258 (Quantitative evidence on the audibility of underwater ship sounds in the presence of selected background noises.)	15 SEPT 1944
10.	THE EFFECT OF SHRIMP NOISE ON AUDIBILITY OF UNDERWATER SOUNDS, R. S. Gales, NO. A46	9 NOV 1944
11.	AUDIBILITY WEIGHTING NETWORK, R. S. Gales, L. J. Goldberg	9 MAR 1945
12.	AN EXPERIMENTAL STUDY OF MASKING BY A LINE SPECTRUM, Sonar Data Division, NO. M314	7 JUNE 1945

d. reverberation and scattering–01.40

1.	THEORY OF REVERBERATION AND ECHO, C. Eckart	JULY 1941
2.	OBSERVATIONS MADE ON BOARD DESTROYERS USS TALBOT AND USS GILMER AND SUBMARINE S-28 DURING MANEUVERS OF JULY 16-17, N. J. Holter	28 JULY 1941
3.	ATTENUATION AND SCATTERING BY BUBBLES ACCORDING TO WILLIS, W. V. Houston	18 AUG 1941
4.	REVERBERATION SIMULATOR AND RANDOM NOISE PRODUCER, T. H. Schafer	31 DEC 1941
5.	REVERBERATION STUDIES, C. F. Eyring	13 FEB 1942
6.	CONFERENCE ON REVERBERATION IN SEA WATER HELD FEBRUARY 23, 1942, W. V. Houston	23 FEB 1942
7.	AMPLITUDE OF THE ECHO FROM A SUBMARINE AS A FUNCTION OF THE SIGNAL LENGTH, C. F. Eyring, R. J. Christensen	18 APRIL 1942
8.	MULTIPLE SCATTERING, C. F. Eyring, R. J. Christensen, C. Eckart	18 APRIL 1942
9.	OPTICAL ANALOGUE OF SONIC REFLECTION FROM THE SURFACE OF THE OCEAN, J. G. Teasdale	21 APRIL 1942
10.	REDUCTION OF REVERBERATION WITH PRESENT ECHO-RANGING EQUIPMENT, L. J. Sivian, C. F. Eyring	2 MAY 1942
11.	REVERBERATION IN SHALLOW WATER, C. F. Eyring, R. W. Raitt, R. J. Christensen	15 MAY 1942
12.	REVERBERATION IN ECHO RANGING—PART I, GENERAL PRINCIPLES, T. H. Osgood, W. V. Houston (A summary of the work which has been carried on principally by the UCDWR.)	28 JULY 1942
13.	EFFECT OF DOPPLER ON ECHO DETECTION (COMMENTS ON BRITISH INTERNAL REPORT NO. 31—V258), C. Eckart	29 JULY 1942
14.	MEASUREMENT OF RAPID DECAY RATES IN A REVERBERATION CHAMBER, D. C. Kalbfell	10 OCT 1942
15.	REVERBERATION STUDIES AT 24 KC, Reverberation Group, NO. U7 (Comprehensive report of the 1941-42 program of reverberation studies. Basic theory and much experimental material. Not superseded by any later report.)	23 NOV 1942

16. SCATTERING OF UNDERWATER SOUND BY SOLID PARTICLES AND AIR BUBBLES, G. E. Duvall, NO. M40 — 11 FEB 1943

(Summary of theoretical formulae and graphs.)

17. VOLUME REVERBERATION SCATTERING AND ATTENUATION VS. FREQUENCY, Reverberation Group, NO. U50 — 13 APRIL 1943

(Report of an extensive program of experiments designed to investigate the effect of frequency on the intensity of volume reverberation. Also see U79.)

18. REVERBERATION IN ECHO RANGING—PART II, REVERBERATION FOUND IN PRACTICE (NAVY PROJECT NO. NS-140), T. H. Osgood, CUDWR — 14 APRIL 1943

(A summary of the work which has been carried on principally by the UCDWR.)

19. THE DISCRIMINATION OF TRANSDUCERS AGAINST REVERBERATION, Reverberation Group, NO. U75 — 31 MAY 1943

(Definitive theoretical discussion of this subject: contains useful approximate formulae and comparison with experiment.)

20. BOTTOM REVERBERATION: DEPENDENCE ON FREQUENCY, Reverberation Group, NO. U79 — 16 JUNE 1943

(Report on experiments designed to investigate the effect of frequency on the intensity of bottom reverberation. Supplements U50.)

21. A SYSTEM FOR RECORDING REVERBERATION AS IT OCCURS IN THE OCEAN, Reverberation Group, NO. M111 — 28 AUG 1943

22. BOTTOM REVERBERATION, T. H. Schafer, NO. A5 — 8 DEC 1943

23. BOTTOM REVERBERATION AT 24 KC—E. W. SCRIPPS DATA, R. R. Carhart, NO. A7 — 18 MAY 1944

24. RANGE LIMITATION IN SHALLOW WATER AS CONTROLLED BY BOTTOM CHARACTER, STATE OF SEA, AND THERMAL STRUCTURE, F. P. Shepard, NO. A10 — 22 MAY 1944

25. REFLECTION COEFFICIENT OF SURFACE AND BOTTOM, R. W. Raitt, NO. A8 — 22 MAY 1944

26. LIMITATION OF RANGE BY REVERBERATION PRESENTATION OF DATA, R. W. Raitt — 3 JUNE 1944

27. SOME EVIDENCE FOR SPECULAR BOTTOM REFLECTION OF 24 KC SOUND, R. R. Carhart, NO. A17 — 9 JUNE 1944

28. BOTTOM REVERBERATION IN VERY SHALLOW WATER, R. W. Raitt, NO. A18 — 15 JUNE 1944

29. APPENDIX TO INTERNAL REPORT A18—BOTTOM REVERBERATION IN VERY SHALLOW WATER, R. W. Raitt, NO. A19 — 15 JUNE 1944

30. BOTTOM REVERBERATION IN VERY SHALLOW WATER, Echo-Ranging Section, NO. SM249 — 18 AUG 1944

31. SUMMARY OF THE CALIBRATION OF THE REVERBERATION EQUIPMENT NOVEMBER 24, 1943, TO FEBRUARY 23, 1945, T. H. Schafer — 18 APRIL 1945

32. UCDWR AND BTL NO-DOPPLER RECOGNITION DIFFERENTIALS, A. M. Small — 4 MAY 1945

33. JOB BREAKDOWN OF REVERBERATION MEASUREMENT AND ANALYSIS TO FIRST SUMMARY SHEETS, T. H. Schafer — 27 JUNE 1945

34. BOTTOM REVERBERATION WITH A HORIZONTAL BEAM, R. R. Carhart — 4 AUG 1945

35. LIMITATION OF ECHO RANGES BY REVERBERATION (DEEP WATER), Sonar Data Division, NO. M361 — 20 SEPT 1945

(A statistical analysis based on transmission and reverberation measurements.)

36. SCATTERING FROM A HEAVY RIGID SPHERE, G. E. Duvall — 26 SEPT 1945

37. A SUGGESTION FOR CONTROLLING THE ERRORS INVOLVED IN THE PROCESSING OF REVERBERATION DATA, G. E. Duvall — 19 DEC 1945

38. STRATIFICATION OF SOUND SCATTERERS IN THE OCEAN, Sonar Data Division, NO. M397 — 16 FEB 1946

e. echo masking by reverberation–01.41

1. INVENTION REPORT NO. PC-4 sr-30 PAT 39—PERIOD METER, R. C. Fisher, W. M. Rayton, OSRD Invention Disclosure NO. 2054

2. A RECORDING CHANNEL FOR THE LABORATORY, J. N. A. Hawkins — AUG 1941

3. THE DETECTION OF AN ECHO IN THE PRESENCE OF REVERBERATION, C. Eckart — 12 MAY 1942

4. REPORT OF LABORATORY TESTS ON AURAL RECEPTION, ETC. BY R. S. ALFORD (COMMENTS ON NDRC DOCUMENT 115.3), C. Eckart, G. Camp — 25 SEPT 1942

5.	THE MASKING OF ECHO BY REVERBERATION, C. Eckart, NO. M22	8 JAN 1943
6.	TONE DURATION AS A FACTOR IN PITCH DISCRIMINATION, E. G. Wever, NO. M179 (First report on the subject; not obsolete.)	16 FEB 1944
7.	FREQUENCY CHARACTERISTICS OF ECHOES AND REVERBERATION, W. M. Rayton, R. C. Fisher, NO. U244 (Final report on the periodmeter and results obtained with this device.)	9 AUG 1944
8.	ANALYSIS OF VARIANCE WITH THE APPLICATION OF THIS METHOD TO PSYCHO-ACOUSTIC TESTS, G. W. Tyler	8 MAR 1945
9.	SONAR HUT NOISE MEASUREMENTS ON A FRIGATE, R. S. Gales, A. M. Small, NO. M324	11 JUNE 1945
10.	DOPPLER JUDGMENT AT LOW BEAT-FREQUENCY OSCILLATOR SETTINGS, A. Ford, L. J. Cronbach, D. F. Lovell, NO. M347 (Experimental results of a study of errors in judgment of doppler as a function of frequency of the echo. The apparent pitch varies with loudness of the echo differently at different audio frequencies.)	13 AUG 1945

f. echo masking by noise–01.42

1.	MASKING EFFECT OF WATER NOISE ON SHORT PULSES, R. C. Fisher, NO. S239	25 JULY 1944

g. acoustic properties of wakes–01.50

1.	DETECTION OF WAKE BY HYDROCARBON, H. M. Zenor	AUG 1941
2.	INFLUENCE OF AIR BUBBLES ON THE EXTINCTION OF SOUND IN WATER—REPORT NO. 1, P. S. Epstein	8 AUG 1941
3.	ON THE EXTINCTION OF SOUND IN WATER CAUSED BY AIR BUBBLES—REPORT NO. 2, P. S. Epstein	11 AUG 1941
4.	ATTENUATION AND SCATTERING BY BUBBLES ACCORDING TO WILLIS, W. V. Houston	18 AUG 1941
5.	ON THE DETECTION OF WAKES BY VERTICAL SUPERSONIC BEAM, W. R. Smythe	13 SEPT 1941
6.	CONFERENCE ON WAKES—JUNE 26, 1942, G. P. Harnwell	26 JUNE 1942
7.	STATUS OF AND PLANS FOR THE WAKE PROGRAM, C. Eckart	24 AUG 1942
8.	ECHOES FROM WAKES, Reverberation Group	29 AUG 1942
9.	CONFERENCE ON WAKES, C. Eckart	16 NOV 1942
10.	THE EFFECT OF TURBULENT MOTION ON THE RATE OF RISE OF BUBBLES IN A WAKE, J. S. McNown, NO. U25	19 FEB 1943
11.	THE ENTRAPMENT OF BUBBLES IN VORTICES, J. S. McNown, NO. M46	3 MAR 1943
12.	BLANKING AND SCREENING BY SURFACE WAKES, Wake Studies Group, NO. M38	5 MAR 1943
13.	ACOUSTIC MEASUREMENTS ON SURFACE WAKES IN SAN DIEGO HARBOR, R. R. Carhart, G. E. Duvall, NO. U62	8 MAY 1943
14.	ECHOES FROM WAKES, Reverberation Group, NO. M99	24 AUG 1943
15.	OSCILLOGRAMS OF 24 KC ECHOES FROM A DESTROYER AND ITS WAKE, Echo-Ranging Section, NO. M141	3 JAN 1944
16.	MEASUREMENTS OF 24 KC ECHOES FROM A DESTROYER AND ITS WAKE, G. Duvall, NO. M141a	20 JAN 1944
17.	PRELIMINARY REPORT ON ECHOES FROM A DIVING SUBMARINE AND ITS WAKE, Sonar Section, NO. M172	22 JAN 1944
18.	DATA AT 45 KC ON ECHOES FROM A DIVING SUBMARINE AND ITS WAKE, Sonar Section, NO. M172a	3 MAR 1944
19.	SOUND TRANSMISSION THROUGH DESTROYER WAKE, Listening Section, NO. M189	8 MAR 1944
20.	SCATTERING STRENGTH OF S/M WAKES AT 45 KC, G. E. Duvall	8 APRIL 1944
21.	OSCILLOGRAMS OF 24 KC NOISE PRODUCED BY A DESTROYER, G. E. Duvall, NO. A2	1 MAY 1944
22.	CHEMICAL RECORDER TRACES OF SUBMARINE WAKES, G. E. Duvall, NO. A23	18 JULY 1944
23.	WAKE OF A FLEET-TYPE SUBMARINE, G. E. Duvall, W. M. Rayton, NO. A34	6 SEPT 1944

h. bottom investigations–01.60

1.	BOTTOM SEDIMENT CHARTS NO. HO-0796-BS, HO-0797-BS, HO-1019-BS, HO-1593-BS, HO-1594-BS, HO-1595-BS, HO-BA1653a-BS, HO-2124-BS, HO-2187-BS, HO-2404-BS, HO-BA2414-BS, HO-2475-BS, HO-BA2637-BS, HO-2725-BS, HO-2726-BS, HO-2728-BS, HO-2732-BS, HO-2733-BS, HO-3112-BS, HO-3117-BS, HO-3149-BS, HO-3176-BS, HO-3240-BS, HO-3308-BS, HO-3747-BS, HO-5316-BS, HO-5317-BS, HO-5322-BS, HO-5323-BS, HO-5326-BS, HO-5466-BS, HO-5467-BS, HO-5493-BS, HO-5494-BS, HO-5495-BS, HO-5677-BS, HO-5679-BS, HO-6146-BS, HO MISC. 10,010-30-BS, HO, UCDWR.	
2.	BOTTOM CHARACTER IN APPROACHES TO SAN FRANCISCO, Oceanographic Division	14 JULY 1942
3.	BOTTOM CHARACTER OFF THE COLUMBIA RIVER ENTRANCE, Oceanographic Division	24 AUG 1942
4.	REVISED BOTTOM CHARACTER CHART OFF SAN DIEGO, Oceanographic Division	25 AUG 1942
5.	BOTTOM CHARACTER IN STRAIT OF JUAN DEFUCA, Oceanographic Division	27 AUG 1942
6.	PROPOSED SOUND-RANGING EXPERIMENTS TO 1EST EFFECTS OF BOTTOM CHARACTER AND SUBMARINE TOPOGRAPHY, Oceanographic Division	3 SEPT 1942
7.	CHARACTER OF THE BOTTOM OFF SAN FRANCISCO (CHART NO. 224), Oceanographic Division	10 NOV 1942
8.	BOTTOM CHARACTER CHART OF TOKYO BAY AND APPROACHES (NO. 221, 1, 2), Oceanographic Division	16 NOV 1942
9.	BOTTOM REVERBERATION: DEPENDENCE ON FREQUENCY, Reverberation Group, NO. U79	16 JUNE 1943
10.	THE EFFECT OF THERMAL CONDITIONS ON THE INCIDENT ANGLE OF SOUND AT THE OCEAN BOTTOM, R. R. Carhart	20 NOV 1943
11.	BOTTOM SCATTERING COEFFICIENT, R. W. Raitt	25 JAN 1944
12.	STATUS OF BOTTOM REVERBERATION STUDIES, R. R. Carhart	17 MAY 1944
13.	BOTTOM REVERBERATION AT 24 KC—E W SCRIPPS DATA, R. R. Carhart, NO. A7	18 MAY 1944
14.	RANGE LIMITATION IN SHALLOW WATER AS CONTROLLED BY BOTTOM CHARACTER, STATE OF SEA AND THERMAL STRUCTURE, F. P. Shepard, NO. A10	22 MAY 1944
15.	SOME EVIDENCE FOR SPECULAR BOTTOM REFLECTION OF 24 KC SOUND, R. R. Carhart, NO. A17	9 JUNE 1944
16.	ECHO RANGING IN SHALLOW WATER AT 20 KC, F. P. Shepard	22 JUNE 1944
17.	A NEW METHOD FOR MEASURING THE ACOUSTICAL CONSTANTS OF SEDIMENT SAMPLES, Sonar Data Division, NO. M340	2 AUG 1945

i. transmission of underwater sound–01.70

1.	ALTERNATIVE METHOD OF MEASURING A SIGNAL-TO-NOISE RATIO LESS THAN UNITY, R. W. Young	22 OCT 1942
2.	VARIATION OF THE SOUND FIELD NEAR THE SURFACE IN DEEP WATER, H. T. O'Neil, T. F. Johnston, NO. U49 (Graphs and formulae concerning interference of direct and surface-reflected sound, neglecting refraction. See M140.)	16 MAR 1943
3.	OUTLINE OF PROPOSED PROGRAM OF DEEP WATER SOUND PROPAGATION MEASUREMENTS, F. A. Everest	28 AUG 1943
4.	SOME GENERAL IDEAS CONCERNING THE TRANSMISSION OF SOUND IN THE DEEP SEA, C. Eckart, NO. M108	28 SEPT 1943
5.	MINUTES OF A CONFERENCE ON THE TRANSMISSION OF SOUND IN THE SEA, C. Eckart	11 OCT 1943
6.	LLOYD MIRROR EFFECT IN A VARIABLE VELOCITY MEDIUM, R. R. Carhart, NO. M140 (An application of ray theory to the problem of interference between direct and surface reflected sound when there are temperature gradients.)	23 OCT 1943
7.	OUTLINE OF PROPOSED PROGRAM OF SOUND PROPAGATION MEASUREMENTS IN DEEP WATER, F. A. Everest, T. F. Johnston	9 NOV 1943
8.	TRANSMISSION OF UNDERWATER SOUND OVER A SLOPING BOTTOM, R. R. Carhart, K. O. Emery, NO. A39	1 OCT 1944

(1) attenuation–01.71

1.	ATTENUATION AND SCATTERING BY BUBBLES ACCORDING TO WILLIS, W. V. Houston	18 AUG 1941
2.	MEMO ON THE ATTENUATION OF SOUND IN WATER (NOTES FROM SEMINAR CONDUCTED BY V. O. KNUDSEN), V. O. Knudsen	29 SEPT 1941

3.	THE ATTENUATION OF SOUND IN WATER—NOTES BASED ON SEMINAR CONDUCTED BY DR. KNUDSEN, 29 SEPTEMBER 1941, V. O. Knudsen	DEC 1941
4.	A METHOD OF DETERMINING THE ATTENUATION OF SOUND IN SEA WATER, R. R. Thompson	16 DEC 1941
5.	SOUND ATTENUATION IN SAN DIEGO HARBOR, F. A. Everest, H. T. O'Neil (Material incorporated in report of 30 July 1942.)	10 JAN 1942
6.	ATTENUATION OF UNDERWATER SOUND, F. A. Everest, H. T. O'Neil (Later revised and issued 30 July 1945.)	16 FEB 1942
7.	MEASUREMENT OF ATTENUATION IN SEA WATER BY VERTICAL PULSING, H. T. O'Neil (Refers principally to work plans.)	14 MAY 1942
8.	ATTENUATION OF UNDERWATER SOUND, F. A. Everest, H. T. O'Neil (A revision of a report originally issued 16 February 1942 on attenuation as deduced from shallow water measurements.)	30 JULY 1942
9.	THE ATTENUATION OF SOUND IN THE SEA, C. Eckart, NO. U236 (Critical summary of measurements by various experimenters.)	6 JULY 1944
10.	ATTENUATION AND FLUCTUATION STUDIES BASED ON SUPERSONIC BOTTOM ECHOES, Sonar Data Division, NO. M384	13 DEC 1945

(2) transmission of high frequency sound–01.72

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 102—CALCULATOR, C. Eckart	
2.	LLOYD MIRROR EFFECT, R. R. Carhart	22 JUNE 1943
3.	INTERIM REPORT ON THE SOUND FIELD OF ECHO-RANGING GEAR, Sound Field Group, NO. U113 (A comprehensive survey of transmission phenomena; extended but not superseded by later reports.)	1 OCT 1943
4.	EFFECTS OF REFRACTION ON LLOYD MIRROR TENTATIVE RESULTS, R. R. Carhart.	16 OCT 1943
5.	LLOYD MIRROR EFFECT IN A VARIABLE VELOCITY MEDIUM, R. R. Carhart, NO. M140 (An application of ray theory to the problem of interference between direct and surface-reflected sound when there are temperature gradients.)	23 OCT 1943
6.	THE AUTOMATIC RECEIVER GAIN CHANGER, N. Most	29 MAR 1944
7.	TRANSMISSION OF 60 KC SOUND DATA OF MARCH AND APRIL 1944, M. J. Sheehy, NO. A6	17 MAY 1944
8.	SCATTERING OF SOUND BY THE SURFACE OF THE SEA, L. I. Schiff, NO. M217	25 MAY 1944
9.	COMPARISON OF THE MEASURING SYSTEMS AT 24 KC OF THE LISTENING SECTION AND THE ECHO-RANGING SECTION, M. J. Sheehy, G. P. Welch, NO. A12	29 MAY 1944
10.	TRANSMISSION OF THE 24 KC COMPONENT OF SIGNALS, M. J. Sheehy, NO. A15	9 JUNE 1944
11.	PROCEDURE FOR CALCULATION AND PLOT OF RAY DIAGRAMS FROM BATHYTHERMOGRAPH DATA, H. R. Gould	28 JUNE 1944
12.	AMPLITUDE FLUCTUATIONS OF TRANSMITTED AND REFLECTED SOUND SIGNALS IN THE OCEAN, M. J. Sheehy, NO. A29	17 AUG 1944
13.	TRANSMISSION OF 24 KC AND 60 KC SOUND IN VERY SHALLOW WATER, JUNE 1944, M. J. Sheehy, NO. A31	26 AUG 1944
14.	LAYER EFFECT, R. W. Raitt, M. J. Sheehy, NO. A35	9 SEPT 1944
15.	VARIABILITY OF DEEP WATER TRANSMISSION, M. J. Sheehy, NO. A40	5 OCT 1944
16.	TRANSMISSION OF 24 KC AND 60 KC SOUND IN VERY SHALLOW WATER, OCTOBER 1944, M. J. Sheehy, NO. A31a	23 OCT 1944
17.	CORRELATION OF SIMULTANEOUS TRANSMISSION IN DEEP WATER AT DIFFERENT FREQUENCIES, M. J. Sheehy, NO. A44	28 OCT 1944
18.	OPERATIONAL PROCEDURE AND EQUIPMENT USED IN SONAR SOUND FIELD STUDIES, Echo-Ranging Section, NO. U295	15 FEB 1945
19.	EFFECT OF ROLL ON SHORT RANGE AMPLITUDE FLUCTUATIONS, N. Most	12 MAR 1945
20.	THE INFLUENCE OF THERMAL CONDITIONS ON TRANSMISSION OF 24 KC SOUND, Sonar Data Division, NO. U307 (Critical survey of data available at the time. Extended but not superseded by later reports.)	16 MAR 1945
21.	A COMPARISON OF TRANSMISSION LOSS AT 15 KC AND 24 KC, Sonar Data Division, NO. M313	5 MAY 1945

22.	THE ISOLATION OF ADDITIVE EFFECTS, Sonar Data Division, NO. M327	13 JUNE 1945
23.	PROCESSING OF SOUND FIELD DATA, Sonar Data Division, NO. M336	7 JULY 1945
24.	OPERATIONAL SUMMARIES, M. J. Sheehy, L. A. Thacker	18 JULY 1945
25.	PROGRESS REPORT ON THE TRANSMISSION OF 24 KC SOUND IN SHALLOW WATER, Sonar Data Division, NO. M368	20 NOV 1945
26.	THE TRANSMISSION OF SOUND AT 56 KC, Sonar Data Division, NO. M378	28 NOV 1945
27.	APPENDIX I TO UCDWR FILE REPORT NO. M336—IMPROVED METHOD OF READING SOUND FIELD RECORDS, Sonar Data Division, NO. M336.1	29 NOV 1945
28.	THE ADDITIVE EFFECTS OF WIND FORCE, THERMAL GRADIENTS AND PARTICLE SIZE ON THE TRANSMISSION OF 24 KC SOUND OVER SAND BOTTOMS IN SHALLOW WATER, Sonar Data Division, NO. M375	1 DEC 1945
29.	ADDITIVE ANALYSIS WITH DISPROPORTIONATE WEIGHTING, Sonar Data Division, NO. M379	5 DEC 1945
30.	FLUCTUATION OF 24 KC SIGNALS AT SHORT RANGE AS A FUNCTION OF THE ROLL OF THE SENDING SHIP, Sonar Data Division, NO. M386	11 DEC 1945
31.	INVENTION REPORT NO. PC-4 sr-30 PAT 65—ELECTRONIC CONTROLLER, J. L. Leonard, OSRD Invention Disclosure NO. 3224, Navy Case NO. 6674, Application Serial NO. 634,844, filed	13 DEC 1945

(3) transmission of low frequency sound–01.73

1.	A NOTE ON THE TRANSMISSION OF LOW FREQUENCY SOUND IN SEA WATER, L. D. Statham	21 JAN 1942
2.	CONCLUSIONS DERIVED FROM THE ANALYSIS OF TRANSMISSION DATA OBTAINED DURING HARBOR SURVEYS, Listening and Oceanographic Sections, NO. U110 (Summary of the results of various expeditions sponsored by BuShips and NDRC.)	2 OCT 1943
3.	SOME SHALLOW WATER SOUND PROPAGATION MEASUREMENTS IN THE 13TH NAVAL DISTRICT, Oceanographic and Listening Sections, NO. M126	26 OCT 1943
4.	OUTLINE OF PROPOSED PROGRAM OF SOUND PROPAGATION MEASUREMENTS IN DEEP WATER, F. A. Everest, T. F. Johnston	9 NOV 1943
5.	SOME EXPERIMENTS ON THE TRANSMISSION OF CONTINUOUS SOUND IN 100 FATHOM TO 600 FATHOM WATER, Listening Section, NO. M193	15 MAR 1944
6.	COMPARISON OF THE MEASURING SYSTEMS AT 24 KC OF THE LISTENING SECTION AND THE ECHO-RANGING SECTION, M. J. Sheehy, G. P. Welch, NO. A12	29 MAY 1944
7.	SOME SOUND PROPAGATION MEASUREMENTS IN THE FOURTEENTH NAVAL DISTRICT, Listening and Oceanographic Sections, NO. M228	19 JUNE 1944
8.	FURTHER EXPERIMENTS ON THE TRANSMISSION OF CONTINUOUS SOUND, R. E. Chambers, NO. A42	13 OCT 1944
9.	SOUND MEASURING EQUIPMENT ON THE YAG-6 (Ex-ENCHANTRESS), T. McMillian, NO. A47	8 NOV 1944
10.	SHALLOW WATER SOUND PROPAGATION NEAR SCRIPPS PIER, Listening Section	10 APRIL 1945
11.	LOW FREQUENCY SOUND TRANSMISSION PROGRAM, F. A. Everest	24 APRIL 1945
12.	LOW FREQUENCY UNDERWATER SOUND SOURCE, TYPE MEF, Listening Section, NO. M331	22 JUNE 1945
13.	EFFECTIVENESS OF THE 01.73 PROGRAM, T. F. Johnston	31 JULY 1945
14.	TIME STUDY OF CURRENT PROCEDURES IN 01.73 DATA PROCESSING, T. F. Johnston	21 AUG 1945
15.	SOUND EQUIPMENT OF THE YP-267 (Ex-DEMOCRACY), F. A. Everest, A. L. Henderson	29 AUG 1945
16.	INTERIM REPORT ON TRANSMISSION OF UNDERWATER SOUND AT LOWER FREQUENCIES, Sonar Data Division, NO. U362	1 NOV 1945
17.	OVERLAYS USEFUL IN THE ANALYSIS OF SOUND TRANSMISSION DATA, Sonar Data Division, NO. M391	10 FEB 1946

(4) transmission of explosive sound–01.74

1.	BOUNDARY STUDIES IN THE OCEAN BY THE USE OF EXPLOSIVE SOUNDS, W. R. Smythe	18 AUG 1941
2.	DATA ON CATHODE RAY OSCILLOGRAPH RECORDS OF EXPLOSIVE SOUNDS, C. F. Eyring, R. J. Christensen	10 NOV 1941
3.	A METHOD OF DETERMINING THE ATTENUATION OF SOUND IN SEA WATER, R. R. Thompson	16 DEC 1941

4.	PROPOSED INVESTIGATION OF EXPLOSIVE PULSES AND POSSIBLE USES OF SONIC IMPULSES FOR THE DETECTION OF SUBMARINES, H. E. Hartig	2 JAN 1942
5.	IMPULSE STUDIES—PROGRESS REPORT (MEMO IM-1), R. A. Peterson	29 JAN 1942
6.	PROGRAM FOR IMPULSE STUDIES, R. A. Peterson	4 FEB 1942
7.	PRELIMINARY REPORT ON COMPARISON BETWEEN COMPUTED SOUND INTENSITIES AND OBSERVATIONS OF INTENSITIES OF EXPLOSIVE SOUND, Oceanographic Division	5 FEB 1942
8.	ATTENUATION OF EXPLOSIVE IMPULSES IN THE SEA, R. W. Raitt	6 APRIL 1942
9.	DEVELOPMENT OF SINGLE SWEEP EQUIPMENT FOR IMPULSE WORK, T. F. Johnston	29 APRIL 1942
10.	WESTERN INSTRUMENT COMPANY AMPLIFIERS, D. C. Kalbfell	19 JUNE 1942
1.	A STUDY OF THE TRANSMISSION OF EXPLOSIVE IMPULSES IN SEA WATER, T. F. Johnston	25 JUNE 1942
12.	COMMENTS ON H M A/S E E FAIRLIE, FEBRUARY 1941—REPORTS, "UNDERWATER EXPLOSIONS," "TIME INTERVAL BETWEEN SUCCESSIVE EXPLOSIONS," T. F. Johnston	13 JULY 1942
13.	FOURIER ANALYSIS OF EXPLOSIVE IMPULSES—DRAFT (PART IV), B. G. Eaton	AUG 1942
14.	EXPLOSIVE SOUND WAVES IN THE SEA—OBSERVATIONS WITH A 2500 MOVING-COIL OSCILLOGRAPH, T. F. Johnston, R. W. Raitt, NO. M10	16 SEPT 1942
15.	TRANSMISSION OF EXPLOSIVE IMPULSES IN THE SEA, T. F. Johnston, R. W. Raitt, NO. U8 (Final report on first explosive impulse program; contains first detailed verification of refraction theory.)	2 DEC 1942
16.	ECHO RANGING WITH EXPLOSIVE SOUND, T. F. Johnston, T. McMillian, NO. U88	14 AUG 1943

(5) mathematical studies–01.75

1.	THE CALCULATION OF RAYS OF SOUND BY DIRECT AND VARIATIONAL METHODS, H. Bateman	16 JULY 1941
2.	INFLUENCE OF AIR BUBBLES ON THE EXTINCTION OF SOUND IN WATER—REPORT NO. 1, P. S. Epstein	8 AUG 1941
3.	ON THE EXTINCTION OF SOUND IN WATER CAUSED BY AIR BUBBLES—REPORT NO. 2, P. S. Epstein	11 AUG 1941
4.	ATTENUATION AND SCATTERING BY BUBBLES ACCORDING TO WILLIS, W. V. Houston	18 AUG 1941
5.	THE EXTINCTION OF SOUND IN WATER, C. Eckart	31 AUG 1941
6.	THE STABILITY OF AIR BUBBLES IN THE SEA AND THE EFFECT OF BUBBLES AND PARTICLES ON THE EXTINCTION OF SOUND AND LIGHT IN SEA WATER, P. S. Epstein	1 SEPT 1941
7.	RANGE AND TRAVEL TIME OF A SOUND RAY IN A MEDIUM OF UNIFORMLY VARYING VELOCITY, R. R. Carhart	2 NOV 1942
8.	SOME THEORETICAL STUDIES OF THE PROPAGATION OF SOUND IN SHALLOW WATER, G. D. Camp, C. Eckart, NO. U102	15 AUG 1943
9.	NATURAL FREQUENCIES OF A FREE ANNULAR PLATE VIBRATING RADIALLY, G. D. Camp	6 DEC 1943
10.	POWER RADIATED BY A STEEL TUBE DRIVEN BY A MULTI-POLE MAGNET, G. D. Camp	15 DEC 1943
11.	STEEL TUBE TRANSDUCER II, G. D. Camp	17 DEC 1943
12.	PRELIMINARY DRAFT—THE SEA SURFACE AND ITS EFFECT ON THE REFLECTION OF SOUND AND LIGHT—I—REFLECTION OF RAYS, Sonar Data Division (Application of new mathematical methods to this problem.)	30 MAY 1945
13.	THE ISOLATION OF ADDITIVE EFFECTS, Sonar Data Division, NO. M327	13 JUNE 1945
14.	CONSIDERATIONS CONCERNING THE ELECTRICAL CALCULATION OF CORRELATIONS, C. Eckart	1 AUG 1945
15.	ADDITIVE ANALYSIS WITH DISPROPORTIONATE WEIGHTING, Sonar Data Division, NO. M379	5 DEC 1945

(6) fluctuation–01.76

1.	ADDITIVE ANALYSIS WITH DISPROPORTIONATE WEIGHTING, Sonar Data Division, NO. M379	5 DEC 1945
2.	FLUCTUATION OF 24 KC SIGNALS AT SHORT RANGE AS A FUNCTION OF THE ROLL OF THE SENDING SHIP; Sonar Data Division, NO. M386	11 DEC 1945
3.	ATTENUATION AND FLUCTUATION STUDIES BASED ON SUPERSONIC BOTTOM ECHOES, Sonar Data Division, NO. M384	13 DEC 1945

j. reflectivity of sound from targets–01.80

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 101—MINE CONSTRUCTION, W. M. Rayton	
2.	SUBMERSIBLE SPHERE FOR SOUND MEASUREMENTS, F. Pierce	18 NOV 1941
3.	THE TARGET SPHERE, F. Pierce	19 JAN 1942
4.	AMPLITUDE OF THE ECHO FROM A SUBMARINE AS A FUNCTION OF THE SIGNAL LENGTH, C. F. Eyring, R. J. Christensen	18 APRIL 1942
5.	EXPLOSIVE SOUND WAVES IN THE SEA—OBSERVATIONS WITH A 2500 MOVING-COIL OSCILLOGRAPH, T. F. Johnston, R. W. Raitt, NO. M10	16 SEPT 1942
6.	TRANSMISSION OF EXPLOSIVE IMPULSES IN THE SEA, T. F. Johnston, R. W. Raitt, NO. U8	2 DEC 1942
7.	REFLECTION OF LIGHT FROM A SUBMARINE MODEL, R. B. Tibby, NO. M61	12 MAY 1943
8.	TARGET STRENGTH OF A SUBMARINE AT 24 KC, G. E. Duvall, NO. A4	10 MAY 1944
9.	ACOUSTIC MEASUREMENTS WITH SUBMARINES, R. J. Christensen	6 JULY 1944
10.	PERSONAL OBSERVATIONS ON OPERATIONS WITH FLEET-TYPE SUBMARINES IN THE KEY WEST AREA, J. D. Frautschy	6 JULY 1944
11.	FREQUENCY CHARACTERISTICS OF ECHOES AND REVERBERATION, W. M. Rayton, R. C. Fisher, NO. U244 (Final report on the periodmeter and results obtained with this device.)	9 AUG 1944
12.	EFFECT OF PING LENGTH ON SUBMARINE TARGET STRENGTH, G. E. Duvall, W. M. Rayton	14 AUG 1944
13.	24 KC ECHOES FROM A 3-FOOT SPHERE, G. E. Duvall, NO. A32	26 AUG 1944
14.	MEASUREMENTS ON THE INTENSITIES OF ECHOES FROM SUBMARINES, R. J. Christensen	2 SEPT 1944
15.	WAKE OF A FLEET-TYPE SUBMARINE, G. E. Duvall, W. M. Rayton, NO. A34	6 SEPT 1944
16.	TARGET STRENGTH, C. Eckart	27 SEPT 1944
17.	ECHOES FROM SWELLS, G. E. Duvall, NO. A43	27 OCT 1944
18.	ECHOES OF VERY SHORT PINGS FROM SUBMARINES, W. M. Rayton, NO. M301	1 MAR 1945
19.	SURFACE-REFLECTED SUBMARINE ECHOES, Echo-Ranging Section, NO. M306	15 MAR 1945
20.	SUMMARY AND CONCLUSIONS OF MEASUREMENTS OF THE REFLECTIONS FROM A SPHERE AND A TEN-INCH DISC, C. J. Burbank	9 JULY 1945
21.	TARGET STRENGTH OF A SIX-FOOT TRIPLANE, T. H. Schafer	19 DEC 1945
22.	STATUS REPORT ON ECHOES FROM SMALL OBJECTS, Sonar Data Division, NO. M388	14 FEB 1946

k. prediction of sound ranges–01.90

1.	OCEANOGRAPHIC PROGRAM FOR COLLECTION OF INFORMATION ON SOUND TRANSMISSION CONDITIONS IN THE PACIFIC OCEAN, USNRSL, NDRC, BuShips	20 AUG 1941
2.	THE EFFECT OF DIURNAL VARIATION IN TEMPERATURE ON SOUND RANGES, Oceanographic Division	SEPT 1941
3.	THE STABILITY OF AIR BUBBLES IN THE SEA AND THE EFFECT OF BUBBLES AND PARTICLES ON THE EXTINCTION OF SOUND AND LIGHT IN SEA WATER, P. S. Epstein	1 SEPT 1941
4.	ACCURACY OF ECHO RANGES PREDICTED FROM BATHYTHERMOGRAPH OBSERVATIONS, Oceanographic Division	11 DEC 1941
5.	THE PROBABLE EFFECT ON SOUND RANGES OF VARYING DEPTH OF THE SOUND PROJECTOR, Oceanographic Division	18 DEC 1941
6.	REPORT ON EXAMINATION OF RANGES OBTAINED BY TWO SUBMARINES RANGING AT EACH OTHER, Oceanographic Division	30 DEC 1941
7.	PREDICTION OF ECHO RANGES FROM BATHYTHERMOGRAPH OBSERVATIONS, A MANUAL ACCOMPANIED BY A SLIDE RULE, Oceanographic Division	3 JAN 1942
8.	CALCULATION OF SOUND RAY PATHS IN SEA WATER, R. H. Fleming, Lt. R. Revelle (Exposition of practical methods of computing sound rays when temperature or salinity gradients are present.)	16 JAN 1942
9.	GENERAL CONDITIONS FOR ECHO RANGING IN THE WESTERN NORTH PACIFIC OCEAN, Oceanographic Division	30 JAN 1942
10.	SOME CHARACTERISTICS OF THE SOUND FIELD IN THE SEA, Oceanographic Division (An early summary of the effects of oceanographic conditions on the transmission of sound in the sea.)	13 MAR 1942

11.	EFFECT OF THE THERMOCLINE ON THE PROPAGATION OF SOUND (NO. 5), P. S. Epstein	19 MAR 1942
12.	PRELIMINARY DRAFT OF MATERIAL TO APPEAR ON FACE OF SOUND RANGING CHARTS, Oceanographic Section	21 MAR 1942
13.	OCEANOGRAPHIC TEMPERATURE MEASUREMENT EQUIPMENT, D. C. Kalbfell	28 MAR 1942
14.	RELATIVE INTENSITIES IN THE SOUND FIELD, Oceanographic Division	17 APRIL 1942
	(Exposition of the application of ray theory to the calculation of transmission loss caused by ray divergence.)	
15.	BEST DEPTH OF ESCAPE FOR SUBMARINES—RULES BASED ON TEMPERATURE STRUCTURE, Oceanographic Section	29 APRIL 1942
16.	PROPOSED STUDY OF CERTAIN TYPES OF WAVE MOTIONS, Oceanographic Division	18 JULY 1942
17.	PREDICTION OF ECHO RANGES FROM SUBMARINE BATHYTHERMOGRAPH OBSERVATIONS (Preliminary Draft), Instruction Manual for Submarine Bathythermograph Observers, Part II, NDRC, WHOI, BuShips	1 SEPT 1942
18.	REFRACTION OF SOUND RAYS IN THE ATMOSPHERE, Oceanographic Division	1 SEPT 1942
19.	RANGE AND TRAVEL TIME OF A SOUND RAY IN A MEDIUM OF UNIFORMLY VARYING VELOCITY, R. R. Carhart	2 NOV 1942
20.	SOUND-RANGING CONDITIONS IN THE JAPANESE AREA, WINTER SEASON, Oceanographic Section, NO. U20	4 JAN 1943
21.	SUPPLEMENT TO SOUND-RANGING CONDITIONS OF THE NORTH PACIFIC OCEAN, Oceanographic Section, NO. M24	20 JAN 1943
22.	SOUND-RANGING CONDITIONS IN THE JAPANESE AREA, SUMMER SEASON, Oceanographic Section, NO. U9	21 JAN 1943
23.	ECHO RANGES AS A FUNCTION OF OCEANOGRAPHIC FACTORS (REVISED), UCDWR	3 SEPT 1943
24.	MAXIMUM ECHO RANGES—THEIR PREDICTION AND USE, WCSS, NDRC	OCT 1943
25.	LLOYD MIRROR EFFECT IN A VARIABLE VELOCITY MEDIUM, R. R. Carhart, NO. M140	23 OCT 1943
	(An application of ray theory to the problem of interference between direct and surface-reflected sound when there are temperature gradients.)	
26.	A SURVEY OF THE PROBLEM OF MAXIMUM ECHO RANGES (PRELIMINARY DRAFT), C. Eckart, NO. U130	20 NOV 1943
	(Exposition of the factors influencing maximum echo ranges. No final draft was prepared.)	
27.	A DEVICE FOR PLOTTING RAYS IN A MEDIUM OF VARIABLE VELOCITY, L. I. Schiff, NO. M125	29 NOV 1943
28.	DEFINITIONS AND RANGE TABLES FOR SONAR CHARTS BT DATA, E. C. LaFond	28 DEC 1943
29.	ANALYSIS OF BLOCK ISLAND TRANSMISSION DATA (TRANSMISSION MEMO NO. 1), R. R. Carhart	29 JAN 1944
30.	FISHERS' ISLAND DATA (TRANSMISSION MEMO NO. 2), R. R. Carhart	31 JAN 1944
31.	PREDICTION OF MAXIMUM ECHO RANGES, R. D. Russell	1 FEB 1944
32.	ANALYSIS OF 14TH NAVAL DISTRICT TRANSMISSION DATA (TRANSMISSION MEMO NO. 4), R. R. Carhart	3 FEB 1944
33.	TRANSMISSION DATA FROM 13TH NAVAL DISTRICT (TRANSMISSION MEMO NO. 5), R. R. Carhart	5 FEB 1944
34.	CONCLUSIONS DERIVED FROM ANALYSIS OF TRANSMISSION DATA OBTAINED DURING HARBOR SURVEYS (TRANSMISSION MEMO NO. 6), R. R. Carhart	7 FEB 1944
35.	PREDICTION OF SOUND RANGES FROM BT OBSERVATIONS—RULES FOR PREPARING SONAR MESSAGES (PRELIMINARY VERSION), UCDWR	MAR 1944
36.	SUGGESTED PLAN FOR DETERMINATION OF MAXIMUM ECHO RANGES, R. D. Russell	20 APRIL 1944
37.	PRELIMINARY REPORT ON THE SONIC RAY PLOTTER, L. I. Schiff, NO. M207	21 APRIL 1944
38.	THE SONIC RAY PLOTTER, L. I. Schiff, NO. U246	8 AUG 1944
	(Final report on a device which automatically plots sound rays from the bathythermogram.)	
39.	USE OF SONIC RAY PLOTTER FOR LARGE ANGLE RAYS, L. I. Schiff	9 SEPT 1944
40.	A SUMMARY OF DATA USED IN THE PRELIMINARY SHALLOW WATER RANGE PREDICTION RULES, R. R. Carhart	12 SEPT 1944
41.	AFTERNOON EFFECT, ITS APPLICATION TO THE SOUND-RANGING CHARTS, E. C. LaFond	27 SEPT 1944
42.	SOUND-RANGING CONDITIONS OFF SOUTHERN CALIFORNIA, K. O. Emery, NO. A45	6 NOV 1944
43.	LIMITATION OF ECHO RANGES BY REVERBERATION (DEEP WATER), Sonar Data Division, NO. M361	20 SEPT 1945
	(A statistical analysis based on transmission and reverberation measurements.)	

(1) preparation of charts and manuals–01.91

1.	SOUND-RANGING (SONAR) CHARTS OF THE INDIAN OCEAN—Summer Season, 4 editions (1942-1945); Winter Season, 3 editions (1942-1944), UCDWR, HO, HO NO. 2603-R	
2.	SOUND-RANGING (SONAR) CHARTS OF THE NORTH PACIFIC OCEAN—Summer Season, 4 editions (1942-1945); Winter Season, 3 editions (1942-1944), UCDWR, HO, HO NO. 1401-R	
3.	SOUND-RANGING (SONAR) CHARTS OF THE SOUTH PACIFIC OCEAN—Summer Season, 3 editions (1942-1944); Winter Season, 4 editions (1942-1945), UCDWR, HO, HO NO. 2601-R	
4.	SOUND-RANGING CONDITIONS IN THE JAPANESE AREA, WINTER SEASON, Oceanographic Section, NO. U20	4 JAN 1943
5.	SUPPLEMENT TO SOUND-RANGING CONDITIONS OF THE NORTH PACIFIC SECTION, NO. M24	20 JAN 1943
6.	SOUND-RANGING CONDITIONS IN THE JAPANESE AREA, SUMMER SEASON, Oceanographic Section, No. U9	21 JAN 1943
7.	AFTERNOON EFFECT, ITS APPLICATION TO SOUND-RANGING CHARTS, E. C. LaFond, NO. A49	25 NOV 1944

(a) charts of average echo-ranging conditions–01.911

1.	PREDICTION OF ECHO RANGES FROM SUBMARINE BATHYTHERMOGRAPH OBSERVATIONS (Preliminary Draft), Instruction Manual for Submarine Bathythermograph Observers, Part II; NDRC, WHOI, BuShips	1 SEPT 1942
2.	PRELIMINARY CHARTS WITH HISTOGRAMS FOR THE FOURTH EDITION OF THE SOUND-RANGING (SONAR) CHARTS, UCDWR, WHOI, NO. M326	8 JUNE 1945

(b) charts of average listening conditions–01.912

(c) submarine supplements–01.913

1.	SUBMARINE SUPPLEMENT TO HYDROGRAPHIC OFFICE PUBLICATION NO. 133, SAILING DIRECTIONS FOR THE BAY OF BISCAY, HO, WHOI, NDRC, BuShips	JUNE 1943
2.	LATE SUMMER HYDROGRAPHIC CONDITIONS IN THE JAPANESE AREA. Preliminary Submarine Supplement to HO. Publ. NO. 123, Asiatic Pilot, Volume II. The Japanese Archipelago, HO, UCDWR, NDRC, BuShips, HO NO. 123	JULY 1943
3.	LATE SUMMER HYDROGRAPHIC CONDITIONS IN THE JAPANESE AREA, R. H. Fleming, NO. U85	19 JULY 1943
4.	SUMMER SUBMARINE SUPPLEMENT TO HYDROGRAPHIC OFFICE PUBLICATIONS NOS. 122, 123, 124—THE JAPANESE EMPIRE AREA, JUNE, JULY AND AUGUST. HO Supplement to HO NOS. 122, 123, 124, HO, SIO, UCDWR, WHOI, NDRC, BuShips	MAY 1944
5.	SUBMARINE SUPPLEMENT TO HYDROGRAPHIC OFFICE PUBLICATION NO. 165. Western Pacific Area July-September, HO, SIO, UCDWR, WHOI, NDRC, BuShips, HO Misc. 11,418	JUNE 1944
6.	SUBMARINE SUPPLEMENT TO THE SAILING DIRECTIONS: THE JAPANESE EMPIRE AREA SEPTEMBER-DECEMBER, HO, S10, UCDWR, WHOI, NDRC, BuShips, HO Misc. 11,381-A	JULY 1944
7.	SUBMARINE SUPPLEMENT TO THE SAILING DIRECTIONS: THE WESTERN PACIFIC AREA SEPTEMBER-DECEMBER, HO, SIO, UCDWR, WHOI, NDRC, BuShips, HO Misc. 11,413-2	AUG 1944
8.	SUBMARINE SUPPLEMENT TO THE SAILING DIRECTIONS: SOUTH CHINA SEA AREA NOVEMBER-APRIL, HO, UCDWR, SIO, CUDWR, Geol. Sur. Dept. of Interior, BuShips, NDRC, WHOI, HO Misc. 11,530-1	OCT 1944
9.	SUBMARINE SUPPLEMENT TO THE SAILING DIRECTIONS: JAPANESE EMPIRE AREA JANUARY-MARCH, HO, SIO, UCDWR, CUDWR, Geol. Sur. Dept. of Interior, BuShips, NDRC, WHOI, HO Misc. 11,381-B	NOV 1944
10.	SUBMARINE SUPPLEMENT TO THE SAILING DIRECTIONS: WESTERN TROPICAL PACIFIC AREA JANUARY-MARCH, HO, UCDWR, SIO, CUDWR, Geol. Sur. Dept. of Interior, BuShips, NDRC, WHOI, HO Misc. 11,418-3	NOV 1944
11.	SUBMARINE SUPPLEMENT TO THE SAILING DIRECTIONS: JAPANESE EMPIRE AREA, HO, UCDWR, NDRC, SIO, BuShips, CUDWR, Geol. Sur. Dept. of Interior, WHOI, HO 231	MAY 1945

(2) methods for range prediction–01.92

1.	RANGE AND TRAVEL TIME OF A SOUND RAY IN A MEDIUM OF UNIFORMLY VARYING VELOCITY, R. R. Carhart	2 NOV 1942
2.	LLOYD MIRROR EFFECT IN A VARIABLE VELOCITY MEDIUM, R. R. Carhart, NO. M140	23 OCT 1943
3.	A SURVEY OF THE PROBLEM OF MAXIMUM ECHO RANGES (PRELIMINARY DRAFT), C. Eckart, NO. U130	20 NOV 1943
4.	A DEVICE FOR PLOTTING RAYS IN A MEDIUM OF VARIABLE VELOCITY, L. I. Schiff, NO. M125	29 NOV 1943
5.	PRELIMINARY REPORT ON THE SONIC RAY PLOTTER, L. I. Schiff, NO. M207	21 APRIL 1944
6.	A COMPARISON OF CALCULATED AND OBSERVED INTENSITIES FOR SOME SPLIT BEAM SOUND FIELD RANGES, R. R. Carhart, L. A. Thacker, NO. A26	2 AUG 1944
7.	THE SONIC RAY PLOTTER, L. I. Schiff, NO. U246	8 AUG 1944
8.	INVENTION REPORT NO. PC-4 sr-30 PAT 64—DIFFERENTIAL ANALYZER, L. I. Schiff, OSRD Invention Disclosure NO. 2560, Navy Case NO. 4457, Application Serial NO. 550,470, filed	21 AUG 1944
9.	OBSERVED RANGES ON A SUBMARINE AT 90 FEET KEEL DEPTH, REPORTED BY THE USS RATHBURNE, R. R. Carhart, NO. A30	24 AUG 1944
10.	SUBMARINE ECHO RANGES OBSERVED AND PREDICTED—MIKE PATTERN, BELOW LAYER, C. Eckart, NO. A33	29 AUG 1944
11.	AFTERNOON EFFECT, ITS APPLICATION TO SOUND-RANGING CHARTS, E. C. LaFond, NO. A49	25 NOV 1944
12.	PRELIMINARY CHARTS WITH HISTOGRAMS FOR THE FOURTH EDITION OF THE SOUND-RANGING (SONAR) CHARTS, UCDWR, WHOI, NO. M326	8 JUNE 1945

(a) maximum echo ranges–01.921

(b) maximum listening ranges–01.922

(3) processing of bt slides–01.93

1.	WOODS HOLE BATHYTHERMOGRAPH INSTRUCTION MANUAL—PRELIMINARY DRAFT, NDRC, WHOI, UCDWR, Bristol Company	3 APRIL 1942
2.	STATUS OF BATHYTHERMOGRAPH PROGRAM IN THE PACIFIC OCEAN OCTOBER 31, 1942, Oceanographic Division	3 NOV 1942
3.	ADJUSTMENT OF THE BATHYTHERMOGRAPH FOR ERRORS IN SURFACE TEMPERATURE AND PRESSURE, J. S. McNown, NO. M103	2 SEPT 1943
4.	SONAR—STATUS OF UNITED STATES NAVY BT PROGRAM IN THE PACIFIC, R. D. Russell	20 JAN 1945
5.	NEW MODEL EXPERIMENTAL BATHYTHERMOGRAPHS, C. W. Ufford	7 APRIL 1945
6.	AFTERNOON EFFECT AND ITS APPLICATION TO SOUND-RANGING CHARTS, Sonar Data Division, NO. U357	15 SEPT 1945

(Analysis of the bathythermograms gathered by the United States Navy during the war, with special reference to empirical rules for the prediction of afternoon effect.)

(4) bathythermograph program for submarines–01.94

1.	BEST DEPTH OF ESCAPE FOR SUBMARINES—RULES BASED ON TEMPERATURE STRUCTURE, Oceanographic Section	29 APRIL 1942
2.	PENETRATION OF SOUND INTO THE SHADOW ZONE, C. Eckart	12 AUG 1942

(5) thermal investigations–01.95

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 20—RESISTANCE THERMOMETER, G. W. Downs, Jr., OSRD Invention Disclosure NO. 1471, Navy Case NO. 4187	

2.	INVENTION REPORT NO. PC-4 sr-30 PAT 34—ADMITTANCE NEUTRALIZING CIRCUIT, G. W. Downs, Jr., OSRD Invention Disclosure NO. 1024, Navy Case NO. 4887	
3.	THE EFFECT OF DIURNAL VARIATION IN TEMPERATURE ON SOUND RANGES—APPENDIX 1 TO REPORT ON WORK IN SEPTEMBER 1941, Oceanographic Division	3 OCT 1941
4.	TEMPERATURE OBSERVATIONS OFF THE SECTION BASE, SAN DIEGO HARBOR, JANUARY 26 TO FEBRUARY 2, 1942, Oceanographic Division	9 FEB 1942
5.	OCEANOGRAPHIC TEMPERATURE MEASUREMENT EQUIPMENT, D. C. Kalbfell	28 MAR 1942
6.	THE STUDY OF THE MICROSTRUCTURE OF THE SEA, Oceanographic Division	30 JUNE 1942
7.	A NEW TYPE OF RESISTANCE THERMOMETER FOR USE IN MEASUREMENTS OF TEMPERATURE STRUCTURE OF THE OCEAN, G. W. Downs, Jr.	2 JULY 1942
8.	PROPOSED STUDY OF CERTAIN TYPES OF WAVE MOTIONS, Oceanographic Division	18 JULY 1942
9.	MEASUREMENTS OF HIGH VELOCITIES WITH A CURRENT METER, J. S. McNown	4 NOV 1942
10.	MOVEMENT IN THE OCEAN, Oceanographic Division	19 NOV 1942
11.	A LABORATORY STUDY OF SURFACE AND INTERNAL WAVE MOTION, Oceanographic Section, NO. U3	23 NOV 1942
12.	MICROSTRUCTURE INSTRUMENTATION, R. H. Fleming	12 JAN 1943
13.	MINUTES OF MEETING ON MICROSTRUCTURE INSTRUMENTATION, R. H. Fleming	15 JAN 1943
14.	REFLECTION OF SOUND IN THE OCEAN FROM TEMPERATURE CHANGES, R. R. Carhart, NO. U74 (Application of theory to the problem of the reflection of sound in regions where its velocity changes gradually. Useful graphs.)	17 MAY 1943
15.	PRELIMINARY REPORT ON THE SOLUTION OF ACOUSTIC BOUNDARY PROBLEMS, L. I. Schiff	4 SEPT 1943
16.	RAPID-RESPONSE THERMOMETER, D. C. Kalbfell, NO. M101	23 SEPT 1943
17.	SOLUTION OF ACOUSTIC BOUNDARY PROBLEMS II, L. I. Schiff	7 OCT 1943
18.	SOLUTION OF ACOUSTIC BOUNDARY PROBLEMS III, L. I. Schiff	2 NOV 1943
19.	PRELIMINARY REPORT ON TEMPERATURE STRUCTURE OF SWEETWATER LAKE JUNE 24, 1944, E. C. LaFond, G. H. Gould	27 JUNE 1944
20.	PRELIMINARY REPORT ON THE TEMPERATURE STRUCTURE OF EL CAPITAN LAKE, G. H. Gould	29 SEPT 1944
21.	FLUCTUATIONS IN SOUND TRANSMISSION OBSERVED AT SWEETWATER LAKE, C. W. Ufford	27 OCT 1944
22.	INTERNAL WAVES, C. W. Ufford (Internal waves with less than tidal periods are shown to exist by measuring the variation of the layer depth with the time. The theory is extended to waves under a moving ship.)	15 DEC 1944
23.	INTERNAL WAVES OFF SAN DIEGO, CALIFORNIA, C. W. Ufford, NO. M290	19 MAR 1945
24.	INVESTIGATIONS OF THE THERMAL STRUCTURE OF SWEETWATER LAKE, B. E. Holtsmark	16 APRIL 1945
25.	ATMOSPHERIC PRESSURE AND INTERNAL WAVES, C. W. Ufford	23 MAY 1945
26.	THE DETERMINATION OF DENSITY FROM TEMPERATURE, PRESSURE, AND THE VELOCITY OF SOUND, C. W. Ufford	25 JUNE 1945
27.	INTERNAL WAVES MEASURED AT THREE STATIONS, C. W. Ufford, NO. M350	15 AUG 1945

2. sonar (echo-ranging) gear—02.00

1.	PROPOSED METHOD FOR DETERMINING THE DEPTH OF A SUBMARINE, D. C. Kalbfell	1 AUG 1941
2.	MEMORANDA ON RANGING EQUIPMENT, H. M. Zenor	AUG-SEPT 1941
3.	THREE METHODS OF EMPLOYING A TWO-CHANNEL ECHO-RANGING PROJECTOR, F. Pierce	20 FEB 1942
4.	PHYSICS OF SOUND AS APPLIED TO ECHO-RANGING DEVICES, UCDWR, Department of Physics, University of Pennsylvania	31 MAR 1942
5.	TECHNIQUE OF ECHO RANGING, UCDWR, Department of Physics, University of Pennsylvania	31 MAR 1942
6.	MECHANICAL RANGE INDICATOR, W. A. Myers, NO. M13	19 NOV 1942

a. fundamental studies–02.10

(1) high-intensity pulsing–02.11

(2) high-frequency echo-ranging–02.12

(3) shallow water sonar–02.13

(a) sod development–02.131

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 88—SMALL OBJECT DETECTOR, M. E. Chun, C. S. Mongan, Jr., W. H. Williams	
2.	INVENTION REPORT NO. PC-4 sr-30 PAT 106—ECHO-RANGING SYSTEM, D. C. Kalbfell	
3.	INVENTION REPORT NO. PC-4 sr-30 PAT 111—ECHO-RANGING SYSTEM, M. E. Chun	
4.	INVENTION REPORT NO. PC-4 sr-30 PAT 112—DIRECTIONAL SOUND APPARATUS, M. E. Chun	
5.	BRITISH ASDIC TYPE 135 TESTS, M. E. Chun, NO. SM221	19 JUNE 1944
6.	BOTTOM REVERBERATION IN VERY SHALLOW WATER, Echo-Ranging Section, NO. SM249	18 AUG 1944
7.	MEASUREMENTS ON CRYSTAL TRANSDUCER, JB4Z-1 NO. 2191, Calibration Group, NO. C71	6 JAN 1945
8.	STATUS OF PRO-SUBMARINE DEVELOPMENT WORK AT UCDWR, F. N. D. Kurie	23 APRIL 1945
9.	PRELIMINARY INSTRUCTION MANUAL: SMALL OBJECT DETECTOR (SOD) MODEL I, NO. 1, NO. M317	30 APRIL 1945
10.	PRELIMINARY REPORT ON SMALL OBJECT DETECTOR (SOD), M. E. Chun, C. E. Mongan, Jr., NO. M343	17 JULY 1945
11.	PRO-SUBMARINE PROGRAM AT UCDWR, W. B. Beckley	28 SEPT 1945
12.	CONFERENCE—PRO-SUBMARINE DEVELOPMENTS, 2 OCTOBER 1945, R. O. Burns	2 OCT 1945

(b) sod evaluation–02.132

1.	MEASUREMENTS ON TYPE 135 ASDIC MAGNETOSTRICTION TRANSDUCER, Calibration Group, NO. C53	18 MAY 1944
2.	MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER XQHA, Calibration Group, NO. C78	23 MAY 1945
3.	XQHA SONAR TESTS, W. H. Williams, NO. M339	17 AUG 1945

(c) sod physics–02.133

1.	EXPERIMENTS IN ECHO RANGING AT 90 KC, C. E. Mongan, Jr., R. Halley	6 FEB 1946

(d) bottom scanning–02.134

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 87—BOTTOM SCANNER, W. H. Williams, D, A. Baldwin	
2.	STATUS OF PRO-SUBMARINE DEVELOPMENT WORK AT UCDWR, F. N. D. Kurie	23 APRIL 1945

(e) expendible echo sounder–02.135

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 77—EXPENDIBLE SOUNDER, F. N. D. Kurie, L. A. Cartwright, Jr.	
2.	INVENTION REPORT NO. PC-4 sr-30 PAT 110—ELECTRONIC INDICATOR, R. A. Mueller	
3.	PROPOSED METHOD FOR AMPHIBIOUS OPERATIONS, F. N. D. Kurie	27 JULY 1944
4.	RADIO SOUNDER BUOY, D. H. Ransom, Jr.	29 JULY 1944
5.	EXPENDIBLE FATHOMETER TESTS, W. B. Beckley	19 SEPT 1944
6.	TESTS OF EXPENDIBLE FATHOMETER, W. B. Beckley	25 SEPT 1944
7.	EXPENDIBLE FATHOMETER, F. N. D. Kurie	5 OCT 1944
8.	REPORT ON INVESTIGATION OF USDAR PRINCIPLE AS APPLIED TO THE EXPENDIBLE BUOY ECHO-SOUNDING EQUIPMENT PROJECT, R. A. Mueller	19 FEB 1945
9.	RESULTS OF USNRSL PRELIMINARY TESTS OF THE EXPENDIBLE BUOY SOUNDING EQUIPMENT 15 JUNE 1945, L. A. Cartwright, Jr.	20 JUNE 1945
10.	RECONNAISANCE PADDLEBOARDS: USE OF EXPENDIBLE ECHO-SOUNDING EQUIPMENT ON, R. H. Fleming	18 JULY 1945
11.	EXPENDIBLE FATHOMETER—TESTS CONDUCTED AT THE NAVAL COMBAT DEMOLITION TRAINING AND EXPERIMENTAL BASE, MAUI, 3 TO 9 AUGUST 1945, S. P. Shelton, L. P. Delsasso	9 AUG 1945
12.	THE EXPENDIBLE ECHO-SOUNDING BUOY MODEL CXKD, R. A. Mueller, Jr.	10 AUG 1945
13.	U.D.T. PADDLEBOARD SOUNDING EQUIPMENT—PRELIMINARY INSTRUCTIONS, L. A. Cartwright, Jr.	30 AUG 1945

(f) expendible wave-buoy–02.136

(4) low-frequency echo ranging–02.14

1.	SONIC IMPULSE METHOD OF SUBMARINE DETECTION AND LOCATION, H. E. Hartig	2 OCT 1941
2.	A NOTE ON THE TRANSMISSION OF LOW-FREQUENCY SOUND IN SEA WATER, L. D. Statham	21 JAN 1942
3.	PROGRAM FOR THE STUDY OF LOWER FREQUENCIES FOR ECHO RANGING, F. N. D. Kurie	29 SEPT 1942
4.	BEARING ACCURACY AT LOWER OPERATING FREQUENCIES, F. N. D. Kurie	30 OCT 1942
5.	BEARING ACCURACY AT LOWER OPERATING FREQUENCIES, F. N. D. Kurie, NO. U2	12 NOV 1942
6.	INTERIM REPORT ON ECHO RANGING AT LOWER FREQUENCIES, L. M. Langer, NO. U109	1 SEPT 1943

(5) targets–02.15

1.	THE TRIPLANE, D. E. Ross, F. N. D. Kurie, NO. U4 (This report covers the design, construction, use, and a brief theory for three-foot and six-foot triplane acoustical targets using fabric-covered celotex panels.)	23 NOV 1942
2.	SUPPLEMENT TO THE TRIPLANE, D. E. Ross, F. N. D. Kurie, NO. U4a (This report covers mechanical design information on the original fabric covered panel type triplane and the replacement of the fabric covered panels by metal covered panels.)	29 JUNE 1943
3.	MEMORANDUM ON TARGET STRENGTH OF THE TWO-FOOT TOWABLE TRIPLANE AT 60 KC, Sonar Section	16 FEB 1944
4.	MEMORANDUM ON STREAMLINED TRIPLANE, D. G. Reed (This report covers the design and construction of a two-foot triplane enclosed in a streamlined lucite case to facilitate towing the triplane as a moving target, also includes design and construction of a cable depressor required to hold the triplane submerged under towing conditions. This equipment was built for the Harvard Underwater Sound Laboratory.)	31 AUG 1944
5.	TRIPLANES, C. E. Mongan (This report covers the design, construction and use of eight-inch foam glass triplanes and a brief theory and discussion of triplane target strength as a function of frequency.)	6 FEB 1945
6.	STATUS OF PRO-SUBMARINE DEVELOPMENT WORK AT UCDWR, F. N. D. Kurie	23 APRIL 1945

b. possible improvements in standard gear–02.30

1.	A CIRCUIT TO OSCILLATE AT A LOW FREQUENCY OR BE NON-OSCILLATORY AS A FUNCTION OF AN APPLIED VOLTAGE, M. C. Henderson	27 AUG 1941
2.	A BEAT FREQUENCY GENERATOR FOR MEASURING VELOCITY BY THE DOPPLER PRINCIPLE, G. E. Duvall	22 SEPT 1941
3.	ELIMINATION OF WATER NOISE IN SUPERSONIC SOUND RANGING BY APPLICATION OF FREQUENCY MODULATION, L. D. Statham	24 OCT 1941
4.	A PROPOSAL TO INVESTIGATE THE EFFECT OF MINIMIZING REVERBERATION IN QC ECHO-RANGING EQUIPMENT, H. E. Hartig	12 DEC 1941
5.	GYROSTABILIZER FOR TRANSDUCERS, F. N. D. Kurie, F. Pierce	14 JAN 1942
6.	APP[illegible]TION OF FM METHODS TO SOUND PULSE RECEPTION, E. M. McMillan	13 FEB 1942
7.	REDUCTION OF REVERBERATION WITH PRESENT ECHO-RANGING EQUIPMENT, L. J. Sivian, C. F. Eyring	2 MAY 1942
8.	CONSIDERATION OF CERTAIN FACTORS AFFECTING THE CHOICE OF SIGNAL FREQUENCIES FOR ECHO RANGING, V. O. Knudsen	23 OCT 1942
9.	A PROPOSED METHOD OF MINIMIZING REVERBERATION PICKUP IN THE QC ECHO-RANGING EQUIPMENT, C. A. Hisserich (This is a two-page paper accompanied by one illustration, covering a proposal which was intended to minimize the annoyance of high-intensity local reverberation. The discussion covers means for obtaining this effect and the illustration shows particular connection with regard to a QC Receiver. This type of system was adapted to many types of sound equipment and has been referred to as TVG (Time Varying Gain).)	8 DEC 1942
10.	ECHO-RANGING SET—UCDWR NO. 483, M. E. Chun, W. A. Myers	15 APRIL 1943
11.	REFLECTION OF LIGHT FROM A SUBMARINE MODEL, R. B. Tibby, NO. M61	12 MAY 1943
12.	MODIFICATION OF A TYPE CBM-55081 RANGE INDICATOR, D. E. Ross, NO. M104	4 SEPT. 1943
13.	THE EFFECT OF THE SHIP'S ROLL ON ECHO RANGING, J. S. McNown, C. Eckart, NO. M114	8 OCT 1943
14.	INVENTION REPORT NO. PC-4 sr-30 PAT 4—FLUXION METER, C. A. Hisserich, OSRD Invention Disclosure NO. 89, Navy Case NO. 3407, Application Serial NO. 510,243 filed	13 NOV 1943

(1) basic improvement study–02.31

(a) doppler devices–02.311

1.	ENHANCEMENT OF DOPPLER EFFECT, K. S. Van Dyke	14 NOV 1941
2.	DOPPLER RECOGNITION, C. A. Hisserich	28 FEB 1942
3.	PROPOSAL FOR A CATHODE RAY INDICATOR FOR ECHO-RANGING EQUIPMENT, G. W. Downs, Jr.	31 MARCH 1942
4.	A METHOD OF FINDING THE VELOCITY OF A SUBMARINE BY USE OF THE DOPPLER EFFECT AND A NEW ATTACK DOCTRINE BASED ON KNOWLEDGE OF THE VELOCITY, T. H. Schafer	23 MAY 1942
5.	EFFECT OF DOPPLER ON ECHO DETECTION (COMMENTS ON BRITISH INTERNAL REPORT NO. 81—V258), C. Eckart	29 JULY 1942
6.	THE DOPPLER DOUBLER AND SQUARE-LAW AMPLIFICATION, W. A. Myers, NO. M48	1 APRIL 1943
7.	DOPPLER DOUBLER AND SQUARE-LAW AMPLIFIER, W. A. Myers, V. G. McKenney, NO. U67	20 MAY 1943
8.	OPERATION, INSTALLATION AND ALIGNMENT INSTRUCTIONS FOR THE DOPPLER DOUBLER (AS APPLIED TO THE SUBMARINE SIGNAL COMPANY 755 RECEIVER AMPLIFIER), W. A. Myers, Lt. Comdr. J. C. Myers, V. G. McKenney, NO. U86	4 AUG 1943
9.	INVENTION REPORT NO. PC-4 sr-30 PAT 35—SIGNAL ENHANCER (DOPPLER DOUBLER), Comdr. J. C. Myers, BuShips, Navy Case NO. 3846, Application Serial NO. 500,781 filed	1 SEPT 1943

(i) doppler enhancers–02.311.1

(ii) visual doppler indicator–02.311.2

(iii) own-doppler nullifier–02.311.3

(iv) reverberation suppression filter–02.311.4

(b) gain control systems–02.312

(c) maintenance of true bearing (mtb)–02.313

(d) bearing deviation indicator (bdi, formerly slc)–02.314

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 37—BEARING DEVIATION INDICATOR, E. M. McMillan, F. N. D. Kurie, F. X. Byrnes, OSRD Invention Disclosure NO. 537, Navy Case NO. 3850.	
2.	SPLIT BEAM DETECTION, F. N. D. Kurie	27 OCT 1941
3.	THREE-CHANNEL BEARING AND RANGE DETERMINATION, F. N. D. Kurie	3 DEC. 1941
4.	REPORT ON SPLIT BEAM WORK AT SAN DIEGO, F. N. D. Kurie	10 SEPT 1942

(e) console racks–02.315

(f) reverberation equalizer–02.316

1.	A PROPOSED METHOD OF MINIMIZING REVERBERATION PICKUP IN THE QC ECHO-RANGING EQUIPMENT, C. A. Hisserich	8 DEC 1941
2.	PROPOSAL FOR A CATHODE RAY INDICATOR FOR ECHO RANGING, G. W. Downs, Jr.	31 MAR 1942
3.	SYSTEM FOR PROVIDING SELECTIVE RECEPTION OF VARIABLE FREQUENCY SIGNALS, G. W. Downs, Jr.	28 MAY 1942
4.	A SUGGESTION FOR THE IMPROVEMENT OF THE RATIO OF ECHO SIGNAL TO REVERBERATION BY USING TWO FREQUENCIES, R. C. Fisher.	25 JUNE 1942
5.	OBSERVATIONS OF ECHO SIGNALS OBTAINED USING VARIABLE FREQUENCY TRANSMISSIONS, E. M. McMillan	4 JULY 1942
6.	PRELIMINARY REPORT ON REVERBERATION EQUALIZER, G. W. Downs, Jr.	4 JULY 1942
7.	FREQUENCY MODULATION IN ECHO RANGING, C. Eckart	21 JULY 1942
8.	REVERBERATION EQUALIZER, G. W. Downs, Jr. (This is a two-page report accompanied by one illustration, stating the particular plan of investigation of a proposed method of minimizing or equalizing reverberation. The report indicates the general type and form of equipment being constructed for use in the above mentioned investigation. This report is supplemented by two other reports on the same subject dated 27 February 1943 and July 1943. Issued as a Laboratory Report U97 on 18 September 1943.)	3 DEC 1942
9.	THE REVERBERATION EQUALIZER, G. W. Downs, Jr. (This is a two-page report supplementing a similar report of the same title dated December 3, 1942. It covers in a little more detail the actual techniques used and parameters chosen for the investigation made at San Diego. This report is still further supplemented by the report of the same name dated July 1943. Issued as a Laboratory Report U97 September 18, 1943.)	27 FEB 1943
10.	APPLICATION OF THE PRINCIPLES OF THE REVERBERATION EQUALIZER TO THE SLC, QC STACK, G. W. Downs, Jr.	25 MAR 1943

11. THE REVERBERATION EQUALIZER, G. W. Downs, Jr., NO. U97 — 18 SEPT 1943

(This report supplements the preliminary material contained in the reports of the same name dated December 3, 1942 and 27 February 1943. It is an eight-page report and contains eight pages of illustrations. The text covers the tests made with this device and is in the form of a final report.)

12. INVENTION REPORT NO. PC-4 sr-30 PAT 24—ECHO-RANGING SYSTEM AND METHOD (REVERBERATION EQUALIZER), C. Eckart, G. W. Downs, Jr., OSRD Invention Disclosure NO. 656, Navy Case NO. 3912, Application Serial NO. 532,632 filed — 25 APRIL 1944

(2) automatic target training–02.32

1. TWO POSSIBLE "BEARING KEEPERS" FOR DISCRETE SIGNAL PULSES OR "ECHOES," M. C. Henderson — 23 OCT 1941

(An automatic hunting device including a scheme for holding contact with a target. Uses relays and bow and stern cut-ons, range-gate and other devices. Never reduced to practice.)

(3) echo-ranging test equipment—02.33

1. MONITOR MICROPHONE AMPLIFIER, D. C. Kalbfell, NO. M77 — 14 JUNE 1943

(a) sound gear monitor–02.331

(b) split projector test unit–02.332

(c) portable directional pattern tracer–02.333

c. devices alert in all directions–02.40

1. NOTES ON FREQUENCY SCANNING I, W. V. Houston — 19 SEPT 1941
2. SONIC IMPULSE METHOD OF SUBMARINE DETECTION LOCATOR, H. E. Hartig — 2 OCT 1941
3. A LONG-RANGE SUBMARINE DETECTION SCHEME, C. A. Hisserich — 16 OCT 1941
4. THE EFFECT OF SWEEPING THE FREQUENCY PAST A FILTER, C. Eckart — 25 JULY 1942

(1) fm systems (non-scanning)–02.41

1. SUPERSONIC ECHOSCOPE DEVELOPMENT, K. S. Van Dyke — 18 AUG 1941

(First memo; intended use, Brush tests.)

2. MODIFIED ECHOSCOPE TO DETERMINE THE DEPTH OF A SUBMARINE, D. C. Kalbfell — 3 SEPT 1941

(Path difference between direct ray and surface-reflected ray utilized.)

3. A POSSIBLE MODIFICATION OF THE ECHOSCOPE, H. M. Zenor — 20 SEPT 1941

(Multiple projectors and receivers, rotatable with angular lag.)

4. SOME BASIC CALCULATIONS ON ECHOSCOPE, K. S. Van Dyke — 1 OCT 1941
5. DOPPLER EFFECT AND ECHOSCOPE, A. M. Thorndike — 17 OCT 1941

(First discussion of subject.)

6. ELIMINATION OF WATER NOISE IN SUPERSONIC SOUND RANGING BY APPLICATION OF FREQUENCY MODULATION, L. D. Statham — 24 OCT 1941

(Makes point that "FM radio" differs from present Echoscope in its use of FM.)

7.	ECHOSCOPE PROGRESS REPORT, J. N. A. Hawkins (Progress, plans, equipment on hand, etc.)	28 OCT 1941
8.	THE ECHOSCOPE DEVELOPMENT, K. S. Van Dyke (Account of Brush demonstration of July 1941, and NDRC's own development to date.)	5 NOV 1941
9.	THE CHARACTERISTICS OF CERTAIN ECHOSCOPE SYSTEMS, D. C. Kalbfell (General discussion. Suggests sum as well as difference be used.)	30 DEC 1941
10.	ECHOSCOPE RANGING, F. C. Jones	13 JAN 1942
11.	ECHOSCOPE SCANNING, F. C. Jones	14 JAN 1942
12.	SAWTOOTH SWEPT OSCILLATOR TESTING BY MEANS OF MECHANICAL ECHO SIMULATION, C. A. Hisserich (Uses frequency division, followed by recording at 2700 ± cycles, and beating the frequency being recorded against the frequency one or two grooves behind. The beat frequency is constant if the oscillator is linear.)	22 JAN 1942
13.	A NEW ECHOSCOPE RECEIVING SYSTEM, F. C. Jones (Suggests fixed sawtooth and a frequency measuring device.)	28 JAN 1942
14.	SOME CONSIDERATIONS WHICH CONCERN THE CHOICE OF OPTIMUM VALUES OF THE ECHOSCOPE DESIGN CONSTANTS, H. P. Yockey	29 JAN 1942
15.	A DISCUSSION OF WHY THE ECHOSCOPE IS A DETECTION DEVICE ONLY, H. P. Yockey	10 FEB 1942
16.	THE DOPPLER EFFECT ON THE ECHOSCOPE, D. K. Froman (Mathematical treatment of time relations between echo, signal, and beat note.)	24 MAR 1942
17.	PROGRESS REPORT ON THE ECHOSCOPE, K. S. Van Dyke (Experimental. Results to date, plans and problems.)	4 APRIL 1942
18.	THE ECHOSCOPE—BI-MONTHLY REPORT, K. S. Van Dyke (Full description of the Echoscope and the Mason Prism.)	24 APRIL 1942
19.	PROGRESS REPORT ON MEASUREMENTS WITH THE ECHOSCOPE, M. C. Henderson (Use of device for measuring target and reverberation levels.)	30 MAY 1942
20.	STUDY OF TWO METHODS FOR IMPROVING THE CONSTANCY OF BEAT FREQUENCY IN THE ECHOSCOPE, R. C. Fisher (Applies to Bell Laboratory oscillator.)	11 JUNE 1942
21.	A PROPOSAL FOR IMPROVING THE RATIO OF SIGNAL TO "REVERBERATION" IN THE ECHOSCOPE, R. C. Fisher (A balance method: Reverberation at A vs. reverberation at B. Signal at A disturbs balance.)	12 JUNE 1942
22.	COBAR—MARK VII, C. G. McProud (Includes the Cobar or Echoscope, Principles and Practice, by M. C. Henderson. Full description of Cobar principles and complete circuit diagrams. Some experimental results.)	15 SEPT 1942
23.	THE COBAR OR ECHOSCOPE—PRINCIPLES AND PRACTICE, M. C. Henderson (Includes Cobar—Mark VII)	15 SEPT 1942
24.	FREQUENCY MODULATION GROUP, J. N. A. Hawkins (Report on personnel and problems.)	7 OCT 1942
25.	AN ANALYSIS OF SINGLE-FREQUENCY, MULTI-FREQUENCY, AND SWEPT-FREQUENCY ECHO-RANGING SYSTEMS, C. A. Hisserich (Extensive discussion of properties of such system, sawtooth relations "lost time," scanning in azimuth and range, etc.)	21 OCT 1942
26.	NOTES ON OPERATING REQUIREMENTS OF FM ECHO-RANGING DETECTION SYSTEMS, J. N. A. Hawkins (A glossary of terms and short discussion of them.)	25 NOV 1942
27.	FREQUENCY MODULATION ECHO-RANGING SYSTEMS—COBAR, PRIBAR, SUBSIGHT, M. C. Henderson, NO. U12 (This report deals with FM systems in general. It evaluates the properties (covering advantages as well as disadvantages) of this particular method of echo ranging. Theory underlying Cobar, Pribar and Subsight is presented with some indication of performance and expected results being made in the text, as well as by illustration. The report concludes with a brief treatment of Doppler effect on range accuracy. Treatment of this subject is only lightly mathematical.)	30 DEC 1942

28. CURRENT DEVICES, INSTALLATIONS, PROGRAM OF MODIFICATION AND INVESTIGATION, M. C. Henderson — 13 JAN 1943

29. OUTLINE OF THE PROPOSED FAMPAS SYSTEM, C. A. Hisserich, NO. M30 — 25 JAN 1943

(This report presents a complete discussion of the Fampas system mentioned in the title. It associates the Fampas proposal as a modification of existing Cobar equipment and supports the discussion with photographs of the initial equipment used, and indications obtained by use of the equipment. This discussion is especially of interest in that it presents the first successful attempt at developing a PPI presentation of targets with an FM echo ranging system.)

30. A MULTI-CHANNEL ELECTRONIC SWITCH, S. Bertram, NO. U29 — 1 MAR 1943

(This report contains a discussion of an essentially new form of electronic switch. It is proposed that the form of switch under discussion is far more simple in design, as well as more versatile, than previous units. The discussion covers complete theory and design details and is supplemented with proposed circuit diagrams and a general mathematical treatment of the problem, of spectrum analysis as well as phase shift network design. This report was supplemented by U29a, dated May 1, 1943.)

31. SUPPLEMENTARY NOTES ON A MULTI-CHANNEL ELECTRONIC SWITCH, S. Bertram, NO. U29a — 1 MAY 1943

(Used in QLA (FM) Sonar.)

32. COHERENCE AND FLUCTUATION OF FM REVERBERATION, M. J. Sheehy, NO. A37 — 19 SEPT 1944

33. COHERENCE AND FLUCTUATION OF FM REVERBERATION, Sonar Data Division, NO. M395 — 14 FEB 1946

(a) cobar–02.411

1. SUPERSONIC ECHOSCOPE DEVELOPMENT, K. S. Van Dyke — 18 AUG 1941

(First memo; intended use, Brush tests.)

2. MODIFIED ECHOSCOPE TO DETERMINE THE DEPTH OF A SUBMARINE, D. C. Kalbfell — 3 SEPT 1941

(Path difference between direct ray and surface-reflected ray utilized.)

3. DESCRIPTION OF THE ECHOSCOPE, D. C. Kalbfell — 18 SEPT 1941

(Circuit operation is described. The "Point Loma" Model.)

4. NOTES ON FREQUENCY SCANNING, W. V. Houston — 19 SEPT 1941

(Response of a filter to a "swept frequency.")

5. A POSSIBLE MODIFICATION OF THE ECHOSCOPE, H. M. Zenor — 20 SEPT 1941

(Multiple projectors and receivers, rotatable with angular lag.)

6. SOME BASIC CALCULATIONS ON ECHOSCOPE, K. S. Van Dyke — 1 OCT 1941

7. DOPPLER EFFECT AND ECHOSCOPE, A. M. Thorndike — 17 OCT 1941

(First discussion of subject.)

8. ECHOSCOPE PROGRESS REPORT, J. N. A. Hawkins — 28 OCT 1941

(Progress, plans, equipment on hand, etc.)

9. THE ECHOSCOPE DEVELOPMENT, K. S. Van Dyke — 5 NOV 1941

(Account of Brush demonstration of July 1941, and NDRC's own development to date.)

10. ECHOSCOPE, J. N. A. Hawkins — 2 DEC 1941

(Report of progress to date and comments.)

11. THE CHARACTERISTICS OF CERTAIN ECHOSCOPE SYSTEMS, D. C. Kalbfell — 30 DEC 1941

(General discussion. Suggests sum as well as difference be used.)

12. ECHOSCOPE RANGING, F. C. Jones — 13 JAN 1942

13. ECHOSCOPE SCANNING, F. C. Jones — 14 JAN 1942

14. SOME NOTES ON THE PECULIAR BEHAVIOR OF FREQUENCY-MODULATED CONTINUOUS-TRANSMISSION ECHO-RANGING SYSTEMS, K. S. Van Dyke — 15 JAN 1942

(Analyzes Kalbfell's suggestions.)

15. A NEW ECHOSCOPE RECEIVING SYSTEM, F. C. Jones — 28 JAN 1942

(Suggests fixed sawtooth and a frequency measuring device.)

16.	SOME CONSIDERATIONS WHICH CONCERN THE CHOICE OF OPTIMUM VALUES OF THE ECHOSCOPE DESIGN CONSTANTS, H. P. Yockey	29 JAN 1942
17.	A DISCUSSION OF WHY THE ECHOSCOPE IS A DETECTION DEVICE ONLY, H. P. Yockey	10 FEB 1942
18.	A SUGGESTION FOR INCREASING THE DEPTH OF FOCUS OF THE ECHOSCOPE, F. N. D. Kurie	9 MAR 1942
19.	THE DOPPLER EFFECT ON THE ECHOSCOPE, D. K. Froman (Mathematical treatment of time relations between echo, signal, and beat note.)	24 MAR 1942
20.	PROGRESS REPORT ON THE ECHOSCOPE, K. S. Van Dyke (Experimental; results to date, plans and problems.)	4 APRIL 1942
21.	THE ECHOSCOPE—BI-MONTHLY REPORT, K. S. Van Dyke (Full description of the Echoscope and the Mason Prism.)	24 APRIL 1942
22.	PROGRESS REPORT ON MEASUREMENTS WITH THE ECHOSCOPE, M. C. Henderson (Use of device for measuring target and reverberation levels.)	30 MAY 1942
23.	STUDY OF TWO METHODS FOR IMPROVING THE CONSTANCY OF BEAT FREQUENCY IN THE ECHOSCOPE, R. C. Fisher (Applies to Bell Laboratory oscillator.)	11 JUNE 1942
24.	COBAR—MARK VII, C. G. McProud (Includes the Cobar or Echoscope—Principles and Practice, by M. C. Henderson. Full description of Cobar principles and complete circuit diagrams. Some experimental results.)	15 SEPT 1942
25.	STATEMENT RE COBAR, K. S. Van Dyke	15 SEPT 1942
26.	THE COBAR OR ECHOSCOPE—PRINCIPLES AND PRACTICE, M. C. Henderson (Includes Cobar—Mark VII, by C. G. McProud.)	15 SEPT 1942
27.	MEASUREMENT PROGRAM OF COBAR GROUP, J. N. A. Hawkins	6 OCT 1942
28.	FREQUENCY MODULATION GROUP, J. N. A. Hawkins (Report on personnel and problems.)	7 OCT 1942
29.	SEA TESTS OF COBAR WITH SUBMARINE FRIDAY, 9 OCTOBER 1942, M. C. Henderson	14 OCT 1942
30.	USE OF FREQUENCY MODULATION IN ECHOSCOPE, A. M. Thorndike (Echoscope is not a true "FM" system.)	25 OCT 1942
31.	COBAR—MARK VIII, C. G. McProud (Circuit diagrams and details of operation.)	17 NOV 1942
32.	NOTES ON OPERATING REQUIREMENTS OF FM ECHO-RANGING DETECTION SYSTEMS, J. N. A. Hawkins (Largely definitions.)	25 NOV 1942
33.	AN ANALYSIS OF THE SINE SWEEP ECHOSCOPE, L. D. Statham (Properties of the sinusoid and sawtooth sweeps.)	5 DEC 1942
34.	CONFERENCE ON THE FM SYSTEMS PROGRAM AT SAN DIEGO JANUARY 13, 1943, G. P. Harnwell	13 JAN 1943
35.	CURRENT DEVICES, INSTALLATIONS, PROGRAM OF MODIFICATION AND INVESTIGATION, M. C. Henderson	13 JAN 1943
36.	FREQUENCY MODULATION SYSTEMS GROUP (CHARTS ON COBAR, SUBSIGHT), J. N. A. Hawkins (Chart showing characteristics (frequency, sweep rate, etc.) of various experimental systems.)	11 FEB 1943
37.	MINE DETECTION WITH COBAR DEVICES, M. C. Henderson, A. H. Roshon, NO. M115 (First use of Cobar and Subsight to detect mines.)	2 AUG 1943
38.	MEASUREMENTS ON CRYSTAL TRANSDUCER GC2-1 NO. 590, C. J. Burbank, NO. C22	11 NOV 1943
39.	INVENTION REPORT NO. PC-4 sr-30 PAT 21—SERVO MECHANISM (FOR COBAR), S. Bertram, OSRD Invention Disclosure NO. 403, Navy Case NO. 4650, Application Serial NO. 556,989 filed	3 OCT 1944

(b) pribar–02.412

1.	THE DOPPLER EFFECT ON THE 'MASON PRISM' ECHOSCOPE, D. K. Froman	16 JUNE 1942
2.	SUBMARINE DETECTION AS A PROBLEM IN SCANNING, A. M. Thorndike	22 OCT 1942

(c) subsight–02.413

1.	EQUIPMENT SPECIFICATIONS, AUTO-TRAIN GEAR, J. N. A. Hawkins	9 JULY 1942
2.	SUBSIGHT, M. C. Henderson, NO. U12a (First description of range-rate compensation by Cobar devices.)	20 FEB 1943
3.	PLANE SPOTTING WITH SUBSIGHT, C. G. McProud (Report on finding a sunken airplane in Lake Mead.)	28 MAY 1943
4.	AIRPLANE LOCATION WITH SUBSIGHT, C. G. McProud, NO. M65 (Report on finding a sunken airplane in Lake Mead.)	29 MAY 1943
5.	MINE DETECTION WITH COBAR DEVICES, M. C. Henderson, A. H. Roshon, NO. M115 (First report of mine detection by FM systems.)	2 AUG 1943
6.	MEASUREMENTS ON CRYSTAL TRANSDUCER GB5-1 NO. 350, C. J. Burbank, NO. C16	2 NOV 1943

(2) polyscope–02.42

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 16—TIME VARYING GAIN DEVICE (FOR POLYSCOPE), E. M. McMillan, OSRD Invention Disclosure NO. 1058, Navy Case NO. 4060	
2.	INVENTION REPORT NO. PC-4 sr-30 PAT 17—MULTIPLE UNIT ECHO-RANGING SYSTEM (POLYSCOPE), E. M. McMillan, OSRD Invention Disclosure NO. 1056, Navy Case NO. 4049	
3.	PROPOSED INDICATING DEVICES TO BE USED ON THE MULTIPLE PROJECTOR, "POLYSCOPE," OR POLYJECTOR, OR DRAGON'S EYE, OR POLYPHONE, E. M. McMillan, M. C. Henderson	27 AUG 1941
4.	SPECIFICATIONS FOR POLYSCOPE EQUIPMENT, E. M. McMillan	8 NOV 1941
5.	POLYSCOPE REPORT, E. M. McMillan	9 APRIL 1942
6.	EVALUATION OF POLYSCOPE AND SUGGESTED MODIFICATIONS, E. M. McMillan	30 JUNE 1942
7.	THE POLYSCOPE ELECTRONIC SWITCH, E. M. McMillan	9 JULY 1942
8.	INVENTION REPORT NO. PC-4 sr-30 PAT 8—ELECTRONIC SWITCH (FOR POLYSCOPE), E. M. McMillan, OSRD Invention Disclosure NO. 127, Navy Case NO. 3732, Application Serial NO. 519,317 filed	22 JAN 1944

(3) supersonic prism–02.43

(4) magnetic tape compensator–02.44

(5) scanning sonar systems–02.45

(a) rotoscope (mr sonar)–02.451

(b) cr sonar (capacity rotated)–02.452

1.	MEASUREMENTS ON CRYSTAL TRANSDUCER CP1-1 NO. 770, C. J. Burbank, NO. C1	4 SEPT 1943

(c) er sonar (electronically rotated)–02.453

(d) qla equipment (fm sonar)–02.454

1. INVENTION REPORT NO. PC-4 sr-30 PAT 23—ECHO-RANGING STROBOSCOPE, R. C. Fisher, OSRD Invention Disclosure NO. 1060

2. INVENTION REPORT NO. PC-4 sr-30 PAT 89—FREQUENCY ANALYSIS SYSTEM (FOR QLA SONAR), S. Bertram

3. INVENTION REPORT NO. PC-4 sr-30 PAT 100—ACOUSTICALLY DIRECTED AND DETONATED ECHO REPEATER (ADDER), G. P. Harnwell, M. O. Kappler

4. INVENTION REPORT NO. PC-4 sr-30 PAT 114—ELECTRIC CONTROLLER, K. K. Wyckoff

5. FREQUENCY MODULATION ECHO-RANGING SYSTEMS—COBAR, PRIBAR, SUBSIGHT, M. C. Henderson, NO. U12 — 30 DEC 1942

   (This report deals with FM systems in general. It evaluates the properties (covering advantages as well as disadvantages) of this particular method of echo ranging. Theory underlying Cobar, Pribar and Subsight is presented with some indication of performance and expected results being made in the text, as well as by illustration. The report concludes with a brief treatment of Doppler effect on range accuracy. Treatment of this subject is only lightly mathematical.)

6. INVENTION REPORT NO. PC-4 sr-30 PAT 80 (DEVELOPED UNDER SUBCONTRACT NO. 8)—RELAXATION OSCILLATOR (FOR FM SONAR), O. D. Engstrom—Western Electric Company, OSRD Invention Disclosure NO. 3903, Application Serial NO. 471,661 filed — 8 JAN 1943

7. INVENTION REPORT NO. PC-4 sr-30 PAT 81 (DEVELOPED UNDER SUBCONTRACT NO. 8)—MULTIVIBRATOR (FOR FM SONAR), O. D. Engstrom—Western Electric Company, OSRD Invention Disclosure NO. 3916, Application Serial NO. 473,189 filed — 22 JAN 1943

8. OUTLINE OF THE PROPOSED FAMPAS SYSTEM, C. A. Hisserich, NO. M30 — 25 JAN 1943

9. SUBSIGHT, M. C. Henderson, NO. U12a — 20 FEB 1943

   (This report covers a particular adaptation of Cobar or FM equipment, known as Subsight. Subsight was proposed and constructed to serve as a fire control device for forward thrown projectors. The device was capable of automatically providing "velocity compensation" to the fire control problem without knowledge of the speed of the submarine target. The report deals with fundamental considerations of FM systems in general and covers theory of Velocity Compensation. Treatment of the subject is only lightly mathematical.)

10. MECHANICAL TUNED ELEMENTS FOR FILTERING AND RANGE INDICATION IN A MULTI-CHANNEL COBAR, R. C. Fisher — 20 APRIL 1943

11. INVENTION REPORT NO. PC-4 sr-30 PAT 14—FM ECHO-RANGING SYSTEM (COBAR), K. Van Dyke, OSRD Invention Disclosure NO. 246, Navy Case NO. 3673, Application Serial NO. 488,501 filed — 24 MAY 1943

12. AIRPLANE LOCATION WITH SUBSIGHT, C. G. McProud, NO. M65 — 29 MAY 1943

    (Finding a sunken plane in Lake Mead.)

13. PROPOSED SYSTEM FOR THE RAPID FREQUENCY ANALYSIS OF AN AUDIO SPECTRUM, S. Bertram, NO. M84 — 16 JULY 1943

    (This report consists of four pages of general discussion of the problem of spectrum analysis, bringing forth in a general discussion the amount of resolution possible when analyzing a particular spectrum within a specified time. The discussion associates the spectrum analysis problem with the particular application in mind at that time, which was Fampas (FM Sonar) range resolution and indication. Suggestion is made in the conclusion of this report as to proposed methods of Doppler multiplication of a given spectrum so that greater percentage accuracy or resolution could be obtained by ultimate analysis of that spectrum.)

14. FM SONAR, M. C. Henderson, C. A. Hisserich, NO. U95 — 4 SEPT 1943

    (This report covers a discussion of FM Sonar (Fampas-QLA) as a new form of echo-ranging gear and compares it briefly with QC echo-ranging equipment. It presents in a general manner, the fundamental FM concept as it is associated with a system to provide Plan Position Indication. Mentioned in the report are various tests which had been conducted, and photographs taken during some of these tests are included. Block diagram and schematic diagrams of FM Sonar Model 1, No. 3 are included in the report.)

15. DOPPLER EFFECT IN FM SONAR, M. C. Henderson, NO. U107 — 20 SEPT 1943

    (This report discusses the influence of the Doppler effect upon the range indications of an FM Sonar device and proposes methods for reducing these effects to the extent where advantages can be derived from them. The report contains discussion of a system known as Subsight, which eliminates own Doppler and which takes advantage of target Doppler to obtain fire control information. The discussion is only lightly mathematical.)

16. FM SONAR, F. N. D. Kurie — 27 OCT 1943

    (This is a one-page report briefly discussing the general arrangement and ability of FM Sonar (QLA). Attached to the report, there are ten photographs from an FM Sonar PPI screen. Also attached, is an artist's conception of an FM Sonar submarine installation.)

17.	SPECIFICATIONS FOR AUXILIARY EQUIPMENT FOR MULTI-STRING LIGHT VALVE, F. N. D. Kurie	2 NOV 1943
18.	MEASUREMENTS ON CRYSTAL TRANSDUCER CP4-1 NO. 942, C. J. Burbank, NO. C26	19 NOV 1943
19.	MEASUREMENTS ON CRYSTAL TRANSDUCER CP6-1 NO. 1127, C. J. Burbank, NO. C27	20 NOV 1943
20.	PRELIMINARY MANUAL FM SONAR MODEL I INSTALLATION AND OPERATION (EXPERIMENTAL), M. C. Henderson, NO. R134	1 DEC 1943
21.	INVENTION REPORT NO. PC-4 sr-30 PAT 47—ECHO-RANGING SYSTEM (QLA SONAR), C. A. Hisserich, OSRD Invention Disclosure NO. 1033, Navy Case NO. 4043, Application Serial NO. 520,667 filed	1 FEB 1944
22.	DOPPLER EFFECT IN FM SONAR, M. C. Henderson, NO. M184 (This report supplements the UCDWR report No. U107 and contains an elaborate mathematical treatment of the subject of Doppler effect in FM Sonar.)	8 FEB 1944
23.	PRO-SUBMARINE CONFERENCE, 8 MARCH 1944, D. J. Evans	10 MAR 1944
24.	DEMONSTRATION OF FM SONAR AT NEW LONDON, C. A. Hisserich	11 MAR 1944
25.	PRELIMINARY INSTRUCTION BOOK FOR FM SONAR MODEL 1 NO. 3, INSTALLATION, OPERATION AND MAINTENANCE, UCDWR, NO. R208	APRIL 1944
26.	PRELIMINARY REPORT ON THE USE OF FM SONAR IN HARBOR NET PROTECTION, Sonar Devices Group, NO. SM201	14 APRIL 1944
27.	PRESENT STATUS ON FM SONAR FOR SUBMARINES, F. N. D. Kurie	20 APRIL 1944
28.	INVENTION REPORT NO. PC-4 sr-30 PAT 12—MULTI-CHANNEL ELECTRONIC SWITCH (FOR QLA SONAR), S. Bertram, OSRD Invention Disclosure NO. 144, Navy Case NO. 3489, Application Serial NO. 532,915 filed	26 APRIL 1944
29.	MEASUREMENTS ON CRYSTAL TRANSDUCERS CP10-1 NO. 1217 AND GA2-5 NO. 1692, Calibration Group, NO. C51	1 MAY 1944
30.	INVENTION REPORT NO. PC-4 sr-30 PAT 28—SAWTOOTH VOLTAGE GENERATOR, G. W. Downs, Jr., OSRD Invention Disclosure NO. 351, Navy Case NO. 3798, Application Serial NO. 536,967 filed	23 MAY 1944
31.	PRELIMINARY INSTRUCTION BOOK FOR FM SONAR MODEL I NO. 5, M. C. Henderson, NO. R223	12 JUNE 1944
32.	FM SONAR, INSTALLATION AND TRIALS OF, F. N. D. Kurie	17 JULY 1944
33.	INVENTION REPORT NO. PC-4 sr-30 PAT 29—LIGHT VALVE (FOR QLA SONAR INDICATOR), C. A. Hisserich, M. C. Henderson, K. K. Wyckoff, OSRD Invention Disclosure NO. 2156, Navy Case NO. 4444, Application Serial NO. 547,780 filed	2 AUG 1944
34.	REPORT ON MEDITERRANEAN FIELD SERVICE EXPEDITION OF J. W. SAMPSELL AND A. H. ROSHON, A. H. Roshon	11 AUG 1944
35.	FM SONAR TRIP TO MEDITERRANEAN, A. H. Roshon	12 AUG 1944
36.	INVENTION REPORT NO. PC-4 sr-30 PAT 45—RADIAL SWEEP CIRCUIT (FOR QLA SONAR), S. Bertram, OSRD Invention Disclosure NO. 1250, Navy Case NO. 4563, Application Serial NO. 549,876 filed	17 AUG 1944
37.	PRELIMINARY INSTRUCTION BOOK FOR FM SONAR MODEL I NO. 5, UCDWR, NO. R223.1	15 SEPT 1944
38.	INVENTION REPORT NO. PC-4 sr-30 PAT 46—MULTI-CHANNEL ELECTRONIC SWITCH (FOR QLA SONAR), S. Bertram, OSRD Invention Disclosure NO. 1249, Navy Case NO. 4644, Application Serial NO. 555,351 filed	22 SEPT 1944
39.	FM SONAR, INSTALLATION AND TRIALS OF, M. C. Henderson	19 OCT 1944
40.	MEASUREMENTS ON CRYSTAL TRANSDUCER CQ4Z-2 NO. 1838 (B), Calibration Group, NO. C63	21 OCT 1944
41.	PRELIMINARY INSTRUCTION BOOK FOR FM SONAR MODEL I NOS. 6-10, UCDWR, NO. R223.2	1 NOV 1944
42.	OBSERVATIONS MADE DURING 10 DAYS AT SEA WITH FM SONAR ON THE USS TINOSA (SS283), M. O. Kappler, NO. SM280	11 NOV 1944
43.	MULTI-STRING LIGHT VALVE, ELECTRICAL RESEARCH PRODUCTS DIVISION OF WESTERN ELECTRIC COMPANY, INC., UCDWR, NO. U276 (This report contains a reasonably complete discussion of the 100-string, light valve, analyzer. The report briefly covers the principles of FM Sonar (QLA) operation and associates the multi-string light valve with the problem of FM Sonar spectrum analysis. 25 illustrations are provided showing details of the mechanical and electrical design as well as graphs showing operating characteristics.)	25 NOV 1944
44.	PRELIMINARY INSTRUCTION BOOK FOR FM SONAR MODEL I NOS. 6-10, UCDWR, NO. R223.3	1 JAN 1945
45.	NOTES ON SHOOTING LIVE ACTION PORTION OF FM SONAR FILM, W. Hutton	19 FEB 1945
46.	PRODUCTION STATUS OF QLA TRAINING FILM, W. Hutton	15 MAR 1945
47.	MINE DETONATOR, M. O. Kappler (This is a single-page memorandum covering in brief discussion, the possibilities of a mine countermeasure device.)	10 APRIL 1945
48.	STATUS OF PRO-SUBMARINE DEVELOPMENT WORK AT UCDWR, F. N. D. Kurie	23 APRIL 1945

49. CRITIQUE OF FM SONAR, T. F. Burke — 27 APRIL 1945

(Written at the request of F. N. D. Kurie as the result of observations and tests of FM sonar, particularly aboard FLYING FISH. Contains opinions shared by most other observers and concludes: (1) Present FM Sonar is range-limited by reverberation in most conditions. (2) Increased output power would improve performance very little. (3) Improved crosstalk isolation might improve the character of the echoes, but would not increase limiting range very much. (4) Present range limitations can be overcome by increasing the number of channels and by decreasing the range depth scanned on each scale.)

50. PRELIMINARY INSTRUCTION BOOK FOR FM SONAR MODEL I NOS. 11-15, UCDWR, NO. R223.4 — 12 MAY 1945

51. INVENTION REPORT NO. PC-4 sr-30 PAT 76—RECORDER (QLA INDICATOR), F. A. Jeswine, M. C. Henderson, K. K. Wyckoff, OSRD Invention Disclosure NO. 2681, Navy Case NO. 5208, Application Serial NO. 559,110 filed — 12 JUNE 1945

52. PRO-SUBMARINE PROGRAM AT UCDWR, W. B. Beckley — 28 SEPT 1945

53. CONFERENCE—PRO-SUBMARINE DEVELOPMENTS, 2 OCTOBER 1945, R. O. Burns — 2 OCT 1945

54. STUDY OF REFRACTION EFFECT ON QLA RANGES, H. R. Gould, F. Baltzly, Jr. — 15 NOV 1945

(i) center bearing indication–02.455

1. STATUS OF PRO-SUBMARINE DEVELOPMENT WORK AT UCDWR, F. N. D. Kurie — 23 APRIL 1945

(ii) qla trainer–02.456

1. INVENTION REPORT NO. PC-4 sr-30 PAT 95—SIMULATION OF UNDERWATER ECHO RANGING, S. Bertram, J. W. Sampsell, A. H. Roshon, F. Baltzly, Jr.

2. INVENTION REPORT NO. PC-4 sr-30 PAT 113—SIMULATOR FOR ECHO RANGING, S. Bertram

3. STATUS OF PRO-SUBMARINE DEVELOPMENT WORK AT UCDWR, F. N. D. Kurie — 23 APRIL 1945

4. PRELIMINARY INSTRUCTION MANUAL FM SONAR SIMULATOR AND OPERATOR TRAINER EXPERIMENTAL MODEL I, NO. 1, UCDWR, NO. M318 — 10 MAY 1945

5. PRO-SUBMARINE PROGRAM AT UCDWR, W. B. Beckley — 28 SEPT 1945

6. QLA TRAINER; STATUS OF, W. W. Isenberg — 15 NOV 1945

d. depth determining echo-ranging gear–02.50

3. harbor defense systems (in general)–03.00

1. HARBOR DEFENSE DETECTION OF VESSELS, K. O. Emery — 16 DEC 1941

a. cable-connected hydrophones–03.10

b. harbor defense surveys–03.30

1. SEASONAL AND DIURNAL WATER-NOISE VARIATIONS, SAN FRANCISCO HARBOR ENTRANCE—SUPPLEMENT TO WATER-NOISE SURVEY, SAN FRANCISCO, F. A. Everest, R. W. Young — 13 JUNE 1942

2. WATER BACKGROUND NOISE IN SAN DIEGO AREA, F. A. Everest, R. W. Young, G. P. Welch — 22 AUG 1942

3. METHOD FOR CALCULATING THE NUMBER OF HYDROPHONES NEEDED FOR LISTENING POSTS FOR HARBOR PROTECTION, R. W. Young — 22 OCT 1942

4. PROPOSALS FOR SAN FRANCISCO WATER-NOISE SURVEY, F. A. Everest — 30 OCT 1942

5. MEASUREMENTS OF HIGH VELOCITIES WITH A CURRENT METER, J. S. McNown — 4 NOV 1942

6.	NOTES ON HARBOR SURVEY TECHNIQUE AS SUGGESTED BY THE EXPERIENCE GAINED AT SAN FRANCISCO DURING NOVEMBER 1942, F. A. Everest	21 DEC 1942
7.	SOUND SURVEY—SAN FRANCISCO HARBOR (NOVEMBER 1942), Listening Section, NO. S27	3 FEB 1943
8.	COMPREHENSIVE OUTLINE FOR HARBOR SURVEY REPORTS, UCDWR, NO. M36	3 MAR 1943
9.	SUPPLEMENT TO SOUND SURVEY—SAN FRANCISCO HARBOR (NOVEMBER 1942), Listening Section, NO. S27a	3 MAR 1943
10.	SOME AMBIENT WATER-NOISE MEASUREMENTS IN THE 13TH NAVAL DISTRICT, Listening Section, NO. M120	15 OCT 1943
11.	SOME AMBIENT WATER-NOISE MEASUREMENTS IN THE 14TH NAVAL DISTRICT, Listening Section, NO. M122	22 OCT 1943
12.	SOME SHALLOW-WATER SOUND-PROPAGATION MEASUREMENTS IN THE 13TH NAVAL DISTRICT, Oceanographic and Listening Sections, NO. M126	26 OCT 1943
13.	SUPPLEMENT TO SOME AMBIENT WATER-NOISE MEASUREMENTS IN THE 14TH NAVAL DISTRICT, Listening Section, NO. M122a	22 JAN 1944
14.	SOME SOUND-PROPAGATION MEASUREMENTS IN THE 14TH NAVAL DISTRICT, Listening and Oceanographic Sections, NO. M228	19 JUNE 1944

c. phase-actuated locator–03.40

d. applications of fm systems to harbor defense–03.50

e. reduction of interference on magnetic detection loops–03.60

4. listening tehniques–04.00

1.	REPORT OF AN INVESTIGATION OF A LISTENING DEVICE DESIGNED BY DR. HANS WALLACH WITH RECOMMENDATIONS FOR EXPERIMENTAL PROJECT INVOLVING ITS USE, A. Ford	20 JULY 1942
2.	COMMENTS ON BINAURAL LISTENING DEVICE PROPOSED TO DR A. FORD BY DR. HANS WALLACH OF SWARTHMORE, C. H. Kean	24 AUG 1942
3.	REPORT OF LABORATORY TESTS ON AURAL RECEPTION, ETC., by R. S. Alford, C. Eckart, G. Camp	25 SEPT 1942
4.	METHOD FOR CALCULATING THE NUMBER OF HYDROPHONES NEEDED FOR LISTENING POSTS FOR HARBOR PROTECTION, R. W. Young	22 OCT 1942
5.	BINAURAL LISTENING GEAR, C. H. Kean, NO. M35	25 FEB 1943

a. listening apparatus for patrol craft–04.10

1.	DEEP AND SHALLOW WATER TESTS OF D-22 JP LISTENING EQUIPMENT, T. F. Johnston	3 NOV 1942
2.	OPERATING AND MAINTENANCE NOTES FOR THROUGH-THE-HULL SONIC LISTENING EQUIPMENT, T. F. Johnston	13 MAY 1943
3.	A STREAMLINED CABLE DEPRESSOR, A. R. Champion, NO. M68	25 MAY 1943
4.	DEEP WATER TESTS OF THROUGH-THE-HULL SONIC LISTENING EQUIPMENT, T. F. Johnston, NO. U73	18 JUNE 1943

b. listening apparatus for submarines–04.20

1.	MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER H NO. 9, C. J. Burbank, NO. C35	21 DEC 1943
2.	MEASUREMENTS ON CRYSTAL TRANSDUCERS CW78205 NOS. 112, 122, 124, 127, C. J. Burbank, NO. C37	6 JAN 1944

3. MEASUREMENTS ON MAGNETOSTRICTION TRANSDUCER A-6, C. J. Burbank, NO. C46 — 21 MAR 1944
4. MEASUREMENTS ON MAGNETOSTRICTION HYDROPHONE H-12, Calibration Group, NO. C52 — 17 MAY 1944

5. radio-sonic buoys–05.00

a. expendible aircraft-launched type—05.30

(1) air sea rescue (raser)–05.32

1. USING THE EXPENDIBLE RADIO SONO BUOY IN AIRCRAFT RESCUE OPERATIONS BY SUBMARINES, J. M. Snodgrass — 31 JAN 1945
2. PROGRESS REPORT ON THE EMPLOYMENT OF EXPENDIBLE RADIO SONO BUOYS IN AIR/SEA AND SURFACE RESCUE OPERATIONS, J. M. Snodgrass — 4 OCT 1945
3. RASER INSTALLATION—TECHNICAL AND OPERATIONAL INSTRUCTIONS, ComDesPac — 15 OCT 1945
4. PRELIMINARY INSTRUCTION BOOK FOR RASER (NAVSHIPS 900,614), J. M. Snodgrass, NO. M387 — JAN 1946

6. miscellaneous acoustic devices–09.00

1. RANGE AND BEARING LISTENING DEVICE, H. M. Zenor — 4 DEC 1941
2. RANGE AND BEARING LISTENING DEVICE FOR SUBMARINE DETECTION, H. M. Zenor — 27 DEC 1941
3. MECHANICAL RANGE INDICATOR, W. A. Myers, NO. M13 — 19 NOV 1942
4. AUDIBLE RIGHT-LEFT BEARING INDICATOR, W. A. Myers — 2 MAR 1943
5. THE DOPPLER DOUBLER AND SQUARE-LAW AMPLIFICATION, W. A. Myers, NO. M48 — 1 APRIL 1943
6. PRESSURE-PROOF SPEAKER, W. A. Myers, NO. M185 — 26 FEB 1944

a. acoustic marine speedometer–09.10

b. echo-sounding equipment–09.20

1. OBJECT LOCATION, W. A. Myers, NO. U92 — 27 AUG 1943
2. SIMPLIFIED FATHOMETER, D. C. Kalbfell — 18 MAY 1945

(1) regenerative type–09.21

1. SILENT FATHOMETER, G. W. Downs, Jr., NO. SM98 — 28 AUG 1943
2. SILENT FATHOMETER, D. H. Ransom — 20 DEC 1943
3. MASKING EFFECT OF WATER NOISE ON SHORT PULSES, R. C. Fisher, NO. S239 — 25 JULY 1944

(2) secure echo-sounding equipment (sese)–09.22

1. MINUTES ON CONFERENCE ON PRO-SUBMARINE DEVICES, F. N. D. Kurie — 9 AUG 1943
2. FEEDBACK DEPTH SOUNDING SYSTEM, G. W. Downs, Jr. — 9 NOV 1943
3. MEASUREMENTS ON CRYSTAL TRANSDUCER GD14-1 NO. 1137, C. J. Burbank, NO. C36(S) — 30 DEC 1943
4. MEASUREMENTS ON THE SPIRAL MAGNETOSTRICTION TRANSDUCER, C. J. Burbank, NO. C39 — 12 JAN 1944

5.	PRO-SUBMARINE CONFERENCE, 8 March 1944, D. J. Evans	10 MAR 1944
6.	THE SECURE ECHO SOUNDER, F. N. D. Kurie	20 APRIL 1944
7.	MASKING EFFECT OF WATER NOISE UPON SHORT PULSES, R. C. Fisher	5 JUNE 1944
8.	PRELIMINARY INSTRUCTION BOOK FOR THE SECURE ECHO-SOUNDING EQUIPMENT, MODEL 2, INSTALLATION, OPERATION AND MAINTENANCE, D. H. Ransom, Jr., NO. S222	13 JUNE 1944
9.	SECURE ECHO-SOUNDING EQUIPMENT, D. H. Ransom, Jr., NO. SM231	14 JUNE 1944
10.	THE DESIGN AND ADJUSTMENT OF A REMOTE INDICATOR FOR SESE, R. C. Fisher	26 JUNE 1944
11.	SEA TESTS OF OVERHEARING OF THE SECURE ECHO-SOUNDING EQUIPMENT (SESE) MODEL 2, ABOARD THE SUBMARINE SS411 (SPADEFISH), D. H. Ransom, R. C. Fisher, NO. SM251	22 AUG 1944
12.	SECURE ECHO-SOUNDING EQUIPMENT, D. H. Ransom, Jr., NO. S257	15 SEPT 1944
13.	THE DETECTABILITY OF REPEATED PULSES, R. C. Fisher, C. Eckart, NO. SM261	27 SEPT 1944
14.	INVENTION REPORT NO. PC-4 sr-30 PAT 41—ECHO-RANGING AND SOUNDING SYSTEM (SESE), D. H. Ransom, Jr., OSRD Invention Disclosure NO. 2939, Navy Case NO. 4633, Application Serial NO. 556,451 filed	29 SEPT 1944
15.	PRELIMINARY INSTRUCTION BOOK FOR THE SECURE ECHO-SOUNDING EQUIPMENT, MODEL 3, INSTALLATION, OPERATION AND MAINTENANCE, L. A. Cartwright, Jr., NO. S222.1	11 OCT 1944
16.	MEASUREMENTS ON CRYSTAL TRANSDUCERS GD16, Calibration Group, NO. C74	12 FEB 1945
17.	STATUS OF PRO-SUBMARINE DEVELOPMENT WORK AT UCDWR, F. N. D. Kurie	23 APRIL 1945
18.	SECURE ECHO-SOUNDING EQUIPMENT (SESE), L. A. Cartwright, Jr., NO. S222.2	1 JUNE 1945
19.	PRO-SUBMARINE PROGRAM AT UCDWR, W. B. Beckley	28 SEPT 1945
20.	CONFERENCE—PRO-SUBMARINE DEVELOPMENTS, 2 OCTOBER 1945, R. O. Burns	2 OCT 1945

c. fiducial signal generator–09.30

1.	FIDUCIAL SIGNAL GENERATOR OPERATING AND GENERAL INSTRUCTIONS, W. A. Myers	1 JAN 1943
2.	PRELIMINARY REPORT ON DISPLACED FREQUENCY ECHO SIGNAL REPEATER, W. A. Myers	8 MAR 1943

d. evasion devices and decoys–09.40

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 100, G. P. Harnwell, M. O. Kappler	
2.	TACTICAL USES FOR BEEPING TOM, D. K. Froman, A. M. Thorndike	22 JUNE 1942
3.	USE OF ECHO REPEATERS AS DECOYS, E. M. McMillan	17 SEPT 1942
4.	ANTI-ECHO-RANGING AND ANTI-LISTENING PROGRAM, W. A. Myers	22 JULY 1943
5.	MINUTES ON CONFERENCE ON PRO-SUBMARINE DEVICES, F. N. D. Kurie	9 AUG 1943
6.	MEASUREMENTS ON MAGNETIC VIBRATOR TYPE TRANSDUCER MEF1-1 NO. 1136, C. J. Burbank, NO. C30(S)	6 DEC 1943
7.	PRO-SUBMARINE DEVICES TO DATE, D. J. Evans	15 JAN 1944
8.	BURGESS SEA CELL OPERATIONAL DATA, W. A. Myers, NO. M148	20 JAN 1944
9.	MEASUREMENTS ON CRYSTAL TRANSDUCER CT1-1 NO. 945, C. J. Burbank, NO. C41	16 FEB 1944
10.	PRO-SUBMARINE CONFERENCE, 8 MARCH 1944, D. J. Evans	10 MAR 1944
11.	PRELIMINARY REPORT ON THE FACTORS INVOLVED IN THE DESIGN OF AN ECHO REPEATER TO SIMULATE A SUBMARINE, F. X. Byrnes	17 MAR 1944
12.	SOUND OUTPUT OF SIX-INCH NAD, T. McMillian, NO. A20	19 JUNE 1944
13.	SPECTRAL ANALYSES OF 3- AND 10-INCH NAD, Listening Section, NO. A22	27 JUNE 1944
14.	SPECTRAL ANALYSES OF MAGNETOSTRICTIONS AND BRIDGE-TYPE SPEAKERS, T. McMillian, NO. A25	12 JULY 1944
15.	STATUS OF PRO-SUBMARINE DEVELOPMENT WORK AT UCDWR, F. N. D. Kurie	23 APRIL 1945
16.	PRO-SUBMARINE PROGRAM AT UCDWR, W. B. Beckley	28 SEPT 1945
17.	CONFERENCE—PRO-SUBMARINE DEVELOPMENTS, 2 OCTOBER 1945, R. O. Burns	2 OCT 1945
18.	THE STATIONARY ECHO-REPEATER DECOY FOR SUBMARINE USE, F. X. Byrnes, C. W. Chattin, NO. SM396	28 FEB 1946

(1) anti-echo ranging–09.41

1. GAS PRODUCTION WITH MAGNESIUM AMALGAM, M. Silverman, NO. M106 — 25 SEPT 1943

(a) ejected echo-repeater type–09.411

1. EXPERIMENTAL SURFACE MODEL ECHO REPEATER, W. A. Myers, E. M. McMillan — 20 JUNE 1942
2. A STUDY OF THE ECHO REPEATER AND ACOUSTIC PROXIMITY FUZE, R. C. Fisher — 2 OCT 1942
3. THE STATIONARY ECHO-REPEATER DECOY FOR SUBMARINE USE, F. X. Byrnes, C. W. Chattin, NO. SM396 — 28 FEB 1946

(b) nac beacon–09.412

1. MEASUREMENTS ON SOUND BEACON, Calibration Group, NO. C49 — 22 APRIL 1944

   (Report C49 gives the sound spectrum both in graphic and tabular form, as measured by a band pass filter 50 cycles wide. This beacon consists of a CY4 type transducer powered by a model 168 amplifier modified for fixed frequencies. The total unit is approximately 30 inches long and 3 inches in diameter.)
2. INVENTION REPORT NO. PC-4 sr-30 PAT 42—BUOYANCY CONTROL DEVICE, R. D. Atchley, OSRD Invention Disclosure NO. 1726, Navy Case NO. 4158, Application Serial NO. 533,895 filed — 3 MAY 1944
3. REPORT ON CONSTRUCTION OF A LOW FREQUENCY SOUND BEACON, B. F. Howell, Jr. — 13 MAY 1944
4. MEASUREMENTS ON CRYSTAL TRANSDUCERS—TYPE CY4 NOS. 1225, 1226, 1237, 1654, Calibration Group, NO. C54 — 18 MAY 1944
5. NAC BEACON TESTS, D. J. Evans, V. G. McKenney, NO. SM215 — 19 MAY 1944
6. NAC BEACON TESTS IN THE 14TH NAVAL DISTRICT, V. G. McKenney, W. B. Beckley, NO. SM240 — 30 JUNE 1944
7. MEASUREMENTS ON CRYSTAL TRANSDUCERS—TYPE CY4 NO. 1777 THROUGH NO. 1781, Calibration Group, NO. C59 — 8 AUG 1944
8. INVENTION REPORT NO. PC-4 sr-30 PAT 60—SOUND BEACON (NAC), W. A. Myers, V. G. McKenney, OSRD Invention Disclosure NO. 2337, Navy Case NO. 4533, Application Serial NO. 548,738 filed — 9 AUG 1944
9. THE NAC BEACON, V. G. McKenney, B. F. Howell, W. L. Bryant, W. B. Beckley, NO. S243 — 15 AUG 1944
10. MEASUREMENTS ON CRYSTAL TRANSDUCER, TYPE CY4 (SECO) SAMPLE NO. 1 (CONTRACT NXsr-60065) NAVY PROJECT NS-316, Calibration Group, NO. C62 — 4 OCT 1944
11. MEASUREMENTS ON CRYSTAL TRANSDUCER, TYPE CY4 (SECO) SAMPLE NO. 2, Calibration Group, NO. C70 — 28 DEC 1944
12. MANUFACTURING SPECIFICATIONS FOR MODEL NAC SOUND BEACON, UCDWR — 1 MAR 1945
13. TEST ON WATER-ACTIVATED BATTERY BURGESS-TYPE 4-CC-167 SAMPLES NOS. 1 AND 2 (CONTRACT NXsr-60065), W. L. Bryant, NO. M309 — 9 APRIL 1945
14. MEASUREMENTS ON CRYSTAL TRANSDUCER TYPE CY4 (SECO)—SAMPLES NOS. 3, 4, 5 (CONTRACT NXsr-60065), Calibration Group, NO. C76 — 3 MAY 1945
15. MEASUREMENTS ON CRYSTAL TRANSDUCER TYPE CY4 (SECO)—SAMPLES NOS. 3A, 4A, 5A (CONTRACT NXsr-60065), Calibration Group, NO. C77 — 10 MAY 1945
16. DESCRIPTION OF NAC BEACON, R. H. Bolt — 21 MAY 1945
17. NAC BEACON, F. N. D. Kurie — 6 JUNE 1945
18. ASDEVLANT EVALUATION TESTS AT FORT LAUDERDALE, FLORIDA, JUNE 9, 1945 TO JUNE 16, 1945, K. E. Geren — 29 JUNE 1945

(c) nah beacon–09.413

1. INVENTION REPORT NO. PC-4 sr-30 PAT 94—UNDERWATER SOUND TRANSMITTER, V. G. McKenney
2. CONTROLLED-FREQUENCY ECHO MASKER, V. G. McKenney — 19 MAY 1945

(2) anti-listening–09.42

(a) mechanical noise makers–09.421

(b) electronic noise makers–09.422

(c) x-nag beacon–09.423

(3) towed fish–09.43

1. SONIC INTENSITY AT SOURCE DEPTH IN DEEP WATER, G. D. Camp — 30 OCT 1943

(4) buoyancy control–09.44

1. GAS PRODUCTION WITH MAGNESIUM AMALGAM, M. Silverman, NO. M106 — 25 SEPT 1943
2. GAS PRODUCTION WITH MIXTURES OF MAGNESIUM AMALGAM AND CRYSTALLINE ACIDS ("BUBBLITE"), M. Silverman, W. B. Beckley, M. Kyle, NO. M133 — 12 NOV 1943
3. BUOYANCY CONTROL, R. D. Atchley, NO. M135 — 3 DEC 1943
4. INVENTION REPORT NO. PC-4 sr-30 PAT 42—BUOYANCY-CONTROL DEVICE, R. D. Atchley, OSRD Invention Disclosure NO. 1726, Navy Case NO. 4158, Application Serial NO. 533,895 filed — 3 MAY 1944

(5) nad beacons–09.45

1. DIRECTIONAL CONTROL DEVICES, L. N. Schwien Engineering Company, UCDWR, NO. U266 — 24 OCT 1944
2. SUMMARY STATUS REPORT OF SELF-PROPELLED DECOYS, F. N. D. Kurie — 13 NOV 1944
3. INSPECTION OF CRYSTAL TRANSDUCERS (10" BEACON), F. X. Byrnes — 9 AUG 1945

(a) nad 3" beacons–09.451

1. INVENTION REPORT NO. PC-4 sr-30 PAT 72—SUBMARINE DEVICE (NAD-3 SOUND BEACON), D. G. Reed, OSRD Invention Disclosure NO. 3389
2. 3" NAD SONIC SIMULATOR DESCRIPTION AND OPERATION INSTRUCTIONS, F. N. D. Kurie — 2 NOV 1944

(b) nad 6" beacons–09.452

1. INVENTION REPORT NO. PC-4 sr-30 PAT 36—NAD-6 SOUND BEACON, G. W. Downs, R. D. Atchley
2. NAD-6A SOUND BEACON, F. N. D. Kurie — 23 JUNE 1945
3. PRELIMINARY INSTRUCTION MANUAL NAD-6A SOUND BEACON, Sonar Devices Group, NO. SM332 — 24 JULY 1945

(c) nad 10" beacons–09.453

1. INVENTION REPORT NO. PC-4 sr-30 PAT 71—ARTIFICIAL UNDERWATER TARGET (NAD-10 SOUND BEACON), D. J. Evans, C. F. Bradley

2. MEASUREMENTS ON 10-INCH NAD BEACON, Calibration Group, NO. C73 — 29 JAN 1945
3. NAD-10A SOUND BEACON, F. N. D. Kurie — 23 JUNE 1945
4. MEASUREMENTS ON CRYSTAL TRANSDUCERS—TYPE BG2, Calibration Group, NO. C79 — 28 JUNE 1945
5. MEASUREMENTS ON CRYSTAL TRANSDUCERS—TYPE BF6, Calibration Group, NO. C80 — 28 JUNE 1945
6. PRELIMINARY INSTRUCTION MANUAL FOR THE NAD-10 PRIME SOUND BEACON; INSPECTION, STOWAGE, MAINTENANCE AND OPERATION, Sonar Devices Group, NO. SM329 — 19 JULY 1945

(d) nad 8" beacons–09.454

1. PROPOSED DESIGN FEATURES FOR THE NEW NAD-8 BEACONS, R. D. Atchley, NO. SM355 — 27 AUG 1945

(e) electronics–09.455

1. COMPLETION MEMO FOR THE BEACON ELECTRONIC DIVISION, C. F. Bradley — 30 OCT 1945

(6) 09.46

e. project "merchant"–09.50

f. depth charge direction indicator–09.60

g. naj beacon (pet)–09.70

h. nah beacon (model cxkk)–09.80

1. CONFERENCE—PRO-SUBMARINE DEVELOPMENTS, 2 OCTOBER 1945, R. O. Burns — 2 OCT 1945

i. dimb transducers–09.81

B. magnetic detection—10.00

1. detection from aircraft (mad)–11.00

1. COMMENTS ON TEMPORARY REPORT NO. 8 CONCERNING MAD EQUIPMENT MARK IV-B2, R. C. Fisher — 3 AUG 1942

C. visual detection accessory devices—20.00

1. optical transmission in sea water–21.00

1. OPTICAL ASPECTS OF SUBMARINE DETECTION, F. A. Jenkins — JUNE 1941

2. VISIBILITY IN OCEAN WATER, F. A. Jenkins, I. S. Bowen, F. T. Rogers — 18 OCT 1941
3. OPTICAL INVESTIGATIONS COMPLETED TO DECEMBER 10, 1941, F. A. Jenkins — 10 DEC 1941

a. turbidity (water transparency) meter–21.10

1. POINT LOMA TRANSPARENCY METER—THREE SETS OF SHOP DRAWINGS — FEB 1942

2. flares–22.00

1. UNDERWATER FLARES FOR ANTI-SUBMARINE OPERATIONS, F. M. Varney — 20 JULY 1942

a. underwater flares–22.10

1. USE OF COMMERCIAL FLARES UNDER WATER, F. A. Jenkins — 9 DEC 1941
2. UNDERWATER FLARE EXPERIMENTS, A. H. Rack — 16 JULY 1942
3. UNDERWATER RESCUE LIGHT AND SOUND SOURCE: SUGGESTED OUTLINE FOR DEVELOPMENT PROGRAM, F. M. Varney — 28 JULY 1942

3. underwater photography–23.00

1. UNDERWATER PHOTOGRAPHY OF SHIP'S HULLS, F. A. Jenkins, B. T. Wright — 5 OCT 1941
2. REPORT OF ACTIVITIES OF NDRC GROUP ON UNDERWATER PHOTOGRAPHY, DECEMBER 13, 1941—JANUARY 6, 1942, F. A. Jenkins — 7 JAN 1942
3. PROGRESS REPORT ON UNDERWATER PHOTOGRAPHY, A. B. Wyse — 26 JAN 1942
4. A NEW LIGHT SOURCE FOR USE IN UNDERWATER PHOTOGRAPHY, E. F. Bushman — 16 OCT 1943

4. underwater television–24.00

1. THE POSSIBILITY OF UNDERWATER TELEVISION AS A SUPPLEMENT TO UNDERWATER PHOTOGRAPHY, I. H. Tilles, A. B. Wyse — 2 APRIL 1942

II. ORDNANCE

A. large depth charges—40.00

1. INVENTION REPORT NO. PC-4 sr-30 PAT 11—DIFFERENTIALLY SENSITIVE SONIC DETECTOR (MINE FUZE), J. N. A. Hawkins, OSRD Invention Disclosure NO. 134, Navy Case NO. 3874, Application Serial NO. 500,999 filed — 2 SEPT 1943

1. sinking rates–41.00

1. FREE FALL OF STREAMLINED BODIES IN WATER, R. G. Folsom, M. P. O'Brien — 22 OCT 1941

2. studies of underwater explosions–42.00

3. fuzes–43.00

1.	APPENDIX TO MEMO OF FEBRUARY 11, 1942, BY L. STATHAM, "AN ELECTRICAL PROXIMITY FUZE FOR ANTI-SUBMARINE BOMBS," W. R. Smythe	8 FEB 1942
2.	PRELIMINARY REPORT ON THE ELECTRICAL ANTI-SUBMARINE BOMB FUZE, L. D. Statham	9 FEB 1942
3.	AN ELECTRICAL PROXIMITY FUZE FOR ANTI-SUBMARINE BOMBS, L. D. Statham	11 FEB 1942
4.	ELECTRIC AND MAGNETIC PROXIMITY FUZES, C. Eckart	5 MAR 1942
5.	AN IMPROVED DESIGN OF AN ELECTRIC PROXIMITY FUZE, L. Statham, C. Eckart	13 MAR 1942
6.	PROGRESS REPORT ON ELECTRICAL CONTACT FUZES, L. D. Statham, C. Eckart, D. Baldwin	13 MAR 1942
7.	APPLICATION OF THE HISSERICH FUZE, E. M. McMillan	1 JULY 1942
8.	A SUGGESTION FOR THE CONSTRUCTION OF A PROXIMITY FUZE BY MEANS OF ELECTRIC FIELDS, H. P. Yockey	27 OCT 1942
9.	HYDRAULIC MINE FUZE, R. D. Atchley, NO. M41	11 MAR 1943

a. underwater acoustic proximity fuze (echo-ranging type)–43.10

1.	A SOUND-OPERATED PROXIMITY FUZE, H. P. Yockey	23 FEB 1942

b. underwater acoustic proximity fuze (feedback type)–43.20

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 5—ACOUSTIC DETECTOR, C. A. Hisserich, D. G. Reed, OSRD Invention Disclosure NO. 83	
2.	AN UNDERWATER ACOUSTIC FEEDBACK PROXIMITY FUZE, C. A. Hisserich	11 JUNE 1942
3.	PRELIMINARY EXPERIMENTS ON THE FEEDBACK PROXIMITY FUZE, A. M. Thorndike	3 JULY 1942
4.	A STUDY OF THE ECHO REPEATER AND ACOUSTIC PROXIMITY FUZE, R. C. Fisher	2 OCT 1942
5.	THE FEEDBACK PROXIMITY FUZE, E. M. McMillan, D. G. Reed, D. W. Mathews	14 OCT 1942

c. underwater optical proximity fuze–43.30

1.	PROXIMITY FUZES MAKING USE OF OPTICAL METHODS, I. S. Bowen, W. R. Smythe	10 SEPT 1941
2.	PROXIMITY DEPTH FUZES (in three installments), W. R. Smythe, I. S. Bowen	24 SEPT 1941 1 OCT 1941 6 OCT 1941
3.	OPTICAL CONDITIONS RELATING TO OPTICAL PROXIMITY FUZE FOR DEPTH CHARGES, A. B. Wyse, B. T. Wright, F. T. Rogers, Jr.	30 JAN 1942
4.	RECOMMENDATIONS FOR DEVELOPMENT OF AN OPTICAL PROXIMITY FUZE FOR DEPTH CHARGES, A. B. Wyse, B. T. Wright	6 FEB 1942
5.	THE FEASIBILITY OF A PHOTO-ELECTRIC PROXIMITY FUZE FOR ANTI-SUBMARINE BOMBS, J. E. Henderson, A. B. Wyse	28 MAR 1942

B. small streamlined charges—50.00

1. bombs–aircraft and side launched–51.00

a. contact fuzes–51.10

1.	CONTACT FUZE FOR MARK 24 MINE, S. C. Baden	20 FEB 1943
2.	AN INERTIA CONTACT BOMB FUZE FOR USE ON TARGETS ABOVE OR BELOW THE SURFACE OF THE WATER, R. D. Atchley, NO. M58	3 MAY 1943

b. magnetic fuzes–51.20

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 25—EXPLOSIVE BOMB FUZE, R. D. Atchley, OSRD Invention Disclosure NO. 337	
2.	ELECTRIC AND MAGNETIC PROXIMITY FUZES, C. Eckart	5 MAR 1942
3.	A MAGNETIC ANTI-SUBMARINE BOMB FUZE, L. D. Statham	6 MAY 1942
4.	A NEW TYPE OF BOMB FUZE, R. D. Atchley	13 JUNE 1942
5.	MAGNETIC FUZE, L. D. Statham	19 JUNE 1942
6.	REMARKS ON MEMORANDUM BY R. D. ATCHLEY, "A NEW TYPE OF BOMB FUZE," L. D. Statham	18 JULY 1942
7.	MAGNETIC FUZE, C. Eckart	23 JULY 1942
8.	THE MAGNETIC FLUX-CHANGE FUZE, L. D. Statham	30 DEC 1942
9.	INVENTION REPORT NO. PC-4 sr-30 PAT 2—MAGNETIC BOMB FUZE, L. D. Statham, OSRD Invention Disclosure NO. 81, Navy Case NO. 4078, Application Serial NO. 512,384 filed	30 NOV 1943

2. mousetrap and hedgehog–52.00

a. projectile–52.10

b. sub-calibre accessories for practice–52.20

C. mines and torpedoes—60.00

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 43—TORPEDO-CONTROL MEANS, C. A. Hisserich, OSRD Invention Disclosure NO. 931	
2.	SONIC MINE USING DIFFERENTIAL DETECTION, J. N. A. Hawkins	21 AUG 1941
3.	A PURSUIT SUBMARINE, B. T. Wright	7 OCT 1941
4.	SONIC CONTROLLED TORPEDOES, H. P. Yockey	17 OCT 1941
5.	A CRITIQUE OF THE BRISCOE REPORT CONTAINING A NEW DESIGN FOR A SELF-GUIDING TORPEDO, H. P. Yockey	30 OCT 1941
6.	CONSIDERATION OF THE DESIGN OF A SOUND-DIRECTED TORPEDO, H. P. Yockey	27 FEB 1942
7.	HYDRAULIC MINE FUZE, R. D. Atchley, NO. M41	11 MAR 1943

1. "181"–66.00

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 68—TOWED SOUND TARGET (PLASTIC COVERED TRIPLANE), F. N. D. Kurie, OSRD Invention Disclosure NO. 3307	
2.	MEASUREMENTS ON CRYSTAL TRANSDUCER CS1-1 NO. 586, C. J. Burbank, NO. C2	7 SEPT 1943
3.	MEASUREMENTS ON CRYSTAL TRANSDUCER CS2-1 NO. 593, C. J. Burbank, NO. C3	9 SEPT 1943
4.	MEASUREMENTS ON CRYSTAL TRANSDUCER GD8-1 NO. 595, C. J. Burbank, NO. C7	24 SEPT 1943
5.	MEASUREMENTS ON CRYSTAL TRANSDUCER CN7-1 NO. 591, C. J. Burbank, NO. C9	29 SEPT 1943
6.	MEASUREMENT OF CRYSTAL TRANSDUCER FC-1 NO. 600, C. J. Burbank, NO. C12	27 OCT 1943
7.	MEASUREMENTS ON CRYSTAL TRANSDUCER CS2-3 NO. 1122, C. J. Burbank, NO. C24(S)	19 NOV 1943
8.	MEASUREMENTS ON CRYSTAL TRANSDUCER GD10-1 NO. 1121, C. J. Burbank, NO. C29(S)	4 DEC 1943
9.	MEASUREMENTS ON CRYSTAL TRANSDUCER FG2-1 NO. 1130, C. J. Burbank, NO. C44(S)	18 MAR 1944
10.	TRANSMISSION OF SOUND THROUGH SCREENS OF LUCITE, POLYSTYRENE, PLEXIGLAS, AND NEOPRENE-COVERED WIRE MESH, C. J. Burbank, NO. C47	12 APRIL 1944
11.	MEASUREMENTS ON CRYSTAL TRANSDUCER FG8Z-3 NO. 1760, Calibration Group, NO. C66	21 NOV 1944

12. MEASUREMENTS ON CRYSTAL TRANSDUCERS CS3-1 NO. 2268 AND CS3-2 NO. 2275, Calibration Group, NO. C72 — 10 JAN 1945

13. MEASUREMENTS ON CRYSTAL TRANSDUCERS CS2Z-1 NO. 2283 AND CS2Z-3 NO. 2279, Calibration Group, NO. C75 — 30 APRIL 1945

III. ANTI-SUBMARINE ATTACK

A. analyses—70.00

1. EVASION OF ANTI-SUBMARINE ATTACK, A. M. Thorndike — 10 DEC 1941
2. A DISCUSSION OF ANTI-SUBMARINE WARFARE, H. P. Yockey — 17 FEB 1942

1. tactical probability studies–improved searching with echo-ranging equipment–71.00

1. ERRORS IN ECHO RANGING AS A SOURCE OF FAILURES IN ANTI-SUBMARINE ATTACK, A. M. Thorndike — 1 DEC 1941

2. ordnance probability studies–72.00

1. A PROPOSED METHOD OF USING ASH-CANS IN ANTI-SUBMARINE ATTACKS, J. E. Henderson, A. B. Wyse — 28 MAR 1942

a. forward throwers–72.10

1. INCREASED PROBABILITY OF SUCCESS IN ANTI-SUBMARINE ATTACKS USING A "BARRAGE-THROWER", A. M. Thorndike — 11 DEC 1941

b. depth charges and depth charge patterns–72.20

c. contact and proximity bombs–72.30

d. aircraft bombs and patterns–72.40

3. operation research–73.00

B. attack predictors and similar instruments—80.00

1. INVENTION REPORT NO. PC-4 sr-30 PAT 91—RANGE-BEARING PLOTTER, H. E. Hartig, Comdr. J. C. Myers, USN
2. SUBMARINE AND DESTROYER COURSE PLOTTER, H. M. Zenor — 11 DEC 1941

3.	SUBMARINE AND DESTROYER COURSE PLOTTER, H. M. Zenor	30 DEC 1941
4.	DETERMINATION OF DATA FOR STEERING A COLLISION COURSE BASED ON OBSERVATIONS OF THE SUBMARINE'S CROSS-COMPONENT OF SPEED, H. E. Hartig	10 DEC 1943
5.	CONSTRUCTION OF A RANGE-BEARING PLOT FOR AID IN ASW SHIP CONNING, H. E. Hartig, NO. M183	29 DEC 1943
6.	ALIGNMENT CHARTS TO DETERMINE TARGET ANGLE AND SUBMARINE SPEED, O. A. Becklund	9 FEB 1944
7.	RATIONAL DEVELOPMENT OF SUPER-LEAD ANGLE IN TERMS OF COLLISION LEAD ANGLE, H. E. Hartig	2 MAR 1944
8.	RANGE-BEARING RECORDER FOR WCSS, H. E. Hartig	4 MAR 1944
9.	OPERATING INSTRUCTIONS FOR THE RANGE-BEARING RECORDER, MODEL I, SERIAL NO. 1650, UCDWR	21 MAR 1944
10.	OPERATING INSTRUCTIONS FOR THE RANGE-BEARING RECORDER, Training Aids Division	APRIL 1944

1. range-bearing plotter–80.00

2. barber-colman attack predictor–81.00

3. poulter attack director–82.00

4. oscilloscope attack plotter–83.00

5. odograph attack plotter–84.00

6. automatic target positioner for drt–85.00

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 86—ELECTRIC SERVO SYSTEM (FOR AUTOMATIC TARGET POSITIONER), G. A. Brettell, Jr.	
2.	MEMORANDUM: DESCRIPTION OF A PROPOSED OPTICAL DRT TABLE, F. Pierce (The original memo that led to the Automatic Target Positioner, an auxiliary target plotting device for DRT.)	24 JAN 1944
3.	A PROPOSED RADAR-COUPLED DEVICE FOR TARGET PLOTTING, F. Pierce (Extension of F. Pierce's memo of 24 January 1944.)	6 MAY 1944
4.	TARGET COURSE AND SPEED COMPUTER, C. A. Hisserich	22 MAY 1944
5.	TARGET COURSE AND SPEED INDICATOR FOR THE DRT SURFACE PLOT, F. Pierce	27 JULY 1944
6.	DRT AUTOMATIC TARGET POSITIONER, F. Pierce	21 SEPT 1944
7.	AUTOMATIC TARGET POSITIONING MECHANISM FOR THE DRT; REPORT ON LIAISON TRIP, H. E. Hartig, F. Pierce	27 SEPT 1944
8.	AUTOMATIC TARGET POSITIONER FOR DRT AND CIC TRAINER, H. E. Hartig	8 FEB 1945
9.	AUTOMATIC TARGET POSITIONER—APPLICATIONS, H. E. Hartig	17 MAR 1945
10.	AUTOMATIC TARGET POSITIONER FOR DRT, F. Pierce, NO. M322	1 JUNE 1945
11.	INVENTION REPORT NO. PC-4 sr-30 PAT 70—PLOTTER (AUTOMATIC TARGET POSITIONER FOR DRT), F. Pierce, G. A. Brettell, Jr., OSRD Invention Disclosure NO. 3724, Navy Case NO. 5253, Application Serial NO. 599,502 filed	14 JUNE 1945
12.	THE AUTOMATIC TARGET POSITIONER FOR THE DEAD RECKONING TRACER MODEL I, Training Aids Division, NO. U353	20 SEPT 1945

7. attack director, mark III–86.00

IV. SELECTION AND TRAINING—91.00

1.	ORGANIZATION OF A PROGRAM FOR THE SELECTION AND TRAINING OF PERSONNEL FOR UNDERWATER SOUND RANGING AND SUBMARINE ATTACK, G. P. Harnwell	22 NOV 1941
2.	RELATIVE MERITS OF SAN DIEGO, SANTA BARBARA AND MONTEREY BAY AS LOCALITIES FOR A SOUND SCHOOL, Oceanographic Division	7 JAN 1942
3.	MEMORANDUM COVERING THE VISIT OF THE COMMITTEE ON SELECTION AND TRAINING OF SOUND OPERATORS OF SECTION C-4 OF NDRC TO THE WCSS, JANUARY 6, 1942, TO JANUARY 13, 1942, G. P. Harnwell	14 JAN 1942
4.	MEMORANDUM ON THE CURRENT WORK OF THE UCDWR TRAINING GROUP, H. E. Hartig	7 SEPT 1943
5.	SONAR AND RADAR TRAINING FACILITIES AT PEARL HARBOR, G. P. Harnwell, W. D. Neff	15 NOV 1943
6.	UCDWR NOTEBOOK NAVY TASKS 5 AND 6, Training Aids Division	15 MAR 1945
7.	PRODUCTION OF SONAR MAINTENANCE MANUALS, Training Aids Division, NO. U370	5 DEC 1945

A. selection, experimental studies, & procedures—91.10

1.	MEMORANDA AND INTERNAL REPORT, UCDWR Psychological Group	8 JAN 1943
2.	INSTRUCTOR'S MANUAL ON DOPPLER DRILLS AND TESTS UCDWR D-SERIES, UCDWR, NO. R127	30 OCT 1943
3.	REVISED SELECTION PROCEDURE FOR SONAR OPERATORS; A REPORT ON VALIDATING RESEARCH, A. Ford, S. W. Osgood, W. J. Giese, W. R. Thurlow, L. J. Cronbach, NO. U197	MAR 1944
4.	THE D-SERIES OF DOPPLER DRILLS AND TESTS—A REPORT ON THE PSYCHOLOGICAL STANDARDS OF AUDITORY DISCRIMINATION, A. Ford, NO. U206	MAR 1944
5.	THE UCDWR PITCH-MEMORY SELECTION TEST; A REPORT ON DESIGN STANDARDS, A. Ford, NO. U196	MAR 1944
6.	PSYCHOLOGICAL METHODS AND PROJECTS IN SONAR TRAINING, Training Aids Division, NO. M369	12 DEC 1945

1. sound operators–91.11

1.	A METHOD OF SCORING SOUND SCHOOL ATTACKS, F. A. Jenkins, B. T. Wright	11 DEC 1941
2.	MEMORANDUM FOR THE NDRC C-4 COMMITTEE ON SELECTION AND TRAINING OF SOUND PERSONNEL REGARDING THE AUDITORY PROGRAM INSTITUTED BY LT. COMDR. C. W. SHILLING (MC) USN AT THE SUBMARINE BASE, NEW LONDON, CONNECTICUT, G. P. Harnwell	13 DEC 1941
3.	TRAINING OF SOUND OPERATORS, L. J. Sivian, C. F. Eyring	17 DEC 1941
4.	REPORT ON SUBMARINE LISTENING, E. G. Wever	27 JAN 1942
5.	PRELIMINARY MEMORANDUM ON LISTENING INSTRUCTION, FEBRUARY 23, 1942, G. P. Harnwell	23 FEB 1942
6.	JOB ANALYSIS OF THE OPERATIONAL COMPONENTS OF THE WORK OF STUDENTS IN THE FLEET SOUND SCHOOLS, A. Ford	17 APRIL 1942
7.	ACTIVITIES OF THE SAN DIEGO NDRC RESIDENT STAFF ON SELECTION AND TRAINING OF SOUND PERSONNEL, H. E. Hartig	30 APRIL 1942
8.	USE OF WOMEN AS LISTENERS, G. P. Harnwell	29 MAY 1942
9.	PROGRESS REPORTS, BRIEFS OF FINDINGS, A. Ford	MAY, JUNE 1942
10.	MEMORANDUM ON THE SELECTION AND TRAINING OF SOUND OPERATORS, W. D. Neff	7 JULY 1942
11.	ANTI-SUBMARINE TRAINING, G. P. Harnwell	5 AUG 1942
12.	CIVILIAN TEACHERS FOR A/S SEA TRAINING, H. E. Hartig	5 AUG 1942
13.	REPORT ON NDRC SELECTION AND TRAINING PROGRAM AT EAST COAST SOUND SCHOOL, KEY WEST, FLORIDA, H. E. Hartig	5 AUG 1942
14.	MEMORANDUM COVERING ANALYSIS OF FLEET SOUND OPERATOR PERFORMANCE REPORTS TO AND INCLUDING SEPTEMBER 1, 1942, W. J. Giese	26 SEPT 1942
15.	PROGRESS REPORT ON PSYCHOLOGICAL ASPECTS OF SELECTION AND TRAINING OF SOUND OPERATORS, A. Ford	15 DEC 1942

16.	MEMORANDUM ON SELECTION OF ELEMENTARY SOUND MATERIEL STUDENTS; SOME PROBLEMS AND SOME RESULTS, R. L. French	22 DEC 1942
17.	INTERIM REPORT BY THE UCDWR PSYCHOLOGICAL GROUP WORKING ON THE SELECTION AND TRAINING OF SOUND OPERATORS, Selection and Training Group	28 DEC 1942
18.	PROGRAM DEALING WITH SOME PSYCHO-PHYSICAL ASPECTS OF THE SOUND OPERATOR TRAINING PROGRAM, H. E. Hartig	22 FEB 1943
19.	TEST-RETEST RELIABILITY OF THE 6B AUDIOMETER UNDER MILITARY CONDITIONS, W. J. Giese, NO. U116	30 AUG 1943
20.	INTERIM RESEARCH REPORT ON THE REVISED NAVAL TRAINING STATION TESTS IN RELATION TO PERFORMANCE SCORES IN UNDERWATER SOUND, Selection and Training Group	9 SEPT 1943
21.	PITCH DISCRIMINATION TESTS FOR SELECTION PURPOSES—DESCRIPTION AND SPECIFICATION, A. Ford	30 SEPT 1943
22.	FORM D PROCEDURE FOR THE SELECTION OF SOUND OPERATORS, Selection and Training Group	7 OCT 1943
23.	PROCEDURES FOR PRESELECTING SOUND SCHOOL STUDENTS, UCDWR	14 OCT 1943
24.	A CRITIQUE OF THE DESIGN AND FUNCTIONS OF WAR TRAINING EQUIPMENT PROCEDURES AND PROGRAMS, A. Ford	MAR 1944
25.	A REPORT ON DOPPLER DRILLS AND TESTS, A. Ford	MAR 1944
26.	REVISED SELECTION PROCEDURE FOR SONAR OPERATORS, A. Ford	MAR 1944
27.	A SURVEY OF 4003 AUDIOGRAMS IN RELATION TO THE PERFORMANCE OF SONAR OPERATORS AT THE WCSS, A. Ford	APRIL 1944
28.	VALIDATION OF "INVENTORY OF MUSICAL BACKGROUND, FORM B", W. J. Giese, NO. M227	19 JUNE 1944
29.	PROCEDURE FOR THE SELECTION OF SONAR OFFICERS, Selection and Training Group	JULY 1944
30.	GRADING STANDARDS IN THE ASW SONAR SCHOOL, REVIEW OF, A. Ford	18 DEC 1944

2. sound officers–91.12

1.	JOB ANALYSIS—SOUND OFFICERS—U. S. NAVY, A. Ford	SEPT 1943
2.	RESEARCH REPORT ON THE SELECTION OF SOUND OFFICERS AND ASW OFFICERS BY THE UCDWR PSYCHOLOGICAL GROUP, A. Ford	9 SEPT 1943
3.	DESIGN OF THE PROPOSED JOB—ANALYSIS OF THE DUTIES AND ACTIVITIES OF THE U. S. NAVY SOUND OFFICERS AND ASW OFFICERS, A. Ford	27 SEPT 1943
4.	SELECTION RESEARCH ON SONAR OFFICERS—TECHNICAL REPORT ON VALIDATION STUDIES, A. Ford, S. W. Osgood, W. J. Giese, W. R. Thurlow, L. J. Cronbach, NO. M235	JUNE 1944
5.	THE RELATIVE MOVEMENT TEST IN SONAR OFFICER SELECTION, Selection and Training Group, NO. M245	5 AUG 1944

3. other a/s personnel–91.13

4. training apparatus research (psychological)–91.14

1.	TALK-THROUGH EQUIPMENT FOR SUBMARINE SONAR TRAINING, C. M. Beyer, NO. M308	12 APRIL 1945
2.	SUBMARINE LISTENING CUES FOR TARGET ANGLE, A. Ford, NO. M311	24 APRIL 1945
3.	COMPARISON OF ECHO RECOGNITION AT 800 AND 500 CYCLES, A. Ford, L. J. Cronbach, NO. M312	30 APRIL 1945
4.	LEARNING STUDIES ON THE SOUND RECOGNITION GROUP TRAINER: SINGLE PING RANGE READING, L. J. Cronbach, NO. M319	18 MAY 1945
5.	TORPEDO DETECTION MODIFICATION (TDM) TRAINING, C. M. Beyer	23 MAY 1945
6.	LEARNING STUDIES ON THE SOUND RECOGNITION GROUP TRAINER: TURN COUNTING, L. J. Cronbach, D. F. Lovell, NO. M338	14 JULY 1945
7.	LEARNING STUDIES ON THE SOUND RECOGNITION GROUP TRAINER: BOW-STERN IDENTIFICATION, L. J. Cronbach, D. F. Lovell, NO. M352	25 AUG 1945
8.	LEARNING STUDIES ON THE SOUND RECOGNITION GROUP TRAINER: CLASSIFICATION OF SUPERSONIC TARGETS, L. J. Cronbach, D. F. Lovell, NO. M351	25 AUG 1945

9.	LEARNING STUDIES ON THE SOUND RECOGNITION GROUP TRAINER: TARGET CLASSIFICATION, L. J. Cronbach, D. F. Lovell, NO. M359	17 SEPT 1945
10.	TESTS AND LEARNING STUDIES ON JP AND WCA SUBMARINE SONAR TRAINER, C. M. Beyer, D. F. Lovell, NO. M366	5 NOV 1945
11.	THE SOUND RECOGNITION GROUP TRAINER—A STUDY OF THE TESTS USED, Training Aids Division, NO. M371	10 DEC 1945
12.	PSYCHOLOGICAL METHODS AND PROJECTS IN SONAR TRAINING, Training Aids Division, NO. M369	12 DEC 1945

B. training devices, development and experimental construction—91.20

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 63—SOUND TARGET (10' HOLLOW SPHERE), F. N. D. Kurie, F. Pierce, OSRD Invention Disclosure NO. 2466	
2.	INVENTION REPORT NO. PC-4 sr-30 PAT 105—IMPROVEMENTS IN POLAR DRIVES AND TAKE-OFFS FOR HARMONIC BALL COMPUTERS, F. Pierce	
3.	A CIRCUIT TO OSCILLATE AT A LOW FREQUENCY OR BE NON-OSCILLATORY AS A FUNCTION OF AN APPLIED VOLTAGE, M. C. Henderson	27 AUG 1941
4.	SUBMERSIBLE SPHERE FOR SOUND MEASUREMENTS, F. Pierce	18 NOV 1941
5.	THE TARGET SPHERE, F. Pierce	19 JAN 1942
6.	NOTE ON AURAL-VISUAL TEACHERS, G. A. Brettell, Jr.	8 APRIL 1942
7.	INVENTION REPORT NO. PC-4 sr-30 PAT 1—NON-INVERTING AMPLIFIER (TRAINING DEVICES), G. A. Brettell, Jr., OSRD Invention Disclosure NO. 80, Navy Case NO. 3433, Application Serial NO. 511,626 filed	24 NOV 1943
8.	AMPLITUDE-REGISTERING TACTICAL RANGE RECORDER, Training Aids Division (The device indicates the intensity of the echo as well as range.)	15 JAN 1945
9.	ASW PLOTTER (PRELIMINARY), Training Aids Division	15 JAN 1945
10.	BALL SOLVER (OR BALL RESOLVER), Training Aids Division (A mechanical device for getting sine and cosine components from a given velocity or motion.)	15 JAN 1945
11.	INVENTION REPORT NO. PC-4 sr-30 PAT 55—BALL COMPUTER CONSTRUCTION, D. D. Evers, OSRD Invention Disclosure NO. 3339, Application Serial NO. 612,677 filed	25 AUG 1945
12.	NON-OBSCURABLE FOCUSING DRT LIGHT, Training Aids Division, NO. M358	19 SEPT 1945

1. sound operators–91.21

a. primary bearing teacher (qfe)–91.211

1.	REVERBERATION SIMULATOR AND RANDOM NOISE PRODUCER, T. H. Schafer	31 DEC 1941
2.	OPERATION OF SIGNAL GENERATOR, G. A. Brettell, Jr.	1 SEPT 1942
3.	PRIMARY BEARING TEACHER, H. E. Hartig, F. Pierce, G. A. Brettell, Jr.	5 NOV 1942
4.	INSTRUCTOR'S MANUAL FOR USE WITH THE PRIMARY BEARING TEACHER, Training Division, NO. U59	1 MAY 1943
5.	INVENTION REPORT NO. PC-4 sr-30 PAT 1—NON-INVERTING AMPLIFIER (TRAINING DEVICES), G. A. Brettell, Jr., OSRD Invention Disclosure NO. 80, Navy Case NO. 3433, Application Serial NO. 511,626 filed	24 NOV 1943
6.	INVENTION REPORT NO. PC-4 sr-30 PAT 3—PRIMARY BEARING TEACHER, F. Pierce, G. A. Brettell, Jr., OSRD Invention Disclosure NO. 82, Navy Case NO. 3427, Application Serial No. 555,144 (Combined with Pat 33) filed	21 SEPT 1944

b. advanced bearing teacher (qfd)–91.212

1.	ADVANCED BEARING TEACHER, Training Section (Preliminary report.)	7 DEC 1942

2.	ADVANCED BEARING TEACHER, H. E. Hartig, F. Pierce, G. A. Brettell, Jr., NO. U18	2 JAN 1943
3.	INVENTION REPORT NO. PC-4 sr-30 PAT 7—ADVANCED BEARING TEACHER, H. E. Hartig, F. Pierce, G. A. Brettell, Jr., OSRD Invention Disclosure NO. 92, Navy Case NO. 3419, Application Serial NO. 483,620, filed	19 APRIL 1943
4.	INSTRUCTOR'S MANUAL FOR USE WITH THE ADVANCED BEARING TEACHER, Training Section, NO. U69	8 JUNE 1943

(1) bdi adjunct for abt–91.212.1

1.	BDI ELEMENT IN SONAR TRAINING, G. P. Harnwell	20 DEC 1943
2.	BEARING DEVIATION INDICATION TEACHER, W. A. Myers	19 JAN 1944
3.	BEARING DEVIATION INDICATOR TRAINER, C. F. Bradley, NO. U218	23 MAY 1944
4.	INVENTION REPORT NO. PC-4 sr-30 PAT 69—ELECTRONIC DEVIATION INDICATOR (BDI TRAINER), G. A. Brettell, Jr., C. F. Bradley, OSRD Invention Disclosure NO. 3186, Navy Case NO. 4836, Application Serial NO. 582,352 filed	12 MAR 1945

c. group operator trainer–91.213

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 73—GROUP TRAINER FOR OPERATORS OF ECHO-RANGING EQUIPMENT, R. G. Nye, G. A. Brettell, Jr., L. T. Apple	
2.	GROUP PROCEDURE TEACHER, G. P. Harnwell	23 SEPT 1943
3.	GROUP BEARING TEACHER, H. E. Hartig	22 NOV 1943
4.	THE GROUP OPERATOR TRAINER, C. F. Bradley (Preliminary report.)	22 MAY 1944
5.	MEANS FOR ADDING QDA DEPTH-DETERMINING EQUIPMENT TO THE GROUP OPERATOR TRAINER, R. G. Nye	27 JULY 1945
6.	QDA TRAINER AND ITS PROBLEMS (NOTES ON CONFERENCE AT 1:30 P.M., MONDAY, 24 SEPTEMBER 1945, IN LT. COMDR. HOFFMAN'S OFFICE AT WCSS), M. C. Henderson	25 SEPT 1945
7.	SONAR GROUP OPERATOR TRAINER, O. A. Becklund	9 JAN 1946

d. midget bearing teacher–91.214

1.	MIDGET BEARING DEMONSTRATOR, K. H. Sommermeyer, NO. M256	14 SEPT 1944
2.	MIDGET BEARING DEMONSTRATOR, K. H. Sommermeyer	14 MAY 1945

e. echo injector–91.215

1.	MANUFACTURE OF EXPERIMENTAL ECHO INJECTOR, H. E. Hartig	10 NOV 1943
2.	ECHO INJECTOR, H. E. Hartig	1 SEPT 1944
3.	ECHO INJECTOR, K. H. Sommermeyer, NO. U302	1 MAR 1945

f. echo recognition group trainer–91.216

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 67—RECORDER (SOUND AND ECHO RECOGNITION GROUP TRAINERS), F. W. Cartland, OSRD Invention Disclosure NO. 3907	
2.	ENGINEERING REPORT ON RECORDERS FOR TRAINING, F. W. Cartland	24 FEB 1944
3.	ECHO RECOGNITION GROUP TRAINING, F. W. Cartland (Engineering report.)	27 APRIL 1944
4.	REPORT ON ECHO RECOGNITION TRAINING, F. W. Cartland	17 MAY 1944
5.	ECHO-RECOGNITION GROUP TRAINING LEARNING STUDY (EFFECT OF TRAINING ON ABILITY TO DISTINGUISH WAKES FROM BEAM SUBMARINES), L. J. Cronbach	26 JUNE 1944

6.	ANALYSIS OF ECHO-RECOGNITION TRAINING IN THE LIGHT OF CERTAIN PSYCHOLOGICAL PRINCIPLES, L. J. Cronbach	15 JULY 1944
7.	ECHO-RECOGNITION TRAINING ABOARD SHIPS AND AT REFRESHER STATIONS, F. W. Cartland	18 JULY 1944
8.	EXPERIMENTAL ECHO-RECOGNITION TRAINING AT MARE ISLAND AND TREASURE ISLAND, F. W. Cartland	29 AUG 1944
9.	INSTRUCTOR'S MANUAL: ECHO-RECOGNITION GROUP TRAINING, Training Aids Division, NO. M341	15 OCT 1944
10.	THE DESIGN AND OPERATION OF MONITOR RECORDER FOR ERGT, Training Aids Division, NO. U300	24 FEB 1945
11.	INSTRUCTION BOOK FOR ECHO-RECOGNITION MONITOR RECORDER MODEL II, INSTALLATION, OPERATION AND MAINTENANCE, F. W. Cartland, NO. M305	15 MAR 1945
12.	INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FOR ECHO-RECOGNITION MONITOR RECORDER, MODEL II (PRELIMINARY), Training Aids Division	21 MAR 1945
13.	PRELIMINARY INSTRUCTOR'S MANUAL FOR ECHO-RECOGNITION REFRESHER TRAINER, Training Aids Division, NO. M330	20 JUNE 1945
14.	ECHO-RECOGNITION GROUP TRAINING AS DEVELOPED FOR USE WITH THE ECHO-RECOGNITION MONITOR RECORDER, MODEL 2, Training Aids Division, NO. U325	10 JULY 1945
15.	ADVANCED COMBAT TRAINING ECHO RECOGNITION SERIES ERT-4, F. W. Cartland	1 SEPT 1945

g. artificial projector (monitor trainer)–91.217

2. sound and conning officers–91.22

a. elementary range-recorder teacher (practice sound range recorder)–91.221

1.	MEMORANDUM RE ALTERATIONS ON RECORDING APPARATUS USED WITH ECHO-RANGING EQUIPMENT, H. E. Hartig	20 AUG 1942
2.	ERROR IN FIRING TIME INDICATED BY SOUND RANGE RECORDER ON D. C. ATTACKS, B. F. Boardman	23 JULY 1943
3.	DISTORTION OF DEPTH-CHARGE EXPLOSION PATTERNS BY DIFFERENCES IN SINKING TIME, W. L. Jenkins	13 AUG 1943
4.	REVIEW OF ERRORS IN DEPTH-CHARGE DROP TIME INDICATED BY SOUND RANGE RECORDER AND SUGGESTED METHODS OF CORRECTION, W. L. Jenkins	13 AUG 1943
5.	THE WEST COAST TRAINING PROGRAM FOR THE TACTICAL SOUND RANGE RECORDER TEACHER, W. L. Jenkins	MAR 1944

b. primary conning teacher (qfh)–91.222

1.	A CONNING TEACHER, W. E. Stephens	29 AUG 1942
2.	UCDWR CONNING TEACHER, H. E. Hartig	13 JAN 1943
3.	MEMORANDUM ON MEETING IN THE NAVY DEPARTMENT ON THE UCDWR CONNING TEACHER, H. E. Hartig	26 JAN 1943
4.	UCDWR CONNING TEACHER, MODEL B1, UCDWR	9 MAR 1943
5.	MODIFIED PRIMARY CONNING TEACHER, H. E. Hartig	30 APRIL 1943
6.	DESCRIPTION AND OPERATION OF PRIMARY CONNING TEACHER, Training Aids Division	8 JUNE 1943
7.	INSTRUCTOR'S MANUAL FOR THE PRIMARY CONNING TEACHER, Training Aids Division	12 JUNE 1943
8.	PRIMARY CONNING TEACHER, A. W. Melloh, NO. U89	14 AUG 1943
9.	RECORDINGS FOR CONNING-OFFICER INSTRUCTION, TRAINING SERIES CO-1, F. W. Cartland	3 SEPT 1943
10.	INVENTION REPORT NO. PC-4 sr-30 PAT 44—PRIMARY CONNING TEACHER, G. P. Harnwell, W. E. Stephens, OSRD Invention Disclosure NO. 1070, Navy Case NO. 4052, Application Serial NO. 511,130 filed	20 NOV 1943
11.	INSTRUCTOR'S MANUAL FOR MODEL QFH SOUND-TRAINING EQUIPMENT (CONNING TEACHER), UCDWR, NO. R147	19 JAN 1944

12. INSTRUCTOR'S MANUAL FOR MODEL QFH SOUND-TRAINING EQUIPMENT (CONNING TEACHER), W. L. Jenkins, NO. R192 — MAR 1944

13. TWO METHODS OF PRACTICING "CREEPING ATTACK" ON THE QFH CONNING TEACHER, W. L. Jenkins — 20 APRIL 1944

c. phonograph recorder trainer (tactical sound range recorder teacher) (qfl)–91.223

1. COMBINATION PHONOGRAPH BDI AND RECORDER TRACE TRAINING APPARATUS, H. E. Hartig — 11 NOV 1943
2. TACTICAL SOUND RANGE RECORDER TEACHER (NAVY QFL), W. L. Jenkins, NO. U190 — MAR 1944
3. FURTHER DEVELOPMENT OF QFL TRAINING, W. L. Jenkins — 30 MAR 1944
4. BDI ATTACHMENT FOR QFL PHONOGRAPHIC RECORDER TRAINER, H. E. Hartig — 18 APRIL 1944

3. a/s team training–91.23

a. sonar-radar target positioner for drt–91.230.1

1. INVENTION REPORT NO. PC-4 sr-30 PAT 86—ELECTRIC SERVO SYSTEM (FOR AUTOMATIC TARGET POSITIONER), G. A. Brettell, Jr.
2. SONAR-RADAR TARGET POSITIONER, H. E. Hartig — 5 MAR 1945
3. INVENTION REPORT NO. PC-4 sr-30 PAT 70—PLOTTER (AUTOMATIC TARGET POSITIONER FOR DRT), F. Pierce, G. A. Brettell, Jr., OSRD Invention Disclosure NO. 3724, Navy Case NO. 5253, Application Serial NO. 599,502 filed — 14 JUNE 1945

b. attack teacher azimuth grid (true bearing projector)–91.231

1. TRUE-BEARING INDICATOR ATTACHMENT FOR SANGAMO ATTACK TEACHER, H. E. Hartig — 24 OCT 1942

c. attack teacher depth charge pattern recorder–91.232

1. INVENTION REPORT NO. PC-4 sr-30 PAT 53—PATTERN RECORDER (FOR DEPTH-CHARGE TRAINING), S. C. Baden, OSRD Invention Disclosure NO. 1840
2. PRELIMINARY INSTRUCTION BOOK FOR DEPTH-CHARGE PATTERN RECORDER MARK I, MODEL O, INSTALLATION, OPERATION AND MAINTENANCE, UCDWR, NO. R173 — MAY 1944
3. DEPTH-CHARGE PATTERN RECORDER, S. C. Baden — 17 MAY 1944
   (Final report.)
4. SPECIAL TOOLS FOR DEPTH-CHARGE PATTERN RECORDER, S. C. Baden — 17 MAY 1944

d. bearing splitter–91.233

1. UCDWR BEARING SPLITTER, UCDWR — 21 DEC 1942
2. INVENTION REPORT NO. PC-4 sr-30 PAT 30—CALCULATOR (BEARING SPLITTER), H. E. Hartig, OSRD Invention Disclosure NO. 373, Navy Case NO. 3835, Application Serial NO. 501,573 filed — 8 SEPT 1943

e. shipboard a/s attack teacher, model a (sasat) (qfk)–91.234

1. ANTI-SUBMARINE ATTACK TRAINER FOR SHIPBOARD USE, H. E. Hartig — 17 NOV 1942
2. DESCRIPTION OF UCDWR SHIPBOARD ATTACK TEACHER, TYPE A, MARK I, G. P. Harnwell — 9 MAR 1943

3.	A DEVICE FOR OBTAINING BEARING AND RANGE RATE TO BE USED AS AN AUXILIARY TO SASAT A, C. Eckart, NO. M82	15 JULY 1943
4.	THE SASAT SLIDE RULE, G. P. Harnwell, L. I. Schiff, NO. U90	13 AUG 1943
5.	SHIPBOARD ANTI-SUBMARINE ATTACK TEACHER (SASAT A), C. F. Bradley, NO. U93	30 AUG 1943
6.	PRELIMINARY INSTRUCTION MANUAL FOR THE SHIPBOARD ANTI-SUBMARINE ATTACK TEACHER (SASAT A), C. F. Bradley, J. M. Snodgrass, NO. R94	31 AUG 1943
7.	WEA-1 AND WEA-2 ADAPTERS FOR SASAT, C. F. Bradley, NO. U121	22 OCT 1943
8.	INSTRUCTOR'S MANUAL FOR THE MODEL QFK SHIPBOARD SOUND OPERATOR TRAINER, Training Section, NO. R191	MAR 1944
9.	NOTES ON SASAT DEMONSTRATION ON THE EAST COAST, W. M. M. Robinson	2 MAY 1944
10.	SHIPBOARD ANTI-SUBMARINE SONAR TRAINER (SASAT A, MODEL V), E. J. Smuckler, NO. U211	5 MAY 1944
11.	INVENTION REPORT NO. PC-4 sr-30 PAT 40—SLIDE RULE (FOR SASAT A), G. P. Harnwell, OSRD Invention Disclosure NO. 655, Navy Case NO. 4015, Application Serial NO. 535,472 filed	13 MAY 1944
12.	INVENTION REPORT NO. PC-4 sr-30 PAT 27—ATTACK-TRAINING DEVICE (SASAT A), F. Pierce, G. A. Brettell, Jr., M. O. Kappler, C. F. Bradley, OSRD Invention Disclosure NO. 590, Navy Case NO. 3863, Application Serial NO. 535,858 filed	16 MAY 1944
13.	SONAR JOE, UCDWR (An introduction to SASAT or Navy Model QFK Shipboard Sound Operator Trainer.)	JULY 1944

f. shipboard a/s attack teacher, model b (sasat b)–91.235

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 104—BALL TYPE DIFFERENTIAL, F. Pierce	
2.	A SHIPBOARD ATTACK TEACHER, F. Pierce	15 JAN 1943
3.	SHIPBOARD ANTI-SUBMARINE ATTACK TEACHER (SASAT B), F. Pierce, J. Schisel, NO. U186	25 MAR 1944
4.	INVENTION REPORT NO. PC-4 sr-30 PAT 31—SHIPBOARD TRAINING DEVICE (SASAT B), F. Pierce, G. A. Brettell, Jr., OSRD Invention Disclosure NO. 2479, Navy Case NO. 4437, Application Serial NO. 542,504 filed	28 JUNE 1944

g. shipboard a/s attack teacher, model c (sasat c)–91.235.1

h. practice targets–91.236

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 13—AGC FOR ECHO REPEATER, J. N. A. Hawkins, W. A. Myers	
2.	INVENTION REPORT NO. PC-4 sr-30 PAT 50—CABLE SPLICE, D. G. Reed, OSRD Invention Disclosure NO. 1761	
3.	INVENTION REPORT NO. PC-4 sr-30 PAT 51—SOUND TARGET (PRACTICE TARGET—SR5), D. G. Reed, OSRD Invention Disclosure NO. 2094	
4.	INVENTION REPORT NO. PC-4 sr-30 PAT 90—MINE ECHO REPEATER, Lt. T. L. Scanland, USN	
5.	THEORY OF ECHO REPEATER AND REGENERATIVE OBJECT LOCATOR, E. M. McMillan	JUNE 1942
6.	EXPERIMENTAL SURFACE-MODEL ECHO REPEATER, W. A. Myers, E. M. McMillan	20 JUNE 1942
7.	TACTICAL USES FOR BEEPING TOM, D. K. Froman, A. M. Thorndike	22 JUNE 1942
8.	EXPERIMENTAL UNDERWATER TOWED-MODEL ECHO REPEATER, E. M. McMillan, W. A. Myers, D. J. Evans	1 SEPT 1942
9.	MEMORANDUM ON PRACTICE TARGETS, G. P. Harnwell	8 SEPT 1942
10.	THEORY OF ECHO REPEATER AND REGENERATIVE OBJECT LOCATOR, E. M. McMillan	3 NOV 1942
11.	ECHO-REPEATER TARGET, SURFACE MODEL RR-1, E. M. McMillan, D. J. Evans, W. A. Myers, NO. U1	12 NOV 1942
12.	TYPE BD-1 TRANSDUCER FOR SURFACE-MODEL KR-1 AND RR-1 ECHO-REPEATER TARGET, W. A. Myers	19 NOV 1942
13.	TYPE CD-1 TRANSDUCER FOR SUBMERGED-MODELS (SR) ECHO-REPEATER TARGETS, W. A. Myers	19 NOV 1942
14.	THE TRIPLANE, D. E. Ross, F. N. D. Kurie, NO. U4	23 NOV 1942
15.	THE SHAPE OF A FLEXIBLE ROPE TOWING A SUBMERGED BODY, G. D. Camp, NO. M5	30 NOV 1942

16. OPERATION, MAINTENANCE AND INSTALLATION INSTRUCTIONS FOR SURFACE-MODEL RR-1 PRACTICE TARGET, R. C. Fisher, NO. U15 — 14 DEC 1942

17. AUTOMATIC GRAIN CONTROL FOR ECHO REPEATERS, W. A. Myers — 21 DEC 1942

18. ANTI-SUBMARINE PRACTICE TARGET—EXPERIMENTAL BUOY MODEL BR-1, D. J. Evans, NO. U53 — 25 FEB 1943

19. ANTI-SUBMARINE PRACTICE TARGET—KEEL MODEL KR-1, D. J. Evans, D. G. Reed, NO. U45 — 25 FEB 1943

20. TOWED SUBMERGED ANTI-SUBMARINE PRACTICE TARGET—MODEL SR-2, D. J. Evans, T. F. Burke, D. G. Reed, NO. U42 — 25 FEB 1943

21. AMPLIFIER AND POWER SUPPLY—MODEL S1-AB, R. O. Burns, NO. U51 — 16 APRIL 1943

22. AMPLIFIER AND POWER SUPPLY—MODEL S2-AB, R. O. Burns, NO. U56 — 16 APRIL 1943

23. OBSERVATIONS OF SS. GEAR FROM SURFACE CRAFT, W. A. Myers, M. E. Chun — 16 APRIL 1943

24. PRELIMINARY INSTRUCTION BOOK FOR MODEL SR-2 ANTI-SUBMARINE PRACTICE TARGET EQUIPMENT—INSTALLATION, OPERATION AND MAINTENANCE MANUAL, R. O. Burns, NO. U64 — 14 MAY 1943

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26. PRELIMINARY INSTRUCTION BOOK FOR MODEL BR-1 A/S PRACTICE TARGET WITH THE MODEL S3-AB AMPLIFIER, R. O. Burns, NO. U71 — 11 JUNE 1943

27. SUPPLEMENT TO THE TRIPLANE, D. E. Ross, F. N. D. Kurie, NO. U4a — 29 JUNE 1943

28. INVENTION REPORT NO. PC-4 sr-30 PAT 10—ECHO REPEATER (PRACTICE TARGET), E. M. McMillan, W. A. Myers, CSRD Invention Disclosure NO. 130, Navy Case NO. 3470, Application Serial NO. 497,232 filed — 3 AUG 1943

29. STATUS OF PRACTICE-TARGET GROUP AS OF AUGUST 20, 1943, D. J. Evans — 23 AUG 1943

30. SUPPLEMENTARY NOTES ON PRELIMINARY INSTRUCTION BOOK FOR MODEL BR-1 A/S PRACTICE TARGET WITH THE MODEL S3-AB AMPLIFIER, R. O. Burns, NO. U71a — 16 SEPT 1943

31. FINDINGS IN STUDY OF ACOUSTIC FEEDBACK IN PRACTICE TARGETS, D. G. Reed — 1 OCT 1943

32. MEASUREMENTS ON CRYSTAL TRANSDUCER CA1-1 NO. 218, C. J. Burbank, NO. C11 — 16 OCT 1943

33. INSTRUCTION BOOK FOR MODEL SR5 PRACTICE TARGET (NAVY MODEL OAT PRACTICE TARGET)—INSTALLATION, OPERATION AND MAINTENANCE, UCDWR, NO. R142 — JAN 1944

34. SUPPLEMENTARY INSTRUCTION BOOK FOR ANTI-SUBMARINE PRACTICE TARGETS, UCDWR, NO. R200 — APRIL 1944

35. A DEPRESSOR FOR A SPECIAL MAGNETOSTRICTION ECHO REPEATER, D. G. Reed, NO. M216 — 10 MAY 1944

36. MODIFICATIONS AND TESTS MADE ON TAYLOR MODEL BASIN SELF-PROPELLED PRACTICE TARGET, D. J. Evans, NO. M225 — 14 JUNE 1944

37. MINE ECHO REPEATER, D. H. Ransom, Jr. — 29 JULY 1944

38. CONSULTING SERVICES UNDER NAVY PROJECT NS-195, UCDWR, NO. U269 — 28 OCT 1944

39. DR1 PRACTICE TARGET FOR ROCKET PRACTICE, UCDWR, NO. M273 — 9 NOV 1944

(1) practice attack targets–91.236.1

1. INVESTIGATION OF OAS PRACTICE TARGETS FOR USE AT 300 FOOT DEPTHS, W. L. Bryant, NO. M349 — 25 AUG 1945

2. PROJECT NS 144—EXTENT OF THE FREQUENCY RANGE OF THE ECHO-REPEATER TARGETS, C. F. Bradley — 31 OCT 1945

i. depth-charge practice attack system–91.237

j. attack teacher for qh type sonar scanning equipment–91.238

k. assisting ship projector–91.239

1. INVENTION REPORT NO. PC-4 sr-30 PAT 83—SIMULATOR FOR SHIP MOVEMENTS, R. M. Oliver

2. PRELIMINARY INSTRUCTION BOOK FOR THE ASSISTING SHIP PROJECTOR, R. Shope, NO. M373 — 21 JAN 1946

4. submarine personnel training–91.24

1.	PRO-SUBMARINE PROGRAM AT UCDWR, W. B. Beckley	28 SEPT 1945

a. primary listening teacher (qff)–91.241

1.	LISTENING TEACHERS FOR SUBMARINE SOUND OPERATOR TRAINING, H. E. Hartig	17 NOV 1942
2.	DEVELOPMENT OF MODIFIED PRIMARY LISTENING TEACHER, H. E. Hartig	11 DEC 1942
3.	PRIMARY LISTENING TEACHER, H. E. Hartig, G. A. Brettell, Jr., NO. U57	30 APRIL 1943
4.	TEST OF CLASS ROOM PROCEDURES FOR PRIMARY LISTENING TEACHERS, K. H. Sommermeyer	3 AUG 1943
5.	PRELIMINARY INSTRUCTOR'S MANUAL FOR USE WITH THE PRIMARY LISTENING TEACHER, Training Division, NO. R119	18 OCT 1943
6.	INVENTION REPORT NO. PC-4 sr-30 PAT 33—PRIMARY LISTENING TEACHER, F. Pierce, G. A. Brettell, Jr., OSRD Invention Disclosure NO. 406, Navy Case NO. 3772, Application Serial NO. 555,144 filed	21 SEPT 1944

b. advanced listening teachers–91.242

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 52—LISTENING TRAINING DEVICE (ADVANCED LISTENING TEACHER), G. A. Brettell, Jr., W. W. Carruthers	
2.	ENEMY FORCE LISTENING TEACHER, F. Pierce	15 SEPT 1942
3.	ENEMY FORCE LISTENING TEACHER, H. E. Hartig	12 OCT 1942
4.	NOTES ON THE CONSTRUCTION DETAILS OF THE ADVANCED LISTENING TEACHER, G. A. Brettell, Jr.	3 FEB 1943
5.	A PROPOSED ADVANCED LISTENING TEACHER, H. E. Hartig	10 FEB 1943
6.	ADVANCED LISTENING TEACHER; STATUS AS OF PRESENT, G. A. Brettell, Jr.	23 OCT 1943
7.	SELECTIVE EFFECT OF A HETERODYNE RECEIVER, W. W. Carruthers	14 MAR 1944
8.	PRELIMINARY INSTRUCTION MANUAL FOR ADVANCED LISTENING TEACHER, K. H. Sommermeyer, NO. M232	7 JUNE 1944
9.	PROPOSED CHANGES IN MODEL 2, ADVANCED LISTENING TEACHER, W. W. Carruthers	4 AUG 1944
10.	PRELIMINARY INSTRUCTION MANUAL FOR ADVANCED LISTENING TEACHER, MODEL 3, UCDWR, NO. U291	22 JAN 1945

c. submarine attack teachers–91.243

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 57—PERISCOPE TRAINING DEVICE, G. P. Harnwell, OSRD Invention Disclosure NO. 2961	
2.	INVENTION REPORT NO. PC-4 sr-30 PAT 58—TRANSDUCER (FOR NAC SOUND BEACON), R. D. Atchley, OSRD Invention Disclosure NO. 2137	
3.	SHIPBOARD SUBMARINE PERISCOPE ATTACK TEACHER, G. P. Harnwell	15 NOV 1943
4.	PRELIMINARY SPECIFICATIONS OF VIEWING MECHANISM, G. A. Brettell, Jr.	14 APRIL 1944
5.	STATEMENT OF ACTION OF ZOOM LENS AS SUGGESTED BY J. H. RANSOM, G. A. Brettell, Jr.	18 APRIL 1944
6.	SUBMARINE SHIPBOARD ATTACK-TEACHER PERFORMANCE SPECIFICATIONS, G. P. Harnwell	18 APRIL 1944
7.	NOTES ON THE OPTICAL SYSTEM FOR SUBMARINE PERISCOPE ATTACK TEACHER, G. A. Brettell, Jr.	23 MAY 1944
8.	SUBMARINE SHIPBOARD ATTACK TEACHER—PERFORMANCE SPECIFICATIONS, G. P. Harnwell	23 MAY 1944
9.	NOTES ON THE SUBMARINE CONVOY ATTACK TEACHER, G. A. Brettell, Jr.	26 MAY 1944

d. periscope range estimation trainer (pret)–91.244

e. submarine convoy attack teacher–91.245

f. sound recognition group trainer–91.246

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 67—RECORDER (SOUND AND ECHO RECOGNITION GROUP TRAINERS), F. W. Cartland, OSRD Invention Disclosure NO. 3907	
2.	INVENTION REPORT NO. PC-4 sr-30 PAT 84—RECOGNITION TRAINER (SOUND RECOGNITION GROUP TRAINER), R. G. Nye, L. T. Apple	
3.	INVENTION REPORT NO. PC-4 sr-30 PAT 96—RANGE INDICATOR, C. M. Beyer, E. M. Bolze	
4.	SUBMARINE SOUND RECOGNITION GROUP TRAINER INSTRUCTOR'S MANUAL NO. 15, WCSS, UCDWR	JAN 1945
5.	NOTES ON CONFERENCE HELD AT WCSS ON 15 MARCH 1945 RE SOUND RECOGNITION GROUP TRAINER, H. E. Hartig	19 MAR 1945
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7.	LEARNING STUDIES ON THE SOUND RECOGNITION GROUP TRAINER: SINGLE PING RANGE READING, L. J. Cronbach, NO. M319	18 MAY 1945
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13.	LEARNING STUDIES ON THE SOUND RECOGNITION GROUP TRAINER: TARGET CLASSIFICATION, L. J. Cronbach, D. F. Lovell, NO. M359	17 SEPT 1945
14.	THE SOUND RECOGNITION GROUP TRAINER—A STUDY OF THE TESTS USED, Training Aids Division, NO. M371	10 DEC 1945
15.	THE RANGE INDICATOR TRAINER, Training Aids Division, NO. M381	11 DEC 1945

g. group listening teacher–91.247

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 82—GROUP LISTENING TEACHER, W. W. Carruthers	
2.	INVENTION REPORT NO. PC-4 sr-30 PAT 107—CAM SHIFTING CONTROL, E. H. Birdsall	
3.	GROUP LISTENING TEACHER, MODEL I PRELIMINARY INSTRUCTIONS FOR OPERATING THE PROBLEM GENERATOR, K. H. Sommermeyer	25 NOV 1944
4.	NOTES ON CONFERENCE AT WEST COAST SOUND SCHOOL ON GROUP LISTENING TEACHER, H. E. Hartig	15 FEB 1945
5.	JP TEST FOR THE GLT, C. M. Beyer	1 MAY 1945
6.	TESTS AND LEARNING STUDIES ON JP AND WCA SUBMARINE SONAR TRAINER, C. M. Beyer, D. F. Lovell, NO. M366	5 NOV 1945

h. submarine bathythermograph simulator–91.248

1.	ASSISTANCE TO SUBDIV 45 IN MAKING BT SIMULATOR, G. A. Brettell, Jr.	7 JUNE 1944
2.	SUBMARINE BATHYTHERMOGRAPH ADJUNCT FOR DIVING TRAINER, H. E. Hartig	8 JUNE 1944

3.	SUBMARINE BATHYTHERMOGRAPH SIMULATOR, H. E. Hartig	24 JUNE 1944
4.	INVENTION REPORT NO. PC-4 sr-30 PAT 74—TRAINING APPARATUS AND CONTROL DEVICE THEREFOR (BATHYTHERMOGRAPH SIMULATOR), H. E. Hartig, G. A. Brettell, Jr., OSRD Invention Disclosure NO. 3891, Navy Case NO. 5513, Application Serial NO. 608,698 filed	3 AUG 1945
5.	THE BATHYTHERMOGRAPH SIMULATOR, Training Aids Division, NO. U360	13 SEPT 1945

i. submarine bathythermograph classroom demonstrator–91.248.1

1.	SUBMARINE BATHYTHERMOGRAPH CLASSROOM DEMONSTRATOR, Training Aids Division, NO. M363	20 SEPT 1945

j. submarine barometer simulator–91.249

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 78—SUBMARINE BAROMETER SIMULATOR (ADJUNCT FOR ASKANIA TRAINER), C. A. Hisserich, OSRD Invention Disclosure NO. 3378	
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3.	SUBMARINE BAROMETER SIMULATOR, H. E. Hartig	21 JUNE 1944
4.	SUBMARINE BAROMETER SIMULATOR, H. E. Hartig	24 JUNE 1944
5.	SUBMARINE BAROMETER SIMULATOR, C. A. Hisserich	29 JULY 1944
6.	SUBMARINE BAROMETER SIMULATOR, Training Group, NO. M270	28 OCT 1944

5. air a/s training–91.25

a. expendible radio-sonic buoy trainer–91.251

b. directional radio sono buoy trainer–91.252

6. special officer groups–91.26

a. convoy trainer–91.261

1.	CONVOY TEACHER, F. Pierce	9 OCT 1942
2.	CONVOY TEACHER, H. E. Hartig	14 OCT 1942

b. tactical (cic) trainer–91.262

1.	INVENTION REPORT NO. PC-4 sr-30 PAT 79—RADAR SIMULATOR (FOR CIC TACTICAL TRAINER), C. A. Hisserich, G. A. Brettell, Jr.	
2.	INVENTION REPORT NO. PC-4 sr-30 PAT 85—HARMONIC COMPUTING MECHANISM (BALL COMPUTER), F. Pierce	
3.	CIC TRAINER, G. P. Harnwell	15 NOV 1943
4.	DESCRIPTION OF PROPOSED CIC TRAINER AS DISCUSSED AT CIC CONFERENCE COTCPAC JANUARY 18, 1944, G. P. Harnwell	20 JAN 1944
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7.	RADAR SIMULATOR FOR THE CIC TRAINER, C. A. Hisserich	18 JULY 1944
8.	CIC TRAINER, F. Pierce	24 JULY 1944

9.	AUTOMATIC TARGET POSITIONER FOR DRT AND CIC TRAINER, H. E. Hartig	8 FEB 1945
10.	CIC TRAINER, UCDWR	1 JUNE 1945
11.	NARRATIVE OF EVENTS LEADING TO THE CIC TACTICAL TRAINER, UCDWR	1 JUNE 1945
12.	PRELIMINARY INSTRUCTION MANUAL: CIC TRAINER MODEL I WITH PROPOSALS FOR IMPROVEMENTS AND EXTENSIONS, Training Aids Division, NO. M320	1 JUNE 1945
13.	HISTORY OF DEVELOPMENT OF THE TYPE B MODEL I CIC TRAINER, E. M. Bolze	9 JUNE 1945
14.	PRELIMINARY INSTRUCTION MANUAL: CIC TRAINER MODEL I, REVISED EDITION, Training Aids Division, NO. M320.1	15 SEPT 1945
15.	INVENTION REPORT NO. PC-4 sr-30 PAT 56—SIMULATOR FOR BATTLE MANEUVERS (CIC TACTICAL TRAINER), F. Pierce, G. A. Brettell, Jr., OSRD Invention Disclosure NO. 3927, Navy Case NO. 6534, Application Serial NO. 631,946 filed	30 NOV 1945

c. escort trainer adjuncts–91.263

C. training aids, development and formulation— 91.40

1. a/s personnel–91.41

a. films and slide films–91.411

b. phonograph records (doppler drills, etc.)–91.412

1.	INSTRUCTOR'S MANUAL ON DOPPLER DRILLS AND TESTS UCDWR D-SERIES, UCDWR, NO. R127	30 OCT 1943
2.	RECORD CATALOG OF UNDERWATER SOUND RECORDINGS, UCDWR, NO. R174	JAN 1944
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c. textual material (writing projects, etc.)–91.413

1.	PRODUCTION OF SONAR MAINTENANCE MANUALS, Training Aids Division, NO. U370	5 DEC 1945

2. submarine personnel–91.42

a. phonograph records–91.421

3. air a/s personnel–91.43

a. slide films–91.431

b. mad training at mineola–91.432

D. navy training assistance— 91.50

E. operational training studies— 91.60

1.	LEADING CUT-ONS ON ATTACK TEACHERS AND AT SEA, W. L. Jenkins, NO. M204	20 APRIL 1944

F. ahead-thrown weapon training studies— 91.70

1.	REPORT ON ROUTINE FOR INSTRUCTION OF VISITING SHIPS IN AHEAD-THROWN ATTACKS (MOUSETRAP AND HEDGEHOG), R. Shope	17 JAN 1944
2.	REPORT ON THE PROFICIENCY OF VISITING SHIPS IN ASW OPERATIONS—WCSS, SAN DIEGO, CALIFORNIA, R. Shope	3 JUNE 1944
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G. sonar—bathythermograph training— 91.80

1.	USE OF SUBMARINE BATHYTHERMOGRAPH OBSERVATIONS, Publications Division, NavShips 900,069	
2.	SONAR PREDICTION WITH THE BATHYTHERMOGRAPH, Publications Division, NavShips 900,111	
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4.	MAXIMUM ECHO RANGES—THEIR PREDICTION AND USE. AN INTERIM MANUAL PREPARED FOR USE IN INSTRUCTION AT THE WEST COAST SOUND SCHOOL, Oceanographic Section—UCDWR, Training Group—Sec. 6.1 NDRC	JAN 1944
5.	SHIPBOARD INSTRUCTION PROGRAM ON BATHYTHERMOGRAPH AND PREDICTION OF ECHO RANGES FOR STUDENT SOUND OFFICERS, WEST COAST SOUND SCHOOL, UCDWR	28 APRIL 1944
6.	WORKBOOK FOR "PREDICTION OF SOUND RANGES FROM BATHYTHERMOGRAPH OBSERVATIONS" (NavShips 943-C2), Oceanographic and Training Groups, NO. R230	1 JUNE 1944
7.	DECISIONS REACHED REGARDING TRAINING PROGRAM ON SUBSURFACE WARFARE OCEANOGRAPHY JUNE 9, 10 AND JUNE 19, 20, R. D. Russell	23 JUNE 1944
8.	STATUS OF 91.80 (NAVY PROJECT NS-308) AS OF JULY 21, 1944, R. D. Russell	21 JULY 1944
9.	MANUAL FOR BATHYTHERMOGRAPH PILOT INSTRUCTORS, Training Aids Group, NO. M250	SEPT 1944
10.	ECHO RANGING IN SHALLOW WATER, U. S. FLEET ANTI-SUBMARINE BULLETIN, VOL. 2, NO. 6, pp. 32-35, NOVEMBER 1944, R. H. Fleming, BuShips NDRC	NOV 1944
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12.	COMPUTATION OF COMPRESSIBILITY OF SUBMARINE, F. Hawthorne	8 JAN 1945
13.	NAVY MANUALS BEING PREPARED FOR BUSHIPS BY UCDWR, R. D. Russell	19 JAN 1945
14.	MATHEMATICAL DETERMINATION OF "AREA OF CERTAIN CONTACT LATER", O. W. Muckenhirn	24 JAN 1945
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22.	THE E W SCRIPPS, Oceanographic Division	1 JULY 1942
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30.	RAPID-RESPONSE THERMOMETER, D. C. Kalbfell, NO. M101	23 SEPT 1943
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appendix b PATENT BIBLIOGRAPHY

As described in the body of this report (see Chapter Nine, Section D), UCDWR submitted Invention Reports from time to time. These reports, over 100 in number, included many types of ideas and suggestions, although the great majority were obviously concerned with the assigned work.

These reports, as of 1 April 1946, are listed below, together with information concerning the inventors, the project or file numbers with which they were associated, and the pertinent OSRD, Navy, and Patent Office designations, where these are known to UCDWR. For convenience, these same numbered reports are also listed in the bibliography of Appendix A, under their appropriate file numbers.

The sequence of numbers in the following list is complete except for Nos. 26, 32, 49, 61, 62, and 97, on which the files were closed by UCDWR, and Nos. 103, 108, and 115, relating to work still in progress at UCDWR on 1 April 1946.

INVENTION REPORT NO. PC-4 sr-30 PAT 1

NON-INVERTING AMPLIFIER (TRAINING DEVICES)
GEORGE A. BRETTELL, JR.
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OSRD INVENTION DISCLOSURE NO. 80
NAVY CASE NO. 3433
APPLICATION, SERIAL NO. 511,626,
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INVENTION REPORT NO. PC-4 sr-30 PAT 2

MAGNETIC BOMB FUSE
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OSRD INVENTION DISCLOSURE NO. 81
NAVY CASE NO. 4078
APPLICATION, SERIAL NO. 512,384,
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INVENTION REPORT NO. PC-4 sr-30 PAT 3

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NAVY CASE NO. 3427
APPLICATION, SERIAL NO. 555,144,
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INVENTION REPORT NO. PC-4 sr-30 PAT 4

FLUXION METER
CHARLES A. HISSERICH
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NAVY CASE NO. 3407
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CHARLES A. HISSERICH, DONALD G. REED
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TRANSDUCER SUSPENSION SYSTEM
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ELECTRONIC SWITCH (FOR POLYSCOPE)
EDWIN M. McMILLAN
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NAVY CASE NO. 3732
APPLICATION, SERIAL NO. 519,317, FILED 22 JANUARY 1944

INVENTION REPORT NO. PC-4 sr-30 PAT 9

TRANSDUCER CONSTRUCTION AND METHOD
FRANZ N. D. KURIE
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OSRD INVENTION DISCLOSURE NO. 286
NAVY CASE NO. 3716
APPLICATION, SERIAL NO. 514,290, FILED 14 DECEMBER 1943

INVENTION REPORT NO. PC-4 sr-30 PAT 10

ECHO REPEATER (PRACTICE TARGET)
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OSRD INVENTION DISCLOSURE NO. 130
NAVY CASE NO. 3470
APPLICATION, SERIAL NO. 497,232, FILED 3 AUGUST 1943

INVENTION REPORT NO. PC-4 sr-30 PAT 11

DIFFERENTIALLY SENSITIVE SONIC DETECTOR (MINE FUZE)
JOHN N. A. HAWKINS
FILE NO. 40.00
OSRD INVENTION DISCLOSURE NO. 134
NAVY CASE NO. 3874
APPLICATION, SERIAL NO. 500,999, FILED 2 SEPTEMBER 1943

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DONALD E. ROSS
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NAVY CASE NO. 3773
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TIME-VARYING GAIN DEVICE (FOR POLYSCOPE)
EDWIN M. McMILLAN
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MULTIPLE UNIT ECHO-RANGING SYSTEM (POLYSCOPE)
EDWIN M. McMILLAN
FILE NO. 02.42
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NAVY CASE NO. 3751
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RAYMOND C. FISHER
FILE NO. 02.454
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ECHO-RANGING SYSTEM AND METHOD
(REVERBERATION EQUALIZER)
CARL H. ECKART, GEORGE W. DOWNS, JR.
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EXPLOSIVE BOMB FUZE
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ATTACK TRAINING DEVICE (SASAT A)
FIRTH PIERCE, GEORGE A. BRETTELL, JR.,
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SAWTOOTH VOLTAGE GENERATOR
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NAVY CASE NO. 3798
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INVENTION REPORT NO. PC-4 sr-30 PAT 29

LIGHT VALVE (FOR QLA SONAR INDICATOR)
CHARLES A. HISSERICH, MALCOLM C. HENDERSON,
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OSRD INVENTION DISCLOSURE NO. 2156
NAVY CASE NO. 4444
APPLICATION, SERIAL NO. 547,780,
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CALCULATOR (BEARING SPLITTER)
HENRY E. HARTIG
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ADMITTANCE NEUTRALIZING CIRCUIT
GEORGE W. DOWNS, JR.
FILE NOS. 01.95, (E)
OSRD INVENTION DISCLOSURE NO. 1024
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INVENTION REPORT NO. PC-4 sr-30 PAT 35

SIGNAL ENHANCER (DOPPLER DOUBLER)
COMDR. J. C. MYERS, BUSHIPS
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APPLICATION, SERIAL NO. 500,781,
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INVENTION REPORT NO. PC-4 sr-30 PAT 36

NAD-6 SOUND BEACON
GEORGE W. DOWNS, JR., RAYMOND D. ATCHLEY
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BEARING DEVIATION INDICATOR
EDWIN M. McMILLAN, FRANZ N. D. KURIE,
FRANCIS X. BYRNES
FILE NO. 02.314
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RADIUS OF CURVATURE METER
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PERIOD METER
RAYMOND C. FISHER, WILLIS M. RAYTON
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INVENTION REPORT NO. PC-4 sr-30 PAT 40

SLIDE RULE (FOR SASAT A)
GAYLORD P. HARNWELL
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ECHO-RANGING AND SOUNDING SYSTEM (SESE)
DAVID H. RANSOM, JR.
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OSRD INVENTION DISCLOSURE NO. 2939
NAVY CASE NO. 4633
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BUOYANCY-CONTROL DEVICE
RAYMOND D. ATCHLEY
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CHARLES A. HISSERICH
FILE NO. 60.00
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PRIMARY CONNING TEACHER
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RADIAL SWEEP CIRCUIT (FOR QLA SONAR)
SIDNEY BERTRAM
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MULTI-CHANNEL ELECTRONIC SWITCH
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ECHO-RANGING SYSTEM (QLA SONAR)
CHARLES A. HISSERICH
FILE NO. 02.454
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INVENTION REPORT NO. PC-4 sr-30 PAT 48

CRYSTAL AND METHOD
GEORGE A. ARGABRITE, T. FINLEY BURKE
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OSRD INVENTION DISCLOSURE NO. 2055
NAVY CASE NO. 4400
APPLICATION, SERIAL NO. 538,434,
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INVENTION REPORT NO. PC-4 sr-30 PAT 50

CABLE SPLICE
DONALD G. REED
FILE NOS. 91.236, (E)
OSRD INVENTION DISCLOSURE NO. 1761
NOT TO BE FILED

INVENTION REPORT NO. PC-4 sr-30 PAT 51

SOUND TARGET (PRACTICE TARGET—SR5)
DONALD G. REED
FILE NO. 91.236
OSRD INVENTION DISCLOSURE NO. 2094
NOT TO BE FILED

INVENTION REPORT NO. PC-4 sr-30 PAT 52

LISTENING TRAINING DEVICE (ADVANCED
LISTENING TEACHER)
GEORGE A. BRETTELL, JR., WALTER W. CARRUTHERS
FILE NO. 91.242

INVENTION REPORT NO. PC-4 sr-30 PAT 53

PATTERN RECORDER (FOR DEPTH-CHARGE TRAINING)
SIEGFRIED C. BADEN
FILE NO. 91.232
OSRD INVENTION DISCLOSURE NO. 1840
NOT TO BE FILED

INVENTION REPORT NO. PC-4 sr-30 PAT 54

DECADE POTENTIOMETER
SIDNEY BERTRAM
FILE NO. (E)
OSRD INVENTION DISCLOSURE NO. 1985
NOT TO BE FILED

INVENTION REPORT NO. PC-4 sr-30 PAT 55

BALL COMPUTER CONSTRUCTION
DUNDRED D. EVERS
FILE NO. 91.20
OSRD INVENTION DISCLOSURE NO. 3339
APPLICATION, SERIAL NO. 612,677,
FILED 25 AUGUST 1945

INVENTION REPORT NO. PC-4 sr-30 PAT 56

SIMULATOR FOR BATTLE MANEUVERS
(CIC TACTICAL TRAINER)
FIRTH PIERCE, GEORGE A. BRETTELL, JR.
FILE NO. 91.262
OSRD INVENTION DISCLOSURE NO. 3927
NAVY CASE NO. 6534
APPLICATION, SERIAL NO. 631,946,
FILED 30 NOVEMBER 1945

INVENTION REPORT NO. PC-4 sr-30 PAT 57

PERISCOPE TRAINING DEVICE
GAYLORD P. HARNWELL
FILE NO. 91.243
OSRD INVENTION DISCLOSURE NO. 2961

INVENTION REPORT NO. PC-4 sr-30 PAT 58

TRANSDUCER (FOR NAC SOUND BEACON)
RAYMOND D. ATCHLEY
FILE NO. 91.412
OSRD INVENTION DISCLOSURE NO. 2137
NOT TO BE FILED

INVENTION REPORT NO. PC-4 sr-30 PAT 59

PRESSURE-PROOF REPRODUCER (FOR SUBMARINE
BRIDGE)
WILLIAM A. MYERS
FILE NO. (E)
OSRD INVENTION DISCLOSURE NO. 2550
NAVY CASE NO. 4455
APPLICATION, SERIAL NO. 543,149,
FILED 1 JULY 1944

INVENTION REPORT NO. PC-4 sr-30 PAT 60

SOUND BEACON (NAC)
WILLIAM A. MYERS, VAUGHN G. McKENNEY
FILE NO. 09.412
OSRD INVENTION DISCLOSURE NO. 2337
NAVY CASE NO. 4533
APPLICATION, SERIAL NO. 548,738,
FILED 9 AUGUST 1944

INVENTION REPORT NO. PC-4 sr-30 PAT 63

SOUND TARGET (10' HOLLOW SPHERE)
FRANZ N. D. KURIE, FIRTH PIERCE
FILE NO. 91.20
OSRD INVENTION DISCLOSURE NO. 2466

INVENTION REPORT NO. PC-4 sr-30 PAT 64

DIFFERENTIAL ANALYZER
LEONARD I. SCHIFF
FILE NO. 01.92
OSRD INVENTION DISCLOSURE NO. 2560
NAVY CASE NO. 4457
APPLICATION, SERIAL NO. 550,470,
FILED 21 AUGUST 1944

INVENTION REPORT NO. PC-4 sr-30 PAT 65

ELECTRONIC CONTROLLER
JOHN L. LEONARD
FILE NOS. 01.72, (E)
OSRD INVENTION DISCLOSURE NO. 3224
NAVY CASE NO. 6674
APPLICATION, SERIAL NO. 634,844,
FILED 13 DECEMBER 1945

INVENTION REPORT NO. PC-4 sr-30 PAT 66

ACOUSTIC IMPEDANCE ELEMENT (TRANSDUCER BACKING PLATE)
T. FINLEY BURKE
FILE NOS. 01.214, 01.22
OSRD INVENTION DISCLOSURE NO. 3902
NAVY CASE NO. 5368
APPLICATION, SERIAL NO. 599,740,
FILED 15 JUNE 1945

INVENTION REPORT NO. PC-4 sr-30 PAT 67

RECORDER (SOUND AND ECHO RECOGNITION GROUP TRAINERS)
FREDERICK W. CARTLAND
FILE NOS. 91.216, 91.246
OSRD INVENTION DISCLOSURE NO. 3907
NOT TO BE FILED

INVENTION REPORT NO. PC-4 sr-30 PAT 68

TOWED SOUND TARGET (PLASTIC COVERED TRIPLANE)
FRANZ N. D. KURIE
FILE NO. 66.00
OSRD INVENTION DISCLOSURE NO. 3307
NOT TO BE FILED

INVENTION REPORT NO. PC-4 sr-30 PAT 69

ELECTRONIC DEVIATION INDICATOR (BDI TRAINER)
GEORGE A. BRETTELL, JR., CLARK F. BRADLEY
FILE NO. 91.212.1
OSRD INVENTION DISCLOSURE NO. 3186
NAVY CASE NO. 4836
APPLICATION, SERIAL NO. 582,352,
FILED 12 MARCH 1945

INVENTION REPORT NO. PC-4 sr-30 PAT 70

PLOTTER (AUTOMATIC TARGET POSITIONER FOR DRT)
FIRTH PIERCE, GEORGE A. BRETTELL, JR.
FILE NOS. 85.00, 91.230.1
OSRD INVENTION DISCLOSURE NO. 3724
NAVY CASE NO. 5253
APPLICATION, SERIAL NO. 599,502,
FILED 14 JUNE 1945

INVENTION REPORT NO. PC-4 sr-30 PAT 71

ARTIFICIAL UNDERWATER TARGET (NAD-10 SOUND BEACON)
DAVID J. EVANS, CLARK F. BRADLEY
FILE NO. 09.453

INVENTION REPORT NO. PC-4 sr-30 PAT 72

SUBMARINE DEVICE (NAD-3 SOUND BEACON)
DONALD G. REED
FILE NO. 09.451
OSRD INVENTION DISCLOSURE NO. 3389

INVENTION REPORT NO. PC-4 sr-30 PAT 73

GROUP TRAINER FOR OPERATORS OF ER EQUIPMENT
R. GLENN NYE, GEORGE A. BRETTELL, JR., LAUREL T. APPLE
FILE NO. 91.213

INVENTION REPORT NO. PC-4 sr-30 PAT 74

TRAINING APPARATUS AND CONTROL DEVICE THEREFOR (BATHYTHERMOGRAPH SIMULATOR)
HENRY E. HARTIG, GEORGE A. BRETTELL, JR.
FILE NO. 91.248
OSRD INVENTION DISCLOSURE NO. 3891
NAVY CASE NO. 5513
APPLICATION, SERIAL NO. 608,698,
FILED 3 AUGUST 1945

INVENTION REPORT NO. PC-4 sr-30 PAT 75

ELECTROMECHANICAL TRANSDUCER
GEORGE A. ARGABRITE
FILE NO. 01.22

INVENTION REPORT NO. PC-4 sr-30 PAT 76

RECORDER (QLA INDICATOR)
FRED A. JESWINE, MALCOLM C. HENDERSON, KENNETH K. WYCKOFF
FILE NO. 02.454
OSRD INVENTION DISCLOSURE NO. 2681
NAVY CASE NO. 5208
APPLICATION, SERIAL NO. 559,110,
FILED 12 JUNE 1945

INVENTION REPORT NO. PC-4 sr-30 PAT 77

EXPENDIBLE SOUNDER
FRANZ N. D. KURIE, LOUIS A. CARTWRIGHT, JR.
FILE NO. 02.135

INVENTION REPORT NO. PC-4 sr-30 PAT 78

SUBMARINE BAROMETER SIMULATOR (ADJUNCT FOR ASKANIA TRAINER)
CHARLES A. HISSERICH
FILE NO. 91.249
OSRD INVENTION DISCLOSURE NO. 3378
NOT TO BE FILED

INVENTION REPORT NO. PC-4 sr-30 PAT 79

RADAR SIMULATOR (FOR CIC TACTICAL TRAINER)
CHARLES A. HISSERICH, GEORGE A. BRETTELL, JR.
FILE NO. 91.262

INVENTION REPORT NO. PC-4 sr-30 PAT 80

DEVELOPED UNDER SUBCONTRACT NO. 8
RELAXATION OSCILLATOR (FOR FM SONAR)
O. D. ENGSTROM—WESTERN ELECTRIC COMPANY
FILE NO. 02.454
OSRD INVENTION DISCLOSURE NO. 3903
APPLICATION, SERIAL NO. 471,661,
FILED 8 JANUARY 1943

INVENTION REPORT NO. PC-4 sr-30 PAT 81

DEVELOPED UNDER SUBCONTRACT NO. 8
MULTIVIBRATOR (FOR FM SONAR)
O. D. ENGSTROM—WESTERN ELECTRIC COMPANY
FILE NO. 02.454
OSRD INVENTION DISCLOSURE NO. 3916
APPLICATION, SERIAL NO. 473,189,
FILED 22 JANUARY 1943

INVENTION REPORT NO. PC-4 sr-30 PAT 82

GROUP LISTENING TEACHER
WALTER W. CARRUTHERS
FILE NO. 91.247

INVENTION REPORT NO. PC-4 sr-30 PAT 83

SIMULATOR FOR SHIP MOVEMENTS
ROBERT M. OLIVER
FILE NO. 91.239

INVENTION REPORT NO. PC-4 sr-30 PAT 84

RECOGNITION TRAINER (SOUND RECOGNITION GROUP TRAINER)
R. GLENN NYE, LAUREL T. APPLE
FILE NO. 91.246

INVENTION REPORT NO. PC-4 sr-30 PAT 85

HARMONIC COMPUTING MECHANISM (BALL COMPUTER)
FIRTH PIERCE
FILE NO. 91.262

INVENTION REPORT NO. PC-4 sr-30 PAT 86

ELECTRIC SERVO SYSTEM (FOR AUTOMATIC TARGET POSITIONER)
GEORGE A. BRETTELL, JR.
FILE NOS. 85.00, 91.230.1

INVENTION REPORT NO. PC-4 sr-30 PAT 87

BOTTOM SCANNER
WILLIAM H. WILLIAMS, DAVID A. BALDWIN
FILE NO. 02.134

INVENTION REPORT NO. PC-4 sr-30 PAT 88

SMALL OBJECT DETECTOR
MELVIN E. CHUN, CHARLES E. MONGAN, JR., WILLIAM H. WILLIAMS
FILE NO. 02.131

INVENTION REPORT NO. PC-4 sr-30 PAT 89

FREQUENCY ANALYSIS SYSTEM (FOR QLA SONAR)
SIDNEY BERTRAM
FILE NO. 02.454

INVENTION REPORT NO. PC-4 sr-30 PAT 90

MINE ECHO REPEATER
LT. T. L. SCANLAND, USN
FILE NO. 91.236

INVENTION REPORT NO. PC-4 sr-30 PAT 91

RANGE-BEARING PLOTTER
HENRY E. HARTIG, COMDR. J. C. MYERS, USN
FILE NO. 80.00

INVENTION REPORT NO. PC-4 sr-30 PAT 92

CEMENTING PIEZOELECTRIC CRYSTALS TO RUBBER
FRED M. UBER
FILE NO. 01.214

INVENTION REPORT NO. PC-4 sr-30 PAT 93

TRANSDUCER CASE
DONALD E. ROSS
FILE NO. 01.22

INVENTION REPORT NO. PC-4 sr-30 PAT 94

UNDERWATER SOUND TRANSMITTER
VAUGHN G. McKENNEY
FILE NO. 09.413

INVENTION REPORT NO. PC-4 sr-30 PAT 95

SIMULATION OF UNDERWATER ECHO RANGING
SIDNEY BERTRAM, JOHN W. SAMPSELL,
ARTHUR H. ROSHON, FREDERICK BALTZLY, JR.
FILE NO. 02.456

INVENTION REPORT NO. PC-4 sr-30 PAT 96

RANGE INDICATOR
CARLTON M. BEYER, ERNEST M. BOLZE
FILE NO. 91.246

INVENTION REPORT NO. PC-4 sr-30 PAT 98

LAMINATED ACOUSTIC WINDOW
EDWIN M. McMILLAN
FILE NO. 01.22

INVENTION REPORT NO. PC-4 sr-30 PAT 99

REINFORCED ACOUSTIC WINDOW
FRED M. UBER
FILE NO. 01.22

INVENTION REPORT NO. PC-4 sr-30 PAT 100

GAYLORD P. HARNWELL, MELVIN O. KAPPLER
FILE NOS. 02.454, 09.40

INVENTION REPORT NO. PC-4 sr-30 PAT 101

MINE CONSTRUCTION
WILLIS M. RAYTON
FILE NO. 01.80

INVENTION REPORT NO. PC-4 sr-30 PAT 102

CALCULATOR
CARL ECKART
FILE NO. 01.72

INVENTION REPORT NO. PC-4 sr-30 PAT 104

BALL TYPE DIFFERENTIAL
FIRTH PIERCE
FILE NO. 91.235

INVENTION REPORT NO. PC-4 sr-30 PAT 105

IMPROVEMENTS IN POLAR DRIVES AND TAKE-OFFS FOR HARMONIC BALL COMPUTERS
FIRTH PIERCE
FILE NO. 91.20

INVENTION REPORT NO. PC-4 sr-30 PAT 106

ECHO-RANGING SYSTEM
DAVID C. KALBFELL
FILE NO. 02.131

INVENTION REPORT NO. PC-4 sr-30 PAT 107

CAM SHIFTING CONTROL
EDWIN H. BIRDSALL
FILE NO. 91.247

INVENTION REPORT NO. PC-4 sr-30 PAT 109

ACOUSTISONDE
DAVID C. KALBFELL
FILE NO. (E)

INVENTION REPORT NO. PC-4 sr-30 PAT 110

ELECTRONIC INDICATOR
RICHARD A. MUELLER
FILE NO. 02.135

INVENTION REPORT NO. PC-4 sr-30 PAT 111

ECHO-RANGING SYSTEM
MELVIN E. CHUN
FILE NO. 02.131

INVENTION REPORT NO. PC-4 sr-30 PAT 112

DIRECTIONAL SOUND APPARATUS
MELVIN E. CHUN
FILE NO. 02.131

INVENTION REPORT NO. PC-4 sr-30 PAT 113

SIMULATOR FOR ECHO RANGING
SIDNEY BERTRAM
FILE NO. 02.456

INVENTION REPORT NO. PC-4 sr-30 PAT 114

ELECTRIC CONTROLLER
KENNETH K. WYCKOFF
FILE NO. 02.454