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ANOMALOUS ABSORPTION

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Principal Investigator

MANAGEMENT REPORT

1 July 1980 thru 30 September 1980

Sponsored by
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Contract N00014-80-C-0091

Contract Effective Date: 1 October 1979
Contract Expiration Date: 30 September 1981
Amount of Anomalous Absorption Contract: \$434,300

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Cooperative support has been offered by the National Bureau of Fisheries for the program by way of ship time on the DAVID STARR JORDAN for deploying and recovering the buoy systems and in collecting and supplying net haul data at the buoy stations during the data collection period. The scope of the program includes the design, fabrication and testing of the automatic data collection buoy system in the first year, followed by a two year program of data collection in the southern California current.



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Marine Physical Laboratory

ANOMALOUS ABSORPTION

MANAGEMENT REPORT

1 July 1980 thru 30 September 1980

RESEARCH PROGRAM AND PLAN

The primary objective of the Anomalous Absorption program is to observe and correlate in a quantitative manner the anomalous frequency dependent acoustic absorption caused by fish and fish larvae with the type and abundance of the fish and larvae population as determined by net hauls. Such a characterization of the absorption will allow tactical sonar performance prediction to draw on fisheries surveys of regional productivity as a data bank for prediction of anomalous absorption in the mobile passive sonar band. Cooperative support has been offered by the National Bureau of Fisheries for the program by way of ship time on the DAVID STARR JORDAN for deploying and recovering the buoy systems and in collecting and supplying net haul data at the buoy stations during the data collection period. The scope of the program includes the design, fabrication and testing of the automatic data collection buoy system in the first year, followed by a two year program of data collection in the southern California current.

MAJOR ACCOMPLISHMENTS

System design has been completed.

Prototype transmitter module, receiver module, transponder acoustic command release modules, shipboard electronics, transmitting transducer array, receiving hydrophone array, towed transducer array, buoyancy system, mooring strings, and shipboard handling system have been fabricated and tested.

Transducer arrays have all been calibrated.

Procedures for handling have been developed and documented.

A tape playback system for on-shore data readout and analysis has been designed and is currently fabricated.

The following software routines have been written, debugged and operationally tested.

1. Mainline initialization and idle loop.
2. Interrupt service for clock, analog to digital converter and data acquisition sequencer.
3. Preprocessing (4:1 data reduction via low-pass filtering for long pulse data; windowing of short pulse data).
4. Long pulse data processing, A.G.C., low-pass filtering matched to pulse bandwidth and pulse edge detection.
5. Sample time determination - (tracking for clock drift).
6. Surface acoustic telemetry link module.
7. Mag tape recording module.

On 18-19 August the prototype transmitter and receiver buoy strings were deployed in 1,040 meters water depth at 33° (17'N, 118° 3.5'W and called up for recovery some 12 hours later. The handling during deployment and recovery went extremely well in near perfect weather. The transmitter transmitted the full set of 13 frequencies as programmed. The receiver data memory was examined periodically via the bidirectional acoustic telemetry link. This examination indicated that acoustic data was being collected, however, software for tape playback was not yet operational for confirmation of data recording. The transponders and acoustic command releases operated satisfactorily and both units released on first command. Minor changes in the transponder circuit design will be incorporated to improve the accuracy of range determination.

FUTURE PLANS

Complete software modules for:

1. On shore tape playback for data analysis.
2. Mag tape error correction or at least error detection.
3. Pulse acquisition (initial clock synchronization).
4. Shipboard checkout system software.

5. Acoustic commanded tape playback.
6. Add preamp gain to mag tape record.
7. Initialize receiver gain upon power-up.
8. Reposition tape by acoustic TLM command.
9. Reduce the amount of short pulse data recorded.

Make minor modification to transmitter, receiver and transponder circuit designs.

Fabricate and test two more receiver modules and accompanying transponders hydrophone arrays and buoy strings.

Deploy and test complete set, i.e.; one transmitter and three receiver strings, 2nd quarter FY 81. Fabricate and test two more complete sets, i.e.; two transmitters, six receivers and eight transpond/release modules with accompanying transducer arrays and buoy strings. 3rd and 4th quarter FY 81.

Analyze data, evaluate performance, document hardware and prepare report 2nd and 3rd quarter FY 81.

Three deployments for data collection FY 81.

Fabricate 4th buoy set 1st quarter FY 82.

Six to seven deployments for data collection FY 82. Report.

FISCAL STATUS

- (1) Amount currently provided in contract
\$434,300
- (2) Expenditures and commitments to date
\$204,300
- (3) Estimated funds required to complete the work
\$230,000
- (4) Estimated date of completion of work
30 September 1981

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