REAL-TIME PROCESSING OF ACOUSTIC
AND OCEANOGRAPHIC DATA AT SEA

by

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ABSTRACT

A data acquisition and analysis system was developed and installed
aboard the oceanographic research vessel USNS SANDS (AGOR-6) to
provide a capability for comprehensive data analysis at sea,
including the ability to perform data processing in real time.
The system is built around the UNIVAC 1230 computer. Peripheral
equipment permits up to 64 channels of data to be fed to the
computer through a 50-kHz A/D multiverter. The processed output
is displayed on a high-speed on-line printer-plotter. Four tape
decks for data storage and read-out permit continuous operation
with no off-line time required for changing tape or data read-out.

The system was used extensively during a $3\frac{1}{2}$ month cruise devoted to
oceanographic and acoustic studies on a track from New London,
Connecticut, to Hawaii and return. These studies included
measurements of the deep scattering layer and reverberation
strength. The processing system was also required to be on line
continuously for a three-week period for acoustic propagation
studies conducted in the North Pacific. Explosive charges and
CW transducers were employed as sources. Acoustic signals from
a number of sensors were processed in real time to determine
ambient noise levels, propagation loss by total energy and peak
response techniques, and signal-to-noise ratios. Processing
included individual signatures as well as 30 s and 5 min averages.

A unique feature of the data-processing system included telemetering data from FLIP to the SANDS over an RF as well as hard-wire link with the SANDS anchored in 17 000 ft of water and FLIP tethered to it with 1.6 miles of polypropylene line.

This extended period at sea proved highly successful and demonstrated the desirability of at-sea data processing by permitting scientists aboard ship the opportunity to collect, process, and evaluate results during the course of the experimental exercise.