REMOTE AUTOMATIC MULTIPURPOSE STATION

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Remote Automatic Multipurpose Station

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TECHNICAL SUMMARY

During the past report period, the second LORAMS station, which will be referred to hereafter as the Barrow LORAMS station, was installed at the Naval Arctic Research Laboratory, Barrow, Alaska. The Barrow LORAMS station is presently sampling wind and acoustic data on an hourly basis.

The first LORAMS prototype station accumulated a total of six months operation before a failure in the TE cell shut it down. Five of the months were continuous operation on the ice pack at the AIDJEX camp.

TECHNICAL RESULTS

The Barrow LORAMS was placed into operation 3 August 1972 at 1420 Alaska Daylight time. The system transmits for four minutes every four hours. The Barrow LORAMS contains the 10,240-bit recirculating memory and is presently collecting wind speed and acoustic data.

An interim receiving station has been set up at NARL to provide a close-in monitoring capability. Periodic data recordings are being made and will be returned to Delco for evaluation. Another receiving station at Wales, Alaska, which was used to monitor the AIDJEX LORAMS, is presently monitoring the Barrow LORAMS. The receiver at Wales is only suitable for signal strength monitoring, therefore data quality cannot be assessed at this location. Wales is approximately 430 nautical miles from Barrow and allows evaluation of a medium path length.

The Barrow LORAMS developed a malfunction near the end of August. It was determined that the power turn-on transistor had shorted. This problem was corrected and the station is back in operation. Initial reports from Wales indicates that strong signals are being received.

The Wales receiving station accumulated approximately two months of continuous signal strength data on AIDJEX LORAMS near the end of its life. The results shown by the summarized data in Figure 1 tend to confirm the original system design concepts.

Summary of AIDJEX LORAMS Signal Quality
Data as Received at Wales, Alaska

	0900 hrs	1300 hrs	1700 hrs	2100 hrs
a. Total of all Monitored Transmissions				
Unreadable	15	18	10	14
Weak	15	12	13	6
Readable	10	13	15	6
Strong	9	8	9	6
b. Month of July Totals of all Monitored Transmissions				
Unreadable	2	3	2	6
Weak	7	4	5	3
Readable	7	10	9	5
Strong	8	5	5	6
c. Month of August* Totals of all Monitored Transmissions				
Unreadable	13	6	2	7
Weak	8	4	5	3
Readable	3	10	10	5
Strong	1	5	5	6
d. Longest No. of Days Between Readable or Strong Signals				
July	4	3	5 (1)	8 (4)
August	18 (4)	11 (3)	18 (5)	21 (13)

*Includes 3 days of Sept.

Note: Numbers in brackets indicate days that hour was not monitored.

e. Longest No. of Days between Readable or Strong Signals Considering all Hours Monitored

July	3 days
August	9 days

Figure 1

The worst case link outage observed was the nine days in August which is somewhat greater than the seven days considered in the initial design. However, the occurrence of two back-to-back severe solar storms which occurred in the first two weeks of August was a rather unexpected and unusual event for a year of low sunspot activity. The size of the LORAMS memory can be easily adjusted to cover a nine-day outage. The Barrow LORAMS system presently contains a 16-day memory sampling five channels with five bits each hour. In addition, two transmissions each day in the early morning were never monitored which could have modified the results.

The data are somewhat subjective being an individual operators interpretation but it is reasonable to assume that good quality data could be decoded when the reported strengths were readable or better.

It should be pointed out that each four-minute LORAMS transmission contains over two complete memory cycles and that each consecutive transmission contains the same memory data as the previous transmission except for four hourly readings which are dropped off and replaced by new ones. Therefore, there is an excellent probability of correcting any errors that may occur by comparing many memory cycles.

The AIDJEX Project people made a trip to the abandoned AIDJEX camp and were able to recover the AIDJEX LORAMS electronics and TE cell. The equipment has not yet been received at Delco, therefore the exact cause of failure is not known. However, indications point to a cutoff of the propane supply. The electronics and housing appeared to be in good condition but the TE cell was extinguished. When the equipment is received, it will be analyzed in an attempt to determine the exact cause of failure.

FUTURE WORK

The Barrow LORAMS will continue to be monitored and the cause of failure of the AIDJEX LORAMS will be determined. Direction is needed from the scientific officer on preparation of the Phase III proposal.