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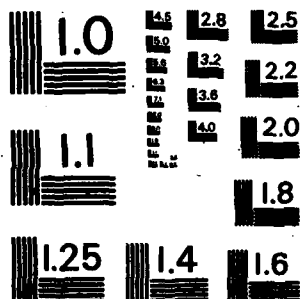
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IRANIAN LONG PERIOD ARRAY SUPPORT

SEMIANNUAL REPORT

1 OCTOBER 1977 THROUGH 31 MARCH 1978

Prepared by

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AIR FORCE TECHNICAL APPLICATIONS CENTER

VELA Seismological Center

312 Montgomery Street

Alexandria, Virginia 22314

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ABSTRACT

This report summarizes continuing activities on the program of technical support and system modification for the Iranian Long Period Array. The Iranian Long Period Array system consists of an array of seven remote seismic sensor installations, data communication links, and a central recording station. Personnel from the University of Tehran Institute of Geophysics (UTIG) operate the system. An on-site technical representative was provided by Texas Instruments under a previous phase of the contract from the Air Force Technical Applications Center. This phase of the work is being continued under contract F08606-78-C-0014 and operation, maintenance, and training activities are described in reports under that contract. This report describes the activities and status of the two remaining tasks under contract F08606-77-C-0016, i.e., providing specified spare parts for the system and adding a short period recording capability to the system.

Neither the Defense Advanced Research Projects Agency nor the Air Force Technical Applications Center will be responsible for information contained herein which has been supplied by other organizations or contractors, and this document is subject to later revision as may be necessary. The views, conclusions, and recommendations presented are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the Defense Advanced Research Projects Agency, the Air Force Technical Applications Center, or the US Government.



SECTION I INTRODUCTION

The Iranian Long Period Array (ILPA) system is a seismic installation consisting of a central recording station (CRS) and an array of seven remote sites. Data received from the array is processed at the central recording station. Each remote site is made up of a three-component sensor system, data acquisition subsystem, telemetry subsystem, and power subsystem. The CRS consists of a station processor, a visual recording subsystem, a magnetic recording subsystem, a timing subsystem, a telemetry subsystem, and a power subsystem. Both long period (LP) and short period (SP) seismic data are recorded by the system. The system was established by a government-to-government agreement between the United States of America and the Imperial Government of Iran. Personnel from the University of Tehran Institute of Geophysics (UTIG) operate the system. The CRS is located in Tehran, Iran and the remote sites are centered in an area approximately 65 kilometers southwest of Tehran.

AFTAC contracted with Texas Instruments Incorporated, under contract number F08606-77-C-0016, to provide technical support for the operation, maintenance, and continued training of UTIG personnel. This work is being continued under contract F08606-78-C-0014. Additional tasks being performed by Texas Instruments under the present contract include providing specified spare parts for the system and developing and installing a short period magnetic recording capability. Activities on these two tasks during the past six months and the current status are discussed in the next two sections of this report.



SECTION II SPARE PARTS

Spare parts recommendations were obtained from the manufacturers of each of the subsystems in the ILPA system. These lists were reviewed by Texas Instruments and AFTAC/VSC, and resulted in the list of spare parts and quantities procured for support of the system. A total of 232 different components or sub-assemblies were ordered.

As the parts are received in Dallas they are shipped to AFTAC/VSC for inspection, acceptance, and shipment to Iran. As of the end of this report period all spare parts except five items had been released for shipping to AFTAC/VSC. It is expected that the five parts yet to be shipped will be received in Dallas during April, and the final shipment of spare parts to AFTAC/VSC will be made at the end of May, thus completing the spares phase of the contract.



SECTION III SHORT PERIOD RECORDING CAPABILITY

Contract Modification P00004 authorized the design and implementation of short period data and site status recording on magnetic tape. The present short period recording capability of the system is limited to recording a single, selectable short period component on a magnetic tape recorder connected to the output originally designated for satellite data transmission.

To implement the short period recording capability it is necessary to expand the memory capacity of both CPUs in the CRS. No hardware changes to the system are required except the addition of the 8,192 word memory modules to each CPU. The memory modules have been delivered to the system in Tehran for use at the time of installation of the recording capability.

The software is being developed which will add short period data to the ILPA magnetic recording tape, add SP site status to the tape and provide the operator interface to select the SP data and status for recording.

Recording is performed on one-second boundaries. The LP recording is performed on second 0 and second 30. The SP recording will be performed as a function of the buffer and the amount of data being recorded per second. The SP data may be written every 5, 10, 15, 20, or 30 seconds. The following SP status information will be recorded as appropriate:

- Sync Error
- Calibration in Progress
- Deleted by Operator
- Faulty or Missing SP Data

The following program executives contain software programs which have had to be modified or added to implement the SP recording capability.

- 00 EXEC Power up or restart
- C3 EXEC I/O Bus interrupt
- 04 EXEC SP EXEC
- 06 EXEC Command EXEC
- 07 BG Background EXEC

In implementing the program, a high-level software design was first developed. A design review was held with AFTAC/VSC at this time. During this



meeting the design concept was reviewed and approved and plans and schedules for completing the program were agreed upon. The approved design was then written in metacode and finally in 980 assembly language code.

The program is presently in the debug-test phase. The software is being subjected to simulation testing using the existing ILPA simulator. Final test of the software will take place at the site after installation and checkout.

Documentation to be provided includes an update of the appropriate pages of the Operation and Maintenance Instructions and a Computer Program Development Specification. The Computer Program Development Specification will be written for the software changes or additions only.



SECTION IV
PLANS FOR NEXT PERIOD

It is anticipated that the program will be completed on schedule by 7 June 1978. Spare parts shipments will be completed during May 1978. The start of installation of the SP recording software is scheduled for 6 May 1978 at the CRS in Tehran, Iran. This work will be completed by the end of May. Completion of the documentation will also be made by the end of May 1978.

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