NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.
Signal Corps Technical Requirement
SCL-4067, dated 28 October 1958
Amendment No. 1, dated September 1960
Project No. 3B21-06-001-03

Object:
The objective of this contract is to develop a highly reliable Telegraph Repeater for field use.

Prepared for:
U. S. Army Electronics Research and Development Laboratories

Prepared by:
Radiation Incorporated
Melbourne, Florida
Report No. 6

QUARTERLY PROGRESS REPORT
REPEATER, TELEGRAPH TH-38( )/G

Covering Period: 1 July to 30 September 1963

Signal Corps Report: DA 36-039 SC-87254

Signal Corps Technical Requirement
SCL-4067, dated 28 October 1958
Amendment No. 1, dated September 1960
Project No. 3B21-06-001-03

Object: The objective of this contract is to develop a highly reliable Telegraph Repeater for field use.

Prepared for: U. S. Army Electronics Research and Development Laboratories

Prepared by: Radiation Incorporated
Melbourne, Florida
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>PURPOSE</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>ABSTRACT</td>
<td>2</td>
</tr>
<tr>
<td>III</td>
<td>PUBLICATIONS, REPORTS AND CONFERENCES</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>A. Publications</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>B. Reports</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>C. Conferences</td>
<td>3</td>
</tr>
<tr>
<td>IV</td>
<td>FACTUAL DATA</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>A. General</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>B. Delivery of Two Each TH-38( )G Test Models</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>C. Test Program at USAELRDL</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>D. Shock Mounts</td>
<td>8</td>
</tr>
<tr>
<td>V</td>
<td>CONCLUSIONS</td>
<td>9</td>
</tr>
<tr>
<td>VI</td>
<td>PROGRAM FOR NEXT QUARTER</td>
<td>10</td>
</tr>
<tr>
<td>VII</td>
<td>KEY PERSONNEL</td>
<td>11</td>
</tr>
</tbody>
</table>

DISTRIBUTION LIST
I PURPOSE

This project consists of the design, development and fabrication of twenty Telegraph Repeaters TH-38( )G, along with documentation as required by the contract. The repeater must be designed to operate in half duplex, full duplex or half duplex-full duplex. Using the converter, circuits of differing characteristics may be interconnected and normal traffic established.

A prime requisite of the contract is to achieve a Mean Time Between Failure of 57,000 hours.

Fabrication of the twenty repeaters will be divided into three phases. Two engineering test models will be fabricated and submitted to USAELRDL for operational and environmental evaluation. Then eight more engineering test models, incorporating any required changes will be built and put on life test along with the first two repeaters. The final phase will consist of the fabrication of ten service test models for field use.
II

ABSTRACT

The two redesigned Repeaters Telegraph TH-38( )Gr-Engineering Test Units were completed, vibration, drop and RFI tested, prior to delivery to USAELRDL as Contract Item 2a, which also was accomplished during this quarter.

One of the TH-38 units, S/N 2R0, underwent temperature, altitude and bounce tests and operated properly following each of them. The other unit, S/N 1R0, underwent thorough electrical tests in accordance with SCL 4067 and RFI tests in accordance with MIL-I-11718, and met all specifications.

Failure of the shock mounts and other items noted in detailed inspection of equipment were called to the attention of Radiation Incorporated for correction on future models. These changes are reported.
III  PUBLICATIONS, REPORTS AND CONFERENCES

A.  Publications

The Repair Parts Selection List, Contract Item 7, was submitted during the quarter.

B.  Reports

(1) Monthly Performance Summaries were prepared and submitted to USAELRDL.

(2) Quarterly Report No. 5 was prepared and submitted to USAELRDL in final form.

(3) The Summary of RF Interference Measurements performed on TH-38( )G, S/N 1 were delivered to USAELRDL on 26 July 1963.

(4) A preliminary submission was made (Item 6) of Visualization Data for evaluation and suggestions by the Contracting Officer's Technical Representative or the Project Engineer. The reply to this letter, dated 25 September 1963, will be provided the Art Department for use in preparing the final version of Item 6, Visualization Data.

C.  Conferences

Four conferences were held during this report period.

Conference held at USAELRDL on 15 July 1963, at which time two Engineering Test Models of the TH-38( )G were delivered. Those in attendance at this conference were:

J. A. Buegler  USAELRDL
J. Lemig  USAELRDL
J. Duffy  USAELRDL
J. Crawford  USAELRDL
C. Conference (Continued)

J. S. Norcross  Radiation Incorporated
W. Premaza  Radiation Incorporated
J. C. Williams  Radiation Incorporated
T. O. Willis  Radiation Incorporated

This conference covered the delivery of the two TH-38 Engineering Test Models, their performance and any possible problem areas which might occur during tests at USAELRDL. Radiation's fullest cooperation was assured to speed the test program to successful completion.

Another short, informal conference was held between Messrs. Norcross, Williams and Premaza of Radiation Incorporated and Mr. J. Lemig of USAELRDL on Friday 26 July 1963 at USAELRDL. This conference was only a brief discussion. RFI Test information was provided.

A third conference was held at USAELRDL on 12 August 1963.

Those in attendance were:

J. Lemig  USAELRDL
F. Deptula  USAELRDL
T. O. Willis  Radiation Incorporated

The purpose of Mr. Willis's trip to USAELRDL was to seek a solution to technical difficulties being experienced in the TH-38 unit undergoing electrical performance tests. This problem was solved without further delay allowing tests to proceed to completion.
C. Conference (Continued)

The fourth conference was held at Radiation Incorporated on 25 and 26 September 1963. Those in attendance were:

J. Lemig  USAELRDL
J. Duffy  USAELRDL
E. Dorsett  Radiation Incorporated
J. S. Norcross  Radiation Incorporated
J. C. Williams  Radiation Incorporated

The purpose of this conference was to review the tests performed on the two engineering test model TH-38 units at USAELRDL and to discuss certain possible modifications, changes and/or additions to future units to be built by Radiation Incorporated under this contract.
IV FACTUAL DATA

A. General

Certain personnel changes were made on the TH-38 program during this quarter. These changes were made in order to enhance the technical support and were from time to time modified during the period to handle the various items which came up. Publications, Manufacturing and other services groups were utilized as required for the various contract items submitted during the period.

The Test Program at USAELRDL extended through most of the quarter, the two TH-38 equipments (Contract Item 2a), having been delivered early in the quarter.

Toward the end of the quarter the two engineering test models TH-38 units completed tests at the USAELRDL and were returned to Radiation Incorporated for incorporation of certain modifications, changes and assurances to be provided in subsequent models.

B. Delivery of Two Each TH-38(G) Test Models

Delivery of the two TH-38 Test Models was accomplished early in this quarter, on 15 July 1963. These units were immediately placed on tests. One unit, S/N 1R0, was subjected to exhaustive Electrical and RFI tests, and the other, S/N 2R0, was subjected to mechanical service.
conditions tests with performance tests before and after each of the tests in the series. Radiation Incorporated was kept posted as to the progress of tests by telephone during the testing program. Close liaison was maintained in order that any problems which might arise could be solved without delaying the test program. RFI Test information was provided on Friday 26 July covering the RFI testing program performed at Radiation Incorporated prior to delivery of the equipment. An engineering design was completed on a packaged RFI filter to replace the individual component network provided in TH-38, S/N 1R0 which underwent RFI tests. This filter, Sprague JN 17-2441 (Radiation No. 104812-1), will be used in subsequent units.

C. Test Program at USAELRDL

Certain difficulties were encountered during the test program at USAELRDL which were solved without extensive delays. Two transistors which failed due to inadvertent erroneous operation of the equipment were replaced in short order and the tests resumed. Later, when performance fell below that specified in certain operational parameters, it was discovered that the quality of one of the two transistors replaced was below the manufacturer's specifications tolerance for this type transistor. When this device was replaced by one within manufacturer's specification tolerances,
C. **Test Program at USAELRDL (Continued)**

the unit performed per specification. This problem was solved with only minor delay to the test program.

The mechanical service conditions tests, primarily the Bounce Test, resulted in fracturing the shock isolation mounts incorporated in the equipment transit case. These mounts built by Barry Controls, Inc., were provided to afford maximum isolation between the equipment and the transit case to limit the shock developed by the two foot drop test.

All other tests of the equipment indicated proper and within specifications operation in all respects. Proper operation was obtained after the Bounce Tests in which the shock isolators were fractured and the equipment sustained greater than specified physical stresses.

D. **Shock Mounts**

As a result of the failure of the shock isolators, Barry Controls Type 16885-3, a different device, a mesh type mount, Type 2004-2, which is not susceptible to temperature extremes and which is suited to the Drop and Bounce requirements has been substituted in the equipment transit case. The TH-38 unit, S/N 2R0, will be returned early during the following period for retesting in the Bounce Test, a Drop Test and a Humidity Test.
V CONCLUSIONS

It is anticipated that the TH-38 unit 2R0 will successfully pass retests, the remaining tests and allow a prompt, unrestricted go ahead for the next eight units (Item 2b), which together with the first two units (Item 2a), will undergo reliability tests.
PROGRAM FOR THE NEXT QUARTER

The retesting of TH-38 S/N 2R0 under the Bounce, Drop and Humidity Tests will be completed during the next quarter. In view of the electrical acceptibility of the TH-38 units, component parts will be procured and by the time a full go ahead is secured from USAELRDL, parts should be on hand for start of fabrication of eight units. No delay as a result of the retesting is anticipated. All requested changes and modifications, with the exception of those on which a waiver request is submitted will be accomplished during the next quarter.
VII  KEY PERSONNEL

Following is a list of Key Personnel and the hours expended by each during the reported quarter:

E. A. Dorsett           112
T. O. Willis            286
DISTRIBUTION LIST

CONTRACT SC-87254

FOURTH QUARTERLY REPORT

OASD (R&E), Rm. 3E1065
ATTN: Technical Library
The Pentagon
Washington 25, D.C. 1

Chief of Research and Development
OCS, Dept. of the Army
Washington 25, D.C. 1

Commanding General
U.S. Army Materiel Command
ATTN: R&D Directorate
Washington 25, D.C. 1

Commanding General
U.S. Army Electronics Command
ATTN: AMSEL-AD
Fort Monmouth, N.J. 2

Director, U.S. Naval Research Laboratory
ATTN: Code 2027
Washington 25, D.C. 1

Commanding Officer and Director
U.S. Navy Electronics Laboratory
San Diego 52, California 1

Aeronautical Systems Division
ATTN: ASAPRL
Wright-Patterson Air Force Base, Ohio 1

Air Force Cambridge Research Laboratories
ATTN: CRZC
L. G. Hanscom Field
Bedford, Massachusetts 1

Commanding Officer
U.S. Army Electronics Material Support Agency
ATTN: SELM6-ADJ
Fort Monmouth, New Jersey 1

Director, Fort Monmouth Office
USA Communication & Electronics Combat Development Agency
Fort Monmouth, New Jersey 1

Corps of Engineers Liaison Office
U.S. Army Electronics R&D Laboratory
Fort Monmouth, New Jersey 1

AFSC Scientific/Technical Liaison Office
U.S. Army Electronics R&D Laboratory
Fort Monmouth, New Jersey 1

AFSC Scientific/Technical Liaison Office
U.S. Naval Air Development Center
Johnsville, Pennsylvania 1

Marine Corps Liaison Office
U.S. Army Electronics R&D Laboratory
Fort Monmouth, New Jersey 1

Commanding Officer
U.S. Army Electronics R&D Laboratory
ATTN: Logistics Division(SELRA/NDD)
Fort Monmouth, New Jersey 2

Rome Air Development Center
ATTN: RAALD
Griffiss Air Force Base
New York 1
DISTRIBUTION LIST (Continued)

Air Force Cambridge Research Laboratories
ATTN: CRXL-R
L. G. Hanscom Field
Bedford, Massachusetts  1

Hq., Electronics Systems Division
ATTN: ESAT, L. G. Hanscom Field
Bedford, Massachusetts  1

Commander
Armed Services Technical Information Agency
ATTN: TISIA
Arlington Hall Station
Arlington 12, Virginia  1

Commanding Officer
U. S. Army Electronics R&D Laboratory
ATTN: Technical Documents Center
Fort Monmouth, New Jersey  1

Commanding Officer
U. S. Army Electronics Research & Development Laboratory
ATTN: Technical Information Division
Fort Monmouth, New Jersey  1

Chief, U. S. Army Security Agency
Arlington Hall Station
Arlington 12, Virginia  1

Commanding Officer
USA Communication & Electronics Combat and Development Agency
Fort Huachuca
Arizona  1

Commanding General
U. S. Army Electronics R&D Activity
ATTN: Technical Library
Fort Huachuca, Arizona  1

Commanding Officer
U. S. Army Electronics R&D Laboratory
ATTN: Director of Research/Engineering
Fort Monmouth, New Jersey  1

Commanding Officer
U. S. Army Electronics Research & Development Laboratory
ATTN: SFLRA/ADJ
Fort Monmouth, New Jersey  1

Commanding General
USA Combat Developments Command
ATTN: CDCMR-E
Fort Belvoir, Virginia  1

Deputy President
U. S. Army Security Agency Board
Arlington Hall Station
Arlington 12, Virginia  1