MONTHLY REPORT

1 September 1956 - 30 September 1956

RESEARCH AND DEVELOPMENT BRANCH
ENGINEERING DIVISION

RESEARCH AND DEVELOPMENT LABORATORY

1. PROJECTS AND ACTIVITIES

2001 - MECHANICAL LABORATORY PROJECTS

In addition to the effort expended in support of the numbered projects 2045, 2099, 2506, 2509, 2510, and 2518 the Mechanical Laboratory completed 30 small equipment cases for SPD.

2003 - LABORATORY OVERHEAD PROJECTS

The Gordon Roto-Beam previously installed at the Laboratory was repaired and equipped with new insulators and elements where needed. The tower has been extended another ten feet to provide more clearance above the Laboratory roof.

2004 - COMMERCIAL EQUIPMENT EVALUATION and 2005 - FOREIGN EQUIPMENT EVALUATION

a. Elgin Indium Micro Cell

The Elgin Indium Micro Cell is a relatively new development in electro-chemical devices. They were originally developed for use in watches; however, they are useful in any application requiring dependability and long life. The cell delivers an open-circuit voltage of approximately 1.15 volts and is free of parasitic reactions such as gassing, electrolyte leakage, and swelling. Performance at temperatures as low as -20 degrees F is satisfactory with a current drain of 15 milliamperes. At 75 degrees F nearly 90% of the manufacturers output rating in milliampere hour capacity was realized. The capacity per unit weight of the cell is slightly comparable to the Mercury type and its performance at various temperatures approaches that of the LeClanche cell.

b. High Speed Voice Transmissions over Long Distance International Telephone Lines

Subsequent investigation of the results of the first test of this type revealed information which gave rise to the validity of the conclusions reached. In this analysis of results it became apparent that the results did not agree with the analytical studies which were conducted at the Laboratory.

With a speed and frequency multiplication factor of 16, the 900 cps frequency used for a 15 wpm CW test was so completely out of the passband of 400 to 2300 cps that a satisfactory reception of this frequency created suspicions (later proven to be correct) that crosstalk between the telephone circuits of [redacted] was responsible for the apparently good results. One-way testing from the [redacted] verified the fact that the initial two-way tests produced erronious results. A lower multiplication factor would improve the CW transmissions and possibly give the voice transmissions intelligibility. More time would be required for the transmissions, however.

25X1A6a

25X1A

25X1A

c. RR-11AA

A summary of the test results on two prototypes of the RR-11AA has been completed. This receiver is notable for its small size, advanced miniaturization, and unique construction; however, neither unit meets the specifications. Both units were below specification requirements in the following instances: frequency stability under shock and with changes in input signal level and temperature, input and output impedance, dial calibration and resettability, spurious response, and radiation from the BFO. Recommendations for improving the characteristics were included in the summary which has been prepared.

d. Tests Complete, Report in Process:

(1) ET-2 (Electro-mechanical Baudot Keyer)
(2) Instructograph Noise Investigation
(3) SQUASH Mark 606 and Mark 607 (British)

e. Projects in Process:

(1) RS-11 (RR-11AA reported above is a portion of this project)
(2) Barker and Williamson Transmit-Receive Switch
(3) PAMM (Portable Automatic Morse Machine Revised)
(4) Variable Frequency Power Supply
(5) Melpar Multicoupler Filters

f. Projects Temporarily Suspended:

(1) RS-11 Noise Limiter - This project was temporarily suspended because of a higher priority assignment.

g. Miscellaneous

Eight man hours were expended during this period in making radiation checks on two MINIFON recorders.

2045 - FACSIMILE PRINTERS (ATP-2 and ATP-3)

a. ATP-3 Printer (6-volt)

The first of the four 6-volt ATP-3 units will be forwarded to O&T for examination within the next ten days. The unit will be complete with exception of painting and engraving. Information proposed to be engraved on the finished unit will be labeled for approval and/or comment. The above approach to delivery will permit an early examination of those features used for the first time in the 6-volt ATP-3 and presently proposed for continued use in the 12-volt system, i.e., encapsulated modular and printed board construction. With delivery of the initial unit attention will immediately turn to the completion of the remaining three units. The battery pack case is the only major item which remains to be completed on the last three units.

b. ATP-3 (12-volt)

The basic circuitry for the 12-volt system has been established. The circuit has been temperature compensated to within ± 6 db variation in sensitivity from -40°C to +50°C. Peak-to-peak voltage required for satisfactory printing ranges over the following values with temperature:

20°C	0.07 volts
-40°C	0.15 volts
+50°C	0.03 volts.

Time and cost estimates for the procurement and packaging required by this circuit are now in process. The determination of permissible component tolerances will be carried out concurrently.

Finished drawings suitable for use in bidding by casting companies are being prepared on all parts for which the design is firm. Drawings for a few parts must await receipt of the 12-volt motor which is expected within approximately one week.

2089 - HIGH SPEED POINT-TO-POINT COMMUNICATION SYSTEM, ASF-4

The two Laboratory engineers assigned to the contractor's plant for familiarization with the SPIT system will complete this phase of the work by 1 October. The engineer assigned to the transmitter site will then assist with the training of additional personnel while awaiting shipment of the equipment. The engineer for the receiver site will return to regular duty during the interim.

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[redacted]

2506 - MODIFIED-DISCONE ANTENNAS

Thirty modified-discone antennas were delivered on 11 September. Current commitments to this project are complete.

2507 - TELEPHONE DIAL KEYERS

Project suspended indefinitely by O&T memo 56-518 dated 13 September.

2508 - PHOTO-ETCHED ANTENNAS

Prototype antennas, one high gain and one low gain, have been designed and etched for the "S" and "X" bands. Characteristics determined thus far indicate that the S-band, high gain antenna has a maximum gain of 14 db with approximately 200 mc bandwidth between the 3 db points. Work on this project remains on a time available basis.

2509 - ELECTRONIC KEY (EK-1X)

Transistor circuitry for the trigger, interlock, and seizure functions has been breadboarded and is now being refined. The coding and time generator circuits must now be added before the characteristics of the key can be studied. Work on these circuits will continue during the coming period.

2510 - MINIATURE AUDIO OSCILLATOR (E/IN-X)

The reworking of the prototype oscillator for use during the development of more reliable circuitry has been abandoned. Preliminary measurements on an oscillator using a new uni-junction silicon transistor manufactured by General Electric (Type ZJ-14) shows promise of meeting the frequency stability requirement. Investigation of this circuit will continue during the coming period.

2512 - TRANSISTORIZED RF CONVERTER

Work on this project has been temporarily suspended because of the personnel requirement of project 2089.

25X1A2g

2513 - [redacted]

Delivery of the five sets of running light components will be delayed briefly in order to determine the advisability of making a slight modification in view of the requirement of project 2518(b).

2515 - TRANSMITTER ADAPTER (TA-1) (A-3 MODIFICATION)

Temporarily suspended to await completion of higher priority projects.

2517 - FIXED FREQUENCY REFERENCE OSCILLATOR (ELINT)

25X1A5a1

The [redacted] has not delivered the 1000 cycle/sec crystal required by the next phase of this project. The company has recently indicated that they were experiencing trouble with resistance in packaging this crystal in a mil-spec. holder. Procurement liaison continues.

2518 - MODIFICATION OF MINIFON WIRE RECORDERS

The modification and repackaging of MINIFON recorders required for use with the demand receivers constructed under project 2513 continues at a satisfactory rate.

An additional requirement added during this period consists of a power pack and relay box designed to permit the use of recorders other than the MINIFON. When other recorders are used, the relay coil will replace the MINIFON motor in series with the demand unit timing motor which will require adjustment of a shunt on the timing motor. For this reason, delivery of the demand receivers (Project 2513) will be held up until the shunt adjustment has been determined.

2. ADMINISTRATIVE

TDY

25X1A9a

[redacted]	10 September 1956 - to date	Los Angeles, Calif.
	11-12 September 1956	Philadelphia, Pa.

PCS

Not applicable

EOD

Not applicable

RESIGNATIONS

Not applicable

TRANSFERS

Not applicable

OTHER

Not applicable

25X1A9a

[redacted]
Chief, Research & Development Laboratory

APPROVED:

25X1A9a

[redacted]
Chief, Research & Development Branch, OC-E

ATTACHMENT:

26 September 1956, RETMA Conference on Reliable Electrical Connections