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TO : The Files

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FROM :

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SUBJECT: Trip Report, RD-76, T.O. C, SAD - TEM Development

1.
 was visited on 25 September 1958 for the purpose of monitoring work in progress on Contract RD-76. This report details the current status of Task Order C and outlines project plans for the immediate future. Project Supervisor, represented the company. Project Engineer, had been involved in an automobile accident a few days earlier and was not able to attend. SPD/EA, and the writer represented the Agency.

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2. Task Order C involved the development of a Time Event Marker (TEM), IN-7, and a Signal Actuate Device (SAD), CU-3, for R+D Projects 2115 and 2116, respectively. The task was formalized on 28 May 1956, and to date a total of \$153,097.00 has been invested.

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3. The Time Event Marker is a miniature time-code generator (5" x 1-3/4" x 2") controlled by a watch movement. The watch is driven by a constant-torque spring motor which when fully wound and mechanically released will operate the movement for a period of 60 days. When the TEM is electrically interrogated, a series of pulses is presented at the output terminals. This coded time group represents the number of elapsed minutes from the time of activation. TEM will be used with ELINT systems to denote the time of day that a sample signal is recorded.

4. The engineering model of the TEM was delivered on 3 April 1958, inspected by R+D, then forwarded to SPD/EA for test and evaluation. Laboratory tests have proven satisfactory electrical operation; however, the unit appears somewhat fragile for field use. Experimental field tests are in progress with the unit repackaged in shock absorbent material.

5. SPD/EA has informally requested that R+D arrange for the procurement of 15 prototype Time Event Markers in addition to initiating a redesign program for ruggedizing the construction. The purpose of building 15 prototypes based on the present design is to satisfy pending field requirements as soon as possible.

has stated that it would be necessary to build a sample prototype to ascertain the accuracy of existing engineering drawings prior to quantity fabrication. This can be accomplished within existing contract funds. The document authorizing this work, extending

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the time, and changing deliverable items of Task Order C is in process. This change will provide delivery of one sample prototype unit and a more accurate set of engineering drawings. On the assumption that the above change in contract will be made, [redacted] has prepared a cost proposal of \$31,440.00 on a CFFF basis for the production of the 15 TEM units.

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6. The prime purpose of this meeting was to outline environmental specifications for the TEM design. The following design goals were considered feasible:

Operating Temperature: -40°C to +70°C

Humidity: 100% at 70°C for four hours.
(The unit will be completely sealed and may require a desiccant).

Altitude: 4000 feet at -40°C
(Might require pressure release valve).

Shock and Vibration: Specification MIL E-52-72-A

Shock-Paragraph 4.15.2.1

(18 impacts of 15 G's each)

Vibration Procedure No. 9, 10 G's, 5 to 55 cycles per second

(these specifications should be met without isolators. Isolators will be added as a safety factor when mounting to vehicle frame.)

Fungus Proofing: MIL-T-152-A

(external coating)

7. In order to meet these environmental specifications certain changes in mechanical design will be necessary. A positive disc locking device will be required to prevent accidental disc repheting due to angular acceleration. It may be necessary to employ an electric winding mechanism if the present negator spring will not provide reasonably constant torque over the temperature range. Shaft diameters, disc and relay contact pressures may have to be increased. This ruggedization process can be accomplished only at the expense of power. Present total power consumed over a sixty-day period is estimated at 1 ampere hour or approximately 1 cubic inch of battery. The redesigned TEM (IN-7A) should not require more than double this power. A technical and cost proposal for this redesign phase is expected within the next two or three weeks.

8. The Signal Actuate Device (SAD) will be used either with TEM or independently. Upon signal presence, a bi-stable multivibrator actuates a relay to turn on a recorder. At the end of a preset recording time period of $1\frac{1}{4}$, $2\frac{1}{2}$, or 5 minutes, the SAD will interrogate TEM and transfer the TEM output to the recorder input. Each of these equipments performs automatically, what is now a manual operation [redacted]

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[redacted] It is intended that the SAD and TEM be used with the fully automatic collection system, [redacted] being developed by the [redacted]

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9. The engineering model SAD was delivered in June 1958, inspected by R+D, and forwarded to SPD/EA for test and evaluation. These tests confirmed the need for a threshold control. The contractor is adding such a control to a breadboard model SAD which remains at the plant. The threshold control will be accessible at the front panel and will work as a signal voltage divider.

[redacted] suggested that a separate connector be used for signal input to possibly eliminate actuation by power switching transients.

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10. [redacted] advised that final engineering reports were being written on both projects. The contractor's technical progress is satisfactory and his cooperation during the engineering model to prototype transition is considered commendable.

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