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UNITED STATES AIR FORCE
Air Force Unit Post Office
Los Angeles 45, California

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REPLY TO
ATTN OF: WDPCR

7 August 1959

SUBJECT: SENTRY Program Progress Report for the Month of July 1959

TO: Director
Advanced Research Projects Agency
Washington 25, DC

1. This report covers progress during the month of July 1959 in the SENTRY Program, directed by ARPA Order 9 (Project Code No. 2100). Prime contractors are Lockheed Missile and Space Division and Thompson-Ramo-Wooldridge Corporation (data handling portion of the program). Fiscal Year 1959 funding was \$105.6 millions; Fiscal Year 1960 funding is \$143.7 millions. A summary list of contractors is given in Tab 3, Section 1, of the Development Plan.

2. TECHNICAL STATUS

a. Visual Reconnaissance System

(1) E-1 Payload - Component assembly will be complete and the first flyable prototype payload will be ready for final assembly on 1 August. Component testing will be completed during August. The thermal model high altitude temperature simulation tests revealed an unexplained temperature distribution. The model has been redesigned and will be tested late in August.

(2) E-2 Payload - Component assembly was completed and final assembly of components on the developmental model structure is nearing completion. Tests are being conducted on the completed 36-inch, f/4 lens and the film and web transport mechanism. Fabrication of the two-speed processor has been started. Design of the prototype (flight) model is complete and fabrication of the first flight package is approximately 30 percent complete.

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b. Ferret Reconnaissance System

(1) F-1 Payload Development - The following models are in various stages of completion and testing:

- (a) Mechanical model - simulates size and weight of various components.
- (b) P-1 Model - first electrical prototype.
- (c) P-2 Model - second prototype.
- (d) Deliverable Models - three types, S-1, S-2, S-3.

(2) F-2 Payload Development - Design and hardware progress is compatible with flight program schedules as follows:

- (a) Band 3a antenna - scale mockup in test, full scale model in fabrication.
- (b) Band 1 receiver subassemblies - package design complete, associated electronic problems solved.
- (c) Band 2 receiver subassemblies - in electronic test.
- (d) Data analyzer circuit boards - in electrical test.
- (e) Power supply (12 volt) - precision trim resistors being added as result of test.
- (f) Power supply (160 volt) - ripple problems revealed by test being solved.
- (g) Magnetic amplified power supply breadboard (-200 to -300 volt) - electrical tests satisfactory except for ripple in output.
- (h) Power supply (-200 to -300 volt) - minor regulation problems being corrected.
- (i) Power and control assembly - in fabrication. Problems exist in cable dressing and packaging due to large number of cable bundles.
- (j) Data analyzer - automatic reset circuit being developed.

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c. Ground Equipment Development

LMED component test and checkout area is nearing completion. Installation of equipment will start in August. Assembly of the E-1 prototype test console and fabrication of the E-2 test console were completed in July. The 240-inch collimator was completed on 1 July, and fabrication of the 144-inch vertical collimator prototype is nearing completion. Prototype ground reconstruction electronic equipment for the E-2 payload video signal will be assembled and preliminary testing completed by 1 August. The F-1 prototype subsystem checkout console was delivered to LMED in mid-July. Acceptance testing of the first deliverable F-1 console was completed and the unit delivered to LMED one week ahead of schedule.

d. Nuclear Auxiliary Power Supply

LMED report 44505, dated 15 July, contains requirements for developing and operating the special accessory equipment and facilities associated with the integration and use of radioisotopic and reactor-type nuclear auxiliary power systems applicable to the SENTRY Program. An auxiliary power supply briefing was presented to the Air Force Ballistic Missile Division Field Office Representative at Vandenberg Air Force Base by LMED.

e. Studies

(1) Haller, Raymond and Brown's sixth quarterly report presented a summary of work conducted on the multiple intercept problem; and discussed mathematical intercept models, radar order-of-battle models, and statistical intercept models. Results are given of the refined multiple intercept probability calculations for the first few priority frequency bands. A signal density model, centered on Moscow, is presented for 1965. The model, extending 1,650 nautical miles, includes, in addition to ground-based emitters, "transient" emitters (such as shipborne and various classes of airborne). The report also describes progress in establishing an advanced system analysis program.

(2) An LMED analytical study of read-in and read-out rates for various orbital altitudes, inclination angles, and receiving station configurations has been completed.

f. Facilities Construction

(1) Navigation Control Center - Construction of the first instrument will be completed by December 1959. Final plans for the second instrument have been completed and are ready for contract advertisement.

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(2) Launch Complex No. 1, Point Arguello - Beneficial occupancy dates have been rescheduled for the blockhouse to 15 August 1959 and Stand No. 1 to 1 October 1959.

(3) Tracking and Data Acquisition Station, New Boston, New Hampshire. Construction is on schedule, with completion scheduled on an incremental basis from February to September 1960.

3. PROBLEMS ENCOUNTERED

Work on the recoverable capsule portion of the SENTRY program was deferred in accordance with an ARPA directive received late in June 1959. The deletion or continued deferment of this portion of the program precludes the attainment of an intelligence collecting capability necessary to fulfill the requirements of the program as reoriented and redirected by ARPA in December 1959. This problem was discussed with ARPA at the Development Plan briefings on 24 July. The problem has been explained as being budgetary and was created by a reduction of \$25 millions from the total of \$160 millions established by ARPA during the February Development Plan review. This fund total was used by the Air Force as a budgetary basis of support planning as well as for the development and programming efforts for SENTRY work levels for Fiscal Year 1959 and planning for Fiscal Year 1960. Receipt of this reduction so late in the fiscal year will have a deleterious effect upon the stable and efficient conduct of the program.

4. WORK SCHEDULES

Reported under TECHNICAL STATUS (Section 2) as related to fabrication, assembly, testing, etcetera.

5. ARPA ACTION REQUIRED

- a. Authorization to continue the recoverable capsule portion of the program in accordance with original schedules.
- b. Re-establish ARPA funding at the \$160 millions level as contained in the January 1959 Development Plan, approved by ARPA in April 1959.

J. J. RIZLAND
Major Gen., USAF
Commander

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