

Two-Stage Vehicle for  
University of California Radiation Laboratory

PROGRESS REPORT NO. 4

For the period between

1 February 1958 - 28 February 1958

Subcontract No. 108, Appendixes B, C, and D

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Submitted by

Cooper Development Corporation

Menrovia, California

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This informal monthly progress report is the fourth of a series submitted in partial fulfillment of Subcontract No. 108. The information is regarded as preliminary and subject to further verification and analysis.

I. Delivery

ASP fins, and the heads and hardware for the second stage motors, will be shipped to PFC on 17 March. The remaining equipment and components will be shipped by air during April.

II. Electronics

Twenty-five ASP programmers have been built; twenty more will be completed by 10 March. Some minor modifications were made in the design of the sequence firing equipment following the assembly and testing of prototype boxes. Twenty-four launcher boxes and five master control boxes are in production at CDC, and are expected to be completed on schedule.

III. Wind Tunnel Tests

A report on the wind tunnel test conducted on 30 January at the NACA Ames Aeronautical Laboratory is being forwarded with this progress report. Further analysis of the data is in process and will be reported when the analysis is completed. A test has been scheduled for 10 March at Ames to determine the operational characteristics of the filter-diffuser assembly with the new filter supplied by UCRL.

#### IV. Field Tests

On 6 February, a three-stage vehicle was test fired at White Sands Proving Grounds. The test vehicle consisted of an ASP first stage, second and third stages of two Loki boosters each, and a head assembly mounted on the frame containing the Loki's. The head separated and the first-stage parachute deployed. The second-stage parachute, however, did not fully deploy. The peak altitude was lower than that obtained with only one pair of Loki's.

Following this test, a weight and drag reduction program on the ASP was begun. Use of the Jet Propulsion Laboratory's solid propellant RTV motor, previously thought to have too high performance for this application, was reconsidered.

Drop tests were conducted to determine whether the second-stage chute could catch on the flotation system and fail to deploy. The tests showed that very little force, about 8 pounds, is required to pull the parachute from the bag. It was concluded that the malfunction on 6 February was an isolated instance, and was unlikely to recur.

The range of recovery transmitter was tested by placing a head assembly containing a transmitter on the ground, then flying a receiver in a light plane. Signals were received at a maximum distance of 1-1/2 miles. It is believed that reception over a somewhat greater distance will be possible with a receiver in a P2V. Later, it was discovered that the

transmitter antenna installation was faulty. New tests, to be conducted during March, are expected to show a considerably greater reception range.

As a result of the re-evaluation of an RTV second stage, six test firings of such a vehicle were planned. The first two were scheduled for 27 and 28 February at WSPG. During this series of tests two configurations will be flown. The first vehicle will be weighted in order to limit maximum velocity. The second vehicle will be designed to achieve maximum altitude by reducing the weight of the vehicle as much as possible. The first vehicle will be programmed to filter during the ascending portion of its trajectory, and will attain a maximum altitude of 70,000 to 80,000 feet, while the second vehicle will be programmed to filter during the descending portion of its trajectory and may be expected to have a potential maximum altitude of 90,000 to 100,000 feet.

The ASP-RTV vehicle launched on 27 February attained a peak altitude of approximately 93,000 feet MSL and impacted approximately 220,500 feet down range. The nose tip separation was programmed to occur during the ascending part of the trajectory; nose tip separation was not observed, and, since the head was not recovered, it is not known whether this function occurred. The first-stage parachute deployed at 125 seconds, then radar lost the vehicle and did not re-acquire it. Consequently,

it is not known whether the second-stage chute deployed. Nothing has been recovered at this writing.

The second test, for which nose tip separation will be programmed to occur during descent, was postponed until the results of the first test have been reduced and analyzed.

V. Field Service

Field service will be supplied as required for operations at PPG.