

TAB 6300-1
DRAFT MEMO
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The Lewis Research Center has a long and distinguished record in the management of a major part of NASA's stable of expendable launch vehicles. This memorandum provides a brief summary of ^{that} experience. It also documents the LeRC capabilities developed during the 20 years in which it managed the development and operational phase of the Atlas/Agena, Thor/Agena, Atlas/Centaur, Titan/Centaur vehicles and their related airborne and ground systems. It is this demonstrated competence which I feel will insure LeRC's success in managing the integration of the Centaur stage with Shuttle.

The Centaur Project was initiated by ARPA in mid-1958. About a year later, the program was transferred to NASA-MSFC. After the failure^{of} the first Atlas/Centaur launch May 8, 1962, the project was assigned to the Lewis Research Center.

The Atlas/Agena and the Thor/Agena programs were also assigned to Lewis in 1962.

The Center continued the vehicle development. The development effort culminated with the successful launch of the First Surveyor Spacedraft on the moon in early June 1966. (AC/5 was not successful). The management of the RL-10 Engine contract with Pratt-Whitney was transferred to LeRC in 1966.

The Centaur/D operational program continued into 1972 with 24 flights.

The Centaur D-1A development was started in 1967. The major development programs during this period were:

- New Integrated Electronics
- Centaur Three Burn Capability
- System Reliability Improvements
- Atlas SLV-3D/Centaur D-1A Integration

The Centaur D-1T studies were also started in 1967. This work culminated in the integration of the Titan III E, and the Centaur D-1T vehicles. Also during this period a new payload shroud suitable for Viking was developed. There were six completely successful launches. They were, two Helios Spacecraft to the sun, two Viking Spacecraft to Mars and two Voyager Spacecraft to Jupiter and beyond.

SEASAT program launch vehicle management was also provided by LeRC. The launch vehicle for SEASAT was an Atlas-F/ Agena combination not used before. In late 1976, LeRC was asked to provide the launch vehicle management for the program by NASA Headquarters. At this time, the performance of the vehicle was highly marginal. The schedule was in jeopardy and projected costs over budget. LeRC changed the vehicle configuration to utilize a 10 ft. diameter fairing and contracted with Lockheed Missile and Space Company to provide the fairing.

Disciplined integration working groups were established to conduct the activities among the Air Force, JPL, NASA and the contractors (GDC and Lockheed Missile and Space Company). LeRC provided the management leadership to integrate three previously separate elements, the Atlas-F, the Agena, and a 10-ft. diameter fairing, into a launch vehicle for SEASAT.

SEASAT was successfully launched in June 1978, on schedule and within budget.

~~The LeRC-Launch Vehicles Division has not been a dormant~~ ^{state}
~~organization.~~ ^{LeRC-LVD} On the contrary, ~~it~~ ^{is} is a vigorous, dynamic ~~group~~ ^{group} which is continually ~~improving~~ ^{striving to} improve the capability, quality and reliability of the launch vehicle.

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This is evidenced by the activity which has resulted in an increase in the payload system weight capability. A series of modifications including early nose fairing jettison, shortened prestart, zero G parking orbit coast, resulted in a 314 pound payload increase for A/C-54 and on, additional inovative changes have further increased the payload capability by 132 additional pounds to a total of 4,414 pounds. Further changes planned for vehicles A/C-62 and on will increase the payload capacity by another 321 pounds to a total of 4,603 pounds.

These changes are making it possible to launch communication Satellites with increased capacity.

LeRC managed the highly successful integration of the NASA Centaur D-1T with the USAF Titan III E vehicle. This development effort included extensive modifications to both of these stages, new interfacing systems, the design and build of the new Centaur Standard Shroud and major changes and additions to the ground support equipment and facilities at the launch site. Payload integration represented another large element of the LeRC responsibility. LeRC integration role included the management and coordination of the activities of many government organizations, contractors, and military agencies. The successful launching of the six operational Titan/Centaur vehicles was accomplished within extremely tight schedules and budgetary constraints.

AGENA

Responsibility for managing the Agena Project was transferred to LeRC early in 1962. Prior to the time the Atlas Agena launch vehicle had been plagued with serious difficulties which jeopardized the successful completion of the Ranger Moon landing program. LeRC instituted substantial changes and improvements to the Atlas/Agena and Thor/Agena vehicle systems which permitted successful accomplishment of many Lunar ~~and~~, Planetary ^{and} scientific payload launches, such as the Lunar Orbiters, ^{Mars 2, 3} OAO, EOGO and POGO.

The Launch Vehicle Project management team at Lewis has been fortunate in being able to draw upon the expertise of many diverse in-house supporting groups. Such support has come from organizations conducting materials/metallurgy R&D, materials fabrication and processing, bearings and seal development, chemical rocket propulsion R&D. Significant help has come also from the LeRC Product Assurance Lab specializing in such activities as failure analysis and construction analysis of electronic piece parts used in launch vehicle avionics systems.

LeRC has demonstrated its competence in managing both large scale development and operation of a large number of NASA's launch vehicle systems. It has functioned as overall Vehicle Program Manager and as Launch Vehicle System Manager. In so doing, it has managed prime contractors and ~~itself~~ ^{itself} has acted as total system integrator. Contractual arrangements are in place and fully functioning with the ongoing Atlas Centaur Program. This operational capability has provided for an efficient and timely response ^{to date} in defining Centaur/Shuttle interfaces. I am confident it will provide ^{cost effective} ~~successful~~ and timely hardware build, integration, testing and ^{for successful} flight of Centaur in Shuttle.

SEASAT

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