

2011 Nuclear and Emerging Technologies for Space

**Technology for Major Renewed Space
Exploration**

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Figure 1: Early Program Actions

1. August 31, 1960: AEC-NASA Space Nuclear Propulsion Office established.
2. September, 1960: Contracts with Convair, Douglas, Lockheed, Martin on flight testing nuclear rockets (RIFT).
3. December, 1960: Contract with Parsons team on master plan for required Nuclear Rocket Engine Development Facilities.
4. February, 1961: Issued RFP for NERVA contractor. Proposals due April 3.
5. June 7, 1961: Aerojet General- Westinghouse Team selected for NERVA contract.
July 10, 1961: NERVA contract signed.
6. July, 1961: RIFT studies extended.
7. August, 1961: Contract with Vitro to design Engine MAD Building. Construction started in 1962.
8. July 11, 1962: RIFT development contract awarded to Lockheed.

Figure 2: KIWI-A REACTOR

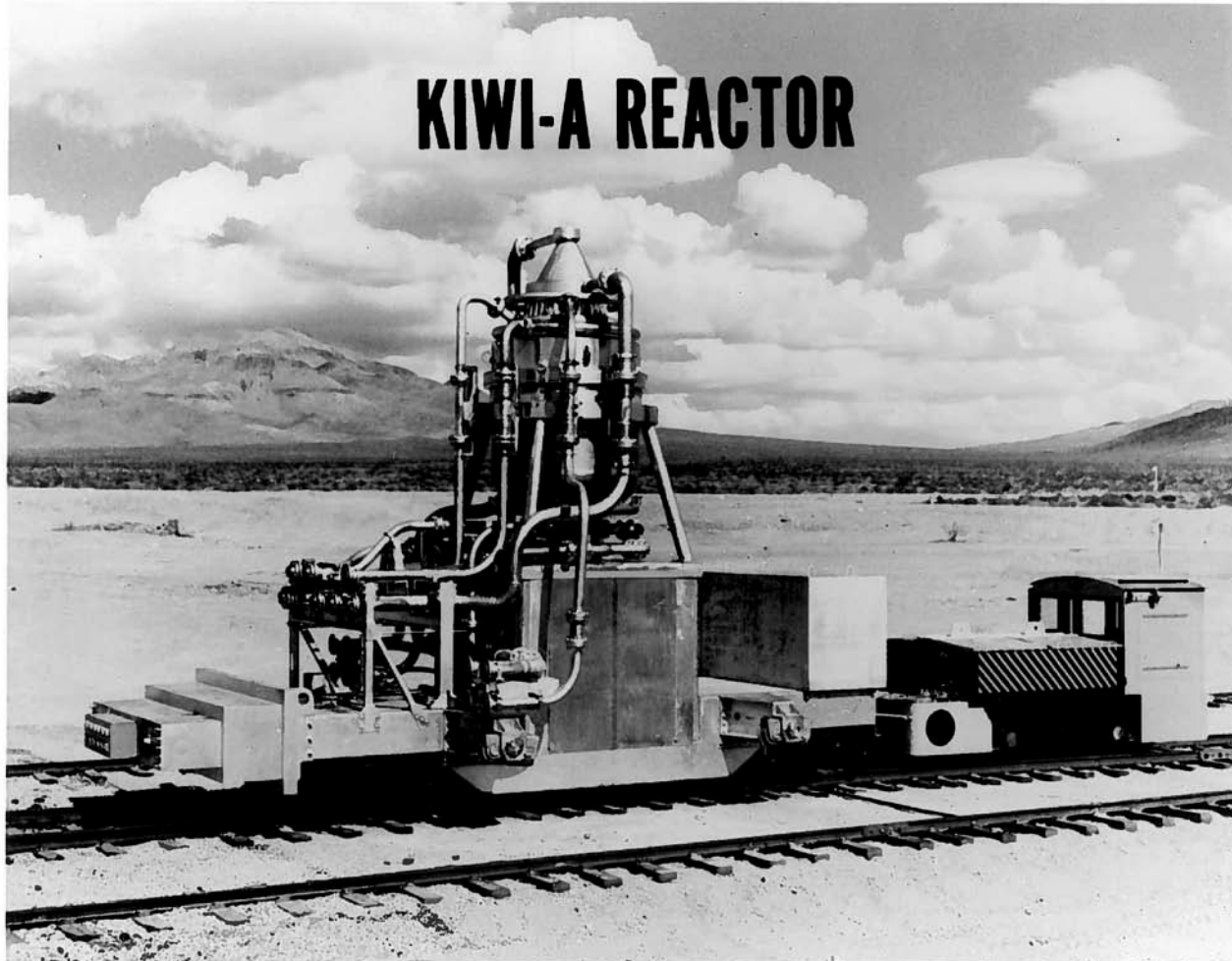


Figure 3: Los Alamos Rover Leaders



Figure 4: KIWI-B4-A REACTOR

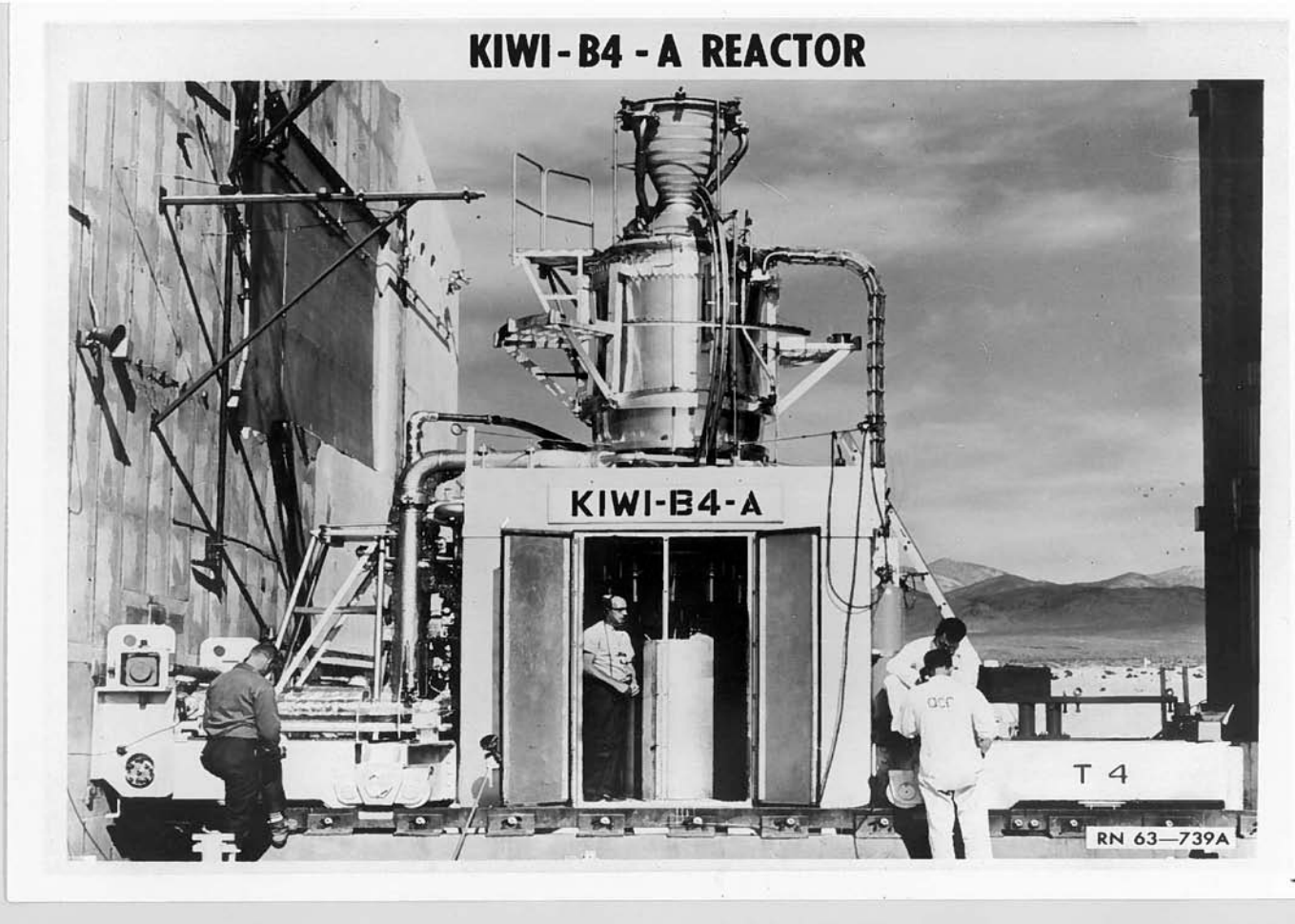


Figure 5: President Kennedy visits NRDS



Figure 6: NERVA/Rover Reactor System Test Sequence

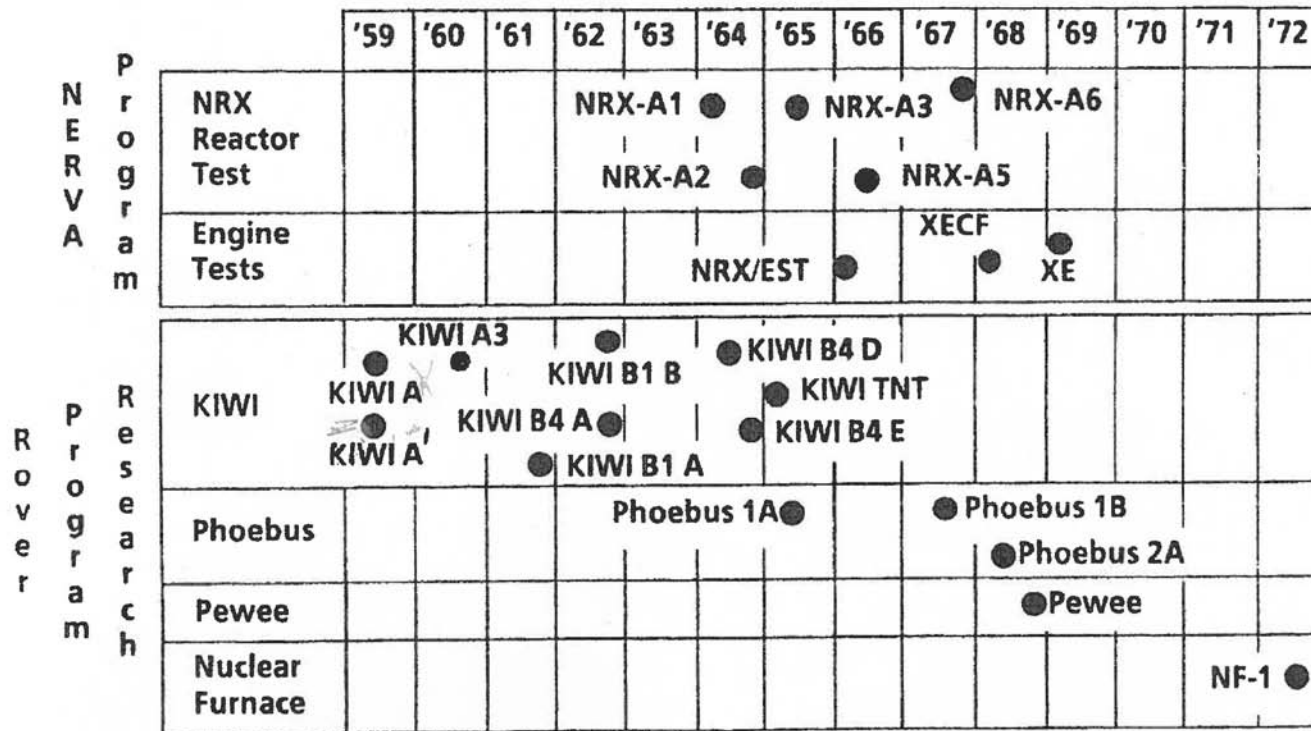
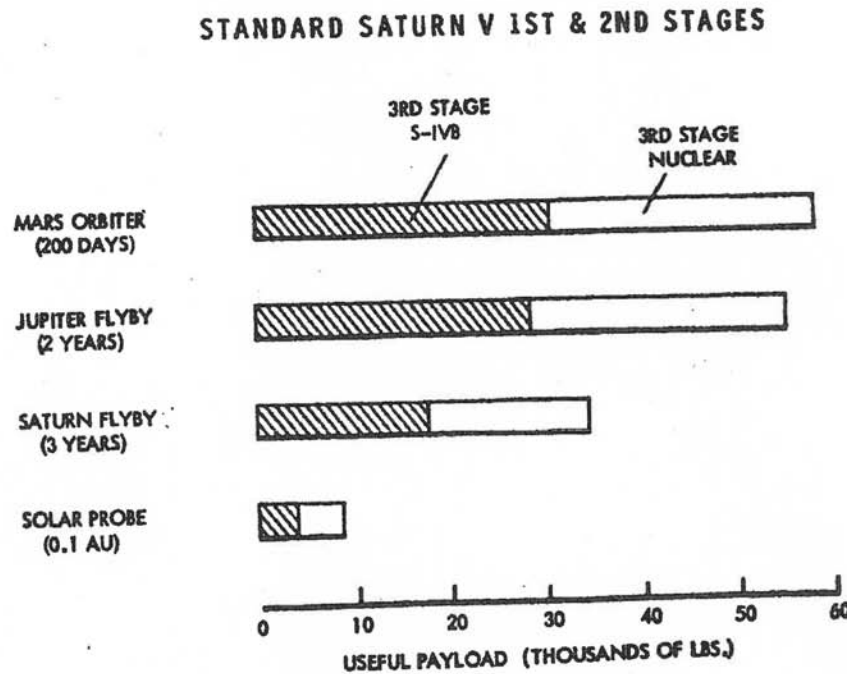


Figure 7: Full NERVA XE Engine at test facility



Figure 8: Application of Nuclear Third Stage to SATURN V UNMANNED Solar System Missions



NASA NPO 67-28
9/27/66

FIGURE 8

Figure 9: Earth-Orbit Weights for Manned Mars Missions

