

2nd stage (S-II)

Moving down to the next line item, our FY 1968 Saturn V requirements, include \$245.9 million for the 2nd stage (S-II).

This stage—powered by a cluster of five liquid oxygen-liquid hydrogen J-2 engines—produces a total thrust of approximately 1 million pounds at altitude. It is the Nation's largest liquid-hydrogen powered stage. The aluminum alloy skin on the initial stages is only .153 inches thick and will be reduced to .128 inches in subsequent stages. Starting off on the launch pad, its gross weight, including engines, is about one million pounds—90 percent of which consists of propellants. During flight, the stage burns for 6½ minutes and must be capable of withstanding temperatures ranging from about +400 to -400 degrees Fahrenheit. The component qualification requirements for the S-II are particularly stringent because the stage stretches to the utmost existing hydrogen propulsion technology and related manufacturing techniques.

The prime contractor, North American Aviation Space and Information Systems Division carries out manufacturing, assembly, and factory checkout at government-owned facilities at Seal Beach, California. North American conducts developmental ground testing at its Santa Susana Static Test Laboratory. Flight stages are shipped through the Panama Canal to the Mississippi Test Facility to undergo acceptance firing before being delivered to the Kennedy Space Center.

Fiscal year 1967 activity to date has been marked by intensive ground qualification testing, acceptance testing of the first flight stage at the Mississippi Test Facility, delivery of this stage to Kennedy in preparation for the first Saturn V launch, and continued production of flight stages for subsequent missions.

Fiscal year 1968 activity will continue to emphasize production of hardware in support of the Apollo Saturn V flight requirements. The third, fourth, fifth, and sixth flight stages are scheduled for completion of acceptance test, poststatic checkout, and shipment to the Kennedy Space Center. The tempo of hardware production for the following flights must also be sustained. The stages for the seventh through twelfth Saturn V vehicles will be in an intensive period of manufacturing, assembly, in-plant checkout, or acceptance firing to support the planned launch rate. In addition, procurement activity will be underway on the three remaining flight stages.

3rd stage (S-IVB)

The next line item on the chart shows the funding estimate for the 3rd stage of the Saturn V—the S-IVB. We are requesting \$151.2 million to cover these requirements in fiscal year 1968. Basic development costs for this stage, which is also used as the upper stage of the Saturn I, are funded in this line item. The S-IVB was developed and is being produced and tested by the Douglas Aircraft Company's Missile and Space Systems Division. The stages are manufactured at the Douglas Space Center, Huntington Beach, California; acceptance testing is conducted at the Sacramento Test Operations Site.

Fiscal year 1968 activity will focus on continued production and delivery of flight stages to support the Apollo Saturn V schedule. The fourth flight stage will be shipped from the West Coast to the Kennedy Space Center for prelaunch checkout. The next two flight stages are scheduled for completion of fabrication and in-plant checkout, as well as acceptance testing and post-static checkout, in preparation for shipment to the Kennedy Space Center. Fabrication, assembly, in-plant checkout, and acceptance testing of the seventh and eighth flight stages are planned, and the ninth and tenth will be through fabrication and assembly in preparation for acceptance firing at Sacramento. The remaining five flight stages will be in various phases of manufacture and assembly.

Instrument Unit

Our fiscal year 1968 funding requirements for the Saturn V Instrument Unit total \$75.1 million. These funds will maintain the necessary delivery rate of flight units during FY 1968. The fourth, fifth, and sixth Saturn V Instrument Units will be checked out and delivered to Kennedy, and assembly, inspection, and checkout of the seventh unit will be completed. Work on the remaining Instrument Units will also be underway at IBM, Huntsville, during the fiscal year.