MAN IN SPACE

READ THIS BEFORE YOU BEGIN

Look over this instruction sheet carefully before you begin building. Follow the assembly instructions and "test-fit" the parts without cementing. This will familiarize you with the location of the parts.

AMT kits are molded from the finest High-Impact Styrene plastic. Use only paint and cement made for Styrene. Trim excess plastic from parts before joining.

Use just enough cement to join parts, and be careful not to smear cement on exposed surfaces.

Built according to the instructions on this sheet, you should have no trouble assembling your kit. Just FOLLOW THE NUMBERS, as parts are numbered in order of assembly.

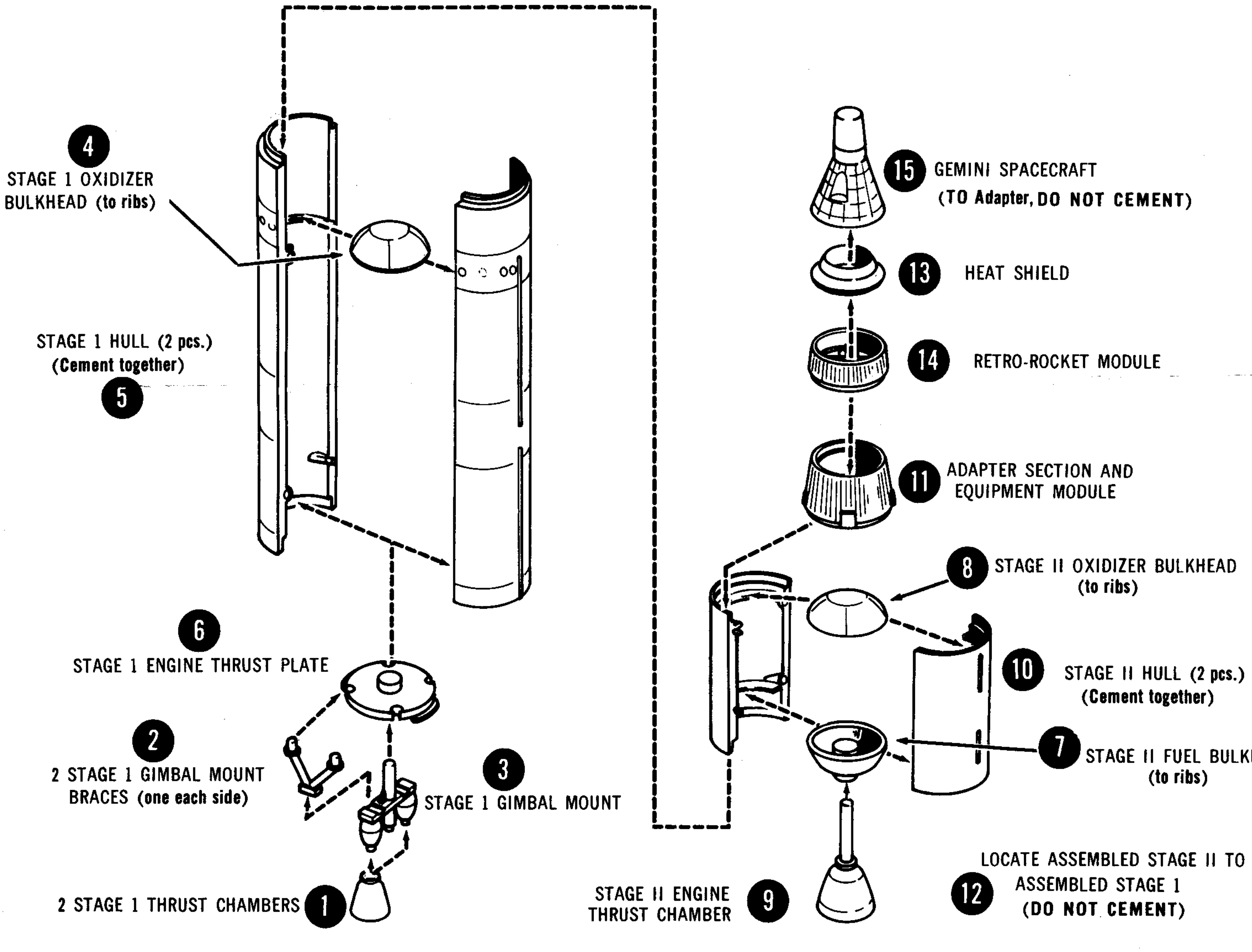
GEMINI-TITAN

The powerful Titan II was selected as the launch vehicle to boost the Gemini two-man spacecraft into orbit. It was first used successfully in the unmanned flight of Gemini on April 8, 1964.

It was chosen for the Gemini mission because of its payload capability and importantly because its propellants are non explosive—a feature permitting use of an ejection-seat escape system instead of the rocket escape tower of Mercury. All engines operate on a mixture in which the fuel is a blend of unsymmetrical dimethylhydrazine (referred to as UDMH) and hydrazine, and the oxidizer is nitrogen tetroxide. The mixture is hypergolic, meaning that when the fuel and oxidizer are brought together the combination ignites spontaneously, without need for an ignition system.

The propellants can also be stored for some time in Titan's fuel tanks. As a result, the launch vehicle can be readied for use on comparatively short notice and need not be drained of fuel if a launch is postponed.

Titan II has a 430,000-pound-thrust first stage and a 100,000-pound-thrust second stage. It is 90 feet high (less payload) and 10 feet in diameter at the base.



APOLLO—SATURN I-B

The original Saturn launch vehicle project was conceived in 1948 to provide early capability for large payloads. The decision to arrange the engines and tanks in clusters allowed the use of equipment already developed for earlier rockets as well as the machine tools that produced them. Thus, the first stage of the two-stage Saturn I was a cluster of eight H-1 engines, each capable of generating 188,000 pounds of thrust. The second stage of the early version had six liquid-oxygen, liquid-hydrogen RL-10 engines, each generating 15,000 pounds of thrust.

Saturn I is a part of a family of heavyweight lifting launch vehicles, used first in the Appolo program. The first ten vehicles, called Saturn I, were launched for research and development purposes, and also placed into earth orbit engineering test models of the command and service modules of the Apollo spacecraft. The last three Saturn I's placed meteoroid technology satellites into earth orbit to examine the size and distribution of particles in space near the earth.

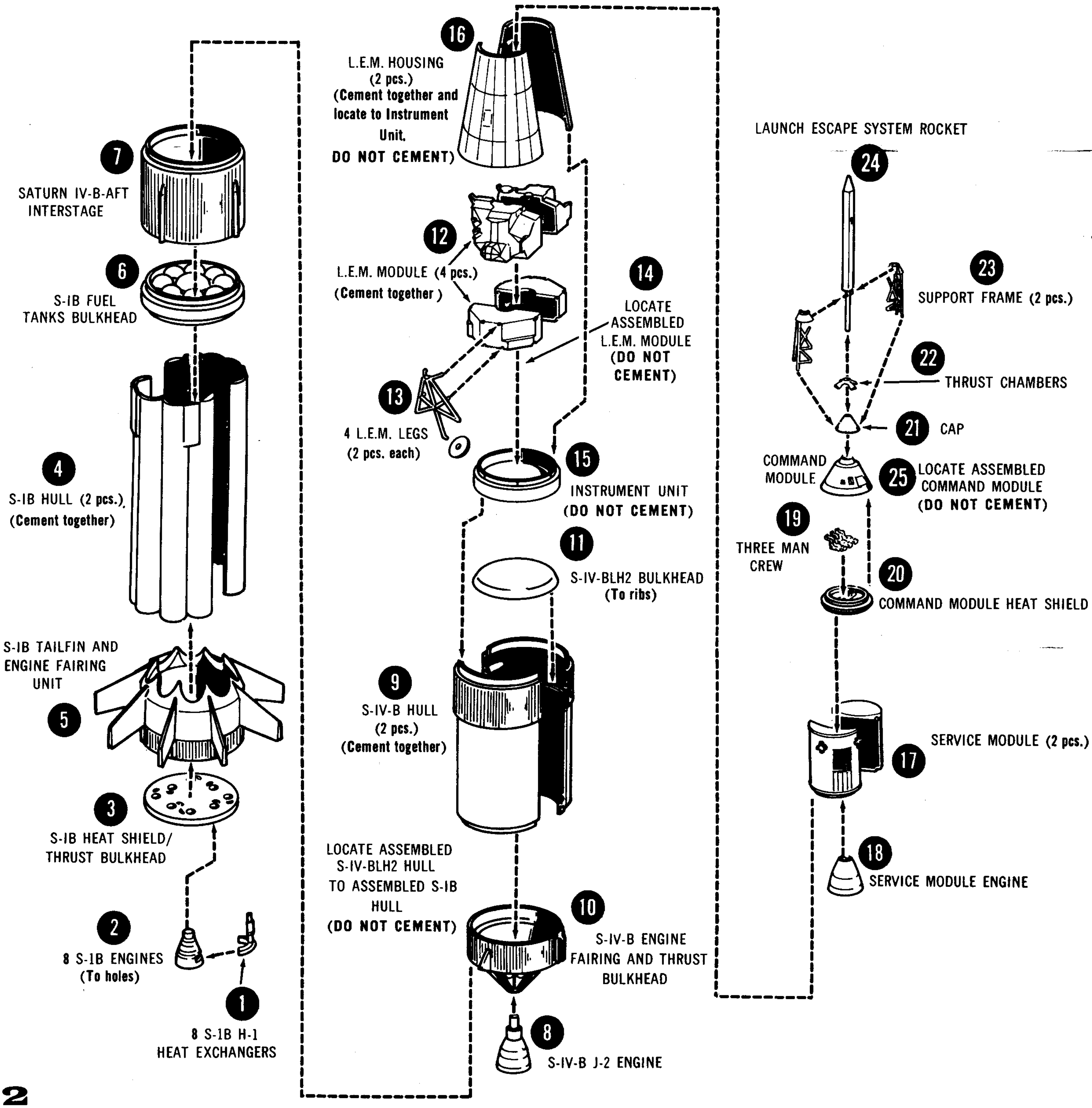
The first Saturn I was launched successively in October, 1961, with only the first stage live. When a live second stage was used for the first time, in January, 1964, the fifth Saturn I placed 37,900 pounds into earth orbit.

Beginning with the eleventh flight, a new, more powerful second stage was used on the Saturn I. This new second stage has a single 200,000-pound-thrust liquid hydrogen-liquid oxygen J-2 engine, replacing the six-engine stage used in the early vehicles. The first stage of the Uprated Saturn I has the same eight liquid oxygen-kerosene engines used previously, but with total thrust uprated to 1.6 million pounds.

Saturn I's first-stage thrust of 1.6 million pounds may be compared with the 360,000 pounds of thrust of the Atlas vehicles that launched the Mercury astronauts into earth orbital flights.

The Uprated Saturn I mated to the Apollo spacecraft and its launch escape system stands 225 feet high. It can orbit 40,000 pounds and will be used to launch manned and unmanned modules of the Apollo spacecraft into earth orbit.

On its first flight, in January, 1966, the Uprated Saturn I was used to test the Apollo command/service modules in a suborbital mission. After three test flights, the improved launch vehicle was declared ready for manned Apollo missions.

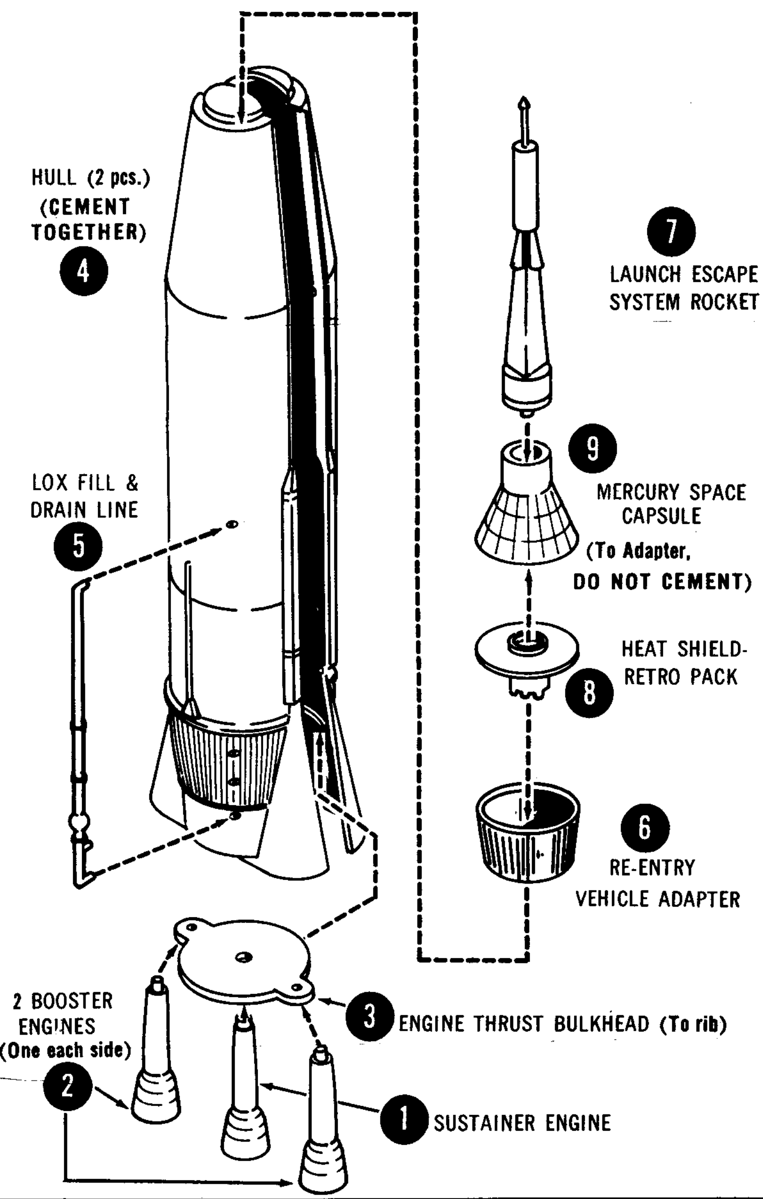


MERCURY-ATLAS

For the orbital flights in the Mercury program, a more powerful launch vehicle was needed. The Air Force Atlas ICMB (D Model) was chosen, and was subsequently modified for use in the Mercury Project.

The final Mercury-Atlas launcher configuration resembled the standard Atlas ICBM right up to the part where the warhead would have been mounted. At that point an adapter was added that held the Mercury spacecraft and escape tower. The entire assembly stood over 95 feet high, ready to launch.

Like its Redstone predecessor, the Atlas used a liquid oxygen propellant. Unlike the Redstone, however, the Atlas was used for a total of four manned-Mercury launches. Flight durations ranged from a low of 4 hours, 55 minutes (John H. Glenn, Jr.), to a high of 34 hours, 19 minutes (L. Gordon Cooper, Jr.).



MERCURY-REDSTONE

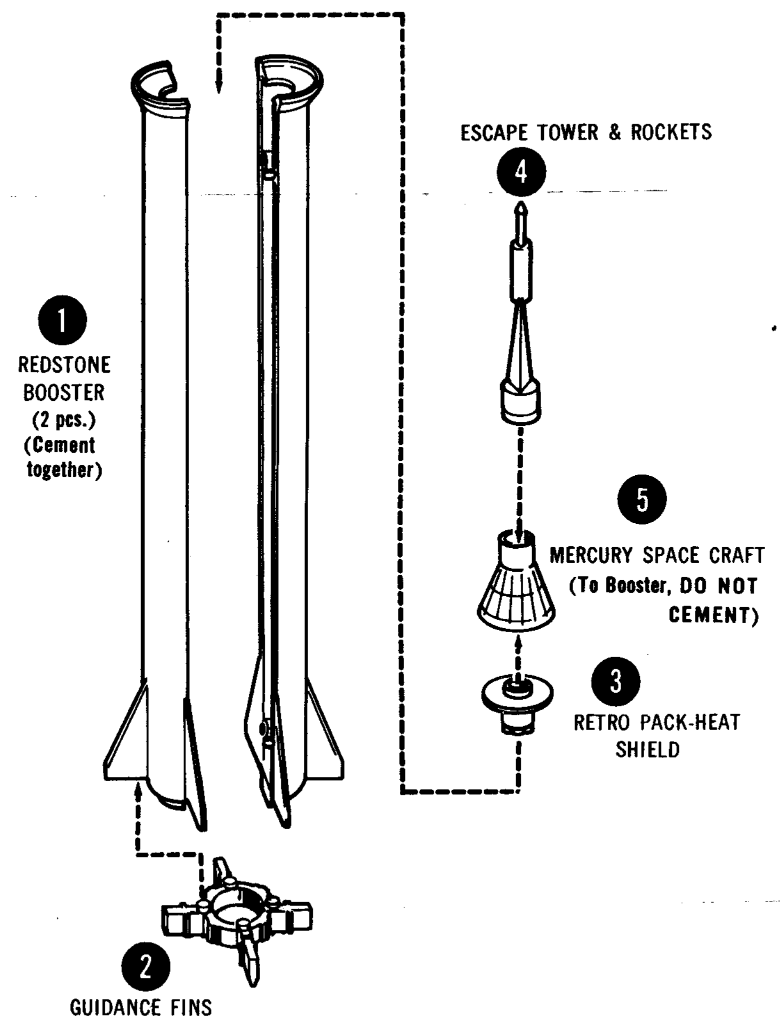
NASA's manned space flight program started with Project Mercury, aimed at placing an astronaut in orbital flight around the earth, and recovering him safely.

The first two manned-Mercury flights were sub-orbital, using the Redstone ballistic missile as the launch vehicle. Developed primarily for military use, the Redstone had to be specially modified for use in Project Mercury. Changes included additional fuel storage (to allow longer engine burn, thus increasing top speed), increased operational reliability, and a special adapter to hold the capsule on the top of the missile.

In its final form, the Redstone launch vehicle stood 59 feet high from the base of its fins to the special frame that held the spacecraft. The Mercury capsule and escape tower added another 24 feet, bringing entire assembly height to 84 feet.

The reentry capsule was extremely small, measuring six feet in diameter, seven feet high, and weighing about 3,500 pounds.

Both the Mercury-Redstone flights lasted only 15½ minutes, from blastoff to splashdown; reaching altitudes of almost 120 miles; and reached maximum velocities of slightly over 5,100 mph.



APOLLO—SATURN V
America's Moon Rocket

The first stage of the Saturn V launch vehicle starts the Apollo spacecraft, with three astronauts aboard, on the journey to the moon. The second and third stages place the spacecraft in earth orbit and on the trajectory to the moon.

The Apollo Program is directed by NASA's office of Manned Space Flight. The Marshall Center is providing the Saturn launch vehicles. The Manned Spacecraft Center at Houston is providing the three separate modules of the spacecraft, selecting and training the astronauts, and will operate the Mission Control Center. The Kennedy Space Center in Florida will launch the astronauts on their epic flight.

When fully operational, the Saturn V will be able to launch into orbit more than a quarter of a million pounds. The total orbiting tonnage in the lunar mission will be about 280,000 pounds. This includes the weight of the third stage and instrument unit section. The fully fueled and loaded Apollo Spacecraft, in its lunar mission configuration, will weigh about 95,000 pounds.

The Saturn V, with its Apollo payload, is 365 feet tall. Physical and performance characteristics of the stages, in a mission such as the lunar trip, are as follows:

First Stage

The first stage burns over 15 tons of propellants per second during its two and one-half minutes of operation to take the vehicle to a height of about 36 miles and to a speed of about 6,000 miles-per-hour. The stage is 138 feet long and 33 feet in diameter.

Second Stage

The second stage burns over one ton of propellants per second during about six and one-half minutes of operation to take the vehicle to an altitude of about 108 miles and a speed of near orbital velocity, which in this case is about 17,400 miles-per-hour. It is 33 feet in diameter and 81½ feet long.

Third Stage

The third stage has two important operations during the Project Apollo lunar

(Continued on page 4).

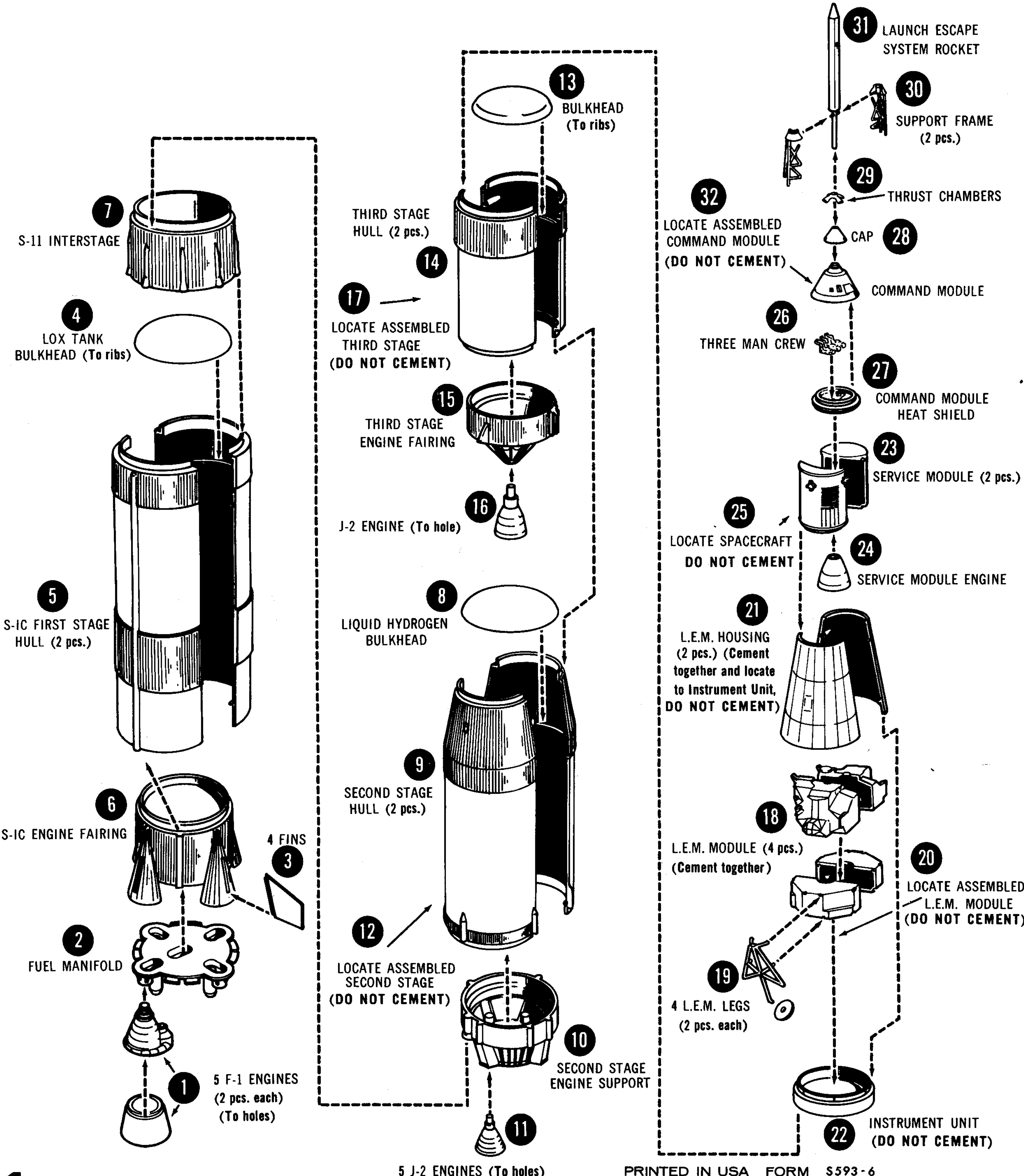
mission. After the second stage drops away, the third ignites and burns for about two minutes to place itself and the spacecraft into the desired earth orbit. At the proper time during this earth parking orbit, the third stage is re-ignited to speed the Apollo spacecraft to escape velocity of 24,900 miles per hour. In this second sequence, the stage burns for about six minutes. The stage is 58 feet long and 21.7 feet in diameter.

Instrument Unit

The instrument unit, located atop the third stage, between the stage and the payload, contains guidance and control equipment for the launch vehicle. It is 3 feet long and 21.7 feet in diameter.

Apollo Spacecraft

Command Module: 13 feet in diameter; weight, 11,000 pounds.
Service Module: 13 feet in diameter, 22 feet high; weight, 52,000 pounds; 22,000-pound thrust engine.
Lunar Module: Two stages; total weight, 32,000 pounds. Descent engine's thrust can be varied from 1,050 to 10,500 pounds.



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