aerospace

FLEEP

A rocket platform for the moon

A rocket-powered flying platform is being developed for the space agency to provide control system design experience and astronaut flight practice in preparation for development of a flier for future exploration of the moon.

Called FLEEP, the one-man Flying Lunar Excursion Experimental Platform will be piloted standing up, as is the Apollo lunar module. The vehicle will stand and land on four struts equipped with shock-absorbing devices and broad footpads similar to those on the LM.

A key part of the program will be to evaluate ways of controlling the lunar flier, such as by body-shifting motions or engine gimbaling. FLEEP is being built for NASA by North American Rockwell Corp.

SOUNDING ROCKETS

Probe in a pouch

An unusual high-altitude sounding rocket, called Kangaroo because it carries its second stage and payload pouched within the main booster stage, is being developed for the U.S. Navy.

The main booster, 10 feet long and 6.5 inches in diameter, carries its payload in a dartlike probe four feet long and one and five-eighths inches thick, nestled within an insulated internal chamber. The main stage is driven by a solid-stage motor and fired from a simple rail launcher.

At the forward end of the main booster, partially recessed into the solid propellant and covered by a nose fairing, is the dart, its rearward end blocked by a plug also made of solid propellant. At a predetermined altitude, the plug consumes itself and pressure from the rocket of the main stage is applied to the base of the dart, expelling it from the chamber and forcing open the nose fairing.

At a preset time, a fuse in the dart fires a charge behind a piston that in turn ejects the payload into the atmosphere.

The Kangaroo booster is being developed for the Navy's Pacific Missile Range, Pt. Mugu, Calif., by United Technology Center in Sunnyvale, Calif.

CONTAMINATION

Long-term disposal system

A waste disposal technique for space vehicles and stations, applicable to missions of a year or longer, is being developed for the National Aeronautics and Space Administration's Langley Research Center in Hampton, Va.

Called a wet oxidation process, the system burns waste under pressure of 2,300 pounds per square inch in a special tank at a temperature of 550 degrees F., in the presence of water, oxygen and steam. Chemical reactions produce largely nitrogen, carbon dioxide and water, says project engineer R. Bruce Jagow of Lockheed Missiles and Space Co., in Sunnydale, Calif. The nitrogen and water vapor can be used directly in the spacecraft, while the oxygen can be recovered from the carbon dioxide by other life support equipment.

In the wet oxidation process, chemicals such as phosphorous and sulphur, come from the reaction tank as salt compounds in the water, and can be easily removed elsewhere in the life support system. By contrast, in some systems the phosphorus and sulfur emerge as gaseous oxides, which can be a source of contamination.

TESTING

Dummy for ejection systems

An elastic dummy with soft bone marrow, fiber glass bones and rubber flesh has been developed by the Air Force to test ejection seats and other escape systems.

Named Dynamic Dan, it is being built at Payne Division of Wyle Laboratories, Rockville, Md., for the Aerospace Medical Research Laboratories at Wright-Patterson Air Force Base in Ohio.

Dan's bones, joints and flesh are designed to become deformed the same way the human body does, and particularly to duplicate the motions that can cause dangerous tumbling of the seat and man during ejection. The dummy's construction is aerodynamically similar to that of a human, making it useful for testing systems such as a new rocket-powered ejection device.

MATERIALS

Testing for space use

A new materials research workshop is being built by Lockheed-Georgia Co. in Marietta, Ga., particularly to evaluate the producibility of aerospace materials of the future.

The facility will concentrate on three principal areas, expanded from the company's existing materials laboratory:

- Chemistry, including advanced graphite composites, high-temperature and low-cost resins, and new adhesives and sealants.
- Metallurgy, investigating metal failure and evaluating treatments that harden, strengthen and increase service life of materials.
- Physical testing, including corrosion tests and development of nondestructive inspection techniques, particularly for fiber-reinforced composites.

DETECTORS

Sensor for moving targets

A passive microwave radiometer that detects objects by the temperature differential between them and their background has been applied to spotting moving targets in all weather conditions by Ryan Aeronautical Co. in San Diego, Calif.

Ryan researchers claim this to be the first time that moving targets have been detected with this type of sensor.

A possible military application of such a system could be the detection of oncoming aircraft through a cloud cover. The system is passive, unlike radar, which sends out a signal that bounces off the target. So the aircraft's pilot would not know it was being detected and thus would be unlikely to try jamming measures.