

# aerospace notes

## HIGH-TEMPERATURE ENGINEERING

### X-15 tests insulation for Saturn 5

The X-15 rocketplane, doomed to retirement by NASA's shrinking budget, has been used to evaluate the heat-resistance of a spray-on-foam insulation that could save headaches on the giant Saturn 5 booster.

The present Saturn insulation, used to keep the rocket's cryogenic propellants cold, is heavy and awkward to apply, since it spreads on like icing. The easily-applied spray material is expected to save 2,200 pounds on the booster's second stage alone.

The X-15, for which this was the second flight since the decision to phase it out of operation (SN: 2/24 p. 188), was the only vehicle available capable of simulating the heat loads of the Saturn 5. Temperatures on the booster, though much lower than those encountered by the Apollo spacecraft during reentry, reach as high as 900 degrees F. on protrusions from the smooth skin.

## MILITARY AVIATION

### USAF to shoot own plane in armor tests

The Air Force Systems Command will fire on one of its own planes late this spring in tests of experimental armor designed to protect combat crews.

Dummy crewmen formed of Celotex wallboard blocks will be placed in the pilot's and radar operator's seats in an obsolete F-89J twin-engine turbojet, along with similar blocks at other points in the cockpit, to indicate the force of projectiles penetrating the aircraft. Full crew equipment, including parachute, survival kit and life raft, will be included to give accurate damage information.

The grounded airplane will be fired upon by fifty-caliber bullets and other sizes of projectiles from distances simulating those encountered in an operational mission. The tests will be conducted at Eglin AFB, Fla.

## SPACECRAFT ENGINEERING

### Model lander drops, works

A model of a wheel-shaped planetary landing craft, heat-sterilized and dropped from an altitude of 250 feet, has operated successfully after hitting a simulated Martian surface at 80 miles per hour.

Using a dry lake bed in California's Mojave Desert to simulate Mars, researchers at the Jet Propulsion Laboratory dropped the 63.5-pound model from a helicopter. In Mars' thin atmosphere, an actual lander would be slowed to the same speed by a 20-foot parachute.

Following impact, the model automatically turned on and operated its radio transmitter for 20 minutes and deployed a tiny wind-speed gauge at the end of a four-foot telescoping boom.

Protected during landing by a balsa wood casing, the model vehicle was powered by a 12-cell silver-zinc battery, the first known to survive both heat sterilization and high-velocity impact. The heat treatment consisted of a 24-hour exposure at 257 degrees F.

430/science news/vol. 93/4 may 1968

## SOVIET SPACECRAFT

### Second automatic Cosmos docking

Russian Cosmos satellites 212 and 213 carried out an automatic docking maneuver in space on April 15, the second time the feat has ever been accomplished. The first time was last October 30, by Cosmos 186 and 188.

The two satellites, launched into orbits very similar to those used by the Russians in some manned flights, remained coupled for three and a half hours while television pictures of the operation were transmitted to the ground.

The U.S. has made no automatic dockings, although there have been nine couplings with astronauts at the controls, a feat which the Soviet Union has not yet matched.

## EXOBIOLGY

### Antarctic soil helps life-on-Mars hunters

A half-ton of Antarctic soil has been received at Jet Propulsion Laboratory in California to help researchers looking for clues to possible life on Mars. Along with many samples previously collected, the material will be tested and cultured to see what types of micro-organisms live in extreme cold.

Experiments have already shown that bacteria, yeasts, molds and algae begin to grow within two weeks when Antarctic soil kept frozen for more than a year is brought up to room temperature. JPL's soil samples were taken from high, dry valleys in Victoria Land, near the U.S. base at McMurdo. Seven types of micro-organisms—three bacterial and four algal—have been found in such valleys.

The NASA-sponsored JPL research, presently being conducted in a lab erected in a converted refrigeration unit, will probably continue right up to the time the U.S. lands a remote-control soil-sampler on Mars to do on-the-scene digging, the space agency says.

The Antarctic samples were dug, using a jackhammer, from beneath as much as two feet of hard permafrost. "If there is permafrost on Mars," says project head Dr. Roy E. Cameron, "the chances of life will be increased."

## COMBAT OPERATIONS

### Making a brighter war

Another in the military's series of ultra-bright light sources to remove the cover of darkness from night combat offensives is being developed by the U.S. Air Force. Called Project Brilliant, it uses a combination of jet fuel and oxygen, burned in a modified Atlas vernier rocket engine.

An aircraft flying at 10,000 feet could use the system to illuminate a four-square-mile area 50 times more brightly than moonlight. At 1,000 feet, looking 2,000 feet downrange, it will light up a half square mile 500 times more brightly than the moon.

The complete unit will fit in an F-4 aircraft fuel pod and weighs less than 2,000 pounds. The light reportedly could be doubled with only a 50 percent increase in weight.