APOLLO 14

More power and oxygen

One of the chief concerns during the abort of Apollo 13 was the conservation of consumables (water, oxygen and power) needed to return the astronauts safely to earth. Although most systems in the Apollo spacecraft have backup systems in case of failure, there was no secondary source for the command module's power system. When it failed, the lunar module power had to be used.

As a result of the abort, changes in the Apollo 14 spacecraft, to be launched Jan. 31, 1971, are now under way (SN: 6/20, p. 598). Wiring changes have already been made. Now a 400-ampere-hour battery is being added to serve as an alternate power source, and 20 additional pounds of potable water will be stored in the command module.

Apollo 13 had only two oxygen tanks, both of which were needed and both of which failed. Improved, fireproof oxygen tanks are now being tested for Apollo 14, and a third emergency tank is being added.

AIR TRAFFIC CONTROL

Atlantic satellites

There is at present no method for air traffic control over the oceans; radar capacity extends only 200 miles. This means that aircraft traveling from the United States to Europe over the Atlantic, or to Asia over the Pacific, are regulated by assigned and different flying altitudes. Until now, this has been sufficient to avoid collisions in mid-ocean.

However, with oceanic air traffic increasing, the Federal Aviation Administration and its European counterpart, with cooperation from the National Aeronautics and Space Administration and the European Space Council, are studying the use of air traffic control satellites over the Atlantic. Both space agencies are already committed to the development (SN: 8/29, p. 165); the implementation is now awaiting FAA action. Such a development would give impetus to use of satellites in synchronous orbit for all air traffic control.

BIOMEDICINE

Effects of shuttle reentry

The astronauts who fly the space shuttle (SN: 8/29, p. 178) will be subjected to prolonged g forces not experienced by fighter pilots or Apollo astronauts. The space shuttle will enter the earth's atmosphere in a nose-up 60-degree angle at speeds of about Mach 20, level out to avoid a spin, then pull up again to 60 degrees in order to slow the craft down to Mach 6. During this time the g levels on the astronauts will range from 2.5 to 4.5 for up to 6 minutes and 10 seconds, as opposed to only seconds of 5 or 6 g's in Apollo lift-off and reentry.

Another difference is the direction of the g forces. Whereas the Apollo acceleration force was through the chest, forcing the eyeballs in, the g force of the shuttle will be downward through the head, forcing the eyeballs down and out.

To investigate the physiological effects of shuttle reentry, nine volunteers from Brooks Air Force Base, San Antonio, Tex., will go through a series of tests beginning this week. The men will be confined to bedrest (to simulate the effects of weightlessness in space) and then ride the centrifuge at the National Aeronautics and Space Administration's Manned Spacecraft Center in Houston.

APOLLO 15

Of time and contaminants

The planning of any one Apollo lunar flight involves, among other details, the organizing of the astronauts' activities schedule. Their activities have to be integrated with spacecraft location and maneuvers and a decision made when to do a particular job.

One pesky problem that has come up is when to jettison a door to expose orbital experiments in the more advanced Apollo hardware series now beginning with Apollo 15 (see page 215).

One service module compartment will house lunar camera systems, a laser and the geochemical experiments. But to expose these to the lunar surface, a door has to be jettisoned off the service module.

Among factors now being considered by space agency planners for the best time to do this are possible contamination of experimental equipment, and the number of hours needed to get sufficient data from the experiments.

The door could be jettisoned right after going into lunar orbit, or after separation of the lunar and command modules. This would give the experiments more than 72 hours of exposure but would also expose them to contamination due to separation or command module maneuvers. Less contamination would occur if the door were jettisoned after lunar landing; orbital science would then have the same amount of time available as surface exploration, but contamination possibilities still exist when the two craft rejoin. Jettisoning the door after lunar exploration when the two have rejoined would be ideal, but it would mean that the men would have to stay in lunar orbit for two to three additional days.

SCIENTIFIC SATELLITES

Italian launch team

The United States has frequently launched satellites for other nations, but the roles are soon to be reversed. Italian space engineers will launch three satellites for the United States from the San Marco platform anchored off the coast of Kenya on the equator—one in November or December, one in the spring and a third in the fall of 1971. Launching from this platform rather than from Cape Kennedy enables the National Aeronautics and Space Administration to use smaller, less expensive launch vehicles.

The Italians, who have been trained by NASA, will use three four-staged NASA Scout rockets to orbit two small astronomy satellites and one small scientific satellite. These satellites will map celestial X-ray sources, look for celestial gamma-ray sources, and investigate electric currents in the magnetosphere, auroras, magnetic storms and the acceleration of charged particles in the magnetosphere.