aerospace notes

NAVIGATION

Satellites mark ship's data points

The Navy's Transit satellite navigation system will be used to note the exact locations of points where data are collected during the year-long voyage of the research ship Argo.

The Argo, operated by the Scripps Institution of Oceanography, sailed March 7 from San Diego, Calif., on a 61,000-mile journey during which scientists will study continental drift, proposed deep-sea drilling sites, the 2,600-mile Ninetyeast mountain range on the floor of the Indian Ocean and other areas of interest. The satellite system's receiver will be installed in Malaysia about May 1, and will enable navigational fixes at any time thereafter to within one-tenth of a mile.

"Rapid, frequent, precise fixing will permit on-the-spot revision and modification of investigations to take advantage, immediately, of knowledge just gained," says Dr. Robert L. Fisher, head of the expedition. "Formerly, gaps or omissions—which can be easily remedied with the ship in the area—might not become apparent until months after a cruise was completed."

OPTICS

Accurate aiming for space lasers

A major problem with lasers for deep-space communications is the pinpoint aiming accuracy required. A tiny angular error, magnified over interplanetary distances, can mean missing by thousands of miles.

A breadboard version of a system specifically designed to overcome aiming difficulties has been developed at Perkin-Elmer Corp., Norwalk, Conn. Using a 16-inch-aperature reflecting telescope as its transmitting and receiving antenna, the system can aim its beam with an accuracy of better than 0.1 second of arc. Since the beam itself is only 0.4 seconds in diameter, it would be barely 200 miles wide after 100 million miles.

The system automatically corrects for motions such as those of a spacecraft on which it might be mounted, and for a relativistic effect which necessitates pointing the transmitted beam ahead of the line of sight. At 100 million miles, which could take in Mars, Venus or Mercury from earth, the system could center its beam to within 20 miles of the receiving station.

Since all key optical elements of the system are reflective, says P-E's Dr. Morley S. Lipsett, they are independent of wavelength or choice of laser. New types of lasers developed in the future can readily be substituted in the system. The project is being sponsored by the National Aeronautics and Space Administration.

SATELLITES

The death of Echo 1

Echo 1, after almost eight years in orbit around the earth, is coming down. The 100-foot balloon, made of aluminum-coated plastic film, was probably seen by more people than any other man-made object in space.

Now battered and wrinkled from continual collisions with space dust and micrometeoroids, Echo was for most of its life brighter and more brilliant than almost any star. Telephone conversations, photographs and music were all bounced from the satellite's passive surface.

Launched Aug. 12, 1960, the balloon is expected to burn up in the atmosphere sometime in April, though its path is now so erratic that predictions are very difficult. At least 100 Project Moonwatch stations and 12 Baker-Nunn space tracking cameras are watching for its descent.

SPACE MANEUVERING

Voice control for astronauts

A voice-operated control unit that would enable an astronaut to maneuver himself in space while keeping his hands free for work is being developed for the Air Force by RCA in Camden, N.J.

If the astronaut should become injured while floating in space, a companion in the spacecraft, or even a controller on earth, could "talk him in" using voice commands to operate the stranded astronaut's maneuvering pack. The unit, which has a 12-word vocabulary, is also being used by the post office to sort packages in response to spoken zip code numbers.

TESTING

Gust simulation for wind tunnels

A new method of simulating wind gusts and atmospheric turbulence has been developed by a researcher at Texas A&M University, College Station.

Dr. Richard E. Thomas, professor of aerospace engineering, injects air from the side of a wind tunnel into its main stream, closely simulating the turbulence and gusts which act on high-speed aircraft and missiles.

In Dr. Thomas' method, air enters the wind tunnel downstream from the test model; that is, after the airflow has passed. The side jets are directed back at the model, and though they do not reach the model, they create turbulence in the main stream. The side jets can be opened and closed in cyclic patterns to create regular pulsations if desired.

The technique was first tried on the university's two-by-three-foot low-speed wind tunnel, using four side jets. This version is now being refined to include 16 jets, and a 16-jet system will be installed in the seven-by-ten-foot main wind tunnel.

APOLLO

Two-gas system at launch

Apollo spacecraft will henceforth have a two-gas, nitrogen-oxygen atmosphere at launch, instead of pure oxygen, the space agency has decided.

Even though most flammable materials have been designed out of the spacecraft and the rest insulated by firebreaks, tests by NASA have shown that the pure oxygen atmosphere formerly used during ground tests will still allow fire to spread and make it difficult to put out. The fireproofing program, which cost at least $100 million, followed the launchpad fire 14 months ago in which three astronauts were killed (SN: 2/4/67 p. 112).

Since the spacecraft will have a pure oxygen atmosphere once in orbit around the earth, the astronauts will have to purge the nitrogen from the cabin just before they are injected into orbit. Even while in the two-gas atmosphere, however, the astronauts will breath pure oxygen from their space suit supplies.