

mate, for the Air Force C-5A can carry 814 troops.

Marked changes are anticipated for the air shipment of cargo. Between 1982 and 1990, the first metropolitan airport intended solely for cargo handling is expected to be operating. Sometime in the following decade, respondents predict, cargo revenues will for the first time equal passenger revenues.

Those surveyed support the notion that new markets will soon appear for the transport of commuters and for intra-megalopolitan travel, probably by improved vertical/short takeoff and landing aircraft. They estimate, for example, that soon after the year 2000 some 25 percent of all commuters traveling one-way distances beyond 15 miles will move by air. □

LUNAR LANDING SITES

Tycho is tantalizing

Lunar scientists do not often agree on many points. But one thing most of them seem to have agreed on of late is the crater Tycho—a very large, young crater in the southern highlands of the moon near the south pole. They would like to have an Apollo flight land there.

At a lunar science symposium last week at the Lunar Science Institute, next to the Manned Spacecraft Center in Houston, 60 scientists met to discuss lunar geology, origins of the earth-moon system, the age of the lunar surface, and to exchange experimental results from the two successful lunar landings so far. Most fundamental questions are still unanswered. Whether the answers will be found in the present Apollo program will depend to a large extent on where the astronauts land on the moon.

The recent decision to cut out two more Apollo flights has not only disturbed the scientific surface and orbital experiment groups (SN: 9/12, p. 215)



NASA

Scientists push for Tycho (arrow).

september 19, 1970

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but also reopened the debate on landing site selection. A few years ago, when the National Aeronautics and Space Administration and its scientists had 10 lunar landing sites to choose, the task was arduous. Now that there are only four more sites, for a total of six, the decision will be even more difficult. NASA has to consider not only the scientific return but also the spacecraft flight capability.

The fervor over Tycho is not new. Out of the prime sites that had been tentatively selected, Tycho had been earmarked for either Apollo 19 or 20 before those missions were cut. Even then, however, those in charge of manned space flight at NASA were hesitant to commit a crew to landing at Tycho. Unlike most of the other sites, it lies 2,000 miles south of the moon's equator; a mission to Tycho would require an orbit around the moon completely different from that of other flights and more fuel to get there. "I don't know today that we would be able to do it," says Astronaut Donald K. Slayton, chief of flight crew operations at the Manned Spacecraft Center.

While NASA officials are still doubtful about the operational feasibilities, the scientists are united in their view: "If you had only two missions left to make," says Dr. Lee Silver of the California Institute of Technology, "you'd send one of them to Tycho."

Tycho would offer to the scientists what no other site could. It is unique among the larger lunar craters in that it is very young and entirely in highland territory. Streaming out from it is the most extensive system of bright rays on the near side of the moon.

However, Tycho has competition. Among the possibilities left for Apollos 15, 16 and 17 (Apollo 14 will go to Fra Mauro) are Copernicus and Descartes craters, Hadley and Davy rilles and the Marius Hills. Each of these has its particular scientific value; each is feasible. The ultimate decision will be made by the site selection committee.

Recommendations to this committee are now being made from three groups of scientists: geologists, geophysicists and geochemists. "Tycho would be a thrilling climax to Apollo," says one NASA official, "if we can do it." □

MISSISSIPPI FACILITY

Adapting to the environment

The charter of the National Aeronautics and Space Administration says nothing about environmental or ecological responsibilities, but several factors have emerged to involve NASA in the current problem. The advent of space travel coincided with the surfac-

ing of the long-muted conservationists' voices. Space flight itself intensified the ecologists' cause: Television audiences across the nation saw the earth as an oasis in space. Finally, the tools of space observation such as infrared, ultraviolet and multispectral photography demonstrated potential practical applications. The photographs located blighted crops, pollution sources and soil erosion processes.

Thus when budget cuts forced NASA to suspend Saturn 5 rocket production and to phase out the 140,000-acre Mississippi Test Facility, 40 miles northeast of New Orleans, where the rockets were tested, former NASA Administrator Thomas O. Paine began exploring possible uses of the facility by other Government agencies—primarily for environmental studies. His efforts were supported by Sen. John Stennis (D-Miss.) and other Congressmen who did not want the center wasted.

One result was that in the present NASA budget, now awaiting further action since President Nixon's veto of the Independent Offices Appropriations Bill, \$10 million has been earmarked for earth and environmental studies by NASA at the center.

The NASA work will be related to current earth resources activities already in progress at the Manned Spacecraft Center in Houston, and at the Goddard Space Flight Center in Maryland. But the vast Mississippi facility has been opened to use by other governmental agencies. Already the Coast Guard and the Department of Interior's Bureau of Commercial Fisheries have signed agreements with NASA for use of parts of the facility. The Coast Guard will headquarter the National Data Buoy Development Project (SN: 7/25, p. 64) there; BCF will use it to conduct a Marine Resources Assessment and Harvesting Program. NASA is also talking to Federal agencies involved in water and air pollution control. Plans are being made to make the facilities available to the two new agencies proposed earlier this year (SN: 6/13, p. 576) by President Nixon, the National Oceanic and Atmospheric Agency (largely a research effort) and the Environmental Protection Agency (largely for monitoring and control).

The NASA computer center at Slidell, La., will also be made available for use. Data from NASA's aircraft remote sensing flights (SN: 8/15, p. 140), as well as from the Earth Resources Satellites and the earth orbiting laboratory, Skylab, both to be launched in 1972, will be made available.

"We are trying to make it possible for a lot of people involved in the environment sciences to get together in a productive symbiotic relationship," says Willis B. Foster, a policy officer at NASA headquarters. □