NORTH AMERICA

Task Done With Force

PRESIDENT JOHNSON set his Task Force on American Communications Policy some hard questions which have just been made public together with the answers:

Is the United States making the best use of the electromagnetic frequency spectrum?

No. The way in which frequencies are now allocated is derived from a simpler era. They are allocated to categories of users on a nation-wide basis, regardless of the fact that New York City has not much use for the frequencies reserved for forestry services nor oil fields for a great deal of intercommunication among taxicabs. As a result, some frequencies, particularly those used by land mobile radio in cities, are congested to the point where demand is inhibited, while others are used wastefully.

The task force's recommendations are that the management of the spectrum should be vested in a single government agency which would oversee public, commercial and military needs; that a policy should be developed in which fees were paid according to the amount of spectrum used and that a more flexible system of assigning wavelengths should be developed. Above all, all unused portions of the spectrum should be assigned to those with legitimate needs, and the basic national policy should be to develop the spectrum as a national resource.

Should the United States consider merging its international communications carriers?

Yes. At present there are four: the American Telephone and Telegraph Corporation, the Radio Corporation of America, Western Union International, and the Communications Satellite Corporation. They are divided on the basis of technology—Comsat running satellites, the others preferring cable. As things stand, the argument about cable versus satellite is endless and is usually settled by dividing new traffic on a 50–50 basis. This is not economic and the public does not get the benefit of the cost reductions inherent in the new technology. Comsat should be allowed to run all the international traffic and to invest in cables as well as satellites to make it less partisan.

What form should the permanent organization of Intelsat take?

The International Telecommunications Satellite Consortium was formed because the United States decided in 1962 on a policy of international cooperation in the satellite field. Comsat should retain its position as manager of Intelsat, but on a contractual basis. It should increase its international representation and set aside a special division to manage Intelsat. The consortium should give developing countries a greater voice by lowering their price of entry and allowing them all—68 at present—to participate in an annual general assembly.

How soon will an American domestic satellite system be economically feasible and should it be used for television only or for a variety of purposes?

Too little is known about communications satellites to make hard and fast decisions. The only way to find out is to experiment. Comsat should be allowed to put up a pilot system, offering one or two dozen colour television channels as well as voice, data, telegraph and facsimile transmission. This should in no way imply that Comsat should be the permanent owner of such a system but factual evidence would become available (although probably not in time for the International Radio Conference on Space Telecommunications in 1971) as to whether widespread use of satellite communications and the siting of ground stations near large cities would cause harmful interference in the 4 and 6 gigaherz bands currently shared between satellite communications and terrestrial microwave systems.

Do the present United States laws and governmental structure for regulating communication need changing?

Yes. The Federal Communications Commission has too much to do with an inadequate staff. The entire responsibility for managing the spectrum and determining long-range communications policy should be taken away from the FCC and handed to a "new entity" within the executive branch of government.

BIOSATELLITES

Monkeying About

WITH all the excitement and preparation at Cape Kennedy for the launch of Apollo 11, NASA's biosatellite programme is easily overlooked. But soon after June 18, NASA will launch Biosatellite III carrying a 14 pound adolescent male pigtail monkey trained for the flight and implanted with apparatus at the University of California, Los Angeles. This will be the third biosatellite—the first was successfully launched but not recovered and the second, a replica of the first, was recovered from orbit in September, 1967. Unlike Biosatellite II (*Nature*, **217**, 899; 1968), which carried a collection of dull experiments whose chief result was the not unexpected discovery that plants require gravity to maintain their orientation, Biosatellite III at least stands a chance of yielding some physiological data of value for space medicine. If all goes according to plan, the monkey finally selected for the flight, from the five being trained at UCLA and delivered to Cape Kennedy, will be in a 220 mile high circular orbit for at least two weeks and perhaps for as long as 30 days.

The monkey will certainly be heavily instrumented. Monitors will record wave patterns from ten areas of his brain, eye movements, heart action and respiration, take measurements at four sites in the circulatory system, record changes in bone and muscle and observe performance in two behavioural tests for which the monkey can earn two thirds of his daily rations. Twenty-four measurements will be recorded simultaneously while the monkey performs his scheduled activities, and 80 per cent of the data recorded will be radioed back to Earth each day.

It is some indication of the rush to put man in space that the recordings of the monkey's brain activity

during weightlessness will be the first ever made by NASA. The brain will be monitored for the four types of brain waves during sleep, wakefulness, anxiety and when the monkey performs his two tasks, to test short term memory and eye–hand coordination. The monkey will have spent 18 weeks learning these tests, which involve matching four symbols and pushing a button when a hole concealed by two sectored disks rotating at different speeds appears in line with the button once every fifty-six revolutions.

One criticism of manned flights has been that NASA throws away valuable physiological data by jettisoning astronauts' urine, but in this experiment the monkey's urine will be analysed for calcium, creatine and creatinine during the flight by an automatic analyser and some will be stored. All the faeces will be returned to Earth and the flight should provide data on net calcium and nitrogen losses because the food intake will be known precisely. Unlike all previous satellites this will be the first with a two-gas atmosphere. The monkey will be breathing 80 per cent nitrogen and 20 per cent oxygen at sea level pressure of 14·7 pounds per square inch.

It is hoped that the satellite will be recovered after its 469 orbits by mid air pick up, but if that fails it will come down in the Pacific. At this stage it would be churlish to wish anything but success to the satellite, but whether the biosatellite programme should be continued is another matter. There is no case for wasting money on satellites similar to Biosatellite II and it is arguable whether putting a monkey in orbit for 30 days will yield the sort of information that is needed to assess the hazards of prolonged space flight. Surely the Biosatellite programme, if there is to be one at all, should be confined to experiments with primates in orbit for periods at least an order of magnitude greater than the length of an Apollo flight.

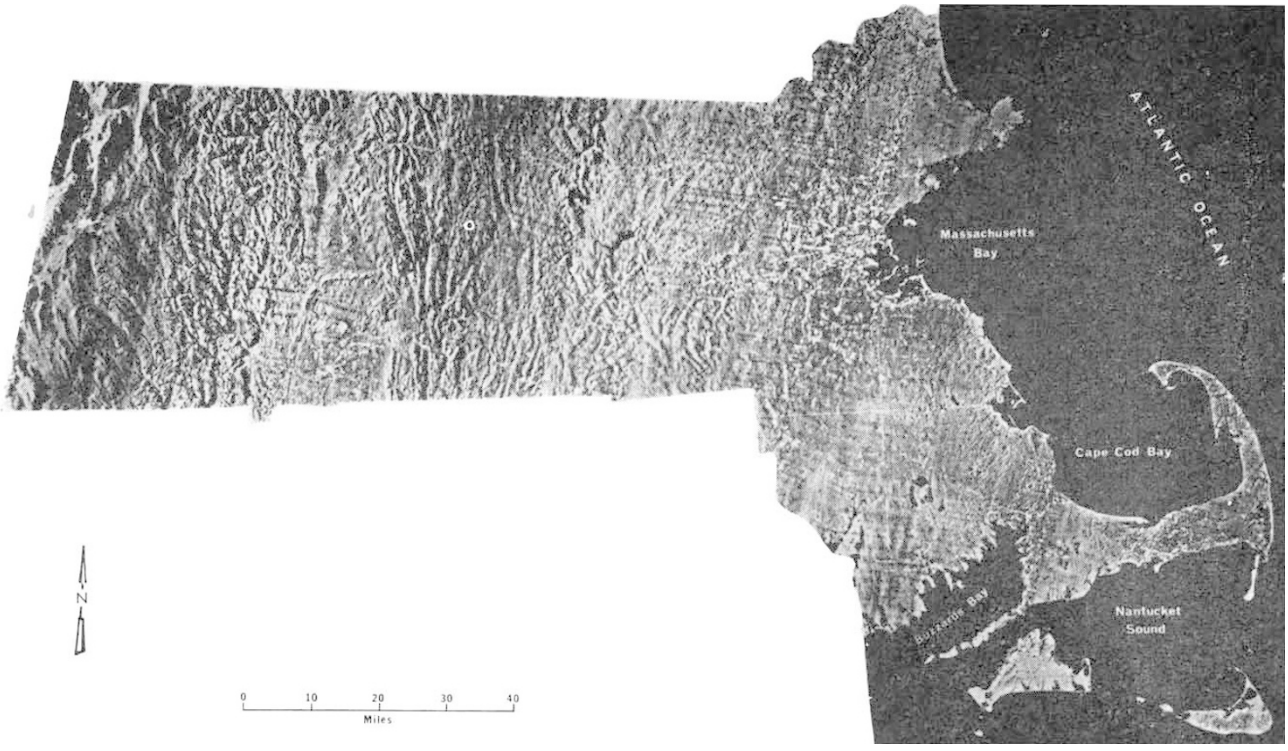
MAPS

Massachusetts by Radar

from our Geomagnetism Correspondent

ONE of the first practical results of a United States programme to evaluate the usefulness of radar and remote sensing in general in studies of the Earth from space is a unique radar map of the entire Commonwealth of Massachusetts. The map is actually a mosaic made up of fifteen-mile wide strips parallel to the Berkshire and Taconic Mountains, each obtained with airborne radar operating at an altitude of only 7,000 feet. The immediate aim of the exercise, which took three weeks to complete, was to determine whether the new view would give additional information which could not be obtained from conventional airborne photography, but without the expense of an Earth satellite. The hope is that by enhancing the topography, the geological relationships betwe n folds, fractures, glacial deposits and other surface features will become more apparent over a wider area.

Although instigated by the US Geological Survey in cooperation with the US Army and the National Aeronautics and Space Administration, the work was done under contract by the Grumman Aircraft Engineering Corp. Unfortunately, none of these organizations has yet discovered that geology abhors the straight line. In common with geological map makers during the past century they are mesmerized by those political abstractions—state boundaries.



View of the Commonwealth of Massachusetts compiled from radar images obtained at an altitude of 7,000 feet. The topography is accentuated in comparison with views from conventional airborne photography, thereby revealing major folds, fractures and glacial deposits which might not otherwise have been observed. (Photo: US Department of the Interior, Geological, Survey.)