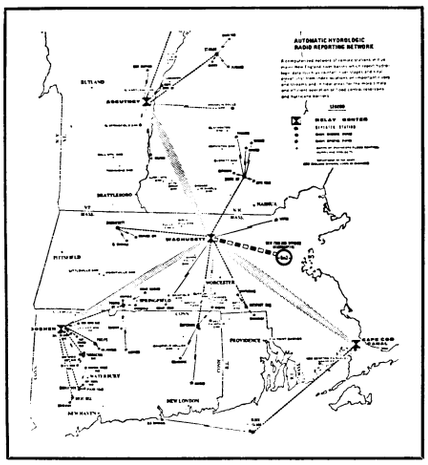

Corps of Engineers

From 41 stations, warning of floods.

of engineers. "I look forward to the day when all parts of our country may be able to enjoy such protection."

The system, whose electronics were developed by Motorola, Inc., relies on 41 battery-powered monitoring stations scattered from Long Island Sound to northern Vermont. The stations use sensors to collect data such as river and reservoir levels, tidal conditions, barometric pressure, rainfall, and wind direction and velocity. These data are encoded into electronic pulses, which are transmitted to the computer center at Waltham.

The interpretation of the data is done by men with the aid of the computer, which has in its memory a history of similar data for when floods occurred. Based on this information, an electronic plotter plots the data and humans make predictions based on them.

"The ultimate goal," says Carl P. Nierzwicki, director of Motorola's applied systems unit, "is to automate the system so that the final predictions will be done by computer."

For the present, though, the information from the computer is passed on to the Weather Bureau, the only agency authorized to issue flood warnings, or used by the Corps to take its own protective action. Should the director of the control system decide that a flood—either inland or coastal—is imminent he can order the Corps' preventive flood control measures into operation. These measures take two forms: hurricane barriers and dams. The dams—35 of them in New England—are simply reservoirs to catch the overflow from rivers and streams.

As for the hurricane barrier, says Saul Cooper, chief of the reservoir center at Waltham, "During coastal storms or hurricanes, they keep the tidal surge from coming into the harbor. They close off the navigational opening." Four such barriers now exist along the New England coast. "More will have to be built," predicts Cooper.

Besides warning of floods and high tides, the system can also help fight water pollution. Because it measures water levels, it can indicate the general contamination of a stream. Too low a flow, for example, could mean that the proportion of pollutants to water is too high, and more water can be released into the stream. Work on this has already begun, says Cooper. □

APOLLO SLOWDOWN

More time for science

While complaining that the Apollo program has not included enough science (SN: 8/9, p. 112), some lunar scientists have also held the seemingly opposite position that the lunar samples are being delivered too quickly (SN: 9/20, p. 235). Researchers studying the initial batch of samples, those from Apollo 11, were barely halfway through gathering their data when Apollo 12 was sent to the moon for more (SN: 11/29, p. 493).

Until last week, the same thing was to have happened with Apollo 13. As scientists met in Houston for the first open discussion of their Apollo 11 analyses, the Lunar Receiving Laboratory was completing preparations to release the Apollo 12 samples for study with Apollo 13 to be launched on March 12, little more than two months later.

But the anticipation of continued tight budgets and the resultant desire by the National Aeronautics and Space Administration for more careful mission planning have combined to give the time-pressed scientists just what they want. With the slowdown of the Apollo program as a whole (SN: 1/3, p. 5), NASA has decided to begin by delaying Apollo 13 for one month.

"Thank God!" exclaimed Dr. Edward Anders of the University of Chicago when he heard of the announcement. "That," added Dr. Paul Gast of Lamont-Doherty Geological Observatory, "is the best news I've heard in a long time."

Apollo 13 will be the first lunar landing mission aimed at a site in the moon's rugged highlands. Besides offering the chance of finding material from the earliest days of the moon, the rough Fra Mauro site could be the most challenging yet for the astronauts' landing abilities.

Apollo 14, once scheduled for July, was tentatively retargeted for September due to the over-all slowdown, and might be held to October due to the postponement of Apollo 13. Also for budgetary reasons, the final mission in the Apollo program, Apollo 20, has been deleted from the lineup and its Saturn 5 booster reassigned to launch the Apollo Applications Program's orbiting workshop in 1972 (SN: 1/3, p. 21). The program's reduced pace, however, is likely to mean that Apollo spacecraft will still be going to the moon in 1974.

As the flight-shuffling goes on, Apollo officials are also developing plans for additional scientific instruments to go on upcoming missions.

A sieve to let the astronauts collect some pure moon dust by separating out even small rough particles may be sent along on Apollo 13. Another possibility is a hand-held microscope, which might go on subsequent flights as well, to let the astronauts take advantage of their geological training by selecting some samples on the basis of tiny details such as their crystalline structure.

Several noted lunar researchers, including geologist Eugene Shoemaker and seismologist Gary Latham, have high hopes for the success of one Apollo 14 proposal: a hand-held magnetometer that could be moved from place to place by the astronauts to measure local variations in the lunar magnetic field. Evidence had been pointing increasingly toward an almost nonexistent field until the magnetometer in the Apollo 12 experiment package detected a field of about 30 gammas, about 0.1 percent as strong as earth's. Apollos 13 and 14, however, do not include plans for permanently implanted magnetometers, so the portable instrument would provide an alternate way of seeing whether the field is similar in widely separated areas of the moon.

Another tool under study for Apollo 14 is essentially a piece of flypaper, says Anthony J. Calio, director of science and applications at the Manned Spacecraft Center in Houston. The astronauts would place its sticky surface face down on the moon to pick up a sample that would include only the topmost layer of lunar material. This would give scientists a chance to examine material known to be the most recently exposed to bombardment of cosmic rays, solar particles and micrometeoroids.

And definitely planned for inclusion on the first flight after it becomes available—probably Apollo 14—is a two-wheeled cart resembling a ricksha that an astronaut will pull behind him to carry a larger volume of rock samples and instruments.

One experiment that had been proposed for a future mission has proved to be so controversial that now even its author has recommended against it. Dr. Latham had suggested setting off a nu-

clear bomb of several kilotons' force on the far side of the moon to provide a source of large shock waves that could be monitored by lunar seismometers (SN: 12/20 p. 573). The main factor causing him to withdraw the suggestion, aside from "considerable mail," says Dr. Latham, is that scientific colleagues persuaded him that the radioactive material thrown out by the blast, while not a danger to astronauts, could upset background readings for other types of scientific experiments. Instead, he now proposes a large, non-nuclear blast or impact, greater than the planned crash into the lunar surface of the third-stage rocket from Apollo 13. □

FT. DETRICK

No home for a weapons lab

The Defense Department is forbidden by Presidential mandate to do any more work on bacteriological warfare (SN: 11/29, p. 495).

And a phrase in the latest Defense Appropriations Act forbids Defense to do basic research not connected to its mission (SN: 1/10, p. 36).

The combination, plus a general tightening of Government-wide research budgets, puts in doubt the future of Ft. Detrick, Md., and of the 806 scientists and technicians who work there.

Detrick for years has been the focus of much of the Pentagon's basic research on chemical and bacteriological warfare.

Laboratories at Ft. Detrick are valued at nearly $250 million.

Dismantling it is regarded as a waste of the first-class research facility. Finding another Government agency that wants—and can afford—another laboratory raises its own problems.

Discussions have been started with the Department of Health, Education and Welfare, specifically with the Public Health Service and the National Institutes of Health. According to officials at both Ft. Detrick and HEW, the discussions are still in an early stage. "It has not been decided what the entire future of Ft. Detrick is to be," says Dr. Riley D. Housewright, the installation's scientific director.

The research center has been doing a good deal of work on vaccines and viruses, both topics of interest to NIH, and has especially good facilities for working with dangerous viruses in controlled and isolated environments. These facilities may be of special interest for research on possible viral causes of cancer.

There is some apprehension that if the future of Ft. Detrick remains in doubt for a long time, many scientists may be prompted to leave. Already the general defense budget cut has cost 219 jobs out of a total of 2,500 employes at Ft. Detrick, and Sen. Charles McC. Mathias (R-Md.) is urging a decision before further attrition occurs.

One of Mathias's suggestions is that NIH might use Ft. Detrick as an in-house agency to do some of the research it now contracts out. But that suggestion may not get an enthusiastic reaction from university administrators outside Maryland. □

DRAFT

Threatening deferments

A gradual end to student and occupational draft deferments is next on the Nixon Administration's list of changes in the Selective Service system, according to Defense Secretary Melvin A. Laird. Laird says the change is a further move in the direction of making the draft more equitable and ending special privileges.

Changes would not be retroactive and would not affect men now holding such deferments. Hardship and medical deferments would remain available to those who qualified for them. Occupational deferments can be ended by Presidential order, but an end to deferments for undergraduate students would require Congressional action. □