ROCKETS AND MISSILES

USSR Leads in Fuel Control

RUSSIA HAS BEEN able to lead in rocketry because of advanced control over fuels, Dr. Roger R. Revelle, director of the Scripps Institution of Oceanography and a divisional committee chairman of the National Science Foundation, said at the National Science Foundation hearings before a subcommittee of the House Committee on Appropriations. Part of the hearings has been released and part is still classified.

Dr. Revelle said:

"In space research, we are familiar with the fact that the Russians have rocket engines with three or four times the thrust of any of ours. This is not due simply to a massive effort, but to a systematic development.

"The Russians started with small rockets and worked up stepwise, very thoroughly, to big ones.

"Apparently their ability to produce engines of such large thrust depends upon a very thorough knowledge of the performance of the rocket fuels, both the liquid and the solid.

"They evidently have much more control over their fuels than we have over ours, and can predict their performance better."

Rep. Harold C. Ostertag (R., N.Y.) asked, "What do you mean by 'control over the fuel'?"

Dr. Revelle: "Knowing how the fuel is going to perform and what its variability is. They seem to know it better than our people do. This is based, obviously, on a broad program of experimentation."

Then Rep. Albert Thomas (D-Tex.), chairman of the Subcommittee on Independent Offices, said:

"May I ask you a question along this line? I have known the Chief of the German Naval Operations Division for ten years. He is certainly a student. . . ."

The rest of the fuel control testimony before the subcommittee was off the record.

On May 15, the USSR demonstrated its fuel control with another spectacular launch, that of a five-ton satellite designed to carry a man, but carrying a dummy—this time.

Science News Letter, June 4, 1960

RADIO

Trans-Ocean Radio Waves

A METHOD for radio communication across the ocean using a naturally available layer of air will be tested soon, five scientists of the National Bureau of Standards report in Washington, D. C.

They propose using the trade-wind "inversion" over the South Atlantic as a channel for radio messages at a frequency of 200 megacycles, which is in the very high frequency range.

The scientists who investigated the trade-wind inversion for radio use are Drs. M. Katzin, H. Pezzner, B. Y.-C. Koo, J. V. Larson and J. C. Katzin of Standards' Central Radio Propagation Laboratory at Boulder, Colo.

Their investigations followed observations during World War II that radar sets at Bombay, India, often showed the entire coast of Arabia, and frequently ranges of up to 1,700 miles were obtained. A radar range of 1,700 miles means the radar waves actually traveled up to 3,400 miles.

Because weather conditions over the South Atlantic are similar to those that produced the record radar scans over the Arabian Sea, the scientists investigated conditions over the South Atlantic to determine if an atmospheric layer there could be used for radio communications. They found that a duct is present most, if not all, of the time.

Two airplanes, one on each side of the South Atlantic, could be used to send and receive radio messages through this duct. The channel is about 1,000 feet thick. It varies from a height of 4,300 feet above the earth's surface in summer to some 6,000 feet in the winter.

The scientists believe that radio messages could be sent through the duct with relatively little power. In the Journal of Research of the National Bureau of Standards, 64D:247, 1960, they suggest using two airplanes to test this new method.

Science News Letter, June 4, 1960

ROCKETS AND MISSILES

Sputnik IV Satellite Passes Over Detroit

See Front Cover

THE RUSSIAN SATELLITE Sputnik IV passing over Detroit, Mich., on May 18, is shown on the cover of this week's SCIENCE NEWS LETTER. The solid line is the satellite's trace; the dotted line is interpreted as the tumbling satellite casing. The photograph, taken during a 15-second interval, was recorded on the screen of a television satellite tracker developed by Bendix Aviation Corp., Southfield, Mich., for the Defense Department. The black line in the center is an element of the TV screen. The larger ball-like objects are stars of the constellation Cassiopeia. The smaller ones are stars invisible without optical aid.

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ROCKETS AND MISSILES

Tiros Spins at Same Rate, Not Slower, as Expected

THE WEATHER SATELLITE Tiros I is still spinning rapidly as it orbits about the world even though experts had expected it to slow down.

When the satellite was launched April 1, the National Aeronautics and Space Administration announced that the satellite would remain stable as long as it maintained a minimum spin rate of nine revolutions per minute.

NASA said that when the spin slowed to nine rpm, three pairs of jets around the satellite's baseplate would send it rotating at 12 rpm again. Each set of jets could be used only once and would be set off by a command from the ground.

NASA said the spin-up was expected to be necessary about every 20 days.

But twice that time has elapsed and, according to a NASA official, the spin has not been noted to decrease—a simple infrared detector in the satellite helps keep tabs on the spin rate.

So far the jet system has not been needed. NASA officials now say they cannot say when or if the jet system will ever be needed.

Science News Letter, June 4, 1960

ROCKETS AND MISSILES

Launched Midas May Be First of Warning System

THE UNITED STATES launched an experimental satellite weighing two and a half tons into orbit May 24 to test the feasibility of using satellites to warn against missile attack.

Called Midas II, the satellite was boosted into orbit by an Atlas-Agena rocket. Inside the satellite is an infrared scanning device for spotting the heat generated by military bases, cities, rocket exhausts and the like. Future networks of Midas-type satellites may do what airplanes with conventional cameras could never do.

The satellites will be too high to be destroyed by any methods now known to be operational. (Midas orbits about 300 miles above the earth.)

And the satellites' infrared detectors will see through conventional camouflage. The detectors respond to heat from factories, cities, military bases, trains and the like.

This heat would seem to be impossible to camouflage. But an enemy might "confuse" an infrared satellite by setting up extra heat sources that have heat patterns like prime targets but are just decoys.

There are indications that the detectors may soon be developed to a point where they can distinguish one missile from another. They could do this by distinguishing between the varying heat patterns produced by the exhausts of different missiles.

The new satellite was similar to the Midas that failed Feb. 26.

The Midas network is one of two reconnaissance systems being prepared by the United States. The other, Samos, is designed to photograph enemy activities and bases.

There are indications that models of both Midas and Samos will be flying over the USSR by the end of this year. The experimental Midas, however, does not cross Russia.

The Midas system would radio missile data to ground stations to provide a 30-minute warning to the U. S. of a missile attack. (See photograph opposite page.)

Science News Letter, June 4, 1960