SATELLITES:

The Camera in Space

To the untutored eye, the pictures may have looked like part of a poorly packed snowball with a rock inside. But to the weatherman, aware that his job is more of an art than a science, they were a triumphant revelation:

The round rock was the planet earth, photographed from an altitude of 440 miles by the United States' Tiros I satellite. And the snowy stuff was earth's cloud cover—the atmospheric caldron where the world's weather is brewed.

There, on the first pictures released (see page 33) was the northern edge of the cold front that marched across the U.S. last weekend.

Four hours after it had been launched from Cape Canaveral at dawn last Friday, Tiros made and transmitted these epochal pictures. Minutes later, as the satellite moved through its third 18,000-mph orbit around the earth, meteorologists at Fort Monmouth, N.J., were studying the print of the space-to-earth transmission.

"Weathermen always looked at the clouds from below like ants," the U.S. Weather Bureau's Harry Wexler said, "now we have a bird's-eye view."

For Wexler, the pictures were the culmination of a ten-year dream. He was among the first to recognize in satellites the key to precise forecasts and eventual weather control. Weather over four-fifths of the earth's surface goes unmonitored today—ample room for storms to spawn undetected.

Tiros cannot singlehandedly fill in all the gaps. But it is the successful forerunner of a satellite system that will.

Hold It, Please: The conditions of this success were in part those that give good snapshots with a Brownie: Sunlight over the shoulder, camera pointed at subject, subject at the right distance, and no jiggling. In satellite terms this means: No delay in launching or error in aiming, a circular orbit 400 miles high, and a stabilizing mechanism to prevent end-over-end tumbling.

All these requirements were met with greater accuracy than in any U.S. satellite to date. The aiming error was a mere .003 of a degree. Wire weights slowed the rapidly spinning satellite down to the camera operating limit of 12 rpm. Only the orbit could be faulted: It is a slight ellipse swinging out 429 miles at its nearest point to earth and 466 miles at its farthest.

Once in orbit, Tiros bore little resemblance to a Brownie or, for that matter, to the crude photoelectric space scanners used in the earlier U.S. satellites.

In electronic elegance, Tiros rivals the Russian Lunik III which photographed the far side of the moon. It is a drum-shaped satellite studded on the top and sides with 9,200 solar cells to recharge its chemical batteries. Sticking out from the bottom are two TV cameras (see above). A focal plane shutter snaps a picture every 30 seconds. Behind each camera is a magnetic tape recorder and an RCA-developed Vidicon tube. As the image lingers on the tube, a magnetic tape records it. The tape's capacity is 32 pictures, or sixteen minutes' "recording time." Thus, a 3,500-mile-long picture strip (the distance the satellite travels in sixteen minutes) can be obtained. At a ground command the tape reads out its recording, wipes clean, and automatically rewinds for another recording.

Tiros' two steady radio beacons enable trackers to plot its orbit and know just where the satellite is at any given time. With a ground-controlled timer, the cameras can be pre-set to photograph any area under its path.

In the weather experiment being conducted, this timer assures that pictures can be taken in daylight and when the camera is pointing earthward. But this timing system is also the most spectacular clue that the weather-watcher could be adapted into an Orwellian "people watcher"; or more precisely, into a monitor of nuclear and missile tests, airplane dispositions at bases, and other military activity.

Black or Blue? Tiros' resolving power—the ability of its cameras to spot ground features—is probably too low to do this job.

But cameras with greater resolving power can be sent into orbit from pole to pole, covering the whole globe as the earth rotates beneath its path.

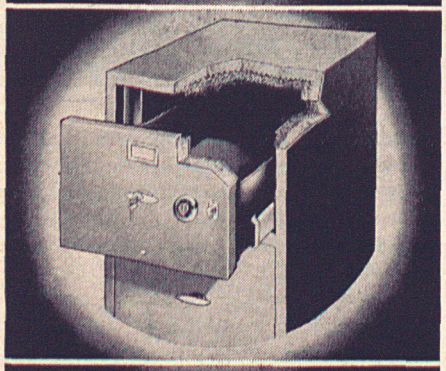
Wexler estimates six such polar satellites plus one girding the equator could give 24-hour weather coverage.

Presumably, the same number could serve as a military spy-in-the-sky network—or a U.N. disarmament police force. In the first case, the satellites

Newsweek—Bresnan

Write Dept. W for Wine Manners, Cookery Booklet

BEWARE OF
Office Ovens!



When a fire strikes, non-insulated files become excellent ovens. Then it's good-by records. And 43 out of 100 firms losing their vital records in a fire never reopen. Sound practice calls for keeping your truly irreplaceable records in insulated files—Meilink-built Hercules® insulated files carrying the Underwriters' Laboratories label. At your Meilink dealer or write for folder to Meilink Steel Safe Company, P. O. Box 2567, Toledo 6, Ohio.

with MEILINK SINCE 1903 it's for keeps

Most complete line of safes and insulated products

would be painted an unreflective black and kept silent except to discharge their secrets over friendly territory. In the second, the satellites would be painted a U.N. blue and freely broadcast their findings to stations all over.

H-WAR DEFENSE:

The Russians Dig In

How good is the Soviet Union's civil-defense program? Very good, indeed.

This, at any rate, is the view of Rogers Cannel, at the Stanford Research Institute in Menlo Park, Calif. He and fellow engineer-consultant Richard B. Foster have been carefully studying the Russian program for the past few years as part of a broad probe into the techniques of national defense. They both agree that it is far ahead of the H-war defense in the United States. As Cannel put it last week: "Where you see a Lucky Strike ad in this country, you see a CD poster, two-sheet size, over there."

Secrecy has not been a barrier in discovering Russian arrangements. Civil-defense plans have been widely circulated. "We may not know the exact number of shelters that have been built," Cannel said, "but when you consider this problem, it is best to assume that their objective has been obtained."

From studies made by SRI and the neighboring Rand Corp.'s Leon Gouré, this picture of Soviet CD has emerged:

- ►A paramilitary cadre of about 40,000 men has been thoroughly trained in every aspect of civil defense.
- ►Complete plans for evacuation of population centers have been drawn up.
- ►Fallout shelters, ranging from single-occupancy, wooden tubes to concrete factory installations, have been designed.
- ►A ten-hour course on atomic defense reached 110 million people in 1956, according to Soviet claims. This was followed by a 22-hour course which was equally far-reaching—until the supply of textbooks ran out in 1958. Soon after, a series of compulsory classes for all adults started. The curriculum: Methods of air attack, individual and collective defense, fire prevention, first aid, decontamination, rules for behavior, and in rural areas, for aid to animals.

Red Volunteers? Despite the importance placed on civil defense, the Soviet people, according to Cannel and Foster, are as lackadaisical as most U.S. citizens. But, says Foster, there is one big difference: "The Soviet Union is essentially a military state and CD is part of the military posture. The citizens may not like CD, but they don't have much choice."

Besides the power of the state apparatus, the Soviet Union has had a head start in its CD program. Millions know from personal experience in World War II how to behave in an emergency. Moreover, even before the last war began, the Soviet Government decreed that no new industries would be built in large cities. More than 600 new cities have been built since 1930 and, as a result, Russia's population and industry are decentralized, in sharp contrast to the United States. Soviet leaders are acutely aware of this fact. Nikita Khrushchev boasted about it: "All countries would suffer in the event of a new world war. We, too, would suffer a great deal—but we would survive. The West would suffer incomparably more."

Many would agree with Khrushchev on U.S. susceptibility to attack.

What Foster says about Russia applies to any nation: "You can't judge an enemy's power by his sword alone. You have to take his shield into account."

Poster in the Soviet Union: 'We will survive'

National Oceanic and Atmospheric Administration
TIROS Satellites and Satellite Meteorology

ERRATA NOTICE

One or more conditions of the original document may affect the quality of the image, such as:

Discolored pages
Faded or light ink
Binding intrudes into the text

This has been a co-operative project between the NOAA Central Library and the Climate Database Modernization Program, National Climate Data Center (NCDC). To view the original document contact the NOAA Central Library in Silver Spring, MD at (301) 713-2607 x124 or Library.Reference@noaa.gov.

HOV Services
Imaging Contractor
12200 Kiln Court
Beltsville, MD 20704-1387
March 20, 2009