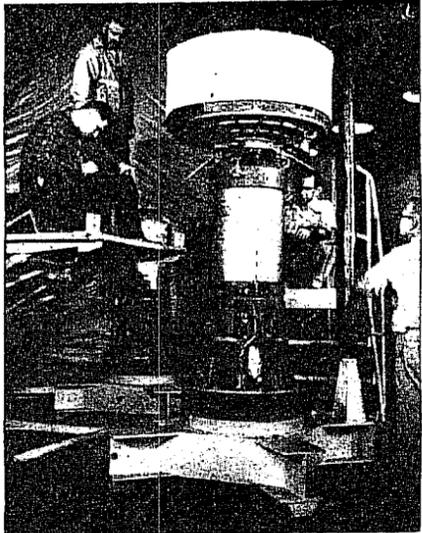


BUSINESS WEEK

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TV CAMERAS in Tiros satellite (left) took weather photos such as this one of a cloud mass over Canada and the U.S. Northeast.

A Weather Eye in the Sky

Tiros I is sending the first useful weather pictures back to earth. It may speed the way to military spy satellites.

Weathermen may have mixed feelings about the significance of the latest U.S. satellite firing—they're not sure how it may affect their jobs. But National Aeronautics & Space Administration spokesmen are wholly jubilant about what the successful firing of Tiros I will mean to prospects for future space satellite launchings.

In many respects, firing Tiros I right now was a risky business. Vital equipment expected to be placed on other weather satellites wasn't ready in time for this firing, so Tiros had to go with substitute equipment.

The substitution could have meant trouble. However, researchers were able to readjust things so that the satellite's twin fist-size cameras and other electronic gear are working perfectly.

• **Camera Work**—On command, stored weather photos (above, right) are being transmitted back to earth stations. Instrument readings indicate that, although the temperature inside the 270-lb. "hatbox" is somewhat elevated by the operation of transmitter equipment, the heat isn't seriously hampering the picture-taking.

Missing in Tiros I (so named because of its mission—a Television Infrared Observation Satellite) is its infrared sensor. This is the instrument that, in future Tiros satellites, will be counted on to map relative temperatures of the earth's surface. The device isn't completely tested yet though. So it was left off Tiros I and an extra TV camera was substituted in its place.

• **Circular Orbit**—The orbit into which Tiros I was slipped by its Thor-Able rocket is a spectacular success. It is,

spacemen boast, the closest to the "ideal" circle that has been achieved by any satellite. Tiros I's perigee (the point at which it comes closest to the earth's surface) is 378.7 mi.; its apogee (the farthest point from the earth) is 407.2 mi.

For weather satellites, the closer the perigee is to the apogee, the easier it becomes to translate the meaning of weather photos transmitted back to the earth.

• **Influence on Samos**—Tiros is supposed to have no direct connection with Defense Dept. plans to orbit a military reconnaissance satellite called Samos, but the military eye in the sky will be considerably influenced by Tiros' success.

Samos will be called on to give much sharper photographs of military targets than Tiros ever will. Therefore, its camera will have to be different. But one of Tiros' two cameras is a narrow-angle camera believed to have a resolution of 1,000 yards.

A resolution of 1,000 yards isn't good enough to detect Soviet launching pads. It's only good for spotting such features as mountain ranges and big bodies of water. Success of the narrow-angle camera on Tiros indicates, however, that military men shouldn't have much trouble in putting an even finer-detail camera on a Samos satellite.

• **Long Life**—The fact that the infrared horizon seeker on Tiros I is maintaining satellite's orientation as it wheels around the earth is also encouraging news. This orientation will only be maintained now for about three months' time. After that, the satellite's camera eyes will have turned out into space, losing their weather usefulness. But there is every reason to expect that sometime next fall, Tiros I will be operating again. Its orbit, NASA scientists say, will last for decades; its electronic equipment, for years.

Since military men, as well as weathermen, must think of a reconnaissance satellite with long life, Tiros' success is significant.

Nimbus (another NASA weather satellite) will have a much more refined orientation system, with a small jet engine to keep it spinning at a given rate (12 rpm.). Tiros is checking the performance of an early design of such a "spin-up" jet engine attachment. But its test engine isn't big enough or powerful enough to keep two cameras pointing on target indefinitely.

• **Weathermen Obsolete?**—Tiros I has other important commercial implications, according to Brig. Gen. David Sarnoff, chairman of Radio Corp. of America, which designed and built Tiros I under NASA contract. The day is not far off, he claims, when 90-day weather forecasts will become acceptable for business use.

Some weathermen still deny that predicting the weather from a satellite will ever be completely reliable. There are too many local conditions, they argue, that could not be observed from a satellite camera traveling hundreds of miles above the earth's surface.

However, Dr. Harry Wexler, director of research at the Weather Bureau, is exuberant about how the weather satellites can serve the weatherman. Already, in its first few days of taking and sending back pictures, Tiros I has revealed the presence of a phenomenon known as a double vortex in a storm centered in the Atlantic Ocean off New England. Double vortices had never been proved to exist, except in tropical storms, and Tiros' pictures explain several things about last week's weather in the Northeast.

In future pictures, Wexler hopes to discover other things about the weather that will similarly clear up some of the major problems involved in predicting its behavior. **END**