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Smithsonian National Air and Space Museum Archives

Technology Review, November 1961

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lite such as NIMBUS and the attendant problems of reliability, associated with both the electronics and the stabilization mechanisms, tend to discourage the operational use of a number of these satellites. If it were possible to assure evenly spaced orbits, six satellites might give excellent time and space coverage. Because of the random spacing that the satellites are likely to achieve after some time in orbit, however, a more realistic estimate of the number of satellites required would be nine or ten.

The AEROS satellite project represents an attempt by NASA to remedy this situation. AEROS would be a stabilized satellite moving in a 22,000-mile equatorial orbit in the same direction that the earth turns. At that distance, the orbital period would be 24 hours, so the satellite would appear to hover motionless over a point on the equator. From its great height, the satellite could constantly observe about one-third of the earth. Three such satellites could maintain surveillance over the entire earth with the exception of the polar caps. If some orbital inclination were present, the satellite would describe an apparent figure 8 with respect to the some points on the equator, thus permitting surveillance of the polar caps. It can well be appreciated that AEROS represents a degree of sophistication that has not yet been achieved in our satellite construction. In order to be economically feasible, the AEROS satellite must have a long life, probably measured in years. With the necessary complication represented by the stabilization, the extremely high quality optics, and the long distance telemetry, such reliability could be achieved at the present state of the art only by the use of heavy and redundant components. If the same satellites were to be used as communications relay stations, however, the AEROS satellites might soon become economically feasible.

An alternate approach to the problem of achieving general coverage would be to use large numbers of low-flying satellites of as simple design as possible. It would appear feasible to make satellites which would require no stabilization at all beyond that provided by the slight torque exerted by the gravitational gradient on an unsymmetrical body. Picture taking would be preformed

[Image 1 right]

Broad bands of clouds, mainly cumulus and stratocumulus, on a weakening cyclone's outer fringe in eastern Pacific.

[Image 2: bottom right]

A narrow angle camera shot over Saudi Arabia of rows of cumulus clouds. Individual clouds are about five miles in diameter.

May, 1961

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