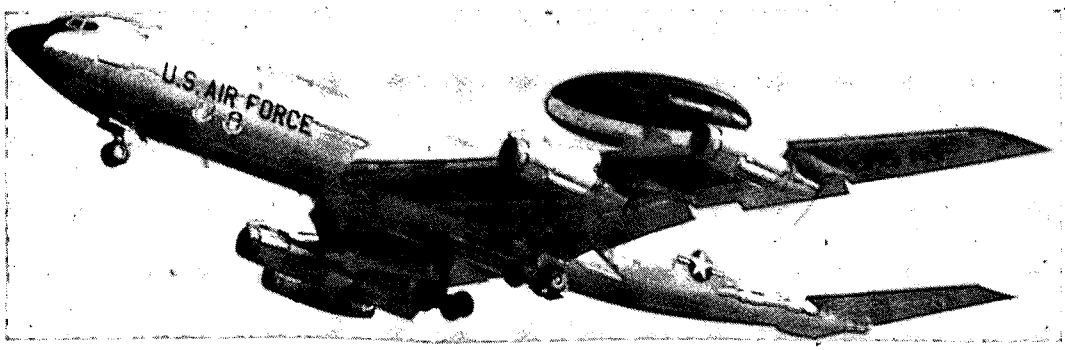
AWACS flies through first trials



The U.S. Air Force Airborne Warning and Control System (AWACS), a flying command post for control of air warfare, has completed a month-long demonstration of its capabilities in a series of complex air engagements. This initial operational test and evaluation phase of the AWACS development program involved some 45 airborne hours during eight flights throughout the United States.

Using a modified Boeing 707-320B airframe topped by a 30-foot rotating array, AWACS is based on a Westinghouse high-prf, pulse doppler radar designed to detect and track aircraft flying at high and low altitudes (see Rush Is On to Complete First AWACS Radars, MicroWaves, September, 1973).

During a two-day exercise on the East Coast, Air Force Test and Evaluation Center crews operated the Airborne Warning and Control System in control of interdiction, close-air support, aerial combat and search and rescue missions. During this operation, a test was conducted with the U.S. Navy to show the compatibility of AWACS data with the Navy Tactical Data System (NTDS). Data on low-altitude penetrating aircraft obtained by AWACS was fed to the NTDS for use in Navy control of their interceptors.

In a separate test with the U.S. Army, it was shown that AWACS could provide precise tracking information of attackers at long range directly to Hawk missile batteries, claims Brig. General Lawrence Skantze, AWACS program director at the Electronic Systems Division.

An Aerospace Defense Command (ADC) exercise called Felix AWACS was conducted over the Pacific Northwest. This involved multi-aircraft penetrations that included electronic countermeasures aircraft and fighter bombers playing the enemy role.

In the exercise, which simulated a major air defense engagement, AWACS scrambled interceptors from their bases and directed interceptors from their combat air patrol positions. Aircraft of the Canadian Armed Forces also participated.

A special survivability exercise carried out in the southwestern U.S. was designed to test AWACS' ability to protect itself from attackers. The attacking force whose mission was to incapacitate AWACS was composed of F-15s, F-106s, F-5s and F-4s working in conjunction with ground based and airborne jammers. The protective force under the direction of AWACS was made up of F-15s and F-4s.

"All of the attackers were neutralized at ranges in excess of their air-to-air weapon capability. In addition, successful simulated attacks against ground-based jammers were completed by AWACS-directed close-air support, aircraft," General Skantze reports.

Next major event for the AWACS testbed, now in the planning stage, is a demonstration of ship detection and tracking. Indications are that this demonstration in conjunction with NATO requirements may take place in Europe in the spring of 1975, according to General Skantze. An additional modification will be made to the testbed to improve the maritime capability for the European demonstration. •• *S.V.B.*

Artificial radio aurora extends HF communications

In trying to develop an interference technique for disrupting ionospheric scatter communications, The Defense Department's Advanced Research Projects Agency, Washington, DC, fell upon a way to extend and improve their own HF communications.

Normally, the ionosphere reflects signals from 3 MHz to 30 MHz back to earth for distances of about 100 miles. However by creating an artificial radio aurora, using large ground-based hf transmitters that put out approximately 2 mega-watts, signals have been found to be reflected over a 1,000 mile range and over frequencies extending to 450 MHz increasing both range and usable spectrum by an order-of-magnitude.

The power transmitters or "heater" installations use high-gain antennas to produce an EIRP of from 20 million to 30 million watts. This, in turn, raises the temperature of electrons in the ionosphere creating scattering irregularities aligned with the geomagnetic field. The result is a reflector 100 miles in diameter and 10 miles thick. This enormous cloud can't be seen by the eye, but it can be photographed with an infrared camera. When the transmitters are turned off, the artificial cloud dissolves instantly.

One of the group based HF transmitters that does the heating is located near Platteville, CO, and is operated by the Institute for Telecommunications Sciences. Another transmitter is the 1,000-ft dish at Arecibo, PR, managed by Cornell University. A third is at Gorki in the Soviet Union about 400 km east of Moscow. Stanford Research Institute, Menlo Park, CA, is studying the feasibility of the system as a communications technique. •• *R.T.D.*

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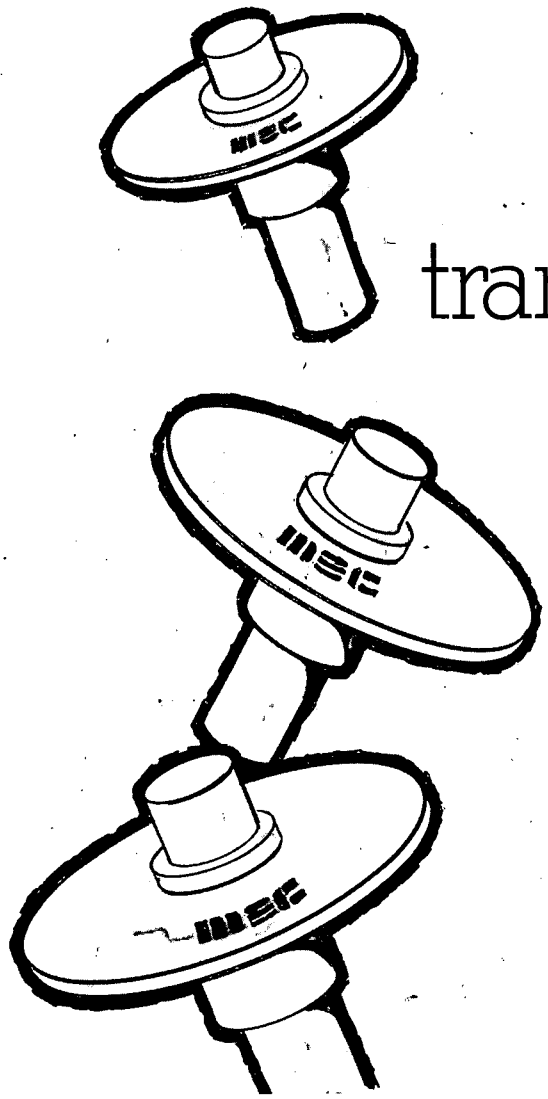

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