ment funding will not be available to support both the VFX/VFAX and AV-16 while continuing development of the Navy/Rockwell International XFV-12A thrust-augmented-wing V/STOL aircraft.

Navy officials said that, during the service's investigation of alternatives for the F-14A, it studied:

- Navy version of the USAF/McDonnell Douglas F-15, the F-15(N).
- Operational versions of the General Dynamics YF-16 and Northrop YF-17 lightweight fighters.
- Rockwell's XFV-12A technology.
- Lower cost variants of the F-14—the F-14X/Optimod.
- Eight additional designs provided by industry.

Carrier Requirements

"The [General Dynamics] YF-16 and [Northrop] YF-17 Air Force lightweight fighters as well as the Navy's XFV-12A thrust-augmented-wing V/STOL prototype are excellent designs, but unfortunately do not satisfy minimum carrier mission requirements unless rescaled for greater strength and range/payload capability. When appropriately scaled, the YF-16 and YF-17 designs become competitive with other new aircraft concepts from industry," a Navy official said.

Navy officials estimate it will require about $600-800 million to get either the YF-16 or YF-17 into production in a Navy version. A Navy version of the YF-16 already has been designed.

The YF-17 with its two General Electric YJ101-GE-100 engines also is attractive to the Navy.

The GE F101 engine developed for the Rockwell International B-1 bomber is an active candidate for an airframe design for the VFAX.

Boeing has designed and submitted to the Navy plans for a lift-cruise engined V/STOL fighter that officials believe may have application as both a VFAX candidate and add not only vertical capability but use thrust vector control to improve fighter performance.

Engine Candidates

The Boeing aircraft is designed around two F401 or Rolls-Royce Bristol Pegasus 15 engines. The Pegasus 15 engine would be a joint effort by Rolls-Royce and Pratt & Whitney for the AV-16. Use of the engine in the Boeing design would be contingent on development of the AV-16, Navy officials point out. The Boeing aircraft would be supersonic in the Mach 2 region and would use partial afterburning technology on the two thrust vector nozzles. Engines are forward in the aircraft design with thrust vector nozzles beneath the fuselage at the aircraft's center of gravity, Navy officials said.

The design is similar to the Soviet's Freehand VTOL testbed aircraft and in the 30,000-lb. weight category, Navy officials added.

Modified OV-1s Planned To Handle Elint Mission

By Clarence A. Robinson, Jr.

Washington—Army plans to modify a number of its Grumman OV-1 reconnaissance aircraft to perform electronic intelligence (Elint) missions, and Israel and Grumman are discussing use and possible later sale of both the OV-1D and the Elint aircraft to the Israeli Air Force. The move is one of several new efforts in U. S. Army aviation.

The modified aircraft will be designated EV-1 by the Army. Israeli air and ground crews are scheduled to undergo training with the OV-1 at Ft. Rucker, Ala., in anticipation of acquiring a number of OV-1Ds and EV-1s.

According to Pentagon officials, Grumman last week submitted a proposal of $38,800 for Israel to conduct a month-long evaluation of an OV-1D already in the Army's inventory. The evaluation would be scheduled for September in Israel. Those aircraft sold to Israel will be from Army's mothball fleet of older OV-1s that will be modified to the EV-1 or OV-1D configuration. The Army has a reserve of approximately 200 Mohawks from which to draw aircraft for modernization.

The Army and Bell Helicopter Co. are also developing five modifications for improving the AH-1G HueyCobra aircraft, including a new engine now in research and development and arming all HueyCobras in the inventory with the Hughes BGM-71A wire-guided anti-tank TOW missile.

The modifications arming AH-1Gs with the TOW would convert the aircraft to AH-1Qs. The new engine development is being funded under a $6.4-million Army contract to increase the lift capacity of the HueyCobra when armed with the anti-tank missile. The TOW system adds about 740 lb. to the AH-1G (AW&ST May 14, 1973, p. 14).

The service also plans a five-year AH-1Q procurement program, but the number of new TOW-equipped helicopters is still being studied. Army officials said the procurement needs are 305 additional attack helicopters through Fiscal 1979.

Congress has been asked for $27.5 million in procurement funds in Fiscal 1975 for 21 AH-1Qs with the improved engine—the Avco Corp. Lycoming Div. T703, formerly the T53-L-703 gas turbine—and improved drive train components. The T703 is a growth version of the L-13B now in use with the inventory AH-1Gs. The new engine, when development is complete, will be rated at 1,800 shp., up 400 shp. from the present rating.

The Senate's tactical air power subcommittee reduced to six the number of new production AH-1Q aircraft in the Army's request. The Senate subcommittee reasoned that the remainder of 15 aircraft will not actually be built until Fiscal 1976, and told Army officials to defer the request until next year's budget.

Army officials believe the modifications to the AH-1Q offer a low-risk approach to improving the aircraft's performance. The addition to the AH-1G of the drive train components from the Marine Corps' AH-1J SeaCobra attack helicopter, including the gear box for the main rotor, power train and tail rotor gear box, allow for an additional 500-lb. gross weight with the new T703 engine. The gear box will accept a 30-min. continuous rating of 1,290 shp. at sea level on a standard day.

The Army is seeking approval in Congress for $86.8 million for an AH-1G modification program, with $80.4 million of that amount earmarked for modifying 189 AH-1G attack helicopters already in the inventory with the TOW missile system, engine and drive train improvements. The Senate tactical air power subcommittee has recommended approval.

Upgrade Capability

"Since the AH-1 series helicopter with the TOW missile system will be a major part of the attack helicopter fleet through the late 1980s, we need to upgrade its operational capability," an Army official said. "We will accomplish this by modifying the engine to provide greater horsepower; modifying the transmission and replacing two gear boxes, and strengthening the tail boom and fuselage to accommodate the improved components."

For the 101 AH-1Q helicopters already being modified with the TOW missile in the current fiscal year budget, the Army plans to add the other new modifications to the aircraft by retrofitting in Fiscal 1977-1978. "Operational test and evaluation confirmed these modifications will be needed if the AH-1Q is to carry normal armament [TOWs integrated with the basic M-28 armament system in the nose turret with a General Electric 7.62-mm. Gatling-type gun and 40-mm. grenade launcher], fuel loads and a full load of eight TOW missiles," an Army official added.

Part of the request in modification includes $19.7 million to begin a program known as Quick Look 2, a three-year project modifying 16 Grumman OV-1B

radar with lesser detection range than that in the present McDonnell Douglas F-4J, but with better reliability than the

Lynx in Egypt. Primary interest is in the army version.

This action could scuttle the project because congressional and Pentagon officials alike believe research and develop-

Mohawk aircraft to electronic surveillance aircraft.

"The estimated total program cost, to include associated training and ground support equipment, is $47.9 million. The Fiscal 1975 request includes $3.4 million to convert and equip the first OV-1B airplane to the EV-1 configuration," an Army official said. He added that the basic OV-1B airframe will be modified to an improved OV-1D airframe, but the EV-1 aircraft will not be equipped with side-looking aerial radar and infrared sensors used in the OV-1Ds.

Long-Lead-Time Items

The remaining $16.3 million of the $19.7 million is to procure long lead time items required in Fiscal 1976 and 1977. The items include:

- Six AN/ALQ-133 electronic surveillance radar target locater systems—$5.7 million.
- Two training systems—$3.8 million.
- Two ground support systems—$1.5 million.
- Twelve sets of airframe conversion items—Lycoming T53-L-15 engines, 10-ft. propellers and a beefed-up landing gear—$2.9 million.
- Ground support and avionics items—$2.4 million.

Two pre-production AN/ALQ-133 models are now under construction by United Technology Laboratories, Inc., Garland, Tex. (see story, p. 61), with a unit for military qualification testing under an approximately $8-million development contract. The military qualification system will later be used for a training device. UTL officials were in Israel last week negotiating with officials there, a Pentagon official said.

The AN/ALQ-133 is scheduled for completion and integration with software routines by late 1974. The system encompasses two pods mounted outboard on the wings. The pods contain phased interferometer antennas and Elint receivers that can detect radar emissions from ground-based surface-to-air weapons systems within a 90-deg. field of view from each pod and detect frequencies in ranges as high as 18 gc., which would cover the full frequency spectrum Soviet surface-to-air missile radars used during the October Mideast war, Pentagon officials said.

The data processing equipment with the system would be mounted in the EV-1's fuselage. The AN/ALQ-133 also can be used with a data processing and radar van on the ground with a data link capability of 125-140 naut. mi. at an altitude of about 10,000 ft.

The system with its software detects targets, catalogues them, and assigns an attacking priority to the ground or other aircraft in the area in such a manner as to assist in helicopter survivability by avoidance or attack options, according to Defense officials.

New Synchronous Satellite To Aid Storm Forecasting

Washington—First weather satellite in geosynchronous orbit is expected to have a profound impact on the U. S. severe storm warning system and weather forecasting in general.

The synchronous meteorological satellite (SMS-A) is due to be launched later this week from the Kennedy Space Center. It will be the first satellite to scan continuously the same area on earth at a relatively high resolution.

In addition, SMS-A will provide data at night, whereas current civil weather satellites only provide daylight readings, according to Dr. Edward Epstein, the National Oceanic and Atmospheric Administration's assistant administrator for environmental monitoring and prediction.

"It's the utility of the information that we're looking forward to," he said. SMS-A is designed not only to provide new information in real time about formation of possible tornadoes in the U. S., but also to furnish data on tropical storms. These often develop in remote ocean areas where accurate and extensive weather data currently are not available.

The satellite was built and will be launched by the National Aeronautics and Space Administration. It will be turned over to NOAA after in-orbit checkout. Philco-Ford is the prime contractor.

SMS-A, which weighs 1,385 lb. at launch and 630 lb. in orbit, will be launched on a McDonnell Douglas Delta 2914. The satellite will spin at 100 rpm. for stabilization in orbit.

The spacecraft has four main missions:

- **Production of images.** This will be done by the visible and infrared spin scan radiometer (VISSR), the main sensor on the spacecraft.
- **Communications transmission.** Imaging data will be sent at a very high rate to a NOAA ground station where they will be "stretched" to a lower rate, retransmitted back to the satellite and sent to another NOAA station for eventual distribution to users.
- **Data collection.** SMS-A will be able to collect data from as many as 10,000 ground stations and retransmit them back to earth for analysis.
- **Space monitoring.** Onboard instruments will detect changes in the solar wind approaching earth before they are perceptible on the ground.

First mission for SMS-A will be participation in the Global Atmospheric Research Program's Atlantic Tropical Experiment (GATE). This will begin as soon as the satellite has drifted into position over the equator at 45 deg. W., about 20 days after launch.

GATE scientists place such emphasis on the importance of SMS-A to the tropical experiment that they will begin using it before checkout is complete. Satellite controllers will check out the spacecraft during those intervals each day when it is not participating in GATE. Don V. Fordyce, SMS project manager at NASA's Goddard Space Flight Center, said a net of about 90 days will be needed for complete checkout. Thus, NOAA will not take over the satellite until early fall.

However, communications will be through the NOAA facility at Wallops Island, Va., because the VISSR data are transmitted at S-band frequencies incompatible with the NASA tracking network. Tracking until orbital station is attained and information on spacecraft status will be done at VHF. The remote stations on earth, called data collection platforms, will be interrogated and transmit at UHF.

The radiometer, built by Hughes Aircraft Co.'s Santa Barbara Research Center, has eight visible channels that operate in the 0.55-0.70 micron band to provide daytime resolution of 0.5 mi. The single infrared channel operates at 10.5-12.6 microns and has a resolution of 5 mi. both day and night. The viewing telescope is 16 in. in diameter.

NOAA officials emphasize that SMS-A will not see tornadoes themselves. Rather, it will detect abrupt changes in the cloud tops and unusual cloud patterns that are indicative of tornado-producing conditions.

NOAA's goal is to be able to give at least 15-20-min. warnings of tornadoes.

Small Storms Followed

The radiometer will scan almost half the earth every 30 min. Most of the time, however, it will operate in the limited-scan mode to provide the higher resolutions needed for following storms as small as 40 mi. across.

Radiometer data will be transmitted to earth at 25 mc. during the 18-20 deg. of satellite rotation that the VISSR views the earth, or during 30 millisec. of the 600-millisec. satellite spin period.

At NOAA's Wallops Island facility, the data will be stretched, i.e., the bandwidth reduced by about 8:1, annotated and gridded. The stretched data then will be retransmitted back to the satellite at 8 mc. during the remaining portion of the satellite's rotation period.

Finally, the stretched data will be retransmitted to NOAA's National Environmental Satellite Service facility at Suitland, Md.