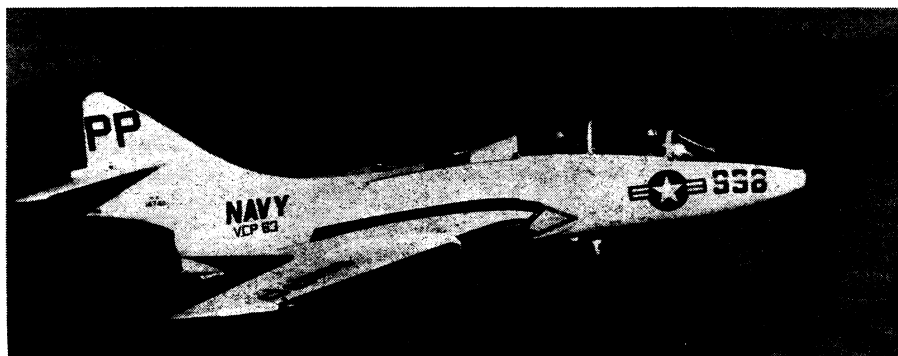


To reduce risks and costs



U.S. Navy

Grumman F-9F fighter: Guinea pig for a pilotless aircraft test program.

The frequently used science-fiction plot involving robot warfare may not be so futuristic after all. As a result of a study sponsored by the U.S. Air Force and the Rand Corp. and completed in July, a series of flight demonstrations were proposed to determine the feasibility of employing unmanned airborne weapons.

Called Remotely Piloted Vehicles (RPV), the aircrafts' combat roles include bombing, reconnaissance and even close air support. But an air superiority fighter version is of even higher interest to the military. Such a craft could perform maneuvers impossible in conventional high-performance aircraft because of physiological limitations imposed by the pilot.

Manufacturing costs could be greatly reduced through the elimination of subsystems and extra armor plate intended primarily for pilot support or protection. Reportedly, some Air Force proponents believe an RPV configured as an air superiority fighter could be built on a mass production basis for under \$250,000, a fraction of the cost of the multimillion dollar F-111A or the new F-15 fighter.

Of greater consequence is their belief that the RPV would out-perform either aircraft without any personnel risk. Preliminary designs indicated the pilotless craft could sustain a 12-g acceleration and still function as a gun or missile-firing platform. With such a capability, military engineers claim the RPV could pass an opposing fighter head-on, turn inside and get on its tail in about 20 seconds. An F-15, they say, will require nearly two minutes to perform the same maneuver.

A modest RPV program is now under way by the Air Force Systems Command at the Armament Development Test Center at Eglin Air Force Base, Fla., and at the Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio, and by a joint Navy/National Aeronautics and Space Administration team at the Naval Weap-

ons Center, China Lake, Calif.

Early flight trials to test concepts, high-speed data links and control systems have begun at China Lake using a modified F-9F fighter. Later, to approximate the lighter weight RPV, the Air Force is expected to use a Firebee BQM-34 target drone, built by Teledyne Ryan Aeronautical, Inc. Its wings will be replaced to increase the span, and additional control instrumentation plus a nose video camera will be installed. Flight testing of the pseudo-RPV may be started late this year. □

EARTHQUAKE PREDICTION

Warnings from the wells

The death and devastation wrought by earthquakes such as those in Alaska and Peru might be reduced by an adequate warning system. Many seismologists are studying ways to predict the occurrence of earthquakes, and several techniques have been proposed.

One possibility, says Dr. A. G. Sylvester of the University of California at Santa Barbara, is to monitor subterranean fluid pressures. Depleted oil wells could provide monitoring sites, he suggests. The tremors following injection of waste water into basement rocks at the Army's Rocky Mountain Arsenal near Denver (SN: 2/8/69, p. 138), are a case where shallow earthquakes may have been triggered by man-made increases in fluid pressure, which reduced the frictional resistance of the rocks to faulting.

Natural variations in fluid pressure, Dr. Sylvester points out, may also trigger quakes. Changes in flow rates of springs and creeks and fluctuations in the production rates of oil, gas and water wells are often associated with earthquakes, and sometimes precede them soon enough to provide some warning to nearby residents.

There is still some doubt about whether fluid injections do in fact cause earthquakes—the Atomic Energy Com-

mission is sponsoring a study on waste storage in bedrock—and Dr. Sylvester admits that more research is needed.

In the meantime, he feels, the hypothesis could be tested empirically by placing recording pressure gauges on depleted oil wells in the seismically active Santa Barbara Channel. The proposed system involves formidable technological and legal problems, but if it proves effective, wells may be drilled along major faults near densely populated areas to be used as barometers for prediction. In other areas, large destructive earthquakes may be prevented by injection of fluids that would release pressures in a series of minor earthquakes. □

SCIENCE NEWSBRIEFS

Ocean dumping

President Nixon this week sent Congress a Council on Environmental Quality report on ocean pollution, and announced he would follow up with legislative proposals to the next Congress. There is increasing evidence that ocean dumping—of toxic military materials (SN: 8/15, p. 137), as well as of trash in general—is doing increasing damage, said the President. The report recommends near total banning of all ocean dumping. □

Policy for power

An interagency study report sponsored by the Energy Policy Staff of the Office of Science and Technology and released by OS&T director Edward E. David Jr. last week seeks middle ground between environmentalists and the electric-power industry.

The study calls for at least 10 years planning by electric utilities on a regional basis prior to plant construction and public disclosure of such intentions at least five years before construction. It also recommends establishment of regional or state agencies to review and approve site selections and building plans or for appropriate Federal intervention if no agency action ensues. □

Mt. Ararat expedition

This summer's archaeological expedition to Mt. Ararat (SN: 6/13, p. 574) has returned to the United States without being allowed to carry out its research on the 50-ton mass of wood beneath a 14,000-foot-high glacial ice pack. The wood is thought to be connected with the Biblical story of Noah's Ark. After a summer of delay, the Turkish Government finally refused permission to the expedition as well as to a number of other archaeological researchers in the country. A primary cause for the refusal has been the country's ire over stolen archaeological artifacts that have turned up in a number of foreign museums. □