

Space-RAAM

Veteran AIM-120 dogfight missile is recast as a ballistic missile interceptor

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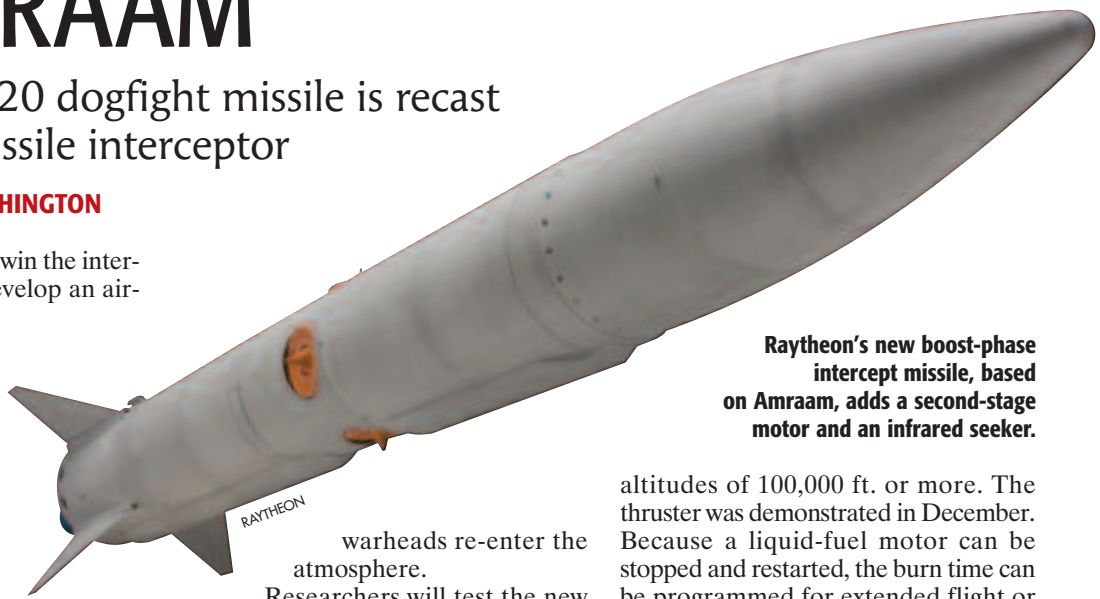
Raytheon is trying to win the international race to develop an air-launched weapon that can shoot down ballistic missiles within tens of seconds after launch. Its entry is a new, longer-range version of the AIM-120 Amraam that could be carried by manned fighters or unmanned surveillance or combat aircraft.

The missile's new second-stage, liquid-rocket motor was tested in December, and its seeker will be demonstrated this summer, says Mike Booen, vice president of advanced missile defense and directed energy weapons for Raytheon Missile Systems. The size, center of gravity and aerodynamic shape of the hit-to-kill interceptor are the same as for the AIM-120.

The concept is that long-endurance UAVs the size of the Predator B could carry adequate missiles and fly high enough to set up "launch area denial spheres," Booen says. That area of denial would be big enough to cover the missile launch complex in eastern North Korea from an orbit over international waters in the Sea of Japan. In fact, the missile could be launched from any platform that has the electrical interface for Amraam, including the F-22 Raptor or F-35 Joint Strike Fighter.

If you don't want somebody to launch missiles, "you can deny those launches with a UAV combat air patrol well offshore and out of the way," Booen says. The UAV would be positioned in the "launch tube" between the missile's firing point and the target.

The Amraam was initially designed for beyond-visual-range, air-to-air combat. But recent variants have been reconfigured for internal carriage by manned and unmanned aircraft. Others have specialized for head-on attacks of small stealth cruise missiles and for better maneuvering at the terminal stage of its flight. While the new missile is intended for engagements in the boost and ascent phase, it is also expected to have application for the terminal phase as



Raytheon's new boost-phase intercept missile, based on Amraam, adds a second-stage motor and an infrared seeker.

warheads re-enter the atmosphere.

Researchers will test the new interceptor's seeker—carried by a fighter-fired AIM-9X—against a boosting ballistic missile in late summer at White Sands Missile Range, N.M., Booen says. Because two-thirds of the missile is already in production, he predicts the company could begin to field the new weapons for less than \$1 million each in about four years. "The services or the Missile Defense Agency [MDA] can adopt these missiles [without] a large logistics bill in the future for introducing this new weapon," he says. Raytheon has offered MDA a series of tests that would leave a residual of 20 production representative missiles for more tests and a small operational capability.

The experiment is called the Network-Centric Airborne Defense Element (Ncade) because it is designed to pull real-time targeting information from many sources, including the Defense Support Program early-warning satellite constellation that provided information of Iraqi scud-missile launches against Saudi Arabia and Israel during the 1991 Persian Gulf war.

Researchers have taken the infrared sensor from the company's AIM-9X short-range, air-to-air missile and integrated it with the AIM-120 Amraam missile body and solid-fuel rocket motor as its first propulsion stage. After firing, the first stage drops away.

A new liquid-fuel second stage—the advanced hydroxyl ammonium nitrate thruster—will provide at least an extra 25-plus sec. of powered flight at more than 150 lb. thrust, Booen says. A variable direction exhaust nozzle will allow rapid maneuvering, without fins, of the missile's front half at exoatmospheric

altitudes of 100,000 ft. or more. The thruster was demonstrated in December. Because a liquid-fuel motor can be stopped and restarted, the burn time can be programmed for extended flight or to save fuel for extra axial velocity or maneuvering in the late stages of flight. The liquid fuel will be environmentally friendly.

Raytheon also has fabricated two prototype Ncade seekers, modified to pick a missile body out of exhaust. Their ability to track a booster has been tested in a high-fidelity simulator. The standard AIM-9X seeker has a single point modification of the filter wheel so that hard bodies can be picked out of the bright rocket plume.

Meanwhile, Israel has been flying a secret new Heron II unmanned aircraft with a wingspan of more than 85 ft. expected to carry two Rafael-designed missiles (see p. 32). A version of the Derby beyond-visual-range, air-to-air missile is being developed for boost-phase intercept, and an air-to-ground version of the Python short-range, air-to-air missile is being eyed for attacking mobile ballistic missile launchers.

General Atomics Aeronautical Systems, builder of the Predator UAV family, and Aerojet, maker of the new second-stage motor, have partnered with Raytheon on the project. Initially, the program was focused only on Predator B because of its altitude performance and payload, but veteran fighter pilots "pointed out that in a conflict, fighters carrying mixed loads of ordnance will be flying around the clock," Booen says. "It would be nice to have one of these missiles on the rails, so that if the enemy launched ballistic missiles, we could do something about it." The new UAVs and fighters also will have advanced infrared sensing systems and "could take target information from anywhere." ☛