

APRIL 4, 2003

NEWS ANALYSIS: TECHNOLOGY

Saddam's Surprisingly Friendly Skies

Ineffective Iraqi anti-aircraft fire testifies to U.S. supremacy in electronic warfare and countermeasures -- an industry that's set to boom

The U.S. military is breaking all records in Gulf War II when it comes to the air campaign. More than 23,800 sorties were flown in the first two weeks of the conflict in Iraq, and so far not a single U.S. or British airplane appears to have been lost to enemy fire. In the early days of Vietnam, the U.S. lost 3.2 planes for every 1,000 sorties flown, a rate that would translate into 80 downed jets in the current conflict.

A Navy F/A-18C Hornet was shot down on Apr. 2, but the circumstances surrounding its loss are still being investigated, and Central Command seems to believe it was the result of an errant U.S. Patriot missile, not Iraqi fire.

Still, the ultralow attrition rate of planes so far highlights a little-noted area of combat where the U.S. is the world leader: electronic-warfare systems. These are radar jammers, antiradar missiles, and other devices that protect U.S. planes and help them detect and destroy enemy anti-aircraft weapons. "One of the reasons we utterly predominate in the sky is we have electronic warfare, and other countries don't," says U.S. Representative Mark Kirk (R-Ill.). "This advantage by the U.S. is growing."

OLD RELIABLE. Kirk ought to know. An Air Force reservist who flew missions over Kosovo, Kirk saw the benefits of electronic warfare firsthand. "Allied aircraft would hunker up close to us. They wanted to be near the electronic support," Kirk remembers. "People's eyes glaze over when you talk about it. Only if you've ever flown in combat do you know just how vital electronic warfare is."

One of the oldest tools in the U.S. military's electronic arsenal is the EA-6B Prowler, a fly-alone plane that soars over combat zones to jam enemy radar. It was originally developed for use in Vietnam. But the Prowler's electronics have been updated several times since. So important is the Prowler's radar-jamming capability that commanders will cancel missions if the planes aren't available. Prowlers are even used on missions involving radar-dodging stealth aircraft.

A number of electronic-warfare initiatives are either making their debut in Iraq or being rolled out extensively for the first time. Towed decoys, which debuted in Kosovo, have been widely employed in Iraq. These disposable craft are released in flight, tethered to the aircraft at a safe distance. The decoys give off radar signals that fool the enemy's radar-guided missiles into thinking the decoy is the actual aircraft.

THANKS FOR THE MEMORY. The military is constantly improving its electronic-warfare capabilities. In Kosovo, Serbian anti-aircraft teams learned to dodge U.S. air-to-ground missiles. One Serbian radar site would lock onto a U.S. plane and then shut down, handing the signal off to a surface-to-air missile launcher to avoid detection. Since then, Raytheon ([RTN](#)) has upgraded the capability of its HARM (High-Speed Anti-Radiation Missile). U.S. missiles now hold the coordinates of the original radar site in their memory and will destroy the site, even if the enemy has turned its radar off. That's one reason why Iraqi radar operators may be reluctant to even turn on their equipment today.

Perhaps the newest example of electronic warfare is the Directional Infrared Countermeasure (Dircm). This laser is mounted on a turret on the side of an aircraft. Sensors on the plane detect incoming heat-seeking missiles and direct the laser toward them. The heat of the laser fools the missile into thinking the plane is somewhere else. The missile will thus fly off somewhere into the ground.

"Every conflict is increasingly waged on the electromagnetic spectrum," says Loren Thompson, chief operating officer of the Lexington Institute, a defense industry think tank. "Long term, more and more warfare is about pushing photons around on the battlefield rather than men and machines."

GOOD PLANNING. Smarter bombs are also aiding in aircraft defense. Precision weapons, guided by lasers or global-positioning satellites, allow pilots to hit targets more accurately from higher altitudes. Above 15,000 feet, planes are safe from most anti-aircraft guns and from shoulder-launched heat-seeking missiles.

While U.S. aircraft defenses are getting better, a lot of the ground work to protect U.S. and British planes came before the Iraq war even started, notes Robert Martinage, a senior analyst at the Center for Strategic & Budgetary Assessments, a Washington-based defense think tank. Because of the U.N.-imposed import restrictions, the Iraqis weren't able to upgrade their air defenses. Moreover, pre-war missions both eliminated Iraqi radar sites in the no-fly zones and mapped out potential threats elsewhere in the country. "When this war started, we had a really good idea of what their air-defense system looked like, and we systematically took it down," Martinage notes.

Of course, not all is well over the skies of Iraq. The American Hornet, like a British jet shot down the week before, may have been hit by a U.S.-launched Patriot missile, raising questions about how well the Pentagon's Identification Friend-or-Foe equipment -- a form of electronic warfare designed to help distinguish the good guy's planes from the bad -- works.

Still, the market for electronic-warfare equipment is expected to surge after the war. Forecast International, a defense-industry market-research firm, expects electronic-warfare spending to jump to around \$3 billion a year by the latter part of the decade, up from around \$2 billion today. That's good news for companies like Northrop Grumman ([NOC](#)), Raytheon, BAE Systems, and ITT Industries ([ITT](#)), which make electronic-warfare gear. It's good news for combat pilots of the future, too.

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