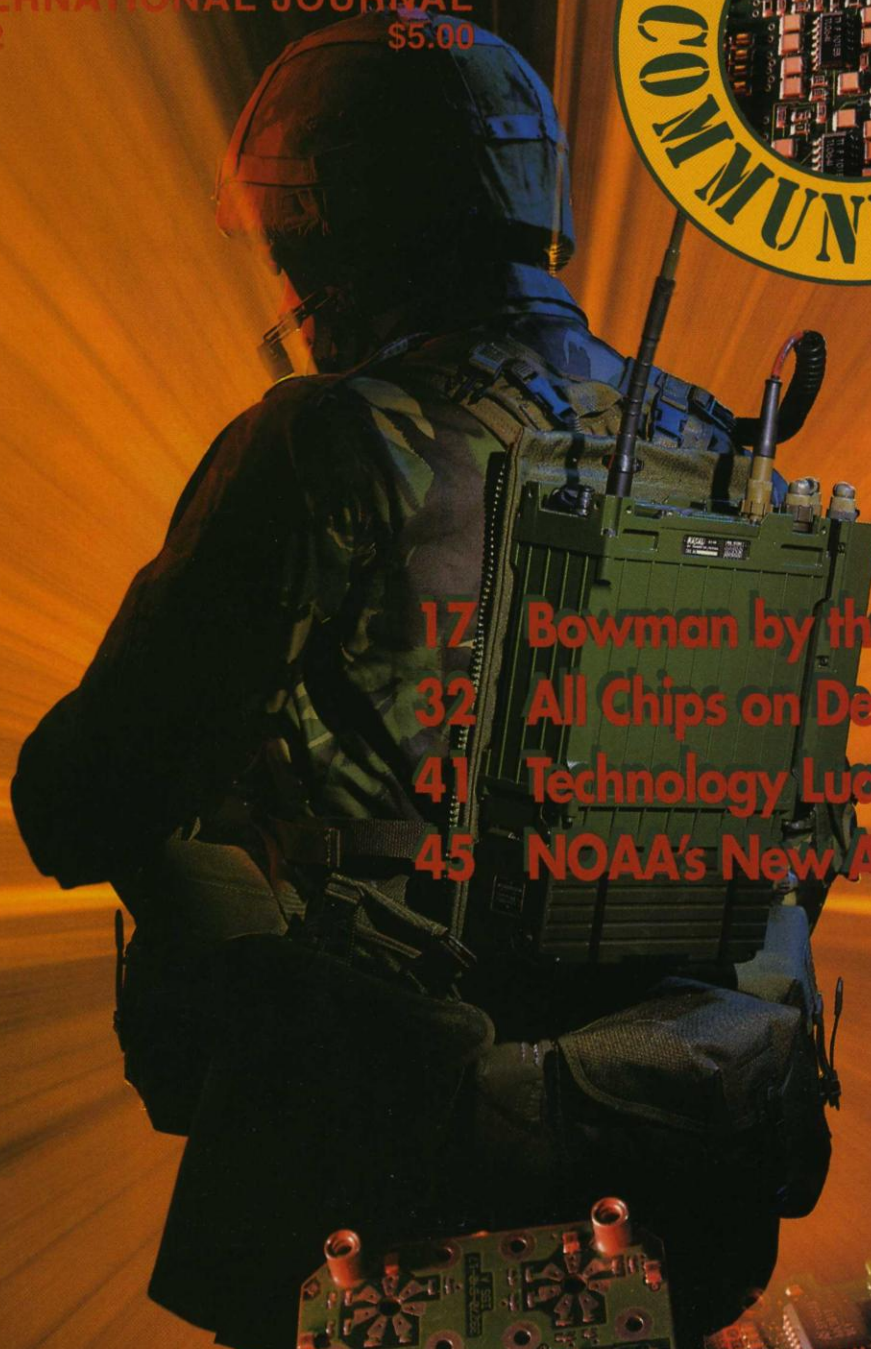
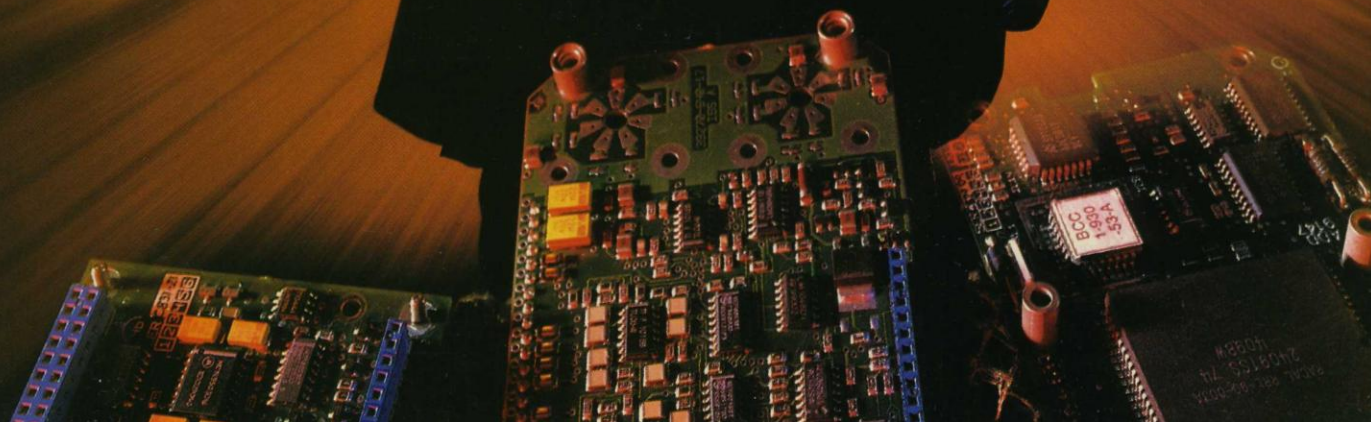


# SIGNAL

AFCEA'S INTERNATIONAL JOURNAL  
NOVEMBER 1992 \$5.00



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## COVER

The U.K. Bowman secure tactical radio program is one of the major communications efforts through the 1990s (See page 17). A \$4 billion, 60,000-radio procurement, Bowman pits international competitive teams vying for the contract. The Siemens Plessey and Racal Radio Yeoman team's 2000-V system, depicted on the cover, represents a new family of reduced size and weight very high-frequency radios. The electronic counter countermeasures radio design is based on surface mount device and very-large-scale integrated circuit technologies. Photograph by Paul Wenham-Clarke. Cover design by Kit McDuffie.

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# Aerospace Industry Defines Course at Farnborough Show

By Gerald F. Merna

Russian aerospace exhibits and business deals dominated the United Kingdom's 30th annual Farnborough Air Show in September. With a contingent of more than 300 pilots, technicians and marketing specialists, 24 aircraft and numerous models and mock-ups, the Russians took the show by storm.

The Kamov Ka-50 military helicopter, which relies on plastic composite material for 35 percent of its airframe, drew crowds. Officials pointed out that the United Kingdom's Ministry of Defence may purchase up to 130 of these combat aircraft.

Another show highlight was the Yakovlev Yak-141 freestyle fighter aircraft, which was shown in the West for the first time. A new entry from the Russians was the nimble Mil Mi-34 helicopter, which is aimed at business markets. Russia's huge Rostvertol Mi-26 helicopter also attracted interest.

## Russian Business

The excitement generated by Russia's aerospace exhibits, according to officials, was matched or exceeded by the business the Russians transacted at this international trade show. For example, Loral Space Systems, a division of Loral Corporation of the United States, has purchased two electric thrusters for its next-generation communications satellites. Officials explain that the deal represents the first

*Shrinking sales prompt teaming, retrenchment and possible cancellation of stellar ventures.*



The British Aerospace Skyhawk 200 is a multirole fighter that is winning an array of overseas customers. It is displayed in its ground support configuration.

time a U.S. company has bought space technology from Russia. These stationary plasma thrusters are to maintain the position of communications spacecraft in geostationary orbits.

The U.S. government purchased a Russian nuclear-powered space reactor, designated as Topaz, which it is studying for use on spacecraft that will travel to the planets.

Aviation industry officials at Farnborough announced an agreement between Bendix/King Air Transport Avionics, a division of the United

States' Allied-Signal Aerospace, and the National Institute of Airborne Avionics Equipment in the Commonwealth of Independent States. These entities will design and produce an array of devices including radars, flight management systems and secondary displays for new aircraft and the retrofit market, officials explain.

Britain's GEC-Marconi announced that it is seeking government approval to sell its thermal and television imaging airborne laser pod (TIALD) to Russia. The military first used this day-night targeting system in the Gulf War. The company also proposed an upgrade of the Mikoyan MiG-21 avionics suite. Officials acknowledge that funding for these projects from Russia and other nations in the Commonwealth of Independent States (CIS) remains a critical stumbling block to doing business in the former Soviet Union.

## Mir Space Station

A number of officials at Farnborough said, however, that the future viability of the European Space Agency (ESA) could well depend on CIS. Germany's Deutsche Aerospace (DASA) discussed with CIS officials the emergence of a joint program to build and operate an advanced *Mir* space station.



Russia's Tupolev Tu-204 passenger airliner has the United Kingdom's Rolls-Royce 535E4 engines.



The Matra Marconi Space optical reconnaissance satellite is a key component of the HELIOS intelligence system. The satellite is to be equipped with multifrequency radar.

Officials predict that the program will require about \$60 million. CIS is regarded as being a potentially vital component to ESA, which is suffering from severe budget cuts.

An example of this malaise, officials pointed out, is France's Aerospatiale and Dassault's Hermes spaceplane project, which industry analysts expect will be canceled. Costs associated with the project, say officials, have ballooned to about \$9 billion. Numerous design changes have added both to cost escalation and the weight of the craft. Some officials believe a possible remedy is reliance on CIS's *Buran* space shuttle.

U.S.-based Lockheed Corporation has an arrangement with Russia's NPO Energia to determine whether a modified Soyuz TM manned space ferry can be used for the U.S. *Freedom* space station. The U.S. National Aeronautics and Space Administration (NASA), officials said, has agreed to work with Russia on using a Soyuz as an interim assured crew return vehicle. This craft would permit three *Freedom* space station crew members to return safely to Earth in the event of an emergency. Analysts expect this vehicle to be operational by 1997.

#### Sweden's Bid

Sweden also adopted a high profile at Farnborough. Defense Minister Anders Bjorck told reporters that his

government has approved production of 140 JAS 39 Gripen fighter aircraft. The defense minister also said that Germany would be given classified performance information on this multirole fighter. The German Ministry of Defense is said to be looking around for an alternative to the proposed European Fighter Aircraft (EFA). Sweden also put on display the Saab 2000, a new regional airliner that provoked interest among potential buyers.

British Aerospace, the United Kingdom's largest defense company, also mounted a major effort. The company presented the most comprehensive exhibition of military wares of the show. The site occupied by this equipment commanded several acres. Officials conceded that British Aerospace's regional airliner division would be sold if aircraft sales did not pick up. The company subsequently announced that it had made a \$400 million sale to Taiwan for medium- and short-range passenger aircraft. British Aerospace also said a French airline had agreed to spend \$25 million for six 19-seat Jetstream Super 31s.

France's Airbus Industrie fly-by-wire A340 Airbus made an embarrassing appearance. Flown in from Toulouse by chief test pilot Pierre Baud, it was stuck on the taxiway for more than an hour. Airbus Industrie Vice President for Corporate Communications Robert Alizart attributed the

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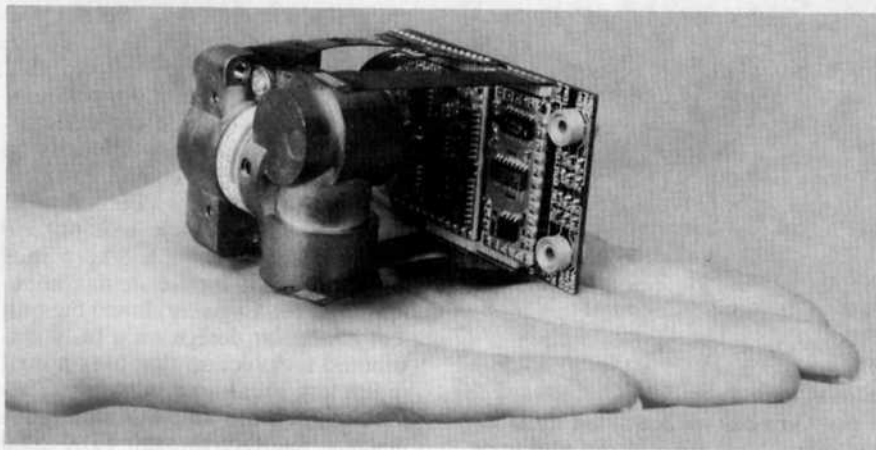
	16 $\mu$ m TAPE	13 $\mu$ m TAPE
D-1S	1.1x10 <sup>11</sup> bits	1.5x10 <sup>11</sup> bits
D-1M	3.4x10 <sup>11</sup> bits	4.5x10 <sup>11</sup> bits
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British Aerospace's Merlin 3-Axis package is a key component of the Merlin terminally guided mortar munition, which can knock out armored vehicles.

stall to a hydraulic snag. He added that the mechanical mishap was a "small problem." This regional airliner generally was regarded by officials as the most important aircraft at the biennial air show. Airbus Industrie sales were described as being robust by officials, who pointed to sales of about \$7.5 billion this year and a 900-aircraft backlog—which equates to about five years of production.

### Smart Mortar

British Aerospace exhibited a rate gyroscope system for the Merlin terminally guided munition 81 millimeter mortar. This gyroscope converts the rather primitive weapon into a precision system that allows a mortar round to home on and hit the top of armored vehicles. Another product on display was the company's LINS 300 laser inertial guidance system. This equipment has been selected as the primary inertial reference unit for the navigation element of the Royal Navy Merlin antisubmarine warfare helicopter. This system is being used on a number of other military aircraft, officials explained.

The fate of European Fighter Aircraft commanded acute interest at Farnborough. British Aerospace officials confirmed that sharp cuts are in the offing. They said a 30-percent reduction is necessary to secure survival of the troubled advanced fighter program. Cost cutting will encompass major subsystems, including the engines and radar systems, they related.

Serge Dassault, chairman and chief executive officer of France's Dassault Aviation, asserted that cancellation of the European fighter program would have dire consequences on all European aerospace companies. His company is building the rival Rafale advanced fighter, but Dassault believes competition is critical. He said that continuation of the project would rely on German and Italian support. Das-

sault notes that three Rafale prototypes currently are flying.

Dassault added that his company is engaged in talks with British Aerospace on what he termed a "post-Rafale and EFA" future combat aircraft.

At one point during the show, Italian Defense Minister Salvo Andò, Italian Air Force Chief of Staff Gen. Stelio Nardini and Alenia Chairman Fausto Cereti, were seen on their way to confer on the fighter program's future with counterparts from other participant nations.

### Gray Skies

Steel gray skies that often shrouded the huge show served as a metaphor of the tight market conditions that companies around the world continue to confront. The U.S. presence this year was muted, said officials. Many exhibitors, reacting to austere market conditions, complained they were required to participate in too many international air shows. Several company officials strongly suggested that two exhibitions, at most, was tolerable, although many advocated a single international aerospace exhibition.

Germany has entered the arena with a major air show, and Japan announced that it also would sponsor an international aerospace event.

The importance of aerospace technology and the vulnerability of current markets was addressed specifically by a senior official from the United States at Farnborough. Lawrence B. Ryan, deputy assistant secretary for technology and aerospace industries of the U.S. Commerce Department, said the U.S. aerospace industry remains the key exporter of goods. Ryan added that last year this sector exported \$43 billion worth of products to 135 nations. Of that sum, \$17 billion in sales came from the European Community. The United States, by comparison, imported from the European Community \$8 billion in aerospace products.

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The Hughes Longhorn missile, a variant of the Maverick, is propelled by a turbine engine and has a range of 40 nautical miles. Note the infrared seeker on the missile's nose. A millimeter wave radar version is under development.

Lawrence cautioned that aerospace companies generally are suffering from shrinking military purchases and increasingly rougher competition in the commercial arena. Analysts in the United States and elsewhere, he explained, anticipate further "market-place contractions" in 1993. Lawrence said U.S. companies are beginning to seek "new international partnerships" aggressively in a campaign to overcome or, at least, ameliorate the tight market situation.

### Theater Missile System

Lockheed went to the show with a \$689 million four-year contract for the theater high altitude air defense (THAAD) program. The missile is a key component of the global protection against limited strikes system.

Lockheed officials also discussed an experimental sensor that gives 20 to 40 seconds warning of windshear. Lockheed Missiles & Space officials said such performance has been achieved by the National Aeronautics and Space Administration (NASA)/Lockheed coherent Lidar airborne shear sensor. This equipment has been undergoing trials on a NASA Boeing 737 in Denver and currently is being used in Orlando, Florida.

Boeing Commercial Airplane Group officials related at the show that production of aircraft has hit a record high. One official noted that the company's Seattle, Washington, facility is rolling 1.8 aircraft a day off its assembly lines.

In other business action, France, Germany, Italy and the Netherlands secured a North Atlantic Treaty Organization contract worth more than \$1.6 billion for the development phase of the NH.90 military transport and frigate-borne antisubmarine warfare helicopter. Companies participating include Agusta of Italy, Eurocopter of France, Eurocopter Deutschland of Germany and Fokker of the Netherlands.

Companies will produce five proto-

types, with the first flight set for late 1995. Production delivery is scheduled for 1999. France will handle 42.4 percent of the work, with Italy receiving 26.9 percent; Germany, 24 percent; and the Netherlands, 6.7 percent. Total market for the NH.90 is an estimated 1,200 aircraft, according to officials.

C&H Engineering, Incorporated, Austin, Texas, and British Aerospace Systems and Equipment, Limited, are joining forces to produce VME and VXI computer modules for the British Ministry of Defence and the U.S. Defense Department.

According to Dr. Fred Harrison, president and chief executive officer of C&H, the modules will be used for military training and systems simulation, data acquisition and automated testing. These new products also have application in commercial avionics, Harrison notes.

### Direction Finder

Collins division, a subsidiary of Rockwell International, showed off the MDF-124F multiband direction finder, which is produced by a French subsidiary at Blagnac Cedex. This search and rescue aircraft equipment continually scans three distress beacon frequencies—121.5 and 243.0 megahertz for close-up detection and 406 megahertz for long-range detection.

Rockwell International's tactical systems division displayed a full-scale model of the AGM-130 stand-off missile, which has attracted the interest of the British Ministry of Defence. This missile will be turbo-jet powered and have a range of about 150 miles with a 2,000-pound warhead and about 100 miles with a 3,000-pound warhead. Designers envision that missile launch will occur at an altitude of 2,000 feet.

Collins also unveiled a new high frequency radio propagation management tool called the PropMan and a "smart" six-inch x eight-inch color liquid crystal display (MDF-900) that combines both the display and the display gener-

ator in a unit requiring less than 10 inches of depth for cockpit installation.

Thomson-CSF, which featured civil aviation and airborne military equipment as well as missile and detection systems, placed primary emphasis on its Eurocat air traffic control complex. Thomson-CSF envisions Eurocat as an adaptive system that can absorb advanced technologies and keep pace with future air traffic management requirements. Engineers based the project's modular design on a fully distributed architecture that uses a dual redundant local area network. This system includes an advanced man-machine interface through TDX 2000 high performance 2,000-line raster scan displays and a family of reduced instruction set computing (RISC) computers for all processors.

Two-year-old Matra Marconi Space, the first fully integrated European Space Agency company, has been named the prime contractor for the military reconnaissance HELIOS 1 and 2 strategic observation and optical reconnaissance satellites and for the associated ground-level facilities. In addition to visible imagery efforts, further development may include an infrared capability and, ultimately, a multifrequency radar system to acquire intelligence regardless of weather conditions.

### U.K. Missile Competition

Hughes Aircraft Company featured an array of items including electro-optical systems, airborne surveillance equipment, helicopter-borne sonar and airspace management systems. Hughes and the United Kingdom's Siemens Plessey Systems and NFT of Norway have joined forces to vie in the U.K. medium surface-to-air missile system competition. The advanced surface-to-air missile system, or ADSAMS, is being proposed as this group's candidate. Among other exhibits is the Hughes TPQ-36A battlefield air defense radar, which the U.S. Army selected for its ground-based sensor as part of the forward area air defense system. Hughes is seeking to sell the system to Britain's Ministry of Defence.

Hughes officials also announced a teaming agreement with Siemens Plessey Systems of the United Kingdom for the development of the high performance radar. Officials explain that the United Kingdom could use this active array ground-based radar in its medium surface-to-air missile system. The program will rely in part on technology developed from the multifunction electronically scanned adaptive radar, a project of Siemens Plessey systems and the United Kingdom's Defence Research Agency.

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