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Backplanes stretch bandwidth limits

Increases in data throughput and processing power are transforming embedded architectures. **PAGE 18**

Military budgets

Pentagon budgets for military electronics looking up for next year. **PAGE 4**

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Shipboard electronics

*Navy pushing for
more ships, improved
combat systems, and
electronics upgrades.* **PAGE 8**

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Backplanes pushing bandwidth limits

Big increases in data throughput and processing power, coupled with demands for reductions in size, weight, and power-consumption are forcing a fundamental transformation in embedded architectures.



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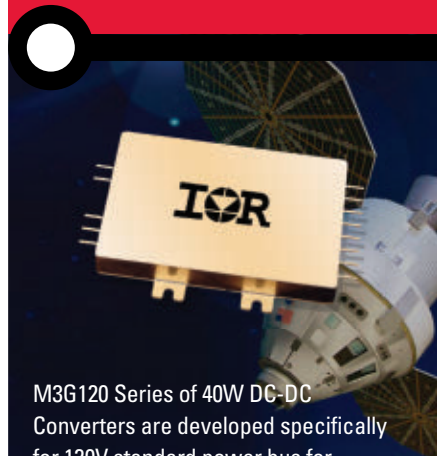
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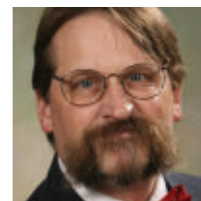
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Buyers Guide living simultaneously in print and online

This month's issue contains the 2015 *Military & Aerospace Electronics Buyers Guide*—an easy-to-navigate resource for you to use all year. This guide contains aerospace and defense electronics and electro-optics product information from hundreds of vendors, consisting of board products, integrated circuits computers, communications, sensors, power electronics, software, electro-optics, RF and microwave products, and more. This guide is for engineers, engineering managers, program managers, and company executives who are involved with military and aerospace electronics applications.

All the information is here in one source that you can keep handy all year, with the who, what, when, where, and why information you need to start your product search.

This print *Buyers Guide* categorizes products and services in the table of contents in alphabetical order within each category. Advertisers have a bullet before their company listings with ad page number. The vendor directory gives complete company information, including company description. The indexes for products and services and for advertisers are in the back of the guide.

We are dedicating many pages in this month's issue to buying information, because we know it's important.

This print *Buyers Guide* will be useful in narrowing down product searches, and getting to know a potential universe of suppliers for your specific needs; yet, we realize that we can provide much more easy-to-use information in a media other than print.

With all the information that is available to you in the print *Buyers Guide*, we admit that print has its limits. It comes out once a year, with no updates, and cannot accurately reflect company listings throughout the course of the year. That's the reason we would like to draw your attention not only to the print *Buyers Guide* in the back of this magazine, but also to the *Military & Aerospace Electronics* online Buyers Guide at www.military-aerospace.com/buyersguide. You can go directly to this online information with this URL, or you can access it from the *Military & Aerospace Electronics* homepage at www.military-aerospace.com, and clicking on the BUYER'S GUIDE icon on the top flag.

We're touting the online buyers guide because of the ease-of-use, broad functionality, search and sorting capability, as well as for the sheer deep amount of information that we can and do put online that we never could fit into a print *Buyers Guide*.

The online guide, for example, lets you search on specific companies and products, yet also enables you to

browse by product categories, companies, or specific products with a simple click. Online product categories consist of board products; communications and peripherals; components, power electronics, and sensors; computers; diagnostics and control; electro-optics; navigation; platform systems and subsystems; RF and microwave; safety equipment and components; services; software; test and measurement; and thermal management and cooling systems.

The Buyers Guide covers products pertaining not only to *Military & Aerospace Electronics*, but also to our sister publication, *Intelligent Aerospace*. Combining products and services from both franchises helps make our online search capability and utility to readers better than ever.

You can check back to the *Military & Aerospace Electronics* online Buyers Guide day after day, week after week, and month after month, because the companies and products are updated continuously. Moreover, the Buyers Guide includes listings from our All Access members that include the latest company announcements, new products, events, and more.

In the future, we are looking at even easier search capability, wider variety of technology topics, and broader ability for vendors to include and edit their own listings. ↙

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DOD budget for communications, electronics, and intelligence headed up after two flat years

BY JOHN KELLER

WASHINGTON—U.S. military electronics spending appears to be headed back up next after two years of modest funding levels. The U.S. Department of Defense (DOD) is asking Congress for \$11 billion in fiscal



U.S. defense spending for communications, electronics, telecommunications, and intelligence could be heading upward next year if Congress approves the Pentagon's request.

2016 for procurement and research in military communications, electronics, telecommunications, and intelligence (CET&I) technologies.

The Pentagon's 2016 CET&I request is up 13.4 percent from the \$9.7 billion that Congress allocated for these accounts for this year. The Pentagon released its 2016 DOD budget request in February.

The \$11 billion request for communications, electronics, telecommunications, and intelligence equipment and research is the highest in at least two years. These accounts contained \$15.1 billion as recently as fiscal 2012.

The DOD request for CET&I procurement and research does not in-

clude military activities with substantial electronics content, such as aircraft avionics, vetronics, and missile guidance; when these are added, DOD spending levels for military electronics and defense electro-optics next year could approach \$90 billion, industry analysts believe.

The DOD's CET&I budget request for fiscal 2016, which begins next October, includes \$7.9 billion for procurement, which is up nearly 18 percent from this year's congressional enacted level of \$6.7 billion.

The proposed budget also requests \$3.1 billion for CET&I research, development, test, and evaluation (RDT&E), which is up 3.5 percent from this year's enacted level of \$2.97 billion.

Highlights of the Army's CET&I 2016 budget request include \$783.1 million for the Warfighter Information Network-Tactical (WIN-T); \$118.1 million for the Defense enterprise Wideband Satellite Communications Systems; \$103 million for the Installation Information Infrastructure Modernization program; and \$314.4 million for the Distributed Common Ground System-Army (DCGS-A).

CONTINUED ON PAGE 6 ➔

IN BRIEF

▶ DARPA wants unmanned sensors to monitor Arctic

Military researchers are asking industry to develop unmanned sensors able to operate in harsh environments to monitor surface, aircraft, and submarine traffic above the Arctic Circle. Officials of the U.S. Defense Advanced Research Projects Agency (DARPA) in Arlington, Va., released a solicitation (DARPA-BAA-15-28) for the Future Arctic Sensing Technologies project, which seeks to capitalize on commercially developed technologies to monitor the Arctic region for military activity. For this project DARPA remote sensing experts are asking for proposals for low-cost unmanned air, surface, and subsurface sensing systems for the Arctic, including ways to deliver sensor information to remote sites.

▶ Boeing to upgrade airborne communications

Military strategic communications experts at Boeing are moving forward on a major project to upgrade low-frequency communications designed to connect U.S. command authorities with submerged ballistic missile submarines in times of national emergency. Officials of the U.S. Air Force Life Cycle Management Center at Tinker Air

CONTINUED ON PAGE 6 ➔

Army considers deploying missile that shoots down rockets and artillery

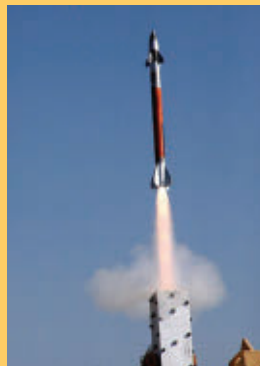
BY JOHN KELLER

REDSTONE ARSENAL, Ala.—Lockheed Martin Corp. has developed hit-to-kill missile technology to destroy incoming rocket, artillery, and mortar rounds before they can do damage. The technology could be deployed with U.S. Army forces within the next five years.

Army Contracting Command officials at Redstone Arsenal, Ala., announced a potential \$46.5 million five-year contract in February to the Lockheed Martin Missiles and Fire Control segment in Grand Prairie, Texas, to demonstrate Extended Area Protection and Survivability

(EAPS) Integrated Demonstration (ID) technology, and begin moving it to an Army program of record.

Lockheed Martin will demonstrate the mobile, ground-based technology necessary to acquire, track, engage, and defeat incoming enemy rocket, artillery, and mortar rounds, as well as enemy cruise missiles and unmanned aerial vehicles (UAVs). Once demonstrated to the Army's satisfaction, Lockheed Martin will



The Lockheed Martin Extended Area Protection and Survivability (EAPS) system is designed to shoot down incoming rockets, mortars, and artillery shells.

switch EAPS ID technology into the Army's Indirect Fire Protection Capability Increment

2-Intercept (IFPC2-I) program. It will provide 360-degree protection and engage threats from different directions and altitudes simultaneously.

IFPC2-I block 1 will have one or more interceptors, fire-control sys-

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BUDGET CONTINUED FROM PAGE 4

Highlights of the Navy's CET&I request include \$103.2 million for the AN/SQQ-89 surface anti-submarine warfare combat system; \$214.8 million for attack submarine acoustics; \$146.97 for the

Fixed Surveillance System wide-area sonar; \$148.2 million for shipboard information warfare exploitation; \$279 million for the Consolidated Afloat Networks and Enterprise Services (CANES) program; and \$118.1 million for the

Navy Multiband Terminal (NMT).

The Air Force CET&I request includes \$140 million for strategic command and control; \$43 million for general information technology; and \$92.4 million for base communications infrastructure. ◀

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IN BRIEF

CONTINUED FROM PAGE 4

Force Base, Okla., announced a \$67.4 million contract modification to Boeing Aerospace Operations in Oklahoma City, Okla., to design and build the low-frequency transmit system for the Air Force E-4B Advanced Airborne Command Post jet. The E-4B is a converted Boeing 747 jumbo jet for the National Command Authority to use as a survivable command post for control of U.S. forces in all levels of conflict including nuclear war.

► Military light vehicle market set to explode

International demand for light wheeled military vehicles is set for explosive growth, fueled by the U.S. military Joint Light Tactical Vehicle (JLTV) program and associated vetronics, predict Forecast International analysts in Newtown, Conn. The market will produce more than 36,000 units worth at least \$30.9 billion through 2024 despite the ongoing worldwide economic crisis. The U.S. Department of Defense wants to buy 54,599 JLTVs. ◀

ARMY CONTINUED FROM PAGE 5

tem, a multimission launcher, and a Sentinel software upgrade to help the system shoot down UAVs and cruise missiles. IFPC2-I block 2, meanwhile, will develop interceptors, sensors, and fire control to shoot down rockets, artillery shells, and mortar rounds. The IFPC2-I system will use the Army Integrated Air and Missile Defense (IAMD) Command and Control (C2) open systems architecture, which includes several different sensors that will hand off targeting data from the IAMD to the IFPC2-I system.

Over the past four years, Lockheed Martin has been developing an affordable, agile, hit-to-kill interceptor rocket that is less than three feet long, about two inches in diameter, and less than 10 pounds at launch. Lockheed Martin engineers are aiming at an Army cost target of \$16,000 per round. The Lockheed Martin EAPS interceptor has a high frequency fire control sensor, and a hit-to-kill interceptor that can destroy incoming rockets, artillery, and mortar rounds at tactically significant ranges, company officials say.

Three years ago Lockheed Martin flight-tested an EAPS ID rocket at White Sands Missile Range, N.M. During the flight test, the tactically configured miniature hit-to-kill (MHTK) interceptor was launched vertically and then performed a series of maneuvers to demonstrate required performance while capturing data. Additional EAPS ID tests were conducted later in 2012.

Lockheed Martin will build a functional EAPS ID unit called the EAPS Battle Unit to demonstrate the system's ability to shoot down rock-

ets, artillery, and mortar rounds before the incoming munitions can do damage. Following demonstration, the interceptors will be folded into the Army's IFPC2-I system.

The Army Contracting Command is awarding the contract on behalf of the Army Aviation and

Missile Research, Development and Engineering Center, Weapons Development, and Integration Directorate at Redstone Arsenal, Ala. ←

FOR MORE INFORMATION visit Lockheed Martin Missiles and Fire Control at www.lockheedmartin.com/us/mfc.

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Navy shipbuilding pits technology versus dollars



The Navy's plans for the last 20 hulls of its still-building class of 52 littoral combat ships will be modified dramatically by redesign and designation as frigates feature more capable weapons, sensors, and combat systems.

Seagoing service pushing for more ships, improved combat systems, and shipboard electronics upgrades, while trying to balance the Navy's future needs with limited Pentagon budgets.

BY **Edward J. Walsh**

The U.S. Navy achieved significant goals for shipbuilding, integration of key shipboard weapon systems, and supporting science and technology development last year that promise to enhance maritime warfighting capabilities.

The sea service last December also announced a major course change for shipbuilding with the unveiling of a plan to modify the

littoral combat ship (LCS) as a "small surface combatant (SSC)" for the final 20 of the planned 52 ships.

For Navy operations, Vice Adm. Thomas Rowden, commander of Naval Surface Forces, announced that Navy surface warships are shifting to a new tactical concept called "distributed lethality." This concept emphasizes offensive tactics to support Chief of Naval Operations

Adm. Jonathan Greenert's baseline Naval tenet of "warfighting first."

In articles, speeches, and briefings, Rowden, Atlantic Surface Force Commander Rear Adm. Peter Gumataotao, and Rear Adm. Peter Fanta, the Navy's Director of Surface Warfare, defined the new concept as a methodology based on "the emergence of sophisticated sea-denial strategies [that] has driven a need to shift to an offensive imperative to control the seas."

Rowden and Fanta said at the Surface Navy Association symposium in January that when the Cold War ended, the U.S. Navy emerged unchallenged and dominant and the

Innovation That Cools.

mindset of surface warriors shifted from offense to defense. "Lack of a blue-water foe influenced warfare analysis and led to cashing in on the peace dividend," Fanta says. "The world has changed—the surface Navy is rethinking its role and going on the offensive. The surface force will be more lethal, both in architecture and operations."

This new focus means looking at the fleet as a system, and adding new weapons and sensors as backfits for lethality upgrades, such as an anti-surface missile for surface combatants, and even offensive weapons for logistics ships for a fleet "bristling with offensive capability," Fanta says.

Shipbuilding

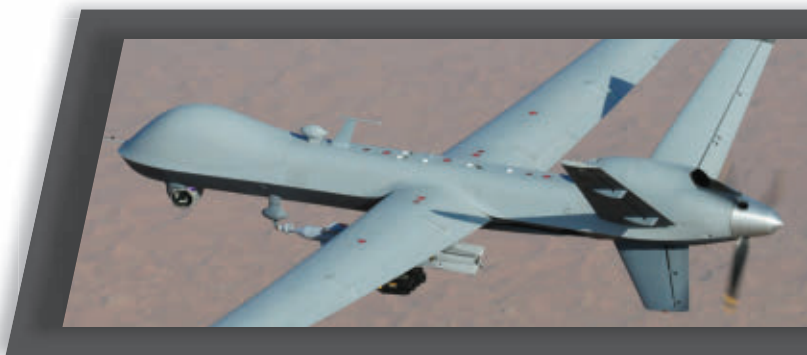
Navy estimates for high long-term costs of its shipbuilding, maintenance, and modernization plans have raised concerns in Congress in recent years.

The Navy's five-year shipbuilding plan from 2015 to 2019 calls for construction of 44 battle force ships, up from 41 in the previous plan, with the goal of maintaining a fleet of 306 ships. The ships now planned are 10 Arleigh Burke-class destroyers, 10 Virginia-class attack submarines, 14 littoral combat ships, one Gerald R. Ford-class aircraft carrier, one America-class amphibious assault ship, one mobile landing platform, three fleet oilers, and four fleet tugs.

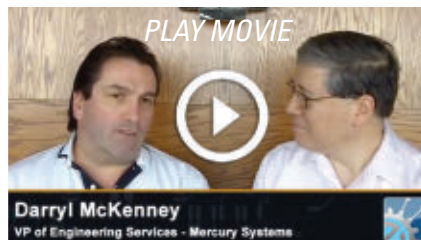
The Congressional Research Service warned last summer that the 306-ship goal reflects projected defense spending levels which, if cut significantly, would require a modified plan. The 306 target is the lowest since the Navy's early 2005 plan that projected between 260 and 313

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The Navy's Ticonderoga-class cruisers like the USS Antietam, shown above, will be fitted out with a new version of the Aegis computer program, called baseline 9A, that will provide new capability against cruise missile threats.

ships. Since then the target shifted from 313 in February 2006, modified to 328, then back to 310 to 316 in early 2012.

Navy Secretary Ray Mabus says that in response to Congressional attempts to cut funding for new ships, "I'll defend shipbuilding as long as I can," noting that 70 ships have been put on contract in the past five years, compared to 27 in the five years before he took office.

Meanwhile, the Navy continues to push for modernizing in-service ships. In a statement to Congress last summer, the Assistant Secretary of the Navy for Research, Development and Acquisition Sean Stackley acknowledged that "in the context of current and projected fiscal constraints ... we do not expect to be able to produce new ships in greater numbers." He added that "modernization is the key to readiness and relevant combat

capability in the current and future fleet."

Navy leaders have struggled to fund their modernization programs, underlined by a proposal in the President's FY 2015 budget to take 11 Ticonderoga cruisers and three amphibious assault ships temporarily out of service starting in 2015 for a phased modernization to upgrade ship machinery, conduct extensive maintenance, and install, integrate, and test new combat systems.

Navy officials argued that the plan would save \$4.7 billion over the life cycles of the ships while allowing the Navy to extend the ships' service lives to between 44 to 51 years. However, subcommittee chair Rep. Randy Forbes called the plan "phased euthanasia," recalling the Navy's plan a year earlier to decommission seven Ticonderoga-class cruisers. Congress rejected the Navy plan and adopted an alternative

based on modernizing two of the ships at a time.

Work is in progress for several major programs, ranging from two Ford-class aircraft carriers, Burke-class destroyers, littoral combat ships, joint high-speed vessels (JHS-Vs), and logistics ships.

Last September Huntington Ingalls Industries in Newport News, Va., laid the keel for the Burke-class Ralph Johnson (DDG-114) at its Pascagoula, Miss., shipyard and started fabrication for Paul Ignatius (DDG-117), first ship of the Navy's FY 2013-2017 multiyear contract for the class. Huntington also is building John Finn (DDG-113). All are called Flight IIA ships; a dramatically upgraded Flight III design is planned to start with the second ship funded for next year.

General Dynamics Bath Iron Works in Bath, Maine, is building the Burke-class destroyers Rafael Peralta (DDG-115), Thomas Hudner (DDG-116), and Daniel Inouye (DDG-118).

In late October Huntington launched John P. Murtha (LPD-26), the tenth of the 11-ship San Antonio-class helicopter-dock landing ships, set for delivery in 2016. The company also is building the last ship of the class, Portland (LPD-27). The San Antonios provide 23,000 square feet of vehicle storage and can accommodate a landing force of 800 Marines with their vehicles and equipment.

Huntington is building the 844-foot, 45,000-ton Tripoli (LHA-7) — the second of the America (LHA-6) amphib class, which are designed without a welldeck because they support aviation to move Marines ashore.

The Navy continues to build

two littoral combat ship types, the 389-foot-long Freedom (LCS-1) variant, which displaces about 3,200 full-load tons and resembles a conventional surface combatant, and the 406-foot-long trimarin three-hulled Independence (LCS-2) ships, which displace 3,100 tons fully loaded.

Lockheed Martin Corp. and Marinette Marine Corp. of Marinette, Wis., are teamed for the Freedom variant, which are designated by odd-numbered hulls and General Dynamics and Austal USA for the even-numbered trimarins. Both are designed to take aboard three separate mission packages: surface warfare; anti-submarine warfare (ASW); and mine countermeasures.

The packages consist of the weapon systems for each of the three missions; the personnel to support each mission; and two variants of the Seahawk helicopter—the MH-60R for surface warfare and ASW, and the MH-60S for mine countermeasures.

In October, the Lockheed Martin-Marinette Marine team launched Detroit (LCS-7). The team is building Little Rock, Sioux City, Wichita, and Billings, hull numbers LCS-9, -11, -13, and -15 respectively. In August, Austal launched Montgomery (LCS-8) at its Mobile, Ala., yard where it also is building Gabrielle Giffords (LCS-10), and three other LCSs. Freedom and Independence are in operational service. In spring 2014, both participated in RIMPAC, the massive joint naval exercise of the allied Pacific navies.

In September the Navy's program executive offices (PEOs) for integrated warfare systems and littoral combat ships oversaw the test

launch of a Norwegian-built Kongsberg long-range precision strike missile from Coronado (LCS-4). The Kongsberg weapon is fielded aboard Norway's Nansen-class frigates and Skjold-class missile torpedo boats. While not planning to buy

the missile, Navy officials cited the launch as an example of the new "distributed lethality" concept

Coronado conducted dynamic interface testing with the MQ-8B Fire Scout unmanned helicopter from Northrop Grumman Corp. The "B"



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variant is planned for integration with the LCS mine warfare and surface warfare modules.

Austal also is building 10 JHSVs for rapid transport of personnel and equipment at speeds to 40 knots. Four have been delivered and three more are under construction.

Rear Adm. Brian Antonio, PEO for littoral combat ships, said in January that the plan to modify the LCS design to produce 20 small service combatants, which Mabus says will be designated formally as frigates (FFs), will upgrade lethality and survivability. The new FFs will retain the LCS modular design but focus on surface warfare and ASW, and leave the mine countermeasures work to the LCS vessels.

Then-Secretary of Defense Chuck Hagel last year directed the Navy to establish a small surface combatant task force. In December, the task force revealed that, rather than shift to either of the two LCS variants for the new ship, it will add to a more capable radar, longer-range surface-to-surface missile, a towed-array sonar, and several other upgrades. The task force is due to report to the secretary of defense again in May.

The first new SSC/FF is to start construction in 2019, when the first 32 littoral combat ships are expected either to be in service or close to completion.

In other shipbuilding achievements, in November the mobile

landing platform Lewis B. Puller (MLP-3) completed float-off from General Dynamics National Steel and Shipbuilding's San Diego shipyard. Puller is the third MLP, following Montford Point and John Glenn, and the first so-called afloat forward staging base (AFSB), designed to provide aviation, berthing, equipment staging, and command and control.



The Navy's Arleigh Burke-class destroyers like the USS Donald Cook, shown above, are going through an extensive retrofit, including air defense and undersea combat systems, ship control and machinery systems.

The Puller AFSB, unlike the first two MLPs, has a flight deck and provides more than 25,000 square feet of vehicle and equipment stowage, and repair spaces. The ship will be manned by a rotating crew of civilian mariners and Navy personnel, operating forward as an afloat base for maritime security, mine warfare, counter-piracy, and humanitarian relief missions.

The MLPs can submerge partially to offload cargo, as well as launch fast landing craft to move cargo rapidly from maritime prepositioned ships to shore.

The new land-attack destroyer Zumwalt (DDG-1000), built at Bath

Iron Works, started major system lightoff last summer, when the ship's generators, fuel systems, and advanced induction motors were turned on for the first time.

Systems integration and engineering

Cruiser and destroyer modernization, built largely around work by Lockheed Martin's Mission Systems and Training (MST) business unit in Moorestown, N.J., long-time prime for the Aegis combat system, continued to be the centerpiece of ship upgrades in 2014. Destroyers beginning with Oscar Austin (DDG-79), the first "Flight II" ship, will receive the full modernization suite: the enhanced baseline 9 Aegis combat system program for ballistic missile defense (BMD)

and anti-air warfare, called integrated air-missile defense (IAMD). The program also calls for upgrades to the ships' ASW systems and machinery and ship control.

In October, John Paul Jones (DDG-53) used its 9.1C Aegis baseline integrated with the BMD 5.0 capability during an exercise to track a ballistic missile and a cruise missile. Later, the John Paul Jones intercepted a ballistic missile with an SM-3 block 1B missile, and then intercepted two cruise missiles simultaneously with two SM-2 block 3A anti-air missiles, says Jim Sheridan, Lockheed Martin's director of U.S. Navy Aegis programs.

For the FTM-25, Sheridan adds, the three outbound missiles were in the air at the same time, demonstrating the ship's integrated air-missile defense capability. The testing, Navy officials say, validated John Paul Jones as the Navy's first IAMD ship.

"The Aegis combat system development is a continuous evolution," Sheridan says, adding that the introduction of new baselines will follow parallel tracks for the destroyers now in service and new construction ships. The 9.C1 baseline will go aboard new-construction ships, DDGs-113 through -118. The next ship, DDG-119, will be fitted with a new 9.C2 baseline.

Installation of 9.C1 aboard Jones was completed in 2013. Barry (DDG-52), Benfold (DDG-65), and Arleigh Burke (DDG-51) started their availabilities in 2014. Modernization will continue on a one ship/two ship per year progression forward until baseline 9.C2 becomes available, with DDG-80 possibly the first ship to get it.

The comprehensive upgrade will add the naval integrated fire control-counter air (NIF-CA) capability; Cooperative Engagement Capability (CEC); evolved Seasparrow air-defense missile; Phalanx close-in weapon system block 1B; a new electronic warfare system called the surface electronic warfare system improvement program (SEWIP) resulting from redesign of the obsolescent SLQ-32(v) shipboard system.

Lockheed Martin's Sheridan describes the NIF-CA as a federated system of systems. NIF-CA integrates CEC and the SM-6 anti-air missile, both built by Raytheon, with the Aegis system to acquire

data from airborne surveillance systems aboard the E-2D Hawkeye surveillance aircraft and joint-service systems to provide an over-the-horizon anti-air capability.

The cruisers will get the X-band SPQ-9B surface-search radar, which also will go aboard the destroyers getting baseline 9.C2 but not those getting 9.C1.

For anti-submarine warfare, the modernization provides the SQQ-89 undersea warfare system, which incorporates a new multifunction towed array sonar.

Sheridan points out that the cruisers will be upgraded to baseline 9A for anti-air warfare, but will not receive the BMD program. Several cruisers, including Lake Erie (CG-70) and Port Royal (CG-73), have been fitted out with an early BMD capability. Currently Chancellorsville, (CG-62), Normandy (CG-60), and Princeton (CG-59) have baseline 9A.

BAE Systems acts as prime yard contractor on the cruiser-destroyer modernization at its Norfolk, Va., Mayport, Fla., San Diego, and Honolulu shipyards.

The Navy now plans to shift to the Flight III destroyer configuration with the second ship to be funded in FY 2016. Navy leaders say they hope to build 22 Flight III ships, which will move beyond the SPY radar, the longtime anchor to the Aegis combat system, and introduce the air-missile defense radar (AMDR), designated SPY-6, which is intended eventually to provide X-band and S-band coverage.

Raytheon Integrated Defense Systems won an intense competition for the contract for engineering and modeling development, design,

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The amphibious assault ship USS Makin Island, shown above, introduced a hybrid conventional-electric drive propulsion system replicated aboard two subsequent amphibs serving as early steps towards full-up integrated electric drive for propulsion and ship power.

development, integration and delivery of the AMDR S-band radar and radar suite controller in October 2013.

The AMDR, Raytheon officials say, will incorporate Raytheon's innovative gallium nitride technology to achieve dramatic improvements in the efficiency of the AMDR transmit/receive modules.

The AMDR X-band radar performs surveillance for horizon and surface-search, navigation, as well as submarine periscope detection and discrimination. The S-band system conducts search, tracking, cueing, missile communication, as well as surveillance for ship self-defense and kill assessment. Initially the SPQ-9B will provide the X-band capability.

In November Raytheon conducted a System Delta preliminary design review of the AMDR design updates, and validated the design for the Navy performance requirement for the system. The review represented "a significant achievement

that demonstrates that the system design effort remains on track for delivery to the 2016 Flight III DDG-51, says Navy AMDR program manager Capt. Doug Small.

The company won a contract modification for options for additional engineering support for the AMDR S-band component in September.

In a significant award, DRS Power & Control Technologies in Milwaukee won a \$15.7 million award in September to build as many as 12 power-conversion modules for the AMDR. The modules, which are components of the ship integrated electric drive system, manages the flow of power to the radar. Options if exercised could bring the award to \$89 million.

In early December Raytheon IDS won a Navy award to continue its long-term work as platform systems engineering agent for the ship self-defense system (SSDS Mk 2), the integrated, fiber-optics-based combat system aboard carriers and big-deck

amphibious assault ships that was one of the first systems to comply with the Navy's Open Architecture Computing Environment. That award followed a \$12 million award in July to Northrop Grumman for engineering services for modernization of SSDS Mk 2.

Lockheed Martin meanwhile continues to upgrade the Aegis system for the modernization. The company won a contract in November to extend its role as Aegis platform systems engineering agent and for engineering of the Advanced Capability Build (ACB) combat systems evolution. In August the Navy awarded the company a contract for shipboard integration, testing, and engineering for ACB-12, the newest iteration of the Aegis software program.

In September Chancellorsville (CG-62), the first CG to receive baseline 9A, conducted combat system ship qualification trials and integrated testing, including live-fire at-sea exercises to test the new program and processing architecture. The testing demonstrated the NIFCA capability and extended range SM-6 air-defense missile.

Meanwhile, Raytheon and Bath Iron Works pushed ahead on the initial system lightoff in mid-2014 for Zumwalt, the first of three ships of the class of heavy land-attack destroyers, after their number was pared from an original 32, then 16 to 24, then seven, and finally three.

The Zumwalts, at 15,480-ton fully loaded, are more than 60 percent heavier than the 9,500-ton Ticonderogas. Ship-systems integrator Raytheon developed the total ship computing environment or TSCE, which links combat systems

with machinery, power-control, communications, engineering, bridge, and navigation systems.

In October, Raytheon won two awards for Zumwalt work, one for further engineering support for mission systems equipment, and the second for options for integration, production and life-cycle support planning and management.

At-sea testing for Zumwalt is set to begin this year, with delivery to the Navy in 2016. Bath also is building Michael Monsoor (DDG-1001) and Lyndon B. Johnson (DDG-1002). Huntington Ingalls Industries has delivered the Monsoor deckhouse, fabricated from composite materials, to Bath. However, the Navy has opted to use a steel deckhouse for Johnson, based on reduced urgency of limiting ship weight and greater emphasis on costs. Monsoor is planned for initial operating capability in 2018 and Johnson in 2021.

In September Raytheon won new options for engineering support for the CEC system both for the U.S. and Australian navies. CEC uses a high-speed data processor to integrate air-tracking data from multiple CEC-equipped cruisers, destroyers, carriers, and aircraft to provide a single composite-track, or “cooperative” picture for use in targeting across the battlespace.

Lockheed Martin received a Navy award in September for continuing work on the SEWIP Block 2 initiative. The award is for construction of 14 Block 2 systems; the company has delivered 10 systems, now being fielded. A later Block 3 variant will be designated SLQ-32(v)6.

General Dynamics Advanced Information Systems is working on the Block 1 SEWIP, focused mainly

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on incremental updates to older components.

Last August the Navy awarded contracts for production units of its consolidated afloat networks and enterprise services (CANES) network to five companies—BAE

Systems, General Dynamics C4 Systems, Global Technical Systems, Northrop Grumman Information Systems, and Serco Inc. CANES is intended as an overarching network management systems, now targeted for some 180 surface ships, sub,



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and maritime operations centers. The system will provide a common computing environment that to upgrade cyber security and command, control, communications and intelligence.

Thus far, CANES has been installed on nine destroyers, three carriers, and a cruiser, among other ships.

The Navy continued to award LCS work to the ship-building teams. Austal won a contract for core-class services, including assessment of production and engineering challenges and development and evaluation of cost and schedule risks for the Independence class. The second award was for post-delivery support for Montgomery (LCS-8). Lockheed Martin won a similar contract mod exercising an option for similar work for Detroit (LCS-7) over the same time.

In late November, the Navy announced that it would evaluate a scaled-down version of the SEWIP Block 2 aboard Freedom (LCS-1), which were not designed with an electronic warfare capability. The SEWIP, officials say, would be part of the sensor suite for the new SSC/ frigates now being planned.

LCS systems integration work, managed by Northrop Grumman Systems, achieved several milestones in 2014. In the spring, the surface-warfare module went through initial operational test and evaluation aboard Fort Worth (LCS-3) and will go through the same testing aboard Coronado (LCS-4) this year. The mine warfare package completed developmental testing



The newest upgrades to the SM-2 shipboard standard air-defense missile, shown above firing from the destroyer USS Roosevelt, will provide an essential component of the Navy's integrated air-and missile defense capability.

aboard Independence (LCS-2).

The ASW module is farthest from completion. The ships will tow a variable-depth sonar and a passive receive array as the primary ASW detection system. The MH-60R helicopter and, potentially, a VTUAV, the MQ-8C Fire Scout, will provide ASW localization and engagement.

The "Charlie" Fire Scout variant is expected to replace the "Bravo" version, two of which, fitted with electro-optical sensors, originally were planned for the module.

The Navy's plan was to arm the MH-60R with the surface-launched Mk 54 torpedo. However, because the "Charlie" has more range than the "Bravo" and carry a heavier payload, the Naval Air Systems Command has explored the possibility of replacing the 600-pound Mk-54

for the helo and the Fire Scout "Charlie" with a compact rapid-attack weapon (CRAW) developed by the Office of Naval Research.

Because the CRAW is considerably lighter than the Mk-54, NAVAIR is looking at the feasibility of arming both the helo and the Fire Scout with more than one of the systems.

In December, Northrop Grumman won a \$21.6 million contract modification for two mission modules and support containers for LCS mission packages and the required engineering support.

Ship Machinery

The Navy continued to pursue integrated electric drive (IED) as the baseline propulsion and power-management architecture for surface ships.

Makin Island (LHD-8), last of the Wasp class, America (LHA-6), and Tripoli (LHA-7) have introduced hybrid electric propulsion system that integrates gas turbine engines for high speed with auxiliary electric motors for more efficient low-speed operation.

The full-up IED system aboard the three Zumwalts represent the most significant steps forward in decades of research and development of high-torque electric motors, power-conversion modules, and switches, and the power-architecture designs, processing systems, and control software.

The ultimate IED goal, Navy officials long have said, is to free ship design from the "tyranny of the design shaft" by introducing high-power electric motors linked to



The E-2D Hawkeye surveillance aircraft, shown above launching from the aircraft carrier USS George H.W. Bush, will participate in air and missile-defense sensor networks to detect hostile air-breathing and ballistic-missile defense threats from long range.

generators and engines without the need for heavy reduction gears.

The Flight III Burkes are targeted

for IED to meet the huge power demands of the AMDR and other advanced power-hungry weapons,

including laser systems. Carriers will be fitted out with the electromagnetic aircraft launch system or EMALS which eventually will replace steam-powered catapults.

The Navy last year awarded a team of DRS Technologies and Lithiumstart of San Francisco a contract to provide energy storage modules for Burke-class destroyers, extending out to DDG-122. Lithiumstart will build the lithium-ion battery that will be integrated by DRS in the modules to provide stable backup power, the company says. The modules will be scalable from 500 kilowatts to tens of megawatts, including the extremely high levels of power required by the AMDR and future pulse-power weapons. ←

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Backplanes pushing bandwidth limits

Big increases in data throughput and processing power, coupled with demands for reductions in size, weight, and power consumption are forcing a fundamental transformation in embedded architectures.

BY J.R. Wilson

As electronic and computing technologies have advanced at evolutionary and revolutionary levels, especially since the turn of the century, nearly every component in military electronic systems has gained in significance, capability, and impact on SWaP-C, which refers to size, weight, power consumption, and cost.

Massive increases in speed and data handling typically require greater — or, at least, more efficient — power; shrinking component sizes reduces weight, but can increase the need for heat dissipation. More recently, there has been a move to combine some capabilities, so what was a simple enclosure now becomes a functional part of the system as wireless and direct connect designs replace wires, cables, and coaxial connectors.

“Making everything more electronic changed the nature of how we build backplanes and enclosures and interconnects that allow you to handle changes that take place,” says Paul J. Kostek, an independent consultant and former president of IEEE Aerospace & Electronic Systems



The Hybricon Fabric40 Backplane from Curtiss-Wright Defense Solutions offers 40-gigabit-per-second Gen3 OpenVPX 6U 6-slot embedded computing performance for the end-to-end transmission of high-speed data.

Society. “It really started when the Ethernet bus and PCI bus came along.

“Instead of traditional hard-wired airplanes, moving to fly-by-wire electronic signals took us from stand-alone boxes with data functions to merging the flight management computer into diagnostics and other applications,” Kostek continues. “That really started to change how packaging is done for individual functions. And the continued growth in capabilities of databuses has changed how we look at managing an airplane.”

The result of these advances and changes also is being seen in how

traditional suppliers do business.

“Technology-wise, with everything continuing to get smaller and smaller, we’ll reach a point where the integration package on the aircraft will be delivering a software function instead of hardware,” Kostek says. “For example, you have companies manufacturing GPS systems, but if that becomes a commodity item, the important part will be updating the software and linking to the satellites, rather like downloading a new app on your smart phone, so the hardware won’t matter as much.

“Things will become more app-

driven and the hardware will just be a standard part to which new software is added. The perfect analogy of that is the software-defined radio, where the software is more important than the hardware. We'll see more and more of that taking place, so a lot of traditional avionics suppliers may find they are becoming software rather than hardware companies."

In recent years, high-performance embedded computing (HPEC) solutions have changed the face of commercial and military computing capabilities, but rely on significant advances on several fronts, especially higher bandwidth access to the mass of data those systems generate.

Backplane technology

In late 2013, Curtiss-Wright Defense Solutions, a division of Curtiss-Wright in Ashburn, Va., introduced its first Generation3 backplanes as a leading-edge advance for intelligence, surveillance, and reconnaissance (ISR), as well as for radar and signals intelligence. The new high speeds now available for military applications in backplanes also forced industry to make innovations to improve cooling of VPX modules that now consume as much as 150 watts.

"The current state-of-the-art in VPX is Gen3 8-to-10.3 Gigabaud, with work going on for the next step — 14-to-16 gigabaud — but that's probably a year away from being available in a lab with multiple suppliers," says Bob Sullivan, chief technology officer of engineered packaging at Curtiss-Wright Defense Solutions. "We aim our backplanes and chassis at Fabric40 technology, a compatible family of backplanes and modules, which is Gen3 VPX/OpenVPX 10.3 gigabaud signaling, primarily

aimed at 40-gigabit Ethernet and QDR InfiniBand, as well as covering PCI-Express Gen-3 and proprietary signaling."

Curtiss-Wright designers use the same components for military applications as they do for commercial

industry, except they make sure these components can handle military environments. For example, 100 Gigabit Ethernet is commercially available for some uses, but won't be ready for the military market until industry understands how to deal

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with that speed and its side effects.

“VPX uses four data pipes, each running at 10.3 gigabaud, to get 40 Gigabit Ethernet. When you go to 100 Gigabit Ethernet, your options are to use 10 of those pipes, which means 2.5 times as many backplane connections, or four pipes at 25 gigabaud, which will require new connector technology,” explains Steve Edwards, product management director in the Curtiss-Wright ISR Solutions Group. “So understanding what that connector technology is—copper or optical—is the challenge now and we just don’t yet know what is best suited for our [military] environment.

“The most critical aerospace and defense applications definitely are high-end ISR,” Edwards continues.

“There are apps out there, such as big-image mapping, that take in and process huge amounts of data. Synthetic aperture radar (SAR) is another app with a lot of data that has to be moved around, among many that need to move lots of data between different processing entities in the backplane, so you need the highest bandwidth pipe you can get between modules in the system.”

Moving large quantities of high-end ISR data from sensor-to-sensor or sensor-to-drive, using high-speed backplanes and communications buses to manipulate that data and get it onto some sort of recording device, is not just a military problem, but one faced by any user of the general Internet of Things.

“Higher and higher resolution or capacity sensors — or just more sensors — means the generation

of data is becoming extraordinarily unmanageable to shove it down to a ground station,” says David Jedynak, Curtiss-Wright’s chief technology officer for COTS Solutions. “To take the raw data, process it with a highly capable system with a set of algorithms already set up to tune or filter that data to get only the per-



The PXI Express backplane from Elma Electronic is a 3U 17-slot PXI Express backplane for OEM embedded control and integrated test and measurement applications.

inent data to send down, is absolutely essential. And that means we have to be able to host and support these sorts of operations. So whether it is a big data algorithm or sophisticated analysis algorithm, it requires a lot of horsepower.

“It often also means parallelism in the compute architectures or distributed sort of system; either way, having a high-speed fabric to put all the compute nodes on is really critical,” Jedynak continues. “Think of it as the mini-data center on the sensor platform. You have to do the work there because you don’t have the bandwidth to send it elsewhere to process. And there is a latency issue. If it is just surveillance data you’ll react to later, latency isn’t an issue, although bandwidth is. But if it is a jamming or protection system, your control loop is essentially

on that platform because you have to do all the processing there.”

Space, power, and cooling

In addition to SWaP-C, issues such as electromagnetic interference (EMI), cooling, ease of installation, and reuse through technology refresh also are essential.

“For critical apps, it’s all about space, power, cooling. Seeing the UAV side growing, how do we not only get the equipment into the vehicle to fly but the additional equipment required for the mission — sensors, weapons, etc.,” Kostek says. “So space becomes a big driver and the amount of data we’re trying to handle becomes a big challenge.

“How do you get the next generation of materials to support higher frequencies, reliable in mil/aero environments, whether on UAVs [unmanned aerial vehicles] flying around for days or weeks or a standard military vehicle operating in a hostile environment, from heat, to sand, to water? You need to put more functions into a box. The integrated systems we see today have multiple boards with multiple functions sharing common I/O and power boards. How hot will those boards get with the level of processing going on, how safe is the enclosure?”

IEEE’s 1101.10 standard on enclosures set guidelines for getting much smaller to meet performance needs. Those are not only mil/aero requirements, but also impact medical devices, especially the levels of heat generated and getting it out of the enclosure without endangering the patient or doctor.

High-speed fabric switches are new enough that the challenge is connecting multiple nodes versus network switching and determining the maximum number that can be reached in terms of speed, then matching that with other requirements and redundancy modes.

For the RF world, new materials and technologies are setting the stage for a new paradigm in which interconnects are "beginning to look a lot more like solid state than the old boxes hooked together with cables," predicts Stephen T. Morley, RF design team product development engineer at TE Connectivity Aerospace, Defense and Marine Division in Harrisburg, Pa.

"There has been an integration of fiber optics and RF into daughter-card backplane interfaces under the VITA-67 specification," Morley says. "Where in the past those were differential and single-ended signal, you now have the option of power, signal, optic and RF. The next thing we focus on is speed and pushing the frequency beyond 40 GHz. For the military, the cards that feed phased array antennas are constructed very much like a daughter-card backplane configuration, virtually identical where RF is concerned.

"As the frequency of the radar goes up, the density of the connectors has to go down, so we are challenged to go to smaller and smaller interconnects that can function on narrower centers. The state-of-the-art for RF interconnects is about one-tenth of an inch, but I envision those interconnects will totally change. We currently think of them as coaxial devices that push together, screw into each other, but in the future, they will need to be connected at a

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much higher level, which I suspect will be an integral interface within the PC board structures.”

Packing the box

Boxes mounted in chassis and hooked together with cables have given way to a new level of integration that pushed more inside the boxes, with the connectors being part of the box interface, he adds. In the future, that integration will move even further inside the box. And to combat high losses when transmitting RF over cables, especially at long distances, the switch from copper to fiber already has begun.

“A lot of signal processing will be done right at the antenna and come down as digitized data, either on high-speed lines or in fiber optic links,” Morley continues. “AESA [active electronically scanned array] radars, enabling platforms to track and fire on multiple targets simultaneously, are a critical application for that. The demand is huge because the AESA panels themselves can incorporate up to 1500 individual elements—some much larger than that—and each of those requires an RF interconnect.”

One of the most critical functions for any mil/aero application is navigation, having reliable systems that can't be overcome by something else, but also are part of a wide variety of functions merged into a common system using advanced backplanes, enclosures and high-speed switch fabrics. Using GPS and other satellite receivers as part of a flight management system, whether commercial or military, has greatly increased navigation reliability, especially in the past 10 to 15 years.

In the future, continually

shrinking electronics and expanded capabilities are likely to lead to some radical new applications, from airliners flying without pilots to driverless cars. Even without removing flight crews from aircraft, smaller and faster electronics eventually will mean a smaller avionics bay, which in turn may mean more capacity for cargo or, in commercial airliners, baggage. The concept of



This 80 high-performance 11-slot VXI backplane from Tracewell Systems is part of the Radio Frequency Distribution and Control Systems (RFDACS) aboard U.S. Navy submarines.

electric airplanes also raises questions about the type, size and number of batteries needed and how everything is packaged with reliable interfaces and redundancies.

“We’ve gone about as far as we can in getting smaller with current semiconductor materials,” Kostek says. “Graphene [a thin layer of pure carbon about 100 times stronger than steel] is the next step to let Moore’s Law continue. It’s a materials issue driving how much smaller we can get and what a backplane or enclosure really will look like as you get smaller and smaller. You’ll still have questions about how much power you need or can supply and how you manage cooling. So we’ll be depending a lot on physicists and chemists in the next few years

in looking at what we can do with materials.

“If you look at semiconductor technology on chips today, it has moved from individual to multiple functions on a single system and that will continue to evolve. Sandia is working on nanowires, for example, which can handle high speeds and will have a huge impact on enclosures because you won’t necessarily need current large enclosures. Backplane technology will be revisited totally. So will we even need a backplane? You’ll still have to find a way to connect those to the necessary applications.”

Backplane speed

With backplane speeds growing from a couple of gigabits per second to regularly as fast as 10 to 12 gigabits per second—as much as 25 gigabits per second serial in the communications sector—there has been an increase in the use of Ethernet as the preferred protocol, replacing a variety of legacy, semi-proprietary protocols, for automotive, including military transports, tanks, and avionics.

“The auto interconnect market has been driving some of the standards to drive Ethernet productivity from 8-wire twisted pair to 2-wire twisted pair for weight reasons, getting 100 megabits over that,” says Martin Nuss, chief technology officer at Vitesse Semiconductor Corp. in Camarillo, Calif. “Industry is working on 100Base-T1 and 1000Base-T1 to get 1000 megabits over a single twisted pair [which requires 10 times more bandwidth with sophisticated signal processing]. Ethernet has become more reliable and there is such a larger ecosystem for

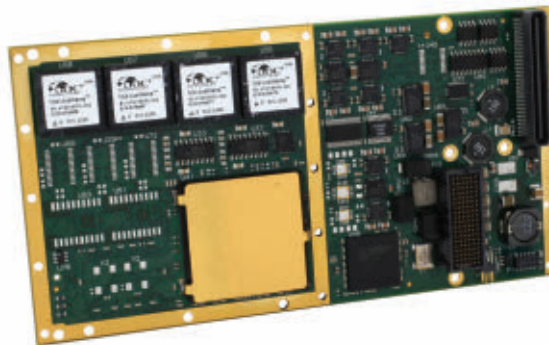
Ethernet components than for the legacy and proprietary boxes and protocols.

“For example, we’re in one military vehicle where there are eight or nine different systems that need to communicate with each other using at least gigabit speeds, but also all need very accurate timing information, mostly for positioning,” Nuss continues. “Location and time are synonymous, so we are using our industrial-grade megabit Ethernet switches to connect those systems and using a grand master clock, which receives timing from a single GPS receiver on the vehicle and generates [IEEE]1588 timing packets for all the other systems in the vehicle.”

For wired connections, Vitesse is using such technologies as timing for location-based services over packet-based networks, which is key for military avionics, and strong encryption.

“You can’t rely on GPS satellite visibility all the time, every time, so being able to distribute accurate timing information over the military backbone and all the way out to individual vehicles and warfighters is highly important,” Nuss says. “On the communications side, Vitesse is the only vendor currently certified by the government for strong encryption over Ethernet, using AES-256 strong encryption over any Ethernet network all the way out to comms systems in the field.

“Legacy protocols and devices have a shrinking ecosystem for semiconductor suppliers, which drives up costs, drives down innovation and lengthens product development cycles. With everything



The BU-67118 multi-protocol data bus networking XMC and PMC cards from Data Device Corp. are for commercial aviation avionics I/O requirements.

else going toward Ethernet, the military is seeing their standards being met there, as well, such as higher availability and reliability, very fast innovation cycles, deterministic behavior, and encryption. PCI

and PCI-Express for processor-to-processor communications will likely be replaced in the future by 10 Gigabit Ethernet and beyond connectivity.”

RF and microwave

Future generations of backplanes also will see major changes for RF.

“From an RF perspective, the signals typically are routed by wires, so an RF backplane looks like a rat’s nest. But we’re working on a solid-state backplane where the RF is routed through the layers of the backplane itself,” says TE Connectivity’s Morley. “I see future interconnects as not being discrete, individual items, but more like arrays of circuits that

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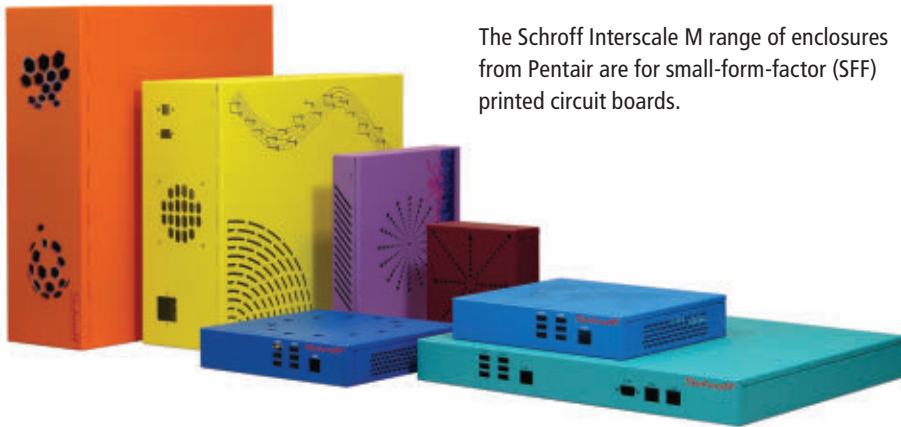
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The Schroff Interscale M range of enclosures from Pentair are for small-form-factor (SFF) printed circuit boards.

interface with each other.

“The whole paradigm of screw machine connectors, in my opinion, will become a thing of the past. Every so often there comes a time in this industry where major paradigm shifts occur and I think RF interconnects and interfaces are very, very close to a major shift.”

Backplanes, enclosures, and high-speed switch fabrics incorporate multiple components, most drawn from commercial development, explains Jim Aralis, chief technology officer at Microsemi Corp. in Alio Viejo, Calif. Microsemi and other component manufacturers place FPGAs and intellectual property cores used in switch fabrics. They also are extending the state-of-the-art in process development, working down to the 16 and 14 nanometer range for FPGAs, he says.

“The types of technologies going toward all of our products allow levels of integration unheard of in the past,” Aralis continues. “We now put so much processing power on a chip that we enable things that would have sounded crazy as recently as five years ago — looking for patterns in radio signals or even human actions or disease-tracking. We’re now able to co-package multiple technologies that can communicate among

themselves to do memory and processing at the same time in a very compact area to enable next-gen fabrics and enclosures.”

The migration of applications from pure hardware to embedded software and hardware is enabling advances in processing power and development time that are dramatically changing hardware development.

“What people have thought of as hardware in the past, even inside the chip, is highly dependent on software and algorithms,” Aralis says. “For any type of highly secured information, we can now put the protected algorithms in software and firmware, so the supply chain can be more in the open and the real protected information put in at the end for less cost than in the past.”

New technologies, many just now coming online, also are having a significant impact on the SWaP-C tradeoffs being made in such areas as reliability, power levels and speed.

“Integrated circuits used to be limited by the process technology speed and power; now we have devices that switch extremely fast and are limited by the transport of information inside the chip,” Aralis explains. “So how do we trade off the

distance it has to go against how fast it has to switch, especially in power and performance areas? Power is a differentiating feature for cost and for getting heat out of the system.

“These tradeoffs are being made at a different level than before; they used to be very simple, but now processing has to be done locally if you want to lower power and keep speed up, but you end up with complications of having to partition the actual algorithms so they can be locally processed and transmitted across the chip at very high data rates.”

Keeping data local

Keeping data local often involves reconfiguring of logic elements and processors. At the component level, trade-offs involving change and optimization are not always on one chip and the manufacturer has to look at different power solutions and even run different parts of the chip at different voltages at the same time.

“You may have a section that you get higher overdrive at 4 GHz, but you don’t need as much processing for something else and can run it slower,” Aralis says. “But you need translators to move the data between those levels of interface. So power, rather than just being a thing, is being dynamically controlled as a tactical optimization, changing power to each area depending on what is actually needed to process at just the right speed. And the ability to use general purpose hardware to do what traditionally was done by dedicated hardware means we now can produce standardized hardware at lower cost and increased flexibility.

“We see reconfiguration in FPGAs and multilevel internal logic driving a more generalized solution and hence changing elements,” Aralis continues. “A switch doesn’t have to just be a switch, but can be configured to do many things. What slows us down most is the access to memory; today, many processors are setting around waiting for memory to serve them with new data. If we can access memories more parallel and at higher speed, we can get rid of that bottleneck.”

IC processor technology also is moving toward the molecular level, with Aralis predicting labs will be working in the 5 nanometer range by the end of this decade, although that will not be ready for product fielding for some years beyond that.

But combining all the advances will mean “the laws of integration, the functions we can put into various chips, will start looking like systems”.

How future backplanes, enclosures and high-speed switch fabrics — or what replaces them — are designed, tested and engineered also is undergoing a major change.

“New engineering technologies allow us to design things you wouldn’t have dreamed about even 15 years ago and do it much more quickly with future iterations,” says TE Connectivity’s Morley. “I have several applications where I’ve 3D-printed parts for qualification and customer testing. I haven’t put any into a production product — yet — but I don’t think we’re far from that. That creates a faster

route to a product because you can design something in a 3D modeling package and a day later have a [review] part you can send to your customer.

“I see that whole side of the business as getting nothing but better fast. I have no doubt we will be printing production parts in the near future. Integration to higher levels — value add — is always a focus for development engineers and what else can we offer beyond what the customer knows we have the capability to make. The whole design cycle has gotten tighter and faster, in large part thanks to 3D printing, and product life cycles have gotten much shorter. I expect that trend to continue with shorter, faster time-to-market cycles.” ◀

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► Sabtech changes name to IXI Technology to focus on military networking

Sabtech Industries, a specialist in the Naval Tactical Data System (NTDS) in Yorba Linda, Calif., is changing its name to IXI Technology to reflect a strategic approach to advanced technology and a focus on new industrial markets. IXI while under the Sabtech banner specialized in tactical data communications solutions for military and government agencies. Now as IXI the company is expanding into industrial applications by capitalizing on the company's specialized interface boards, rugged computer systems, and test equipment.

FOR MORE INFORMATION visit IXI Technology at <http://ixitech.com>.

► Custom MMIC unveils low-noise amplifier

Custom MMIC in Westford, Mass., is introducing the CMD163 low-noise amplifier (LNA) for military and space applications, as well as point-to-point and point-to-multipoint communication systems where small die size and high linearity are needed. The 17-to-27-GHz LNA that comes in die form, has a gain of +24 dB, a noise figure of less than 1.3 dB, and an output 1 dB compression point of +19 dBm across the 17 to 27 GHz bandwidth. ◀

FOR MORE INFORMATION visit Custom MMIC online at www.custommmic.com.

Digital radio technologies eyed for spectrum warfare and jam-resistant radar

BY John Keller

WRIGHT-PATTERSON AFB, Ohio—U.S. Air Force researchers are trying to use software-defined radio and cognitive radio technologies to develop new kinds of radar jamming capabilities, as well as active electrically scanned array (AESA) radar that can resist advanced electronic warfare (EW) jamming.

Officials of the Air Force Research Laboratory at Wright-Patterson Air Force Base, Ohio, have released a presolicitation (BAA-RQKS-2015-0002) for the Spectrum Warfare Evaluation and Assessment Technology Engineering Research (SWEATER) program.

SWEATER seeks to develop sensor-assessment technologies involving AESA radar and jamming systems using digital RF memory (DRFM) and devices that are software-defined or use RF-cognitive based technology.

The program will conduct RF sensor assessment technology for electronic support (ES), electronic attack (EA), electronic protect (EP) and cyber warfare. Special emphasis is on countering enemy radar and communications systems in closed-loop and free-space environments.

Air Force researchers say they expect to issue a formal request for proposals (RFP) for the SWEATER program late this month. The sponsoring organization of the SWEATER program is the Spectrum Warfare Systems Engineering Branch of the Air Force Research Laboratory's Sensors Directorate.

Air Force researchers sponsored an open house last month for companies interested in participating in the SWEATER program.

For questions or concerns about the SWEATER program contact the Air Force's John Fisher by email at john.fisher.33@us.af.mil or by phone at 937-713-9978. Also contact Gail Krentz by email at gail.krentz@us.af.mil or by phone at 937-713-9980. ◀

MORE INFORMATION IS online at <https://www.fbo.gov/spg/USAF/AFMC/AFRLWRS/BAA-RQKS-2015-0002/listing.html>.



The Air Force is leveraging software-defined radio and cognitive radio technologies for radar jamming and anti-jam radar.

Navy wants new cable to improve AN/AQS-22 helicopter dipping sonar

BY John Keller

PATUXENT RIVER NAS, Md.—U.S. Navy anti-submarine warfare (ASW) experts are reaching out to industry to find improved sonar cable for the dipping sonar system on the Navy's MH-60R shipboard ASW helicopter to correct deficiencies in existing cable.

Officials of the Naval Air Systems Command at Patuxent River Naval Air Station, Md. released a solicitation (N00019-15-R-0001) for the AN/AQS-22 Airborne Low Frequency Sonar (ALFS) Improved Sonar Cable for the MH-60 Romeo program.

The solicitation asks companies for a new cable that improves on the existing cable's drawbacks that include uncertain shelf life; cable miswraps on the reeling machine; cable jacket stretching or deformation that changes the cable's reeling characteristics; and an inability of the ALFS cable position sensors to detect the cable's white marks.

Navy experts want to integrate the new cable in the existing AN/AQS-22 ALFS system as a replacement for the existing sonar cable. The new cable should meet or exceed the current sonar cable's performance and meets Navy performance requirements.

The AN/AQS-22 dipping sonar is the primary under-sea warfare sensor of the MH-60R multimission helicopter. It enables the MH-60R to detect, track, pinpoint, and classify potentially hostile submarines. It reels the sonar transducer from the aircraft and can operate the sonar at a wide variety of depths to find submarines hiding under temperature inversions in the water.

The current ALFS sonar cable on the Navy Sikorsky MH-60R ASW helicopter has an estimated life of as long as six years, including one year in storage prior to first use, yet some things have cropped up that reduce the cable's life and increase the risk of the cable breaking and losing the transducer assembly part of the sonar during dipping operations, Navy officials explain.

The project has two parts: non-recurring engineering and candidate cable delivery; and recurring cable production. The first phase may involve several contractors



The Navy MH-60R ASW helicopter is shown above dangling the AN/AQS-22 sonar transducer from its sonar cable.

and three candidate cables. The second phase will choose one cable for production.

Companies interested may view documents outlining the solicitation, statement of work, and performance requirements online at <http://goo.gl/Uelg3X>.

For questions or concerns contact the Navy's Erika-Lynn Griffin by email at erika.griffin1@navy.mil, or by phone at 301-

757-5398. Also contact the Navy's Erin Bailey by email at erin.bailey1@navy.mil, or by phone at 301-757-8970. ←

MORE INFORMATION IS online at <https://www.fbo.gov/spg/DON/NAVAIR/N00019/N00019-15-R-0001/listing.html>.



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UNMANNED vehicles

Air Force orders UAV sensor payloads

U.S. Air Force airborne sensors experts intend to buy as many as 49 MST-B multispectral targeting systems from Raytheon for the MQ-9 Reaper hunter-killer unmanned aerial vehicle (UAV). The MTS-B multispectral targeting system provides electro-optical, infrared, laser designation, and laser illumination capabilities for the Reaper armed drone that are integrated into one sensor package. The Air Force will buy as many as 49 MTS-B turret units, turret containers, high-definition electronics units, containers, and spare parts. The MTS-B UAV sensor payload provides detecting, ranging, and tracking for the Air Force MQ-9 Reaper.

General Atomics to build 24 MQ-9 Block 5 Reaper attack drones

General Atomics in Poway, Calif., will provide the U.S. Air Force with 24 MQ-9 Block 5 Reaper attack drones under a \$279.1 million contract. The Reaper is a variation of the MQ-1 Predator UAV that is designed for surveillance and attack missions using a suite of airborne sensors and the AGM-114 Hellfire air-to-ground missile. Compared to the Block 1, the Block 5 offers increased electrical power, secure communications, auto land, weapons growth, and more. ◀

BAE Systems developing submarine-hunting drone sidekick for Navy P-8A

BY John Keller

ARLINGTON, Va. — Anti-submarine warfare (ASW) experts at BAE Systems are developing an unmanned aerial vehicle (UAV) sensor payload able to look for submerged enemy submarines by detecting small variations in the Earth's magnetic field.

Officials of the U.S. Office of Naval Research (ONR) in Arlington, Va., announced an \$8.9 million contract to the BAE Systems Electronic Systems segment in Merrimack, N.H., for the High Altitude ASW (HAASW) Unmanned Targeting Air System (UTAS) program for the Navy Boeing P-8A Poseidon maritime patrol jet.

HAASW UTAS seeks to integrate a magnetic anomaly detector (MAD) and algorithms on an air-launched drone that the P-8A will use to detect and pinpoint enemy submarines. A MAD instrument detects minute variations in the Earth's magnetic field. A submerged submarine represents a mass of ferromagnetic material that creates a detectable disturbance in the Earth's magnetic field.

The Navy's predecessor to the P-8A — the Lockheed Martin P-3 Orion four-engine turboprop aircraft — has a MAD sensor attached to the back that looks like a large stinger protruding backward from the plane's tail. The P-8A — a maritime patrol version of the Boeing 737-800 single-aisle passenger jet — was designed without the built-in MAD instrument largely because the P-8 is designed to operate primarily at high



The Navy's new P-8A Poseidon maritime patrol jet will compensate for its lack of a built-in magnetic anomaly detector with a submarine-hunting drone.

altitudes. The MAD sensor works best at low altitudes.

To compensate for the lack of a built-in MAD instrument, the P-8 will use an unmanned drone equipped with the HAASW UTAS MAD sensor and computer algorithms.

Although the P-8A is capable of low-altitude operations, it is designed primarily for use at relatively high altitudes to enable the aircraft to keep watch over large ocean areas and fly as fuel-efficiently as possible.

The plane is being designed not only with the HAASW UTAS to enable the aircraft to use a MAD instrument from high altitudes, but also with sonobuoys designed to launch from high altitudes and cover large areas of the ocean. The P-8A also is being equipped with a flying torpedo called the High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) Air Launch Accessory (ALA) that can be released from altitudes as high as 30,000 feet. ◀

FOR MORE INFORMATION visit BAE Systems at www.baesystems.com.

PRODUCT applications

TEST AND MEASUREMENT

Marvin GENASYS test equipment chosen for satellite electronics

Engineers at the Lockheed Martin Corp. Space Systems segment in Denver needed performance-testing equipment for high-reliability space electronics designs. They found their solution from Marvin Test Solutions Inc. in Irvine, Calif.

Lockheed Martin is using the Marvin TS-323 GENASYS test equipment to ensure the reliability of space launch and orbiting satellite equipment. GENASYS is a PXI-based test & measurement system for mission-critical applications that require performance functional testing.



GENASYS features a high-density, multiplexed switching subsystem with any-pin-to-any-resource architecture and switch management software that provides automated, end-to-end signal routing, Marvin officials say. Lockheed Martin will use the system to test satellite systems and subsystems.

The PXI digital subsystem addresses a range of avionics data bus test requirements, including 1553, 429, RS-232, and custom or parallel digital buses. In addition, the multiplexed

pin architecture of the GENASYS supports more than 6,000 UUT pin connections. With hybrid pin capability, both analog and digital tests can be performed at the pin level.

The test equipment is for high-value, mission-critical electronics applications at the board, box, or system level. Applications include testing for satellite payloads, platform management systems, armament electronics, and flight management.

GENASYS also includes a digital subsystem that supports as many as 512 I/O pins with several timing sets and per-pin PMU capability.

FOR MORE INFORMATION visit Marvin Test Systems online at www.marvintest.com, and Lockheed Martin Space Systems at www.lockheedmartin.com/us/ssc.



MOTION AND MOTOR CONTROL

Military chooses resolver motion-control from Kearfott for M1 tank

U.S. military vetronics experts need precision electronic motion-control devices to help keep the 120-millimeter main gun on the General Dynamics M1 Abrams main battle tank on target. They found their solution from Kearfott Corp., a subsidiary of Astronautics Corp. of America in Black Mountain, N.C.

Officials of the U.S. Defense Logistics Agency (DLA) Land in Warren, Mich., intend to award a potential \$2.5 million contract to Kearfott for as many as 470 resolver differential 4X gun trunnion motion-control devices for M1 Abrams main battle tanks. The initial contract is worth \$1.2 million for 235 resolvers, with options for 235 additional resolvers with a value of \$1.3 million. The unique military-grade resolver differential 4X gun trunnion was developed, designed, built, and tested at Kearfott, which owns proprietary rights to the design.

Resolvers are rotary electrical transformers that measure degrees of rotation. They enable the main gun on the Abrams tank to stay on target even if the tank is moving over rugged terrain. The resolver is an enabling technology in the fire-control system; the trunnion is a structure on which the main gun moves. ←

FOR MORE INFORMATION visit Kearfott Corp. online at www.kearfott.com.

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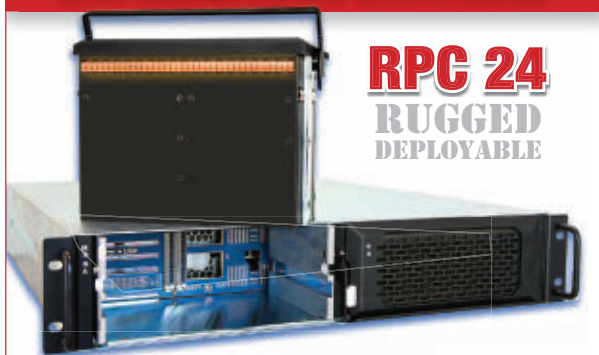
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VETRONICS

Vetronics processing and network switch for military ground vehicles

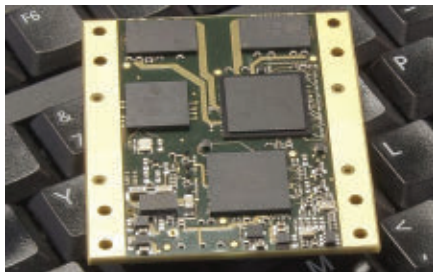
Curtiss-Wright Defense Solutions, a division of Curtiss-Wright in Ashburn, Va., is introducing the Ground Control System (GCS) processing and network switch subsystem for use with the U.S. Army Vehicular Integration for C4ISR/EW Interoperability (VICTORY) standard vetronics architecture. The integrated commercial off-the-shelf (COTS) GCS combines rugged processing and Gigabit Ethernet networking to modernize legacy and future military ground vehicles. The subsystem is based on the small-form-factor 3U OpenVPX embedded computing standard, and is part of Curtiss-Wright's family of multiplatform mission computers. It has 3U OpenVPX fire control processor, Ethernet switch, and power supply modules packaged in one upgradeable rugged enclosure.

FOR MORE INFORMATION visit **Curtiss-Wright Defense Solutions** online at www.cwcdefense.com.

IMAGE PROCESSING

Compact digital video tracker for unmanned and portable systems

GE Intelligent Platforms in Huntsville, Ala., is introducing the rugged ADEPT4000 compact high-definition digital video tracker with electronic image processing for unmanned vehicles, portable systems, and other small applications. The HD digital video tracker has the capability to perform tracking, image stabilization, and video compression simultaneously in a package designed to



minimize size, weight, and power (SWaP) in constrained environments. The video tracker measures 64 by 54 millimeters—or 75 by 75 millimeters with connectors—weighs 28 grams, and consumes 4 watts of power. The ADEPT4000 combines high performance with low-latency simultaneous target tracking with any SD/HD-SDI or parallel digital video signal, electronic video stabilization, moving target detection, and video compression. It incorporates onboard serial links and Ethernet, allowing it to interface to most platforms, and is for configuration and device control.

FOR MORE INFORMATION visit **GE Intelligent Platforms** online at www.defense.ge-ip.com.

RUGGED NETWORKING

Rugged embedded computing switches for military and commercial avionics

Kontron in Poway, Calif., is introducing the AIREX line of rugged switches for harsh-environment network connectivity embedded computing applications in military and commercial avionics, smart grid, and homeland security applications. The first product in the rugged, IP67 sealed switch family measures 1.75 by 6.5 by 8.5 inches and offers 16x gigabit Ethernet ports with direct locking connectors. A second version measures 2 by



6.5 by 8.5 inches and has four 38999 MIL Circular connectors supporting four Gigabit Ethernet ports per connector. Both versions have 28-volt DC power input for vehicle or aircraft and operate fanless in temperatures from -40 to 71 degrees Celsius.

FOR MORE INFORMATION visit **Kontron** online at www.kontron.com.

BOARD PRODUCTS

ARM-powered CompactPCI single-board computers introduced by NAI

North Atlantic Industries in Bohemia, N.Y., is introducing the 75ARM1 6U VME and 64ARM1 3U CompactPCI single-board computers powered by high-speed ARM Cortex-A9 dual core processors for military and aerospace applications that require high-density, configurable I/O and communication functions. Built on Custom-On-Standard Architecture, these embedded computers have pre-existing, tested functions that can be selected to meet system requirements. Each I/O function has its own dedicated processing. The computer boards support three to six high-performance function module slots that enable system integrators to choose from more than 40 I/O and communication functions.



FOR MORE INFORMATION visit **North Atlantic Industries** at www.naii.com.

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- 46 Communications/networking ICs
- 46 D-A converters
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- 46 FPGAs
- 47 General-purpose ICs
- 47 Graphics ICs
- 47 IP cores
- 47 Memory ICs
- 47 Microprocessors/microcontrollers
- 47 Mixed-signal ICs
- 47 Network interface ICs
- 47 Peripheral/support ICs
- 47 Solid-state memory

47 Power Electronics

- 47 Actuators
- 48 Auxiliary power units (APUs)
- 48 Batteries
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- 48 Inverters/converters
- 48 Motor controllers
- 48 Motors
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- 48 Power supplies
- 48 Transducers
- 48 Transient voltage suppressors

48 Sensors

- 48 Chemical analyzers
- 48 Inertial
- 48 Infrared/ultraviolet
- 49 Ladar/lidar
- 49 Radar
- 49 Sonar
- 49 Tactile
- 49 Visible-light cameras

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- 50 Air data computers
- 50 Desktop computers
- 50 Electronic flight bags (EFTs)
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- 50 Laptops/notebooks/handheld computers
- 50 Multicomputer systems
- 50 Rack-mount computers
- 50 Servers
- 50 Specialized computers - TEMPEST

- 50 Wearable computers

51 Diagnostics and Control

- 51 Avionics health management
- 51 Clocks/timers
- 51 Engine controls
- 51 Engine monitoring
- 51 Fuel management systems
- 51 Health and usage monitoring (HUMS)
- 51 Ice detection
- 51 Overheat detection

51 Electro-optics

- 51 Cameras
- 51 Electro-optic materials and substrates
- 51 Forward-looking infrared systems
- 51 Laser components
- 51 Lasers
- 52 LEDs
- 52 Lighting
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- 53 Optical transceivers
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- 53 Ultraviolet light sources

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- 53 GPS systems
- 53 Terrain

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- 55 MMICs

- 55 Oscillators/synthesizers
- 56 RF attenuators
- 56 RF packaging
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- 56 Transmit/receive modules
- 56 Up/down converters

56 Safety Equipment and Components

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- 56 Windshear warning systems

57 Services

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- 57 Distributors

58 Software

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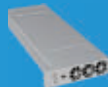


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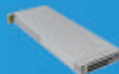
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RES-XR5-HDS8
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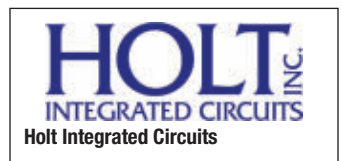
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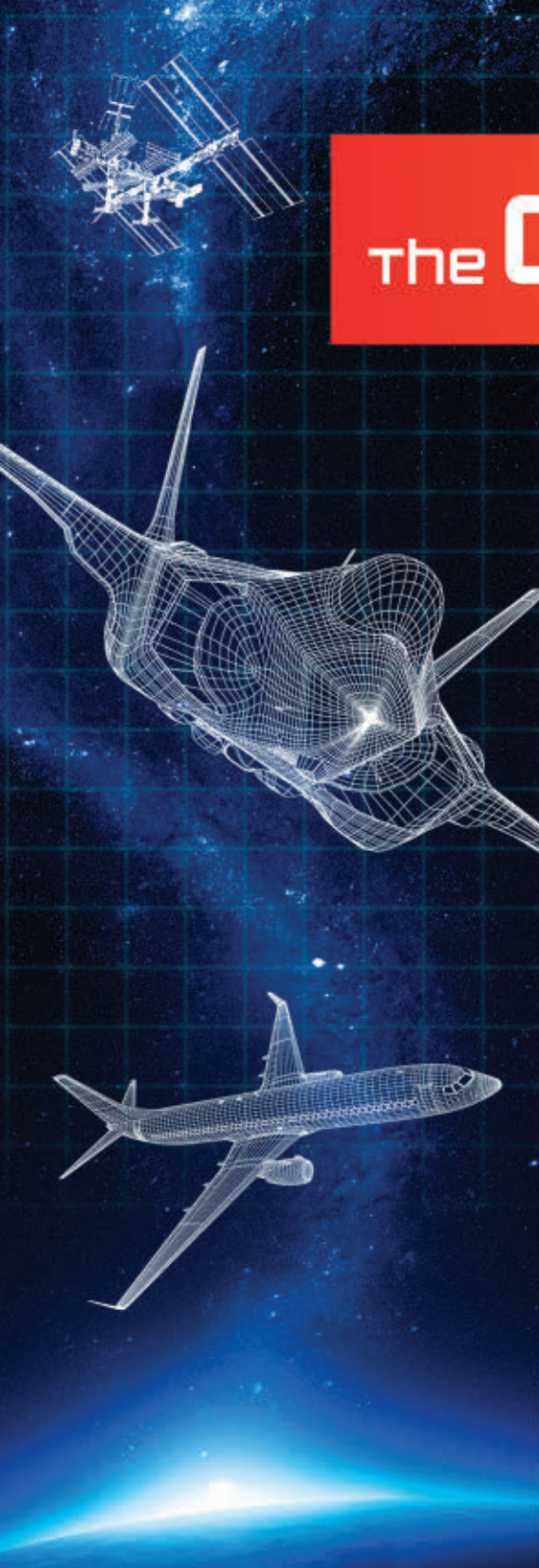
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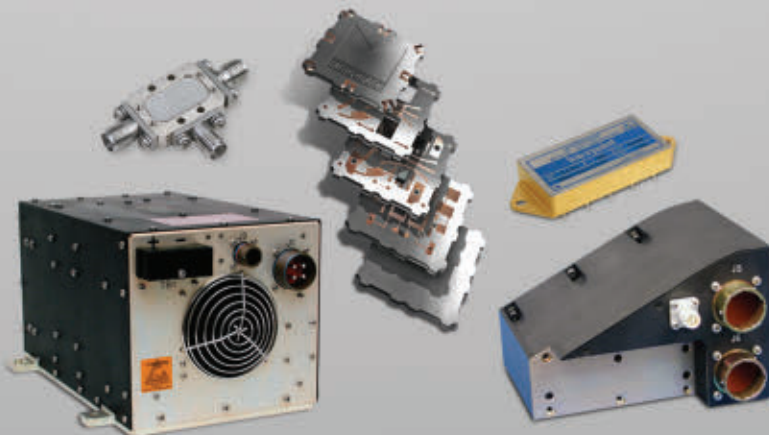
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SwissOptic AG
Tapeswitch Corp
Thermo Scientific - CIDTEC
Thermoteknix Systems Ltd
Ultra Communications Inc
Warsash Scientific Pty Ltd
Xenics

LADAR/LIDAR

Advanced Photonix Inc
Dexter Magnetic Technologies Inc
General Atomics Aeronautical
Systems Inc
LEONI Fiber Optics Inc
MegaWatt Lasers Inc
MesoEngineering LLC
Preciseley Microtechnology Corp
Quantum Composers
RPMC Lasers Inc
Timbercon
Warsash Scientific Pty Ltd
Wavelength Electronics Inc

RADAR

BEEcube Inc
Dexter Magnetic Technologies Inc
General Atomics Aeronautical
Systems Inc
Interface Displays & Controls Inc
Logitech Ltd
MesoEngineering LLC
North Atlantic Industries Inc
Statek Corp

SONAR

Applied Signal Technology Inc
MesoEngineering LLC

TACTILE

MesoEngineering LLC

Powell Electronics
Pyromation Inc
QTI Sensing Solutions
SpaceAge Control Inc
S-Products Inc
Tapeswitch Corp
UTC Aerospace Systems

VISIBLE-LIGHT CAMERAS

Active Silicon Inc
Active Silicon Ltd

Adimec Advanced Image Systems BV
ASE Optics LLC
Forza Silicon
GEViCAM Inc
Headwall Photonics Inc
Iscan Inc
ISVI Corp
Keo Scientific Ltd
Kowa American Corp
Lumetrics Inc
MAZeT GmbH

MesoEngineering LLC
Omega Engineering Inc
PIXELTEQ
Sony Electronics Inc
Specialised Imaging Inc
Specialised Imaging Ltd
Thermo Scientific - CIDTEC
Ultra Communications Inc
Video Scope International Ltd
Vision Components GmbH
XIMEA



Gaia CONVERTER

Avionics Power Supply Solutions

EMI - TRANSIENTS - HOLD UP - CONVERSION

Gaia Converter's proven power modules protect and regulate power for avionic applications.

Example Block Diagram for a Flight Sensor:



EMI Filters	Transient Suppression	Hold-Up Modules	DC-DC Converters
2 / 10 / 20 Amps	50 / 100 / 300 Watts	50 / 300 Watts	4 ~ 200 Watts
• DO160 C-F • Passive, common & differential modes	• MIL-STD-704 A-F • DO160 C-F	• 50ms, 200ms & up • Charge, monitoring & switching functions	• 1 ~ 3 Output Modules • DO160 & Mil-Std 704 Input Ranges

REDEFINING THE SOURCE OF POWER

www.gaia-converter.com

AIR DATA COMPUTERS

DAC International Inc

■ **Daisy Data Displays Inc**
(See ad page 15)

Innovation Management Group Inc

MicroDISC Inc

Vision4ce

Winchester Systems Inc

DESKTOP COMPUTERS

Acnodes Corp

■ **AIM-USA**

(See ad page 27)

Clear-Com

General Dynamics C4 Systems

Innovation Management Group Inc

MicroDISC Inc

MPL AG

NextComputing

PrehKeyTec Inc

TEN TECH LLC

Vision4ce

ELECTRONIC FLIGHT BAGS (EFTS)

APACER Memory America Inc

Arena Solutions

Ballard Technology

MICCAVIONICS GmbH

Xplore Technologies

EMBEDDED COMPUTERS

1st Power

3D Plus USA Inc

AAEON Electronics Inc

ACCES I/O Products

Acnodes Corp

■ **Acromag Inc**

(See ad page 7)

Active Silicon Inc

Active Silicon Ltd

AdvancedIO

Alonex Electronic Engineering Ltd

American Portwell Technology

ADLINK Technology Inc

APACER Memory America Inc

Arena Solutions

Ballard Technology

Barco Federal Systems LLC

Cepoint Networks LLC



Chassis Plans

Cornet Technology Inc

■ **Crystal Group Inc**
(See ad page 19)

Curtiss-Wright Defense Solutions

■ **Daisy Data Displays Inc**
(See ad page 15)■ **Dawn VME Products**
(See ad page 6)

Elma Electronic Inc

esd electronics Inc

■ **Extreme Engineering Solutions Inc (X-ES)**

(See ads pages 3, 37)

■ **Gaia Converter**

(See ad page 49)

Gateworks

GDCA Inc

General Dynamics C4 Systems

Innovation Management Group Inc

Innovative Integration

IXI Technology

Logic PD

Matrox Imaging

■ **Mercury Systems**
(See ad page 9)

MICCAVIONICS GmbH

MicroDISC Inc

Modular Industrial Computer Inc

Motion Maker Engineering

Moxa Americas Inc

MPL AG

NextComputing

One Stop Systems Inc

Parvus Corp

Pentek Inc

Quantum3D Inc

Rigel Engineering LLC

TEN TECH LLC

■ **Themis Computer**
(See ad page 39)

Trenton Systems Inc

Ultra Communications Inc

Vadatech Inc

Vision4ce

Vision Components GmbH

Winchester Systems Inc

ZNYX Networks

**LAPTOPS/NOTEBOOKS/
HANDHELD COMPUTERS**

Acnodes Corp

■ **AIM-USA**

(See ad page 27)

AMREL/American Reliance Inc

Broadax Systems Inc

■ **Crystal Group Inc**

(See ad page 19)

GaGe

GammaTech Computer Corp

General Dynamics C4 Systems

Getac

GET Engineering Corp

■ **IBI Systems Inc**

(See ad page 30)

Innovation Management Group Inc

Logic PD

Mobile Desk/Mobile Office Solutions

Mooring Tech

National Instruments

NextComputing

One Stop Systems Inc

PrehKeyTec Inc

TEN TECH LLC

Toughbook Depot

Xplore Technologies

MULTICOMPUTER SYSTEMS

Acnodes Corp

Alonex Electronic Engineering Ltd

American Portwell Technology

APACER Memory America Inc

Arena Solutions

Chassis Plans

■ **Crystal Group Inc**
(See ad page 19)DIT HD: Display Integration
Technologies

esd electronics Inc

Forefronts Defense Systems

Innovation Management Group Inc

IXI Technology

■ **Mercury Systems**
(See ad page 9)

Pentek Inc

Rigel Engineering LLC

Trenton Systems Inc

Winchester Systems Inc

RACK-MOUNT COMPUTERS

1st Power

AAEON Electronics Inc

Acnodes Corp

Aegis Power Systems Inc

■ **AIM-USA**

(See ad page 27)

Alonex Electronic Engineering Ltd

American Portwell Technology

Ampex Data Systems Corp

APACER Memory America Inc

BEEcube Inc

Broadax Systems Inc

Canyonwest Cases

Cepoint Networks LLC

Chassis Plans

Clear-Com

■ **Crystal Group Inc**
(See ad page 19)■ **Daisy Data Displays Inc**
(See ad page 15)■ **Dawn VME Products**
(See ad page 6)DIT HD: Display Integration
Technologies

EDT Inc

esd electronics Inc

Fiber Savvy

GDCA Inc

■ **IBI Systems Inc**
(See ad page 30)

Innovation Management Group Inc

IXI Technology

MicroDISC Inc

Modular Industrial Computer Inc

Mooring Tech

Moxa Americas Inc

MPL AG

NextComputing

One Stop Systems Inc

Pentek Inc

PrehKeyTec Inc

Radisys

Rave Computer Assoc Inc

SystelUSA

TEN TECH LLC

■ **Themis Computer**
(See ad page 39)

Trenton Systems Inc

Vadatech Inc

Vector Electronics & Technology Inc

Xplore Technologies

SERVERS

AAEON Electronics Inc

ACCES I/O Products

Acnodes Corp

American Portwell Technology

Ampex Data Systems Corp

APACER Memory America Inc

Cepoint Networks LLC

Chassis Plans

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■ **Crystal Group Inc**
(See ad page 19)

EDT Inc

FileCatalyst

General Micro Systems Inc

Innovation Management Group Inc

■ **Mercury Systems**
(See ad page 9)

MicroDISC Inc

Moxa Americas Inc

PrehKeyTec Inc

■ **Themis Computer**
(See ad page 39)

Trenton Systems Inc

Winchester Systems Inc

ZNYX Networks

**SPECIALIZED COMPUTERS -
TEMPEST**

Acnodes Corp

BEEcube Inc

Chassis Plans

Forefronts Defense Systems

Innovation Management Group Inc

Mobile Desk/Mobile Office Solutions

MPL AG

Vision4ce

Xplore Technologies

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AMREL/American Reliance Inc

APACER Memory America Inc

Arena Solutions

■ **Crystal Group Inc**
(See ad page 19)

General Dynamics C4 Systems

Innovation Management Group Inc

Logic PD

Mobile Desk/Mobile Office Solutions

Parvus Corp

PrehKeyTec Inc

Xplore Technologies

AVIONICS HEALTH MANAGEMENT

Ballard Technology

■ **Dawn VME Products**
(See ad page 6)

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Ridgetop Group Inc

Sporian Microsystems Inc

Teletronics Technology Corp

Ultra Communications Inc

CLOCKS/TIMERS

TLC International

Weschler Instruments

ENGINE CONTROLS

CERTON

dSPACE Inc

■ **Gaia Converter**
(See ad page 49)

General Digital Software Services

Sporian Microsystems Inc

Tapeswitch Corp

ENGINE MONITORING

All Flex Flexible Circuits & Heaters

■ **Crane Aerospace & Electronics**
(See ad page 45)

Dataforth Corp

■ **EMCOR Group Inc**
(See ad back cover)

ESI Technology Ltd

General Digital Software Services

Omega Engineering Inc

Optocon AG

PCE Instruments UK Ltd

Sporian Microsystems Inc

Teletronics Technology Corp

Weschler Instruments

Xenics

FUEL MANAGEMENT SYSTEMS

All Flex Flexible Circuits & Heaters

■ **Crane Aerospace & Electronics**
(See ad page 45)

General Digital Software Services

HEALTH AND USAGE MONITORING (HUMS)

Dataforth Corp

■ **Dawn VME Products**
(See ad page 6)■ **EMCOR Group Inc**
(See ad back cover)

General Digital Software Services

Impact Technical Services Ltd
Interface Displays & Controls Inc
Sporian Microsystems Inc
Teletronics Technology Corp
Versatile Power**ICE DETECTION**

All Flex Flexible Circuits & Heaters

General Digital Software Services

Pyromation Inc

OVERHEAT DETECTION■ **Dawn VME Products**
(See ad page 6)

General Digital Software Services

Optocon AG

PCE Instruments UK Ltd

Pyromation Inc

Sporian Microsystems Inc

Xenics

ELECTRO-OPTICS**CAMERAS**

Active Silicon Inc

Active Silicon Ltd

American Infrared Solutions (AIRS)

Arena Solutions

Cantronic Systems (Canada) Inc

Carr Quality Compliance Consulting

CohuHD

EO Strategies

■ **Gaia Converter**
(See ad page 49)

General Atomics Aeronautical

Systems Inc

GEViCAM Inc

IRCameras LLC

ISVI Corp

Kowa American Corp

Lockheed Martin Santa Barbara Focal Plane

Matrox Imaging

Phase 1 Technology Corp

Santa Barbara Infrared Inc

Teledyne Nova Sensors

Teletronics Technology Corp

TEN TECH LLC

TLC International

TNC Optics & Technologies Pte Ltd

Ultra Communications Inc

Vision Components GmbH

Warsash Scientific Pty Ltd

Xenics

XIMEA

Xplore Technologies

ELECTRO-OPTIC MATERIALS AND SUBSTRATES

Advanced Photonix Inc

Arena Solutions

DeWAL Industries

EO Strategies

Harris Corp

IMPCO Inc

JENOPTIK Optical Systems GmbH

Lasertec Inc

Logitech Ltd

Max Levy Autograph Inc

OptoCity

Photonic Sense GmbH

Reynard Corp

Ultra Communications Inc

United Lens Co Inc

Vision Components GmbH

WhiteOptics LLC

ZC&R Coatings for Optics, an Abrisa Technologies Co

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American Infrared Solutions (AIRS)

EO Strategies

Lasertec Inc

Meggitt Defense

Santa Barbara Infrared Inc

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Changchun New Industries

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Coherent Inc

Del Mar Photonics Inc

DILAS Diode Laser Inc

EigenLight Corp

Electro-Optical Products Corp

Evans Capacitor Co

■ **Falcon Electronics**
(See ad page 42)

GiGa Concept Inc

Go4Fiber Ltd

G-S PLASTIC OPTICS

Infinite Optics Inc

JENOPTIK Optical Systems GmbH

Krell Technologies Inc

Kugler of America Ltd

Lasertec Inc

LEONI Fiber Optics Inc

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LPKF Laser & Electronics

Lumetrics Inc

Max Levy Autograph Inc

MegaWatt Lasers Inc

Micro Laser Systems Inc

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nLIGHT

Northrop Grumman Cutting Edge

Optronics

Nufern

OptoCity

OZ Optics Ltd

Passat Ltd

Quantum Composers

Reynard Corp

RPMC Lasers Inc

Sacher Lasertechnik GmbH

TNC Optics & Technologies Pte Ltd

VAT Inc

Warsash Scientific Pty Ltd

Wavelength Electronics Inc

LASERS

Advanced Optowave Corp

American Laser Enterprises LLC

ASE Optics LLC

Blue Sky Research

Boston Electronics Corp

Carr Quality Compliance Consulting

Changchun New Industries

Optoelectronics Technology Co Ltd

Coherent Inc

Del Mar Photonics Inc

DILAS Diode Laser Inc

EigenLight Corp

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General Atomics Aeronautical

Systems Inc

Kimmon Koha USA Inc

Krell Technologies Inc

LAS-CAD GmbH

Lasertec Inc

Logitech Ltd

LPKF Laser & Electronics
 MegaWatt Lasers Inc
 Micro Laser Systems Inc
 Motion Maker Engineering
 nLIGHT
 Northrop Grumman Cutting Edge
 Optronics
 Nufern
 OFS
 OptoCity
 OZ Optics Ltd
 Passat Ltd
 Quantum Composers
 RPMC Lasers Inc
 Sacher Lasertechnik GmbH
 Sacher Lasertechnik LLC
 SurClean Inc
 SurplusEQ.com Inc
 Timbercon
 TNC Optics & Technologies Pte Ltd
 Warsash Scientific Pty Ltd

LEDs

Advanced Photonix Inc
 Arena Solutions
 ASE Optics LLC
 Blue Sky Research
 Blue Wolf
 Carr Quality Compliance Consulting
 Cree Inc
 DesignLED Technology (HK) Co Ltd
 EMTEQ

■ Falcon Electronics (See ad page 42)

FoxFury Lighting Solutions
 Greenshine New Energy LLC
 Interface Displays & Controls Inc
 Konica Minolta Sensing Americas Inc
 Lambda Research Corp
 Logitech Ltd
 MAZeT GmbH
 Nordson ASYMTEK
 OSI OptoElectronics Inc
 RPMC Lasers Inc
 StacoSystems
 TTI Inc
 Up-shine Lighting Co Ltd
 VCC
 WhiteOptics LLC
 Wilbrecht Ledco Inc

LIGHTING

Advanced Photonix Inc
 Arena Solutions
 Blue Wolf
 DesignLED Technology (HK) Co Ltd
 FoxFury Lighting Solutions
 GiGa Concept Inc
 Greenshine New Energy LLC

Infinite Optics Inc
 Interlight
 Konica Minolta Sensing Americas Inc
 MAZeT GmbH
 Nightstick
 Phase 1 Technology Corp
 Reynard Corp
 TNC Optics & Technologies Pte Ltd
 VCC
 Versatile Power
 Whelen Engineering Co Inc
 WhiteOptics LLC

NIGHT VISION

Advanced Night Visions Systems Inc
 (ANVS)
 Advanced Photonix Inc
 Aerospace Optics Inc
 All Flex Flexible Circuits & Heaters
 American GMG Inc
 American Infrared Solutions (AIRS)
 BE Meyers & Co Inc
 Blue Wolf
 Cantronic Systems (Canada) Inc
 Cepoint Networks LLC
 CohuHD
 EO Strategies

■ Gaia Converter (See ad page 49)

Infinite Optics Inc
 Interface Displays & Controls Inc
 IRCameras LLC
 Konica Minolta Sensing Americas Inc
 Kowa American Corp
 L-3 Electron Devices
 Lasertec Inc
 Lensel Optics Pvt Ltd
 Max Levy Autograph Inc
 NiCoForm Inc
 The Night Vision Store
 Phase 1 Technology Corp
 Photonic Sense GmbH
 Reynard Corp
 Santa Barbara Infrared Inc
 SwissOptic AG
 Thermoteknix Systems Ltd
 TNC Optics & Technologies Pte Ltd
 Xenics

OPTICAL AMPLIFIERS

Advanced Photonix Inc
 EigenLight Corp
 Fibernet
 Nufern
 OSI OptoElectronics Inc
 OZ Optics Ltd
 Reynard Corp
 RPMC Lasers Inc
 Sacher Lasertechnik GmbH

Sacher Lasertechnik LLC
 Specialised Imaging Inc
 Specialised Imaging Ltd
 Warsash Scientific Pty Ltd
 WhiteOptics LLC

OPTICAL COATINGS/ TREATMENTS

G-S PLASTIC OPTICS
 Infinite Optics Inc
 JENOPTIK Optical Systems GmbH
 Kowa American Corp
 Lasertec Inc
 Logitech Ltd
 Lumetrics Inc
■ Master Bond
 (See ad page 30)
 Max Levy Autograph Inc
 Nufern
 OptoCity
 OSI OptoElectronics Inc
 Reynard Corp
 Sacher Lasertechnik LLC
 SwissOptic AG
 Timbercon
 United Lens Co Inc
 Westech Optical Corp
 WhiteOptics LLC
 ZC&R Coatings for Optics, an Abrisa
 Technologies Co

OPTICAL DETECTORS

Advanced Photonix Inc
 ASE Optics LLC
 Blue Sky Research
 Boston Electronics Corp
■ Falcon Electronics
 (See ad page 42)
 Gigahertz-Optik Inc
 HGH Infrared Systems
 Kowa American Corp
 Lasertec Inc
 Logitech Ltd
 MAZeT GmbH
 OSI OptoElectronics Inc
 Sofradir EC Inc
 Specialised Imaging Inc
 Specialised Imaging Ltd
 Tapeswitch Corp
 Thermo Scientific - CIDTEC
 TNC Optics & Technologies Pte Ltd
 Warsash Scientific Pty Ltd
 Xenics

OPTICAL FIBER

Blue Sky Research
 EigenLight Corp
 Fiber Savvy
 GiGa Concept Inc
 Go4Fiber Ltd

Greenlee Communications, a Textron Co
 HUBER+SUHNER AG
 IEWC
 InnovaQuartz LLC
 Krell Technologies Inc
 kSaria Corp
 LEMO SA
 LEONI Fiber Optics Inc
 Logitech Ltd
 Micro Laser Systems Inc
 nLIGHT
 Nufern
 OFS
 OptiConcepts Inc
 Optocon AG
 Photon Control Inc
 Sacher Lasertechnik GmbH
 TE Connectivity
 Timbercon
 TNC Optics & Technologies Pte Ltd
 Ultra Communications Inc

OPTICAL FILTERS

G-S PLASTIC OPTICS
 Infinite Optics Inc
 Iridian Spectral Technologies
 ISP Optics Corp
 JENOPTIK Optical Systems GmbH
 Lasertec Inc
 Logitech Ltd
 Max Levy Autograph Inc
 MAZeT GmbH
 OptoCity
 Reynard Corp
 Sofradir EC Inc
 TLC International
 TNC Optics & Technologies Pte Ltd
 United Lens Co Inc
 ZC&R Coatings for Optics, an Abrisa
 Technologies Co

OPTICAL IMAGING

American Infrared Solutions (AIRS)
 ASE Optics LLC
 Electro-Optical Products Corp
 EO Strategies
 GiGa Concept Inc
 Headwall Photonics Inc
 HGH Infrared Systems
 Infinite Optics Inc
 Iscan Inc
 ISP Optics Corp
 ISVI Corp
 Keo Scientific Ltd
 KEYENCE Corp of America
 Kowa American Corp
 Lambda Research Corp
 Lasertec Inc
 Logitech Ltd

Max Levy Autograph Inc
 OptoCity
 Reynard Corp
 Santa Barbara Infrared Inc
 Specialised Imaging Inc
 Specialised Imaging Ltd
 Telops Inc
 TNC Optics & Technologies Pte Ltd
 United Lens Co Inc
 UTC Aerospace Systems
 Video Scope International Ltd
 Warsash Scientific Pty Ltd
 Westech Optical Corp
 Xenics

OPTICAL SWITCHES

Advanced Photonix Inc
 Aerospace Optics Inc
 Cornet Technology Inc
 DiCon Fiberoptics Inc
 ■ **Falcon Electronics**
 (See ad page 42)
 Fiber Savvy
 LEONI Fiber Optics Inc
 Moog Protokraft
 OptiConcepts Inc
 OSI OptoElectronics Inc
 Pickering Interfaces Inc
 Powell Electronics
 Raycom Electronics
 StacoSystems
 SurplusEQ.com Inc

OPTICAL TRANSCEIVERS

Applied Optoelectronics Inc
 EigenLight Corp
 Molex Inc
 Moog Protokraft
 Tektronix Component Solutions
 Timbercon
 Ultra Communications Inc

OPTICS

Advanced Optics Inc
 ASE Optics LLC
 Carr Quality Compliance Consulting
 Changchun New Industries
 Optoelectronics Technology Co Ltd
 Del Mar Photonics Inc
 EigenLight Corp
 EO Strategies
 GiGa Concept Inc
 G-S PLASTIC OPTICS
 Headwall Photonics Inc
 Infinite Optics Inc
 InnovaQuartz LLC
 IRCameras LLC
 Iridian Spectral Technologies
 ISP Optics Corp
 JENOPTIK Optical Systems GmbH
 Kowa American Corp
 Krell Technologies Inc
 Kugler of America Ltd
 Lambda Research Corp
 LAS-CAD GmbH

Lasertec Inc
 Lensel Optics Pvt Ltd
 Logitech Ltd
 Max Levy Autograph Inc
 Micro Laser Systems Inc
 Optis
 OptoCity
 Photon Control Inc
 Photonic Sense GmbH
 Reynard Corp
 Sacher Lasertechnik LLC
 Santa Barbara Infrared Inc
 SurplusEQ.com Inc
 SwissOptic AG
 TE Connectivity
 Telops Inc
 Timbercon
 TLC International
 TNC Optics & Technologies Pte Ltd
 United Lens Co Inc
 Westech Optical Corp
 WhiteOptics LLC
 ZC&R Coatings for Optics, an Abris
 Technologies Co

THERMAL IMAGING

American Infrared Solutions (AIRS)
 CohuHD
 EO Strategies
 Headwall Photonics Inc
 IRCameras LLC
 Iridian Spectral Technologies

ISP Optics Corp
 Kowa American Corp
 Lasertec Inc
 Max Levy Autograph Inc
 NiCoForm Inc
 PCE Instruments UK Ltd
 Phase 1 Technology Corp
 Raytheon Vision Systems
 Reynard Corp
 Santa Barbara Infrared Inc
 Telops Inc
 Thermoteknix Systems Ltd
 Vision4ce
 Warsash Scientific Pty Ltd
 Wavelength Electronics Inc
 Xenics

ULTRAVIOLET LIGHT SOURCES

Coherent Inc
 FoxFury Lighting Solutions
 Gigahertz-Optik Inc
 Interlight
 Lasertec Inc
 Micro Laser Systems Inc
 Nightstick
 OptoCity
 Passat Ltd
 Photon Control Inc
 Reynard Corp
 SurplusEQ.com Inc
 Warsash Scientific Pty Ltd

NAVIGATION

AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST (ADS-B) EQUIPMENT

Carr Quality Compliance Consulting
 Cepoint Networks LLC
 Dexter Magnetic Technologies Inc
 Harris Corp
 Teletronics Technology Corp

GPS SYSTEMS

APACER Memory America Inc
 ASE Optics LLC
 Ball Aerospace and Technologies Corp
 CERTON
 Dexter Magnetic Technologies Inc
 General Micro Systems Inc

L-3 Communications Interstate
 Electronics Corp
 Mobile Mark Antenna Solutions
 Rohde & Schwarz USA Inc
 Savi Technology
 Tango Wave
 Teletronics Technology Corp
 US Dynamics Corp

TERRAIN

Harris Corp
 MICCAVIONICS GmbH

AVIONICS

Advanced Conversion Technology Inc
Aerospace Optics Inc
ADLINK Technology Inc
APACER Memory America Inc
ASE Optics LLC
Avionics Interface Technologies (AIT)
AWT-Global LLC
Ballard Technology
Barco Federal Systems LLC
CERTON



Clear-Com
Conscious Systems Engineering LLC
■ **Crane Aerospace & Electronics**
(See ad page 45)
Curtiss-Wright Defense Solutions
Dynamic Engineering
EaglePicher Technologies LLC
ELDEC
Elma Electronic Inc
EMTEQ
■ **Extreme Engineering Solutions Inc (X-ES)**
(See ads pages 3, 37)



Honeywell Aerospace
Interpoint
Keltec
Meggitt Defense
MEN Micro Inc
Merrimac
North Atlantic Industries Inc
Parvus Corp
PIC Wire & Cable
Sandel Avionics
Sensitron Semiconductor
Signal Technology
SpaceAge Control Inc
Space Micro
Speel Praha Ltd
StacoSystems
Statek Corp
TenCate Advanced Composites
TEN TECH LLC
Teradyne
TESEO SpA
Ultra Communications Inc
Unitron LP
US Dynamics Corp

CABIN MANAGEMENT SYSTEMS

Automated Motion
Conscious Systems Engineering LLC
PureTech Systems

COUNTERMEASURES

CTT Inc
MC Countermeasures Inc
Vision4ce

ELECTRONIC FLIGHT INSTRUMENT SYSTEMS (EFIS)

■ **Gaia Converter**
(See ad page 49)
TEN TECH LLC

LIGHTING

Interface Displays & Controls Inc
Interlight
MAZeT GmbH
Nightstick

LIGHT MANAGEMENT SYSTEMS

Alonex Electronic Engineering Ltd
MAZeT GmbH
Nightstick
Whelen Engineering Co Inc

NAVIGATION EQUIPMENT

Advanced Conversion Technology Inc
APACER Memory America Inc
Applied Signal Technology Inc
AWT-Global LLC
CERTON
CTT Inc
■ **Dawn VME Products**
(See ad page 6)
Interface Displays & Controls Inc
MEN Micro Inc
MICCAVIONICS GmbH
Mobile Mark Antenna Solutions
Rockwell Collins
Sandel Avionics
SPINNER GmbH
Statek Corp
Vision4ce

SATELLITE SYSTEMS

APACER Memory America Inc
Berliner Glas KGaA Herbert Kubatz GmbH & Co
EaglePicher Technologies LLC
GE Intelligent Platforms
IXI Technology
Parvus Corp
Pearson Machine Co LLC
Savi Technology
Tango Wave
TEN TECH LLC
Ultra Communications Inc

ViaSat Inc
Vision4ce

SECURITY SYSTEMS

Active Silicon Inc
Active Silicon Ltd
Alonex Electronic Engineering Ltd
Cepoint Networks LLC
Fibernet
GE Intelligent Platforms
GiDEL
PureTech Systems
Tapeswitch Corp
Vision4ce

SHIPBOARD/MARITIME ELECTRONICS

Advanced Conversion Technology Inc
ADLINK Technology Inc
Analytic Systems
APACER Memory America Inc
Avionics Interface Technologies (AIT)
CES - Creative Electronic Systems SA
■ **Crane Aerospace & Electronics**
(See ad page 45)
■ **Dawn VME Products**
(See ad page 6)
Dynamic Engineering
ELDEC
Elma Electronic Inc
GE Intelligent Platforms
Innovation Management Group Inc
Interpoint
Keltec
MC Countermeasures Inc
MEN Micro Inc
Merrimac
■ **Modular Devices Inc**
(See ad page 11)
North Atlantic Industries Inc
OPHIR RF
Parvus Corp
Pearson Machine Co LLC
■ **PICO Electronics Inc**
(See ad page 47)
PIC Wire & Cable
■ **RGB Spectrum**
(See ad page 30)
Signal Technology
Smiths Connectors
StacoSystems
TESEO SpA
Unitron LP
US Dynamics Corp
Vision4ce

TRAINING AND SIMULATION

1st Power
Aerosim Flight Academy
APACER Memory America Inc
Avionics Interface Technologies (AIT)
AWT-Global LLC
Barco Federal Systems LLC
Camber Corp

CDG, a Boeing Co
CES - Creative Electronic Systems SA
Clear-Com
Dataforth Corp
L-3 Electron Devices
Lexycom Technologies Inc
MC Countermeasures Inc
Quantum3D Inc
■ **RGB Spectrum**
(See ad page 30)
Rockwell Collins
Simlat Ltd

UNMANNED VEHICLES

Active Silicon Inc
Active Silicon Ltd
Advanced Conversion Technology Inc
ADLINK Technology Inc
APACER Memory America Inc
Barco Federal Systems LLC
Clear-Com
■ **Crane Aerospace & Electronics**
(See ad page 45)
CTT Inc
EaglePicher Technologies LLC
ELDEC
■ **Extreme Engineering Solutions Inc (X-ES)**
(See ads pages 3, 37)
FLIR Systems Inc
GE Intelligent Platforms
GiDEL
IXI Technology
Lexycom Technologies Inc
Parvus Corp
Pearson Machine Co LLC
Phase 1 Technology Corp
Rigel Engineering LLC
Santa Barbara Infrared Inc
Sensitron Semiconductor
Simlat Ltd
Vision4ce
Xplore Technologies

VETRONICS

Advanced Conversion Technology Inc
Aerospace Optics Inc
Ballard Technology
Barco Federal Systems LLC
CES - Creative Electronic Systems SA
Elma Electronic Inc
GE Intelligent Platforms
Holt Integrated Circuits
■ **Modular Devices Inc**
(See ad page 11)
North Atlantic Industries Inc
Parvus Corp
Pleora Technologies Inc
Sensitron Semiconductor
Vision4ce

WEATHER SYSTEMS

Columbia Weather Systems Inc
PCE Instruments UK Ltd

AMPLIFIERS

Advanced Microwave Products
Aethercomm Inc
Agile Microwave Technology Inc
API Technologies Corp
Arrow Electronics Inc
Carr Quality Compliance Consulting
Comdel Inc
CTT Inc
Dexter Magnetic Technologies Inc

■ **Falcon Electronics**
(See ad page 42)

I2R Nanowave
Intersil
Keltec
L-3 Communications Interstate Electronics Corp

■ **Mercury Systems**
(See ad page 9)

Merrimac
Mistral Solutions
Mouser Electronics
■ **MS Kennedy Products**
(See ad page 5)

Nanowave Technologies
National Semiconductor
NuWaves Engineering
OPHIR RF
Pamir Electronics Corp
Pickering Interfaces Inc
Pole Zero Corp
Pro-Comm Inc
Sensitron Semiconductor
Signal Technology
Silicon Radar GmbH
STMicroelectronics Inc
Tango Wave
Teletronics Technology Corp
US Dynamics Corp

ANTENNAS

API Technologies Corp
ASC Signal Corp
ChoiceRight Electronic Inc
Clear-Com
Cobham Antenna Systems
Dexter Magnetic Technologies Inc
Fralock
Harris Corp
HUBER+SUHNER AG
HUBER+SUHNER Inc
I2R Nanowave
L-3 Electron Devices
Max Levy Autograph Inc
Mobile Mark Antenna Solutions
Nanowave Technologies
Phoenix Contact
Powell Electronics
Rohde & Schwarz USA Inc
Streamline Circuits Corp
TECOM Industries Inc
Teletronics Technology Corp

TenCate Advanced Composites
ViaSat Inc

DIPLEXERS/MULTIPLEXERS

API Technologies Corp
Carr Quality Compliance Consulting
Lark Engineering
Microlab (A Wireless Telecom Group Co)

Nanowave Technologies
NuWaves Engineering
Pickering Interfaces Inc
Pole Zero Corp
SPINNER GmbH
Tango Wave
US Dynamics Corp

DISCRETE COMPONENTS

BI Technologies
Cobham Antenna Systems
Cobham Weinschel (formerly Aeroflex)

■ **Crane Aerospace & Electronics**
(See ad page 45)

DPA Components International

■ **Falcon Electronics**
(See ad page 42)

Fox Electronics
Integra Technologies
Microlab (A Wireless Telecom Group Co)
Mouser Electronics
Positronic
Powell Electronics
TE Connectivity
TTI Inc
Wavelength Electronics Inc

FILTERS

Amphenol Aerospace
API Technologies Corp
Barry Industries Inc
Cobham Antenna Systems
Cobham Signal & Control Solutions (formerly Aeroflex)
Dexter Magnetic Technologies Inc
DJM Electronics
Fabritech Inc

■ **Keysight Technology Inc**
(See ads inside front and inside back covers)

Lark Engineering
Max Levy Autograph Inc
Merrimac
Microlab (A Wireless Telecom Group Co)

Mixed Signal Integration Corp
Mouser Electronics

■ **MS Kennedy Products**
(See ad page 5)

NuWaves Engineering
Pamir Electronics Corp
Pole Zero Corp

Quell Corp
Radius Power
Raycom Electronics
Sealing Devices Inc
Signal Technology
SPINNER GmbH
Tektronix Component Solutions
TTI Inc
US Dynamics Corp

FREQUENCY SYNTHESIZERS

Comdel Inc

■ **Crane Aerospace & Electronics**
(See ad page 45)

I2R Nanowave
Merrimac
Mistral Solutions
Nanowave Technologies
NuWaves Engineering
Pamir Electronics Corp
Pole Zero Corp
Signal Technology
US Dynamics Corp

HYBRIDS

Advanced Photonix Inc
Agile Microwave Technology Inc
BI Technologies

■ **Crane Aerospace & Electronics**
(See ad page 45)

DPA Components International
I2R Nanowave
Merrimac
Microlab (A Wireless Telecom Group Co)

Nanowave Technologies
Signal Technology
SPINNER GmbH
Streamline Circuits Corp
Tektronix Component Solutions

MICROWAVE SUBASSEMBLIES

Advanced Microwave Products
Aethercomm Inc
Barry Industries Inc
BellowsTech LLC
BroadWave Technologies Inc
ChoiceRight Electronic Inc
Cobham Signal & Control Solutions (formerly Aeroflex)
Cobham Weinschel (formerly Aeroflex)

■ **Crane Aerospace & Electronics**
(See ad page 45)

CTT Inc
HUBER+SUHNER AG
HUBER+SUHNER Inc
Hunter Technology Corp
I2R Nanowave
Lark Engineering

■ **Mercury Systems**
(See ad page 9)

Merrimac
Microlab (A Wireless Telecom Group Co)
Nanowave Technologies
NuWaves Engineering
OPHIR RF
Pearson Machine Co LLC
Pickering Interfaces Inc
Pro-Comm Inc
QTI Sensing Solutions
RF Precision Products
Servometer
Signal Technology
SOURIAU PA&E
Tango Wave
Tektronix Component Solutions
Teledyne Storm Microwave
TESEO SpA
ViaSat Inc

MIXED-SIGNAL DEVICES

Agile Microwave Technology Inc
API Technologies Corp
ASIC Advantage Inc
BI Technologies
Cobham Antenna Systems

■ **Crane Aerospace & Electronics**
(See ad page 45)

DPA Components International

■ **Falcon Electronics**
(See ad page 42)

HUBER+SUHNER AG
Logic PD

■ **Mercury Systems**
(See ad page 9)

Merrimac
Mixed Signal Integration Corp
Pamir Electronics Corp
Ridgetop Group Inc
Signal Technology
Silicon Radar GmbH
STMicroelectronics Inc
Tektronix Component Solutions

MMICS

I2R Nanowave
KAMAKA Electronic Bauelemente Vertriebs GmbH
Nanowave Technologies
Silicon Radar GmbH
ViaSat Inc

OSCILLATORS/SYNTHESIZERS

■ **Crane Aerospace & Electronics**
(See ad page 45)

■ **Falcon Electronics**
(See ad page 42)

Fox Electronics
Hunter Technology Corp
I2R Nanowave
Merrimac

Mixed Signal Integration Corp
Nanowave Technologies
NuWaves Engineering
Pamir Electronics Corp
Pro-Comm Inc
Signal Technology
Silicon Radar GmbH
Tektronix Component Solutions
Ultraview Corp
US Dynamics Corp

RF ATTENUATORS

API Technologies Corp
Barry Industries Inc
BroadWave Technologies Inc
ChoiceRight Electronic Inc
Coaxial Components Corp (Coaxicom)
Cobham Antenna Systems

■ Crane Aerospace & Electronics (See ad page 45)

DS Instruments
Honeywell Microelectronics &
Precision Sensors

HUBER+SUHNER AG
KAMAKA Electronic Bauelemente
Vertriebs GmbH

■ Keysight Technology Inc (See ads inside front and inside back covers)

Merrimac
Microlab (A Wireless Telecom Group
Co)

Mouser Electronics
Pickering Interfaces Inc
Pole Zero Corp
RF Precision Products
Signal Technology
SPINNER GmbH
Streamline Circuits Corp
Teledyne Relays US

RF PACKAGING

Agile Microwave Technology Inc
AI Technology Inc
Aries Electronics inc
Barry Industries Inc
Fabritech Inc
Fralock
HUBER+SUHNER AG
packIQ
Pearson Machine Co LLC
Protective Packaging Corp
SOURIAU PA&E
Tech Products Inc
Tektronix Component Solutions

RF SWITCHES

Aethercomm Inc
Agile Microwave Technology Inc
API Technologies Corp
BroadWave Technologies Inc
Cobham Signal & Control Solutions
(formerly Aeroflex)

■ Crane Aerospace & Electronics (See ad page 45)

Honeywell Microelectronics &
Precision Sensors

■ Keysight Technology Inc (See ads inside front and inside back covers)

Lark Engineering

■ Mercury Systems (See ad page 9)

Merrimac
MesoEngineering LLC
Mistral Solutions
Mouser Electronics
Pamir Electronics Corp
Pickering Interfaces Inc
Pole Zero Corp
Powell Electronics
Raycom Electronics

Signal Technology
Silicon Radar GmbH
SPINNER GmbH
Tapeswitch Corp
Teledyne Relays US
TTI Inc
US Dynamics Corp

SIGNAL GENERATORS

Applied Physical Electronics LC
AWT-Global LLC
Berkeley Nucleonics Corp
DS Instruments
Epiq Solutions

■ Keysight Technology Inc (See ads inside front and inside back covers)

MC Countermeasures Corp
Pickering Interfaces Inc
Pro-Comm Inc
Quantum Composers
Rohde & Schwarz USA Inc
US Dynamics Corp
ViaSat Inc

TRANSMIT/RECEIVE MODULES

Advanced Microwave Products
Aethercomm Inc

■ Crane Aerospace & Electronics (See ad page 45)

CTT Inc
Epiq Solutions
I2R Nanowave
Innovative Integration
Keltec
Lexcom Technologies Inc
Logic PD

■ Mercury Systems (See ad page 9)

Merrimac
Nanowave Technologies
NuWaves Engineering
OPHIR RF
Pentek Inc
Pole Zero Corp
Powell Electronics
Signal Technology
Silicon Radar GmbH
Tango Wave
US Dynamics Corp

UP/DOWN CONVERTERS

4DSP LLC
Agile Microwave Technology Inc
Behlman Electronics Inc
■ Crane Aerospace & Electronics
(See ad page 45)

CTT Inc
Hunter Technology Corp
I2R Nanowave
Innovative Integration

■ Mercury Systems (See ad page 9)

Merrimac
Mixed Signal Integration Corp
Nanowave Technologies
NuWaves Engineering
■ PICO Electronics Inc
(See ad page 47)



Signal Technology
Silicon Radar GmbH
Tango Wave
Tektronix Component Solutions

SAFETY EQUIPMENT AND COMPONENTS

ALARM SYSTEMS

■ EMCOR Group Inc
(See ad back cover)
General Digital Software Services
LRAD Corp
Pan Gulf Industrial Systems
Tapeswitch Corp

ANTI-ICING EQUIPMENT

All Flex Flexible Circuits & Heaters
zGRIP

ANTI-STATIC EQUIPMENT

GWD and Associates

Protective Packaging Corp
Quell Corp
Reelcraft Industries Inc

COLLISION AVOIDANCE SYSTEMS

General Digital Software Services
Tapeswitch Corp

EMI/RFI

Amphenol Aerospace
DLS Electronic Systems Inc
Fabritech Inc

■ Gaia Converter (See ad page 49)

Lapp USA
Ness Engineering Inc
OPHIR RF
Optocon AG
Quell Corp
Raycom Electronics
Servometer
TESEO SpA

FIRE DETECTION

Advanced Photonix Inc
■ EMCOR Group Inc
(See ad back cover)
Pan Gulf Industrial Systems

STALL WARNING

General Digital Software Services

TERRAIN AWARENESS WARNING SYSTEMS (TAWS)

General Digital Software Services
MICCAVIONICS GmbH

WINDSHEAR WARNING SYSTEMS

General Digital Software Services

ASSEMBLY/SUBCONTRACT SERVICES

AbelConn LLC
Adaptive Innovations
ADCO Circuits
ASE Optics LLC
Austin Semiconductor Inc
Aviel Electronics
Avnet Inc
BellowsTech LLC
Berliner Glas KGaA Herbert Kubatz GmbH & Co
Blue Wolf
Boker's Inc
Chassis Plans
Cobham RAD Solutions (formerly Aeroflex)

■ **Cobham Semiconductor Solutions (formerly Aeroflex)**
(See ad page 23)

CTT Inc
Custom Engineering Co
Cyclosystem Pte Ltd
Digital Core Design
DILAS Diode Laser Inc
DPA Components International
Elan Technical Corp
ESAM Inc
FileCatalyst
Fischer Connectors Inc
Fralock
GDCA Inc
HALT and HASS Labs
HUBER+SUHNER Inc
Hughes Circuits Inc
Hunter Technology Corp
Impact Technical Services Ltd
IMPCO Inc
InnovaQuartz LLC
JENOPTIK Optical Systems GmbH
LAI International Inc
Lapp USA
Latchways Inc
LEONI Fiber Optics Inc
Logic PD

■ **Master Bond**
(See ad page 30)

Max Levy Autograph Inc
Micom Laboratories Inc
Motion Maker Engineering

■ **MS Kennedy Products**
(See ad page 5)

MTI Electronics
Murrietta Circuits
Nelson Design Services Inc
NiCoForm Inc
Nordson ASYMTEK
Nova Electric
NuWaves Engineering
OptoCity
P3 Technologies
Pearson Machine Co LLC
PIC Wire & Cable
Powell Electronics

Pro-Comm Inc
Projects Unlimited
Raycom Electronics
Reynard Corp
RF Precision Products
Signet FPD Inc
Six Sigma
S-Products Inc
SwissOptic AG
Switching Power Inc
TASC Technical & Assembly Services Corp
Tektronix Component Solutions
TESEO SpA
TLC International
Winslow Automation

CALIBRATION SERVICES

Keithley Instruments Inc

■ **Keysight Technology Inc**
(See ads inside front and inside back covers)

Lockheed Martin Santa Barbara Focal Plane
Micom Laboratories Inc
National Instruments
Rohde & Schwarz USA Inc

CONSULTANTS

Adaptive Innovations
AEI Systems
Aerosim Flight Academy
Allied Industrial Marketing
American Laser Enterprises LLC
Americon
Applied Physical Electronics LC
ASE Optics LLC
BQR
Carr Quality Compliance Consulting
CDG, a Boeing Co
Clements Worldwide
Conscious Systems Engineering LLC
DeTect Inc
Develeat SA
Digital Core Design
DLS Electronic Systems Inc
Embassy Global LLC

■ **EMCOR Group Inc**
(See ad back cover)

Enea
EO Strategies
Epiq Solutions
FileCatalyst
Forefronts Defense Systems
GL Communications Inc
Green Hills Software Inc
Growth Technical Marketing
GWD and Associates
HALT and HASS Labs
HC Controls Inc
Impact Technical Services Ltd
IMPCO Inc
Impulse Accelerated Technologies
Industrial Training Consultants Inc

InnovaQuartz LLC
Integra Technologies
Keo Scientific Ltd
The Light Brigade Inc
Logic PD
Micom Laboratories Inc
Motion Maker Engineering
Nelson Design Services Inc
Ness Engineering Inc
NuWaves Engineering
Optis
OptoCity
packIQ
Passat Ltd
Pearson Machine Co LLC
Protective Packaging Corp
Quanta Laboratories
Raycom Electronics
R Blaine Industries Inc
Ridgetop Group Inc
Rigel Engineering LLC
San Francisco Circuits
Specialised Imaging Inc
Specialised Imaging Ltd
Storage Clarity
SuperPower Inc
Synopsys Inc
Tata Technologies Ltd
TEN TECH LLC
TLC International
Varna Products TRC
Viking Equipment Finance
Winchester Systems Inc

DESIGN ENGINEERING

1st Power
ACD
ADCO Circuits
Advanced Conversion Technology Inc
American Laser Enterprises LLC
Americon
API Technologies Corp
Barco Federal Systems LLC
BellowsTech LLC
Blue Wolf
Boker's Inc
CERTON
Chassis Plans
Conscious Systems Engineering LLC

■ **Crane Aerospace & Electronics**
(See ad page 45)

Custom Engineering Co
Cyclosystem Pte Ltd
Develeat SA
DLS Electronic Systems Inc
■ **EMCOR Group Inc**
(See ad back cover)
Epiq Solutions
Fabritech Inc
Forza Silicon
Handling Specialty Manufacturing Ltd
Hunter Technology Corp
IEWC
Impact Technical Services Ltd

InfoSight Corp
InnovaQuartz LLC
Integra Technologies
Intersil
IOxOS Technologies
IXI Technology
Jazz Semiconductor Inc
LAI International Inc
Lapp USA
Lenseil Optics Pvt Ltd
Lexycom Technologies Inc
Marvin Land Systems Inc
Max Levy Autograph Inc
MAZeT GmbH
MegaWatt Lasers Inc
MICCAVIONICS GmbH
Motion Maker Engineering
Ness Engineering Inc
Northwire Inc
NuWaves Engineering
OptoCity
P3 Technologies
Pearson Machine Co LLC
Positronic
Protective Packaging Corp
Quantum Composers
Rambus Inc
Raycom Electronics
Raytheon Vision Systems
R Blaine Industries Inc
Reynard Corp
Rigel Engineering LLC
Santa Barbara Infrared Inc
Signet FPD Inc
SOURIAU PA&E
SurClean Inc
Tapeswitch Corp
Tata Technologies Ltd
Telesis Technologies Inc
Telops Inc
Vadatech Inc
Varna Products TRC
Vision Components GmbH
■ **VPT Inc**
(See ad page 13)
Winchester Systems Inc
zGRIP

DISTRIBUTORS

Aero Express Inc
Alphabyte Technology
American GMG Inc
Arrow Electronics Inc
Avnet Inc
Cable Labels USA
Canyonwest Cases
DAC International Inc
■ **Falcon Electronics**
(See ad page 42)
Fiber Savvy
FileCatalyst
Fralock
GWD and Associates
Haven Automation Ltd

HC Controls Inc
IEWC
Impact Technical Services Ltd
JTime Inc
LPKF Laser & Electronics

Motion Maker Engineering
Nelco Products
The Night Vision Store
Phase 1 Technology Corp
Powell Electronics

Ronco
STI Electronics Inc
Storage Clarity
Super Brush LLC
SuperPower Inc

TTI Inc
VC DISPLAYS
Weschler Instruments

SOFTWARE

APPLICATIONS

1st Power

■ AIM-USA

(See ad page 27)

Avionics Interface Technologies (AIT)
Carr Quality Compliance Consulting
CDG, a Boeing Co
Compsim
Digital Core Design
dSPACE Inc
FileCatalyst
GiDEL
Impulse Accelerated Technologies
Innovation Management Group Inc
IXI Technology
Keithley Instruments Inc
K-Sun Corp
Logic PD
Lynx Software Technologies Inc
Mega-Fabs Motion Systems Ltd
MICCAVIONICS GmbH
Phoenix Contact
Rapid Imaging Software Inc
Real-Time Innovations
Savi Technology
TESEO SpA
Vision Components GmbH
VXI Technology Inc

COMMUNICATIONS/ NETWORKING

Applied Signal Technology Inc
Barco Federal Systems LLC
Cable Labels USA
CES - Creative Electronic Systems SA
Clear-Com
Cornet Technology Inc
Digital Core Design
Epiq Solutions
esd electronics Inc
FileCatalyst
GL Communications Inc
Green Hills Software Inc
Harris Corp
Honeywell Aerospace
Impulse Accelerated Technologies
Lynx Software Technologies Inc
Pleora Technologies Inc
Real-Time Innovations
Savi Technology
Storage Clarity

Synopsys Inc
SYSGO
Vector Informatik GmbH
Xplore Technologies
ZNYX Networks

DATABASE MANAGEMENT

Beamex
Harris Corp
McObject
MICCAVIONICS GmbH

DATABASES

McObject

DATA SECURITY

Applied Signal Technology Inc
Digital Core Design
Fibernet
Global Training Solutions Inc
Green Hills Software Inc
Impulse Accelerated Technologies
LDRA
Lynx Software Technologies Inc
Storage Clarity
Xplore Technologies

DESIGN AND DEVELOPMENT TOOLS

AEi Systems
Aldec Inc
Avionics Interface Technologies (AIT)
Ballard Technology
BQR
Camber Corp
CDG, a Boeing Co
CERTON
CES - Creative Electronic Systems SA
■ **Data Device Corp (DDC)**
(See ad page 21)
DDC-I Inc
Digital Core Design
dSPACE Inc
FileCatalyst
General Digital Software Services
GiDEL
Green Hills Software Inc
Impulse Accelerated Technologies
Innovation Management Group Inc

■ **Keysight Technology Inc** (See ads inside front and inside back covers)

Lambda Research Corp
LAS-CAD GmbH
Logic PD
Lynx Software Technologies Inc
MathWorks Inc
MAZeT GmbH
McObject
Mega-Fabs Motion Systems Ltd
Mentor Graphics
Motion Maker Engineering
Optis
Praxis Optics
Real-Time Innovations
Synopsys Inc
Vector Informatik GmbH
Vision Components GmbH

DOCUMENT MANAGEMENT SYSTEMS

Beamex
dSPACE Inc
FileCatalyst
Storage Clarity

ELECTRONIC DESIGN AUTOMATON (EDA)

BQR
Digital Core Design
FileCatalyst
Impulse Accelerated Technologies

GRAPHICS AND SIMULATION

Active Silicon Ltd
■ **AIM-USA**
(See ad page 27)
Ballard Technology
Camber Corp
CDG, a Boeing Co
CES - Creative Electronic Systems SA
Compsim
dSPACE Inc
FileCatalyst
GiDEL
Global Training Solutions Inc
HC Controls Inc
Impulse Accelerated Technologies
Industrial Training Consultants Inc
MathWorks Inc

Quantum3D Inc
Rapid Imaging Software Inc
Simlat Ltd
Vector Informatik GmbH
Vision4ce

INFORMATION SECURITY

Camber Corp
Digital Core Design
FileCatalyst
Global Training Solutions Inc
Green Hills Software Inc
Innovation Management Group Inc
LDRA
Lynx Software Technologies Inc
Storage Clarity
SYSGO
Xplore Technologies

MOVING MAPS

Interface Displays & Controls Inc
MICCAVIONICS GmbH
Rapid Imaging Software Inc
Savi Technology

OPERATING SYSTEMS

AbsInt Angewandte Informatik GmbH
Digital Core Design
Enea
Global Training Solutions Inc
Green Hills Software Inc
Logic PD
Lynx Software Technologies Inc
Motion Maker Engineering
Santa Barbara Infrared Inc
SYSGO
Winchester Systems Inc
Xplore Technologies

PRODUCT LIFE CYCLE MANAGEMENT (PLM)

Avionics Interface Technologies (AIT)
BQR
CERTON
Rockwell Automation Inc
Siemens Process Industries and
Drives

PROGRAMMING LANGUAGES

DDC-I Inc
Digital Core Design

Global Training Solutions Inc
Green Hills Software Inc
Impulse Accelerated Technologies
MathWorks Inc
Mega-Fabs Motion Systems Ltd

REAL-TIME OPERATING SYSTEMS (RTOS) AND KERNELS

Camber Corp

CES - Creative Electronic Systems SA
DDC-I Inc
esd electronics Inc
General Digital Software Services
Green Hills Software Inc
Lynx Software Technologies Inc
Savi Technology
SYSGO
Vision4ce
Vision Components GmbH

SOFTWARE CODE DESIGN, TEST, AND VERIFICATION

■ AIM-USA

(See ad page 27)

Avionics Interface Technologies (AIT)
BQR
Camber Corp
CERTON
dSPACE Inc
Green Hills Software Inc

Impulse Accelerated Technologies
Lynx Software Technologies Inc
MathWorks Inc
Ridgetop Group Inc
Storage Clarity
Verocel
Vision4ce
Vision Components GmbH

TEST AND MEASUREMENT

CALIBRATION EQUIPMENT

4DSP LLC
Adamant Valves
ADLINK Technology Inc
Beamex
Carr Quality Compliance Consulting
Chroma Systems Solutions Inc
Cincinnati Sub-Zero (CSZ)
Cobham Antenna Systems
Haven Automation Ltd
HC Controls Inc
HUBER+SUHNER AG

■ Keysight Technology Inc (See ads inside front and inside back covers)

Konica Minolta Sensing Americas Inc
Max Levy Autograph Inc
MC Countermeasures Inc
Omega Engineering Inc
OPHIR RF
PCE Instruments UK Ltd
Reynard Corp
Santa Barbara Infrared Inc
Sensor Developments Inc
Smart Electronics
SPINNER GmbH
Stanford Magnets
Steritool Inc
TESEO SpA
Versatile Power
Weschler Instruments

COTS UPSCREENING

AAEON Electronics Inc
Adimec Advanced Image Systems BV
Austin Semiconductor Inc
Automated Motion
DLS Electronic Systems Inc
DPA Components International
■ **Falcon Electronics**
(See ad page 42)
GIDEL
North Atlantic Industries Inc
NuWaves Engineering
OPHIR RF
QTI Sensing Solutions

Silicon Designs Inc
Tektronix Component Solutions

EMC COMPLIANCE

1st Power
API Technologies Corp
DJM Electronics
DLS Electronic Systems Inc
Fralock

■ Keysight Technology Inc (See ads inside front and inside back covers)

OPHIR RF
TESEO SpA

HALT/HASS

Adaptive Innovations
Cascade TEK
Cincinnati Sub-Zero (CSZ)
CSZ Testing
DLS Electronic Systems Inc
DPA Components International
HALT and HASS Labs
inTEST Thermal Solutions
Keithley Instruments Inc
Microm Laboratories Inc
QTI Sensing Solutions
Qualmark Corp
Quanta Laboratories
Screening Systems Inc
VXI Technology Inc

METERS

Beamex
Boonton (A Wireless Telecom Group Co)
Carr Quality Compliance Consulting
Chroma Systems Solutions Inc
Digital Lightwave Inc
DS Instruments
EXFO
Greenlee Communications, a Textron Co
Haven Automation Ltd
HC Controls Inc
Keithley Instruments Inc

■ Keysight Technology Inc (See ads inside front and inside back covers)

Konica Minolta Sensing Americas Inc
LASERVISION GmbH & Co KG
Microm Laboratories Inc
Omega Engineering Inc
Palmer Wahl Temperature Instruments
PCE Instruments UK Ltd
Process Technology
Rohde & Schwarz USA Inc
RWC Testing & Lab Supplies
SurplusEQ.com Inc
Teradyne
Warsash Scientific Pty Ltd
Weschler Instruments

NETWORK ANALYZERS

AAEON Electronics Inc
AEI Systems
Avionics Interface Technologies (AIT)
Cepoint Networks LLC
CES - Creative Electronic Systems SA
Continental Resources
Digital Lightwave Inc
Epiq Solutions
EXFO
GL Communications Inc
Go4Fiber Ltd
Greenlee Communications, a Textron Co
■ **Keysight Technology Inc**
(See ads inside front and inside back covers)
National Test Equipment
NextComputing
PCE Instruments UK Ltd
Rohde & Schwarz USA Inc
SurplusEQ.com Inc
Vector Informatik GmbH

NETWORK/DATABUS ANALYZERS

■ AIM-USA

(See ad page 27)

ADLINK Technology Inc
Avionics Interface Technologies (AIT)
Ballard Technology

CES - Creative Electronic Systems SA ■ **Data Device Corp (DDC)** (See ad page 21)

NextComputing
Teradyne
Vector Informatik GmbH

OPTICAL TEST AND MEASUREMENT

Adimec Advanced Image Systems BV
Advanced Optics Inc
American Laser Enterprises LLC
AMOTronics
ADLINK Technology Inc
ASE Optics LLC
Berkeley Nucleonics Corp
Cascade TEK
Continental Resources
DiCon Fiberoptics Inc
Digital Lightwave Inc
EigenLight Corp
EXFO
Fibernet
Fiber Savvy
GIDEL
GiGa Concept Inc
GL Communications Inc
Go4Fiber Ltd
Greenlee Communications, a Textron Co
Infinity Photo-Optical
ISVI Corp
JENOPTIK Optical Systems GmbH
Keo Scientific Ltd
KEYENCE Corp of America
■ **Keysight Technology Inc**
(See ads inside front and inside back covers)
Konica Minolta Sensing Americas Inc
Kowa American Corp
Krell Technologies Inc
kSaria Corp
Lambda Research Corp
Laser Technology Inc
LASERVISION GmbH & Co KG
The Light Brigade Inc
Lumetrics Inc
Max Levy Autograph Inc

MAZeT GmbH
Micom Laboratories Inc
Micro Laser Systems Inc
OptiConcepts Inc
Optis
OptoCity
Optocon AG
OZ Optics Ltd
PCE Instruments UK Ltd
Photon Control Inc
Prior Scientific Inc
Quantum Composers
Reynard Corp
RWC Testing & Lab Supplies
Sacher Lasertechnik GmbH
Sacher Lasertechnik LLC
Santa Barbara Infrared Inc
Sofradir EC Inc
Specialised Imaging Inc
Specialised Imaging Ltd
SurplusEQ.com Inc
SwissOptic AG
Telops Inc
Timbercon
UTC Aerospace Systems
Versatile Power
Vision Components GmbH
Warsash Scientific Pty Ltd
WhiteOptics LLC

OSCILLOSCOPES

AEi Systems
AMOTronics
ADLINK Technology Inc
Continental Resources
GaGe
■ **Keysight Technology Inc**
(See ads inside front and inside back covers)
Omega Engineering Inc
PCE Instruments UK Ltd
Rohde & Schwarz USA Inc
SurplusEQ.com Inc

PORTABLE TEST SYSTEMS

■ **AIM-USA**
(See ad page 27)
Aircraft Instrument Support Services Inc
AMOTronics
ADLINK Technology Inc
Automated Motion
Avionics Interface Technologies (AIT)
AWT-Global LLC
Ballard Technology
Beamex
Berkeley Nucleonics Corp
Canyonwest Cases
Cepoint Networks LLC
Chroma Systems Solutions Inc
Cincinnati Sub-Zero (CSZ)
Continental Resources
■ **Data Device Corp (DDC)**
(See ad page 21)
Digital Lightwave Inc
Epiq Solutions
esd electronics Inc
EXFO
GaGe
GiGa Concept Inc
Gigahertz-Optik Inc
GL Communications Inc
Go4Fiber Ltd
Greenlee Communications, a Textron Co
Haven Automation Ltd
HC Controls Inc
Innovative Integration
Keithley Instruments Inc
■ **Keysight Technology Inc**
(See ads inside front and inside back covers)
Konica Minolta Sensing Americas Inc
LASERVISION GmbH & Co KG
Logic PD
MC Countermeasures Inc
Motion Maker Engineering
NextComputing
North Atlantic Industries Inc

Omega Engineering Inc
OptiConcepts Inc
Optocon AG
Oxford Instruments Industrial Analysis
PCE Instruments UK Ltd
Pentek Inc
Prior Scientific Inc
Qualmark Corp
Rockwell Automation Inc
RUSSTECH Engineering Co Inc
RWC Testing & Lab Supplies
Santa Barbara Infrared Inc
Siemens Process Industries and Drives
Silicon Designs Inc
Smart Electronics
Teradyne
TESEO SpA
United Electronic Industries Inc
Unitron LP
Vector Informatik GmbH
Versatile Power
VXI Technology Inc
Warsash Scientific Pty Ltd
Weschler Instruments

SOFTWARE-DRIVEN INSTRUMENTATION

■ **AIM-USA**
(See ad page 27)
AMOTronics
Avionics Interface Technologies (AIT)
AWT-Global LLC
Beamex
Boonton (A Wireless Telecom Group Co)
Chroma Systems Solutions Inc
Coherent Inc
GaGe
General Digital Software Services
HC Controls Inc
Innovation Management Group Inc
Innovative Integration

■ **Keysight Technology Inc**
(See ads inside front and inside back covers)
Konica Minolta Sensing Americas Inc
L-3 Communications Interstate Electronics Corp
MathWorks Inc
Motion Maker Engineering
PCE Instruments UK Ltd
Photon Control Inc
Prior Scientific Inc



Red Rapids

Santa Barbara Infrared Inc
Teradyne
TESEO SpA
Ultraview Corp
Versatile Power
Vision Components GmbH
VXI Technology Inc

SPECTRUM ANALYZERS

ADLINK Technology Inc
Coherent Inc
Continental Resources
Digital Lightwave Inc
Epiq Solutions
EXFO
■ **Keysight Technology Inc**
(See ads inside front and inside back covers)
LASERVISION GmbH & Co KG
LEONI Fiber Optics Inc
MAZeT GmbH
OptoCity
Oxford Instruments Industrial Analysis
PCE Instruments UK Ltd
Photon Control Inc
Rohde & Schwarz USA Inc
Warsash Scientific Pty Ltd

THERMAL MANAGEMENT/COOLING SYSTEMS

CONDUCTION COOLING

Aavid Thermalloy LLC
■ **Acromag Inc**
(See ad page 7)
Al Technolgy Inc
Aspen Systems Inc
Barry Industries Inc
Celsia Inc - Custom Thermal Solutions
■ **Dawn VME Products**
(See ad page 6)
■ **EMCOR Group Inc**
(See ad back cover)
■ **Extreme Engineering Solutions Inc (X-ES)**
(See ads pages 3, 37)

Fabritech Inc
Fralock
General Air Products Inc
Ness Engineering Inc
Pearson Machine Co LLC
Sealing Devices Inc
TEN TECH LLC
Varna Products TRC

CONVECTION COOLING

Aavid Thermalloy LLC
Aspen Systems Inc
Celsia Inc - Custom Thermal Solutions

■ **Dawn VME Products**
(See ad page 6)
Dynamic Engineering
■ **EMCOR Group Inc**
(See ad back cover)
■ **Extreme Engineering Solutions Inc (X-ES)**
(See ads pages 3, 37)
Fralock
Ness Engineering Inc
Pearson Machine Co LLC
TEN TECH LLC
Varna Products TRC

LIQUID COOLING

Aavid Thermalloy LLC
Aspen Systems Inc
Celsia Inc - Custom Thermal Solutions
General Air Products Inc
Meggitt Defense
Microflexis
Ness Engineering Inc
Omega Engineering Inc
Process Technology
TEN TECH LLC
Varna Products TRC

1st Power

Rugged Power-Global Solutions Div, (sub of Energy Technologies Inc), 219 Park Ave E, Mansfield, OH 44902, 419-522-4444, sales@1stpower.com, www.1stpower.com

3D Plus USA Inc

6633 W Eldorado Pkwy, Suite 420, McKinney, TX 75040, 214-733 8505, www.3d-plus.com

4DSP LLC

3101 Bee Caves Rd, Suite 350, Austin, TX 78746, 800-816-1751, sales@4dsp.com, www.4dsp.com

AAA OEM & ODM Ltd

LED Dept, Rm 602 B, 6/F, Fook Cheong Bldg, 63 Hoi Yuen Rd, Kwun Tong, Kowloon, Hong Kong, 852-238-89538, sales@aaaomodm.com, www.aaaomodm.com

AAEON Electronics Inc

11 Crown Plaza, Hazlet, NJ 07730, 732-203-9300, sales@aaeon.com, www.aaeonusa.com

Aavid Thermalloy LLC

1 Aavid Way, Laconia, NH 03246, 603-528-3400, rsoucy@aavid.com, www.aavid.com

Abbott Technologies Inc

8203 Vineland Ave, Sun Valley, CA 91352, 800-367-8200, www.abbott-tech.com

AbelConn LLC

9210 Science Center Dr, New Hope, MN 55428, 763-533-3533, www.abelconn.com

AbsInt Angewandte Informatik GmbH

Science Pk 1, Saarbrücken 66123, Germany, 49-681-383-600, info@absint.com, www.absint.com

Acal Bfi UK Ltd

(sub of Acal Plc), 3 The Business Centre, Wokingham, Berkshire RG41 2EY, UK, 44-1189-788-878, sales-uk@acalbfi.co.uk, www.acalbfi.com

Accel Connectors Inc

42020 Winchester Rd, Temecula, CA 92590-4804, 951-296-9435, sales@accelconnectors.com, www.accelconnectors.com

ACCES I/O Products

10623 Roselle St, San Diego, CA 92121, 858-550-9559, sales@accesio.com, www.accesio.com

ACD

1250 American Pkwy, Richardson, TX 75081, 972-664-0900, scott.fillebrown@acdcusa.com, www.acdcusa.com

Acnodes Corp

14628 Central Ave, Chino, CA 91710, 909-597-7588, info@acnodes.com, www.acnodes.com

■ Acromag Inc

30765 S Wixom Rd, Wixom, MI 48393-2417, 248-295-0880, sales@acromag.com, www.acromag.com

Manufactures measurement and control products for the military, transportation, manufacturing and research industries. Embedded computing solutions operate on VME, VPX, PCI, CompactPCI and COM Express platforms, as well as IP, PMC and XMC mezzanine module standards. Functions include SBCs, FPGAs, data storage, Ethernet communication and I/O processing.

(See ad page 7)

Active Silicon Inc

479 Jumpers Hole Rd, Suite 301, Severna Park, MD 21146, 410-696-7642, info@activesilicon.com, www.activesilicon.com

Active Silicon Ltd

Pinewood Mews, Bond Close, Iver SL0 0NA, UK, 44-1753-650-600, info@activesilicon.com, www.activesilicon.com

Adamant Valves

360 Goddard, Irvine, CA 92618, 949-407-8897, sales@valves-fittings.com, www.adamantvalvesco.com

Adaptive Innovations

1315 Nelson St, Unit 8, Lakewood, CO 80215, 303-362-0400, info@a-i-corp.com, www.a-i-corp.com

ADCO Circuits

2868 Bond St, Rochester Hills, MI 48309, 248-853-6620, sales@adcocircuits.com, www.adcocircuits.com

Adimec Advanced Image Systems BV

Luchthavenweg 91, Eindhoven 5657 EA, The Netherlands, 31-40-2353900, marketing@adimec.com, www.adimec.com

**Advanced Conversion Technology Inc**

2001 Fulling Mill Rd, Middletown, PA 17057, 717-939-2300, sales-ma@actpower.com, www.actpower.com

Designs and manufactures an extensive range of AC-DC and DC-DC power supplies (linear, rack-mounted VME, rugged, etc) as well as inverters for various applications since 1981. Designs meet the typical MIL standards including MIL-STD-704, MIL-STD-1399, MIL-STD-1275, MIL-STD-461, and MIL-STD-810. ISO-9001. Made in the US.

Advanced Interconnections Corp

5 Energy Way, West Warwick, RI 02893, 401-823-5200, info@advanced.com, www.advanced.com

AdvancedIO

1400-1055 W Hasting St, Vancouver, BC V6E 2E9, Canada, 877-331-7755, contactus@advancedio.com, www.advancedio.com

Advanced Micro Devices Inc

1 AMD Pl, Sunnyvale, CA 94088, 408-749-4000, info@amd.com, www.amd.com

Advanced Microwave Products

8748 Technology Way, Reno, NV 89521, 775-345-9933, sales@advmw.com, www.advmw.com

Advanced Night Visions Systems Inc (ANVS)

801 W Robinson Dr, Suite 500, North Salt Lake, UT 84054, 801-519-0500, support@anvsinc.com, www.anvsinc.com

Advanced Optics Inc

PO Box 117, Pewaukee, WI 53072-0117, 262-548-1155, sales@advancedoptics.com, www.advancedoptics.com

Advanced Optowave Corp

105 Comac St, Ronkonkoma, NY 11779-6931, 631-750-6035, info@a-optowave.com, www.a-optowave.com

Advanced Photonix Inc

Opto Solutions Div, 1240 Avenida Acaso, Camarillo, CA 93012, 805-987-0146, sales@advancedphotonix.com, www.advancedphotonix.com

Aegis Power Systems Inc

Design Architect Div, (sub of Vicor Electronics),
805 Greenlawn Cemetery Rd, Murphy, NC
28906, 828-837-4029, sales@aegispower.com,
www.aegispower.com

AEI Systems

5777W Century Blvd, Suite 1285, Los Angeles, CA
90045, 310-216-1144, info@aeng.com,
www.aeng.com

AE Petsche Co

(div of Arrow Electronics), 2112 W Division St,
Arlington, TX 76012, 817-461-9473,
info@aepetsche.com, www.aepetsche.com

Aero Express Inc

1825-1 SW Market St, PO Box 1212, Lee's Summit,
MT 64082, 816-246-4500,
sales@aeroexpress.com, www.aeroexpress.com

Aerosim Flight Academy

2700 Flight Line Ave, Sanford, FL 32773,
407-330-7020, info@aerosimacademy.com,
http://academy.aerosim.com

Aerospace Optics Inc

3201 Sandy Ln, Ft Worth, TX 76112-7203,
817-451-1141, sales@vivisun.com,
www.vivisun.com

Aerotech Inc

101 Zeta Dr, Pittsburgh, PA 15238, 412-963-7470,
sales@aerotech.com, www.aerotech.com

Aethercomm Inc

3205 Lionshead Ave, Carlsbad, CA 92010,
760-208-6002, sales@aethercomm.com,
www.aethercomm.com

Agile Microwave Technology Inc

101 Bloomingdale Rd, Hicksville, NY 11801,
516-931-1760, info@agilemwt.com,
www.agilemwt.com

AIM-USA

7 Neshaminy Interplex, Suite 211, Trevose, PA
19053, 267-982-2600,
salesusa@aim-online.com,
www.aim-online.com

Manufactures and designs avionics test
and simulation products for MIL-STD-1553,
STANAG3910/EFEX, ARINC429, AFDX/ARINC664P7,
Panavia serial link, Fibre Channel and
MIL-STD-1760 applications including
high-performance test and simulation modules,
embedded interfaces, data bus analyzers, network
analyzers and customized systems.

(See ad page 27)

AirBorn

4321 AirBorn Dr, Addison, TX 75001-0519,
972-931-3200, prodinfo@airborn.com,
www.airborn.com

Aircraft Instrument Support Services Inc

900 E Pecan St, Suite 300-231, Pflugerville, TX
78660, 512-252-3031, ralphposey@sbcglobal.net,
www.aissinc.net

Aire Industrial

2010 E Wilson Ln, Meridian, ID 83642,
208-514-4040, tim.lewis@aire.com,
www.aireindustrial.net

Air Electro

9452 Desoto Ave, Chatsworth, CA 91311,
818-407-5400, www.airelectro.com

AI Technology Inc

70 Washington Rd, Princeton Junction, NJ 08550,
609-799-9388, ait@aitechnology.com,
www.aitechnology.com

Aldec Inc

2260 Corporate Cir, Henderson, NV 89074,
702-990-4400, sales@aldec.com, www.aldec.com

All Flex Flexible Circuits & Heaters

1705 Cannon Ln, Northfield, MN 55057,
507-663-7162, information@allflexinc.com,
www.allflexinc.com

Allied Industrial Marketing

W62 N248 Washington Ave, Suite 208, Cedarburg,
WI 53012, 262-618-2403,
info@alliedindustrialmarketing.com,
www.alliedindustrialmarketing.com

Allied Motion Technologies Inc

495 Commerce Dr, Suite 3, Amherst, NY 14228,
716-242-7535, inquiry@alliedmotion.com,
www.alliedmotion.com

Alonex Electronic Engineering Ltd

PO Box 1377, Holon 5811203, Israel,
972-3-503-7095, i.alonex@gmail.com,
www.alonex.com

Alphabyte Technology

1449 Outwest Ct, Cool, CA 95614, 530-889-5517,
robert@datatapes.biz, www.datatapes.biz

Altera Corp

101 Innovation Dr, San Jose, CA 95134,
408-544-7000, newsroom@altera.com,
www.altera.com

Alturair

1985 N Marshall, #107, El Cajon, CA 92020,
619-449-1570, info@alturair.com, www.alturair.com

Alturdyne Power Systems

660 Steele St, El Cajon, CA 92020, 619-440-5531,
info@alturdyne.com, www.alturdyne.com

American Applied Materials Corp

765 Weyburn Pl, Los Angeles, CA 90024,
310-660-7828, sales@rareearth-magnets.net,
www.rareearth-magnets.net

American GMG Inc

29430 Union City Blvd, Union City, CA 94587,
510-675-9793, sales@american-gmg.com,
www.american-gmg.com

American Infrared Solutions (AIRS)

1 Wall St, Hudson, NH 03051, 662-626-2477,
rmannello@go-airs.com, www.go-airs.com

American Laser Enterprises LLC

28221 Beck Rd, Suite A-4, Wixom, MI 48393,
248-449-3714, info@a-l-e.net, www.a-l-e.net

American Portwell Technology

44200 Christy St, Fremont, CA 94538,
510-403-3399, info@portwell.com,
www.portwell.com

American

900 Flynn Rd, Camarillo, CA 93012, 707-539-3321,
jerryh@american-usa.com,
www.controlroomsusa.com

AMOTronics

Roermonder Str 594, Aachen 52072, Germany,
49-241-169780-28, info@amotronics.de,
www.amotronics.de

Ampex Data Systems Corp

500 Broadway, Redwood City, CA 94063-3436,
650-367-2011, info@ampex.com, www.ampex.com

Amphenol Aerospace

(div of Amphenol Corp), 40-60 Delaware Ave, Sidney,
NY 13838, 800-678-0141,
cservice@amphenol-ao.com,
www.amphenol-aerospace.com

Amphenol Industrial Products Group

40-60 Delaware Ave, Sidney, NY 13838-1395,
800-678-0141, mhartman@amphenol-ao.com,
www.amphenol-industrial.com

ADLINK Technology Inc

5215 Hellyer Ave, #110, San Jose, CA 95138,
408-360-0200, info@adlinktech.com,
www.adlinktech.com

AMREL/American Reliance Inc

3445 Fletcher Ave, El Monte, CA 91731,
626-443-6818, www.amrel.com

AMWEI Thermistor

11-502 Songpingshan, Langshan Rd Nanshan,
Shenzhen, Guangdong 518057, China,
86-755-2657-0111, sales@amwei.com,
www.amwei.com

Analytic Systems

8128 River Way, Delta, BC V4G 1K5, Canada,
604-946-9981, analyticinfo@analyticsystems.com,
www.analyticsystems.com

APACER Memory America Inc

386 Fairview Way, Suite 102, Milpitas, CA 95035,
408-518-8646, rchang@apacerus.com,
http://us.apacer.com/business/industrial-ssd

API Technologies Corp

4705 S Apopka Vineland Rd, Suite 210, Orlando, FL
32819, 855-294-3000, sales@apitech.com,
www.apitech.com

AppliedMicro

215 Moffett Pk Dr, Sunnyvale, CA 94089,
408-542-8600, support@amcc.com, www.apm.com

Applied Optoelectronics Inc

13111 Jess Pirtle Blvd, Sugar Land, TX 77478,
281-295-1800, info@ao-inc.com, www.ao-inc.com

Applied Physical Electronics LC

19510 Texas 71, Spicewood, TX 78669,
512-264-1804, info@apelc.com, www.apelc.com

Applied Power Systems

124 Charlotte Ave, Hicksville, NY 11801,
516-935-2230, info@appliedps.com,
www.appliedps.com

Applied Signal Technology Inc

400 W California Ave, Sunnyvale, CA 94086,
408-749-1888, customer@appsig.com,
www.appsig.com

Arena Solutions

110 Marsh Drive, Suite 100, Foster City, CA 94404,
650.513.3500, urneshm@arenasolutions.com,
www.arenasolutions.com

Aries Electronics inc

2609 Bartram Rd, Bristol, PA 19007,
215-781-9956, info@arieselec.com,
www.arieselec.com

Armour Group Inc

6700 NW 9th Ave, Ft Lauderdale, FL 33309,
954-767-2030, sales@thearmourgroup.com,
www.thearmourgroup.com

Arraid Inc

9414 E San Salvador Dr, Suite 250, Scottsdale, AZ
85258, 480-699-3047, jenkins@arraid.com,
www.arraid.com

Arrow Electronics Inc

7459 S Lima St, Bldg 1, Englewood, CO 80112,
800-833-3557, www.arrow.com

ASC Signal Corp

1120 Jupiter Rd, Suite 102, Plano, TX 75074,
214-291-7654, satcomtechsupport@ascsignal.com,
www.ascsignal.com

ASE Optics LLC

(div of Rochester Precision Optics), 850 John St,
West Henrietta, NY 14586, 585-292-5450 x2125,
sales@aseoptics.com, www.aseoptics.com

Ashine Industries Inc

5 Orchid Ct, Toronto, ON M2L 2X8, Canada,
416-493-5187, ashine@ashine.com,
www.ashine.com

ASIC Advantage Inc

1290-B Reamwood Ave, Sunnyvale, CA 94089,
408-541-8686, sales@asicadvantage.com,
www.asicadvantage.com

Aspen Systems Inc

184 Cedar Hill St, Marlborough, MA 01752,
508-481-5058, jburnett@aspensystems.com,
www.aspensystems.com

Atmel Corp

2325 Orchard Pkwy, San Jose, CA 95131,
408-441-0311, www.atmel.com

Austin Semiconductor Inc

8701 Cross Pk Dr, Austin, TX 78754,
512-339-1188, sales@austinsemiconductor.com,
www.austinsemiconductor.com

Automated Motion

Oxygen Products Div, 807 NW Commerce Dr,
Lees Summit, MO 64086, 816-525-8304,
rtaylor@automatedmotion.com,
www.automatedmotion.com

Aviel Electronics

(div of RF Industries), 3060 E Post Rd, Suite 100,
Las Vegas, NV 89120, 702-739-8155,
aviel@rfindustries.com, www.avielelectronics.com

Avionics Interface Technologies (AIT)

3703 N 200th St, Elkhorn, NE 68022,
402-763-9644, sales@avitech.com,
www.avitech.com

Avitech International Corp

8655 154th Ave NE, Redmond, WA 98052,
425-885-3863, sales@avitechvideo.com,
www.avitechvideo.com

Avnet Inc

ElectroAir Div, (div of Avnet Electronics Marketing),
400 Franklin Rd, Marietta, GA 30067,
800-241-7530, www.em.avnet.com

AWT-Global LLC

117 Grand Ave, Hackensack, NJ 07840,
973-321-3423, info@awt-global.com,
www.awt-global.com

Ball Aerospace and Technologies Corp

(sub of Ball Corp), 1600 Commerce St, Boulder, CO
80303, 303-939-4000, media@ball.com,
www.ballaerospace.com

Ballard Technology

(div of Astronics), 11400 Airport Rd, Suite 201,
Everett, WA 98204, 425-339-0281,
sales@ballardtech.com, www.ballardtech.com

Barco Federal Systems LLC

3059 Premiere Pkwy, Suite 100, Duluth, GA 30097,
678-475-8080, www.barco.com

Barry Industries Inc

60 Walton St, Attleboro, MA 02703, 508-226-3350,
sales@barryind.com, www.barryind.com

Beamex

2152 Northwest Pkwy, Suite A, Marietta, GA 30067,
770-951-1927, beamex.inc@beamex.com,
www.beamex.com

BearCom Wireless

4009 Distribution Dr, Garland, TX 75041,
800-527-1670, info@bearcom.com,
www.bearcom.com

BEEcube Inc

39465 Paseo Padre Pkwy, Suite 3700, Fremont, CA
94538, 510-252-1136, sales@beecube.com,
www.beecube.com

Behlman Electronics Inc

(sub of Orbit International), 80 Cabot Ct, Hauppauge,
NY 11788, 631-435-0410 x195,
sales@behlman.com, www.behlman.com

BellowsTech LLC

(sub of Servometer), 1289 N US Hwy 1, Suite 1,
Ormond Beach, FL 32174, 386-615-7530,
bellows@bellowstech.com, www.bellowstech.com

BE Meyers & Co Inc

9461 Willows Rd NE, Redmond, WA 98052,
425-881-6648, sales@bemeyers.com,
www.bemeyers.com

Berkeley Nucleonics Corp

2955 Kerner Blvd, San Rafael, CA 94901-5533,
415-453-9955, info@berkeleynucleonics.com,
www.berkeleynucleonics.com

Berliner Glas KGaA Herbert Kubatz GmbH & Co

Space Div, (sub of Berliner Glas Group),
Waldkraiburger Str 5, Berlin 12347, Germany,
49-30-60905-0, info@berlinerglas.de,
www.berlinerglas.com

Binder-USA

3903 Calle Tecate, Camarillo, CA 93012,
805-437-9925, sales@binder-usa.com,
www.binder-usa.com

BI Technologies

(sub of TT Electronics), 4200 Bonita Pl, Fullerton, CA
92835, 714-447-2345, sales@bitechnologies.com,
www.bitechnologies.com

Blue Sky Research

510 Alder Dr, Milpitas, CA 95035, 408-941-6068,
sales@blueskyresearch.com,
www.blueskyresearch.com

Blue Wolf

9179 W State St, Garden City, ID 83714,
208-629-5222, info@bluewolfinc.com,
www.bluewolfinc.com

Boker's Inc

3104 Snelling Ave, Minneapolis, MN 55406-1937,
612-729-9365, sales@bokers.com,
www.bokers.com

Boonton (A Wireless Telecom Group Co)

25 Eastmans Rd, Parsippany, NJ 07054,
973-386-9696, info@boonton.com,
www.boonton.com

Boston Electronics Corp

91 Boylston St, Brookline, MA 02445,
800-347-5445, boselec@boselec.com,
www.boselec.com

BQR

5 Mazal eliezer st' Rishon Lezion, Rishon Lezion,
Merkaz 75101, Israel, 972-3-962-5911,
info@bqr.com, www.bqr.com

Bravo Communications Inc

3463 Meadowlands Ln, San Jose, CA 95135,
408-297-8700, sales@bravobravo.com,
www.bravobravo.us

Broadax Systems Inc

17539 E Rowland St, City of Industry, CA 91748,
626-964-2335, info@bsicomputer.com,
www.bsicomputer.com

BroadWave Technologies Inc

170 Airport Pkwy, Suite A, Greenwood, IN 46143,
317-888-8316, sales@broadwavetech.com,
www.broadwavetech.com

Cable Labels USA

Network Connections Group USA Div, Lake Mary
Bld, Lake Mary, FL 32746, 407-321-7394,
info@cablelabelsusa.com,
www.cablelabelsusa.com

CAD/CAM Services Inc

1529 Brooklane, Suite 201, Celina, TX 75009,
800-938-7226, scott@cadcam.org,
www.cadcam.org

CALCULEX Inc

132 W Las Cruces Ave, Las Cruces, NM 88001,
505-525-0131, sales@calculex.com,
www.calculex.com

Camber Corp

Unmanned, Airborne & Systems Div, 4885 Alpha Rd,
Suite 110, Dallas, TX 75244, 972-308-2008,
radar@camber.com, www.camber.com

Cantronic Systems (Canada) Inc

Unit 226-17 Fawcett Rd, Coquitlam, BC V3K 6V2,
Canada, 604-516-6667, info@cantronics.com,
www.cantronics.com

Canyonwest Cases

PO Box 19827, Fountain Hills, AZ 85269,
480-816-9652, sales@canyonwestcases.com,
www.canyonwestcases.com

Carr Quality Compliance Consulting

28536 Oakmont, Mission Viejo, CA 92692,
949-306-4354, fred@carrconsulting.org,
www.carrconsulting.org

Cascade TEK

5245-A NE Elam Young Pkwy, Hillsboro, OR 97124,
503-648-1818, www.cascadetek.com,
www.cascadetek.com

CAS DataLoggers

12628 Chillicothe Rd, Unit J, Chesterland, OH
44026, 440-729-2570, sales@dataloggerinc.com,
www.dataloggerinc.com

CDG, a Boeing Co

2401 E Wardlow Rd, MC D801-OC DG, Long Beach,
CA 90807-5309, 562-608-2000,
marketing@cdgnow.com, www.cdgnow.com

Cell-Con Inc

305 Commerce Dr, Suite 300, Exton, PA 19341,
sales@cell-con.com, www.cell-con.com

Celsia Inc - Custom Thermal Solutions

3487 Kifer Rd, Santa Clara, CA 95051,
408-577-1407, gmeyer@celsiainc.com,
www.celsiainc.com

Cepoint Networks LLC

1 W Otterson St, Nashua, NH 03060,
603-883-7979 x103, sales@cepoint.com,
www.cepoint.com

CERTON

511 N John Rodes Blvd, Melbourne, FL 32924,
321-674-2155, sales@certon.com,
www.certon.com



CES - Creative Electronic Systems SA

Ave Eugène-Lance 38, PO Box 584,
Grand-Lancy 1 CH-1212, Switzerland,
41-22-884-51-00, info@ces-swap.com,
www.ces-swap.com

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demanding performance needs for optimal size,
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products are made to withstand the extremes of
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Changchun New Industries Optoelectronics Technology Co Ltd

888 Jinhua Rd High-tech Zone, Changchun,
Jilin 130103, China, 86-431-8703-4313,
liyang@cnlaser.com, www.cnlaser.com

Chassis Plans

10123 Carroll Canyon Rd, San Diego, CA 92131,
858-571-4330, davidl@chassisplans.com,
www.chassis-plans.com

ChoiceRight Electronic Inc

3F-1, 191 Cing Ping Rd, Tainan 70845, Taiwan,
886-6-299-3510, info@choicright.com,
www.choicright.com

Chroma Systems Solutions Inc

19772 Pauling, Foothill Ranch, CA 92610,
949-600-6400, sales@chromausa.com,
www.chromausa.com

Cincinnati Inc

7420 Kilby Rd, Harrison, OH 45030, 513-367-7100,
info@e-ci.com, www.e-ci.com

Cincinnati Sub-Zero (CSZ)

Industrial Div, 12011 Mosteller Rd, Cincinnati, OH
45241, 513-772-8810, indsales@cszinc.com,
www.cszindustrial.com

Clear-Com

1301 Marina Village Pkwy, Suite 105, Alameda, CA
94501, 855-237-4624, magsales@clearcom.com,
www.clearcom.com

ClearDrain

(div of Melville Industries Inc), PO Box 555,
Willingboro, NJ 08046, 856-461-0091,
sales@clearrainusa.com, www.clearrainusa.com

Clements Worldwide

1 Thomas Cir, NW, Suite 800, Washington, DC
20005, 202-872-0060, request@cllements.com,
www.cllements.com

Coaxial Components Corp (Coaxicom)

1501 SE Decker Ave, #201, Stuart, FL 34994-3964,
866-262-9426, sales@coaxicom.com,
www.coaxicom.com

Cobham Antenna Systems

Microwave Antennas Div, Lambda House, Little
Green, Newmarket, Suffolk CB8 9RG, UK,
44-1638-732-177, newmarket.sales@cobham.com,
www.cobham.com/antennasystems/
microwaveantennas

Cobham Metelics (formerly Aeroflex)

(div of Cobham), 9 Hampshire St, Lawrence, MA
01840, 978-683-4122,
metelics-sales@aeroflex.com,
www.aeroflex.com/ams/metelics

Cobham Mission Systems

(div of Cobham), 2734 Hickory Grove Rd, Davenport, IA 52804, 563-383-6000, cms.lainfo@cobham.com, www.cobham.com

Cobham Motion Control Solutions (formerly Aeroflex)

(div of Cobham), 350 Kennedy Dr, Hauppauge, NY 11783, 631-231-9100, sales-motion@aeroflex.com, www.aeroflex.com/motion

Cobham RAD Solutions (formerly Aeroflex)

(div of Cobham), 5030 Centennial Blvd, Colorado Springs, CO 80919, 719-531-0800, info-ams@aeroflex.com, www.aeroflex.com/rad

■ **Cobham Semiconductor Solutions (formerly Aeroflex)**

(div of Cobham), 4350 Centennial Blvd, Colorado Springs, CO 80907, 719-594-8035, info-ams@aeroflex.com, www.aeroflex.com/hirel

Provides standard hi-rel ICs including memory, microprocessor interconnect and power, and ASICs (application-specific integrated circuits) for space, commercial, medical and industrial markets along with electronic manufacturing services including circuit card assembly, radiation testing, component up screening and packaging. (See ad page 23)

Cobham Signal & Control Solutions (formerly Aeroflex)

(div of Cobham), 40 Industrial Way, Eatontown, NJ 07724, 732-460-0212, ascs-sales@aeroflex.com, www.aeroflex.com/ascs

Cobham Weinschel (formerly Aeroflex)

(div of Cobham), 5305 Spectrum Dr, Frederick, MD 21703, 301-846-9222, weinschel-sales@aeroflex.com, www.aeroflex.com/weinschel

Coherent Inc

5100 Patrick Henry Dr, Santa Clara, CA 95054, 408-764-4983, tech.sales@coherent.com, www.coherent.com

Coherent Logix Inc

1120 S Capital of Texas Hwy, Bldg 3, Suite 310, Austin, TX 78746, 512-382-8940, www.coherentlogix.com

CohuHD

12367 Crosthwaite Cir, Poway, CA 92064, 858-391-1795, news@cohuhd.com, www.cohuhd.com

Columbia Weather Systems Inc

5285 NE Elam Young Pkwy, Suite C100, Hillsboro, OR 97124, 503-629-0887, info@columbiaweather.com, www.columbiaweather.com

Combined Systems Inc

388 Kinsman Rd, Jamestown, PA 16134, 724-932-2177, sales@combinedsystems.com, www.combinedsystems.com

Comco Inc

2151 N Lincoln St, Burbank, CA 91504, 818-841-5500, sales@comcoinc.com, www.comcoinc.com

Comdel Inc

11 Kondelin Rd, Gloucester, MA 01930, 978-282-0620, amy_greaves@comdel.com, www.comdel.com

Communication Automation Corp

1171 McDermott Dr, West Chester, PA 19380, 610-692-9526, sales@cacadsp.com, www.cacadsp.com

Compsim

1040 Thornridge Ct, Brookfield, WI 53045, 262-797-0418, info@compsim.com, www.compsim.com

Concord Electronics Inc

33-00 47th Ave, Level 1A, Long Island City, NY 11101, 212-777-6571, sales@concord-electronics.com, www.concord-electronics.com

Conduant Corp

1501 S Sunset St, Suite C, Longmont, CO 80501, 303-485-2721, info@conduant.com, www.conduant.com

Connection Technology USA

40538 La Purissima Way, Fremont, CA 94539, 510-509-0305, andrew_wang@ctsystem.com, www.ctsystem.com

Conscious Systems Engineering LLC

314 Forrest Valley Dr, Nashville, TN 37209, 314-495-2293, info@consyseng.com, www.consyseng.com

Continental Resources

Test Equipment Div, 175 Middlesex Tpke, PO Box 9137, Bedford, MA 01730-9137, 800-937-4688, salestm@conres.com, www.conres.com/test-equipment

CoorsTek Armor Solutions Inc

N Table Mountain, 16000 Table Mountain Pkwy, Golden, CO 80403, 303-271-7000, info@ctarmor.com, www.coorstek.com

Cornell Dubilier Electronics

140 Technology Pl, Liberty, SC 29657, 864-843-2277, cdelb@cde.com, www.cde.com

Cornet Technology Inc

6800 Versar Center, Springfield, VA 22151, 703-658-3400, sales@cornet.com, www.cornet.com

■ **Crane Aerospace & Electronics**

(div of Crane Co), 10301 Willows Rd NE, Redmond, WA 98052, 425-882-3100, electronics@crane-eg.com, www.craneae.com
Supplies high-density, high-reliability components and electronics to the aerospace and defense markets that are designed for some of the toughest environments including ground based, airborne and space flight. When failure is not an option, partner with Crane, a trusted market leader in critical applications. (See ad page 45)

Cree Inc

4600 Silicon Dr, Durham, NC 27703, 919-313-5300, xlampsales@cree.com, www.cree.com

Critical I/O

36 Executive Pk, Suite 150, Irvine, CA 92614, 949-553-2200, info@criticalio.com, www.criticalio.com

Crouzet Aerospace

Custom Sensors and Technologies Div, 14401 Princeton Ave, Moorpark, CA 93021, 847-220-1542, jill.wagar@cstsensors.com, www.crouzet.com

■ **Crystal Group Inc**

850 Kacena Rd, Hiawatha, IA 52233, 319-378-1636, rfq@crystalrugged.com, www.crystalrugged.com
Designs and manufactures deployment-ready, rugged servers, displays, networking, embedded, and storage devices that fit mission-critical applications. Excels at providing commercial-off-the-shelf (COTS) and custom designed systems tailored to specifications. All products are designed and built to meet/exceed MIL-STDs 810F/G, 167-1, 461E/F and MIL-S-901D. (See ad page 19)

CSZ Testing

11901 Mosteller Rd, Cincinnati, OH 45241, 513-793-7774, testing@cszinc.com, www.csztesting.com

CTT Inc

241 E Java Dr, Sunnyvale, CA 94089, 408-541-0596, sales@cttinc.com, www.cttinc.com

CUI Inc

20050 SW 112th Ave, Tualatin, OR 97062, 503-612-2300, sales@cui.com, www.cui.com

Curtiss-Wright Defense Solutions

(sub of Curtiss-Wright Corporation), 20130 Lakeview Center Plaza, Suite 200, Ashburn, VA 20147, 703-779-7800, defensesales@curtisswright.com, www.cwcdefense.com

Custom Engineering Co

2800 McClelland Ave, Erie, PA 16510, 814-898-2800, emcdermit@customeng.com, www.customeng.com

CyberXLink

36595 Kevin Rd, Suite 138-139, Wildomar, CA 92595, 951-824-1572, sales@cyberxlink.com, www.cyberxlink.com

CycloSystem Pte Ltd

(sub of Bulox Corp), 15 Woodlands Sector 1, 738355, Singapore, 65-6455-4111, sales@cyclo-system.com, www.cyclo-system.com

DAC International Inc

6702 McNeil Dr, Austin, TX 78729, 512-331-5323, dacinfo@dacint.com, www.dacint.com

■ Daisy Data Displays Inc

2850 Lewisberry Rd, York Haven, PA 17370, 717-932-9999, www.makeitdaisy.com

Manufactures a fully ruggedized industrial computer solution custom-fit to specifications. Computers are made to withstand the harshest of situations and environments from a wash-down application to a hazardous area. Offers a solution that is built from the ground up, in-house ensuring better quality control and design needed.

(See ad page 15)

■ Data Device Corp (DDC)

105 Wilbur Pl, Bohemia, NY 11716, 631-567-5600, service@ddc-web.com, www.ddc-web.com

Designs and manufactures high-reliability data bus, motion control, and solid-state power controller products, including MIL-STD-1553, ARINC 429, AFDX, fibre channel and synchro/resolver interfaces for aerospace, defense and industrial applications. The headquarters, design and manufacturing operations are located in NY.

(See ad page 21)

Dataforth Corp

3331 E Hemisphere Loop, Tucson, AZ 85706, 520-741-1404, sales@dataforth.com, www.dataforth.com

■ Dawn VME Products

47915 Westinghouse Dr, Fremont, CA 94539, 800-258-3296, mail@dawnvme.com, www.dawnvme.com

Manufactures commercial to full rugged embedded packaging solutions based on the VITA and PICMIG system architectures. Products include development systems, rack-mount powered chassis and enclosures, backplanes, system health monitors, accessories, extender boards, protoboards, overlays, front and filler panels. Backplanes and chassis available for VPX, VME, VME64x, VITA41 (VXS) and more.

(See ad page 6)

DDC-I Inc

4600 E Shea Blvd, Suite 102, Phoenix, AZ 85028, 602-275-7172, sales@ddci.com, www.ddci.com

Del Mar Photonics Inc

4119 Twilight Ridge, San Diego, CA 92130, 858-876-3133, sales@dmphotonics.com, www.dmphotonics.com

Delphi Automotive LLP

5725 Delphi Dr, Troy, MI 48098, 248-813-2000, www.delphi.com

Design Criteria Inc

1821 W 4000 S, Suite 200, Roy, UT 84067, 801-393-1414, power@designcriteria.com, www.designcriteria.com

DesignLED Technology (HK) Co Ltd

B Bldg, Taohuayuan Innovation Zone, Xixiang St, Bao'an Dist, Shenzhen, Guangdong 518102, China, 86-755-2796-0837, info@designledpro.com, www.designledpro.com

DeTect Inc

1022 W 23rd St, Panama City, FL 32405, 850-763-7200, sales@detect-inc.com, www.detect-inc.com

Develeat SA

Palazzo la Grida, Roveredo, GR 6535, Switzerland, 41-78-956-42-07, info@develeat.ch, www.develeat.ch

DeWAL Industries

15 Ray Trainor Dr, Narragansett, RI 02882, 401-789-9736, cbrooks@dewal.com, www.dewal.com

Dexter Magnetic Technologies Inc

1050 Morse Ave, Elk Grove Village, IL 60007, 847-956-1140, info@dextermag.com, www.dextermag.com

DGLR eV

Godesberger Allee 70, Bonn D-53175, Germany, 49-228-308-050, info@dglr.de, www.dglr.de

DiCon Fiberoptics Inc

1689 Regetta Blvd, Richmond, CA 94804, 510-620-5200, sales@diconfiberoptics.com, www.diconfiberoptics.com

Digi-Key Corp

701 Brooks Ave S, Thief River Falls, MN 56701, 800-344-4539, sales@digikey.com, www.digikey.com

Digital Core Design

Wroclawska 94, Bytom 41-902, Poland, 48-32-282-82-66, info@dcd.pl, www.dcd.pl

Digital Lightwave Inc

1780 102nd Ave N, St Petersburg, FL 33716, 727-442-6677, sales@lightwave.com, www.lightwave.com

DILAS Diode Laser Inc

9070 S Rita Rd, Suite 1500, Tucson, AZ 85747, 520-232-3480, sales@dilas-inc.com, www.dilas.com

DIT HD: Display Integration Technologies

1357 Rocky Point Dr, Oceanside, CA 92056, 888-272-8325, benjamin.chapman@dithd.com, www.dithd.com

DJM Electronics

2907 Shelter Island Dr, Suite 105-138, San Diego, CA 92106, 866-356-3532, sales@djmelectronics.com, www.djmelectronics.com

DLP Design Inc

1605 Roma Ln, Allen, TX 75013, 469-964-8027, support@dlpdesign.com, www.dlpdesign.com

DLS Electronic Systems Inc

1250 Peterson Dr, Wheeling, IL 60090, 847-537-6400, jblack@dlsemc.com, www.dlsemc.com

Dot Hill Systems Corp

1351 S Sunset St, Longmont, CO 80501, 303-845-3200, www.dothill.com

DPA Components International

2251 Ward Ave, Simi Valley, CA 93065, 805-581-9200, dougs@dpaci.com, www.dpaci.com

DS Instruments

Test & Measurement Div, 180 E Foothill Blvd, San Luis Obispo, CA 93405, 805-242-6685, support@dsinstruments.com, www.dsinstruments.com

dSPACE Inc

(div of dSPACE GmbH), 50131 Pontiac Trail, Wixom, MI 48393-2020, 248-295-4700, info@dspaceinc.com, www.dspaceinc.com

Dynamic Engineering

150 Dubois St, Suite C, Santa Cruz, CA 95060, 831-457-8891, sales@dyneng.com, www.dyneng.com

EaglePicher Technologies LLC

C and Porter Sts, PO Box 47, Joplin, MO 64802, 417-623-8000, inquiry.technologies@eaglepicher.com, www.eaglepicher.com

EDM Department Inc

1261 Humbracht Cir, Suite A, Bartlett, IL 60103, 630-736-0531, info@edmdept.com, www.edmdept.com

EDT Inc

Electronic Technologies Group Div, (sub of HEICO Corp), 1400 NW Compton Dr, Suite 315, Beaverton, OR 97006, 503-690-1234, info@edt.com, www.edt.com

EigenLight Corp

30 Centre Rd, Somersworth, NH 03878,
603-692-9200, sales@eigenlight.com,
www.eigenlight.com

Elan Technical Corp

141 Kings Hwy E, Fairfield, CT 06825,
203-335-2115, elantechnical@sbcglobal.net,
www.elantechnical.com

ELDEC

(div of Crane Aerospace & Electronics), 16700 13th
Ave W, Lynnwood, WA 98037, 425-743-1313,
electronics@crane-eg.com, www.craneae.com

Electro-Optical Products Corp

PO Box 650441, Fresh Meadows, NY 11365,
718-456-6000, sales@eopc.com, www.eopc.com

Electrorack

(div of Legrand), 1443 S Sunkist St, Anaheim, CA
92806, 714-776-5420, info@electrorack.com,
www.electrorack.com

Elma Electronic Inc

44350 S Grimmer Blvd, Fremont, CA 94538,
510-656-3400, sales@elma.com, www.elma.com

Elsys Instruments

234 Cromwell Hill Rd, Monroe, NY 10950,
845-238-3933, www.elsys-instruments.com

Embassy Global LLC

PO Box 105, Orchard Park, NY 14127,
800-309-6150, inquiries@embassyglobalpr.com,
www.embassyglobal.com

■ EMCOR Group Inc

**Government Services Div, 2800 Crystal Dr,
Suite 600, Arlington, VA 22202,
571-403-8900, emcor_info@emcor.net,
www.emcorgovservices.com**

Offers an experienced single-source solution for
meeting the routine and mission-critical needs
of federal, state, local and other government
organizations. Is GSA-approved and security
cleared.

(See ad back cover)

EMTEQ

5349 S Emmer Dr, New Berlin, WI 53151,
262-679-6170, sales@emteq.com,
www.emteq.com

Enea

1711 W Greentree Dr, Suite 108, Tempe, AZ 85284,
480-753-9200, info@enea.com, www.enea.com

EO Strategies

12 Prospect St, Holliston, MA 01746,
774-217-1122, rickm@eo-strategies.com,
www.eo-strategies.com

Epiq Solutions

165 Commerce Dr, Suite 204, Schaumburg, IL
60173, 847-598-0218, info@epiqsolutions.com,
www.epiqsolutions.com

Ericsson

6300 Legacy Dr, Plano, TX 75024, 972-583-0000,
media.relations@ericsson.com, www.ericsson.com

ESAM Inc

2100 NE Spalding Ave, Grants Pass, OR 97526,
541-476-9162, info@esam.com, www.esam.com

ES Components

108 Pratts Junction Rd, Sterling, MA 01564,
978-422-7641, www.escomponents.com

esd electronics Inc

70 Federal St, Suite 2, Greenfield, MA 01301,
413-772317-0, us-sales@esd-electronics.us,
www.esd-electronics.us

ESI Technology Ltd

Sensor House, Wrexham Technology Pk, Wrexham
LL13 7YP, UK, 44-1978-262-255,
sales@esi-tec.com, www.esi-tec.com

Esterline Power Systems

(div of Esterline Technologies), 6900 Orangethorpe
Ave, PO Box 5032, Buena Park, CA 90622-5032,
714-736-7598, info@leachintl.com,
www.esterline.com

EUROATLAS GmbH

Marine and Power Systems Div, (div of L3
Communications), Zum Panrepel 2, Bremen 28307,
Germany, 49-421-48-69338, vertrieb@euroatlas.de,
www.euroatlas.de

Evans Capacitor Co

72 Boyd Ave, East Providence, RI 02914,
401-435-3555, chasd@evanscap.com,
www.evanscap.com

Exelis C4i

12930 Worldgate Dr, 4th Fl, Herndon, VA 20170,
877-266-6712, contact@c4i.com, www.c4i.com

EXFO

400 Godin Ave, Quebec City, QC G1M 2K2, Canada,
418-683-0211, info@exfo.com, www.exfo.com

■ Extreme Engineering Solutions Inc (X-ES)

**3225 Deming Way, Suite 120, Middleton, WI
53562, 608-833-1155, sales@xes-inc.com,
www.xes-inc.com**

Designs and builds single-board computers, I/O
boards, power supplies, backplanes, chassis, and
system-level solutions for embedded computing
customers. Offers cutting-edge performance and
flexibility in design, plus an unparalleled level of
customer support and service.

(See ads pages 3, 37)

Fabritech Inc

(sub of Sanders Industries Holdings Inc), 20 Hagerty
Blvd, Suite 2, West Chester, PA 19382,
610-430-0027, mfein@fabritechinc.net,
www.fabritechemi.com

**■ Falcon Electronics**

**47 Mall Dr, Suite 5, Commack, NY 11725,
631-351-8515, bflynn@falconelec.com,
www.falconelec.com**

Distributes military, hi-rel and space-grade
semiconductors including ARINC 429/1553
databus products, power supplies, data
acquisition circuits, solid-state data storage and
full MIL-SMD static RAMs. Supplies companies
including API Technologies, Datel, DPACI, FMJ, Holt,
ISC8, Microsemi, PDI, Semtech, SMART Modular
Technologies, TT electronics, Vishay, Western
Digital and Xtreme Semiconductor.

(See ad page 42)

Falcon Electronics

1505 W University Dr, Suite 105, Tempe, AZ 85281,
480-829-1100, ian@falconelec.com,
www.falconelec.com

Fastener Specialty Inc

2435 109th St, Grand Prairie, TX 75050-1113,
972-988-0064, sales@fastenerspecialty.com,
www.fastenerspecialty.com

Faster Technology LLC

1812 Ave D, Suite 202, Katy, TX 77493,
281-391-5482, info@fastertechnology.com,
www.fastertechnology.com

FEI-Zyfer Inc

(sub of Frequency Electronics Inc), 7321 Lincoln
Way, Garden Grove, CA 92841-1428,
714-933-4000, dmc@fei-zyfer.com,
www.fei-zyfer.com

Fibernet

DWDM Equipment Div, (sub of Fiber Connectivity &
Security - FiberSec), Torres Quevedo 7 PTM - Tres
Cantos, Madrid 28760, Spain, 34-918-076-520,
comercial@fibernet.es, www.fibernet.es

Fiber Savvy

(sub of CRN Solutions Inc), 36595 Kevin Rd,
Suite 138-139, Wildomar, CA 92595,
951-801-5780, sales@fibersavvy.com,
www.fibersavvy.com

FileCatalyst

1725 St Laurent Blvd, Suite 205, Ottawa, ON
K1G 3V4, Canada, 613-667-2349,
aatkinson@filecatalyst.com, www.filecatalyst.com

Finetech

560 E Germann Rd, Suite 103, Gilbert, AZ 85297,
480-893-1630, www.finetechusa.com,
www.finetechusa.com

Fischer Connectors Inc

1735 Founders Pkwy, Suite 100, Alpharetta, GA
30004-7606, 678-393-5400,
mail@fischerconnectors.com,
www.fischerconnectors.com

FLIR Systems Inc

27700A SW Parkway Ave, Wilsonville, OR 97070,
503-498-3457, david.strong@flir.com,
www.flir.com/gs

Forefronts Defense Systems

(sub of Forefronts Technologies Group), PO Box 427,
Dufur, OR 97021-0427, 541-467-2511,
operations@forefronts.com, www.forefronts.com

Forza Silicon

2947 Bradley St, Suite 130, Pasadena, CA 91107,
626-796-1182, info@forzasilicon.com,
www.forzasilicon.com

Fox Electronics

5570 Enterprise Pkwy, Ft Myers, FL 33905,
239-693-0099, elf@foxonline.com,
www.foxonline.com

FoxFury Lighting Solutions

3528 Seagard Way, Suite 100, Oceanside, CA
92056, 760-945-4231, fox@foxfury.com,
www.foxfury.com

Frako Capacitors

(sub of Frako Kondensatoren GmbH), W62 N248
Washington Ave, Suite 208, Cedarburg, WI 53012,
262-618-2403, info@alliedindustrialmarketing.com,
www.alliedindustrialmarketing.com

Fralock

(div of Lockwood Industries), 28525 W Industry Dr,
Valencia, CA 91355, 714-357-5603,
jimc@fralock.com, www.fralock.com

Freescale Semiconductor

6501 Wm Cannon Dr W, Austin, TX 78735,
512-895-6178, www.freescale.com

Futura Automation Pvt Ltd

Plot S4, Off 3rd Cross, 1st Stage, Peenya Industrial
Area, Bangalore, Karnataka 560058, India,
91-80-28375290, info@futuraautomation.com,
www.futuraautomation.com

GaGe

900 N State St, Lockport, IL 60441, 514-633-7447,
prodinfo@gage-applied.com,
www.gage-applied.com

■ Gaia Converter

4038 le Corbusier Blvd, Laval, QC H7L 5R2,
Canada, 514-333-3169,
salesus@gaia-converter.com,
www.gaia-converter.com

Manufactures over 3500 power modules to help
power supplies comply with MIL-STD-461, 1275,
704, D0-160 or equivalent standards. Offers DC
converters from 4-200W, AC/DC PFC converters
from 35-350W, EMI filters and input transient
protections for modular power architectures.
(See ad page 49)

GammaTech Computer Corp

48303 Fremont Blvd, Fremont, CA 94538,
800-995-8946, marketing@gammatechusa.com,
www.gammatechusa.com

Gateworks

3026 S Higuera St, San Luis Obispo, CA 93401,
805-781-2000, sales@gateworks.com,
www.gateworks.com

GDCA Inc

1799 Portola Ave, Livermore, CA 94551,
925-456-9900, sales@gdca.com, www.gdca.com

GE Intelligent Platforms

(div of General Electric), 7401 Snaproll NE,
Albuquerque, NM 87109, 505-875-0600,
www.ge.ip.com

GE Intelligent Platforms

(div of General Electric), 12090 S Memorial Pkwy,
Huntsville, AL 35803, 434-978-5100,
ge-ip.info@ge.com, www.defense.ge-ip.com

Gel-Pak

31398 Huntwood Ave, Hayward, CA 94544,
510-576-2220, info@gelpak.com, www.gelpak.com

General Air Products Inc

Industrial/Fluid Process Div, 118 Summit Dr, Exton,
PA 19341, 610-524-8950,
rmfjr@generalairproducts.com,
www.generalairproducts.com

General Atomics Aeronautical Systems Inc

14200 Kirkham Way, Poway, CA 92064,
858-312-2810, pr-asi@ga-asi.com,
www.ga-asi.com

General Digital Software Services

(sub of General Digital Corp), 8 Nutmeg Rd S,
South Windsor, CT 06074,
860-282-2900 x159, jconsolini@generaldigital.com,
www.gdssoftwareservices.com

General Dynamics C4 Systems

8201 E McDowell Rd, Scottsdale, AZ 85257,
480-441-3033, info@gdc4s.com, www.gdc4s.com

General Micro Systems Inc

8358 Maple Pl, Rancho Cucamonga, CA 91730,
909-980-4863, www.gms4sbc.com

Getac

43 Tesla, Irvine, CA 92618, 949-681-2900,
getacsales_us@getac.com, www.us.getac.com

GET Engineering Corp

9350 Bond Ave, El Cajon, CA 92021,
619-443-8295, jhalsted@getntds.com,
www.getntds.com

GEViCAM Inc

673 S Milpitas Blvd, Suite 100, Milpitas, CA 95035,
408-945-9900, info@gevicam.com,
www.gevicam.com

Giatech Ltd

Blandford Heights Industrial Estate, Blandford Forum
DT11 7TE, UK, 44-1202-890-975, info@giatech.eu,
www.giatech.eu

GiDEL

1600 Wyatt Dr, Suite 1, Santa Clara, CA 95054,
408-969-0389, sales_usa@gidel.com,
www.gidel.com/image-processing

GiGa Concept Inc

11811 Suzor-Cote, Montreal, QC H3M 2H8, Canada,
514-745-8877, egirard@gigaconcept.com,
www.gigaconcept.com

Gigahertz-Optik Inc

(sub of Gigahertz-Optik GmbH), 5 Perry Way,
Newburyport, MA 01950-4009,
978-462-1818, b.angelo@gigahertz-optik.com,
www.gigahertz-optik.com

GL Communications Inc

818 W Diamond Ave, 3rd Fl, Gaithersburg, MD
20878, 301-670-4784, gl-info@gl.com,
www.gl.com

Global Training Solutions Inc

3163 Winston Churchill Blvd, PO Box 26067,
Mississauga, ON L5L 5W7, Canada,
416-806-5777, info@globaltrainingsolutions.ca,
www.globaltrainingsolutions.ca

Go4Fiber Ltd

3/F Tung Lee Bldg, 9 Lai Yip St, Kwun Tong,
Hong Kong, 852-2174-1338,
sales_group@go4fiber.com, www.go4fiber.com

GP:50 Corp

2770 Long Rd, Grand Island, NY 14072,
716-773-9300, sales@gp50.com, www.gp50.com

Green Hills Software Inc

30 W Sola St, Santa Barbara, CA 93101,
805-965-6044, info@ghs.com, www.ghs.com

Greenlee, a Textron Co

4455 Boeing Dr, Rockford, IL 61109,
815-397-7070, www.greenlee.com

Greenlee Communications, a Textron Co

(sub of Textron Inc), 1390 Aspen Way, Vista, CA 92081, 760-598-8900,
communicationssales@greenlee.textron.com,
www.greenleecomunications.com

Greenliant Systems

3970 Freedom Cir, Suite 100, Santa Clara, CA 95054, 408-200-8000, sales@greenliant.com,
www.greenliant.com

Greenshine New Energy LLC

72 Fairbanks, Irvine, CA 92618, 949-609-9636,
sales@streetlights-solar.com,
www.streetlights-solar.com

Growth Technical Marketing

6501 Hercus Ct, San Jose, CA 95119,
408-780-4769, tim@growthtechnicalmarketing.com,
www.growthtechnicalmarketing.com

G-S PLASTIC OPTICS

408 St Paul St, Rochester, NY 14605,
585-295-0200, info@gs optics.com,
www.gs optics.com

Guernsey Coating Laboratories Inc

1788 Goodyear Ave, Ventura, CA 93003,
805-642-1508, sales@gclinc.com, www.gclinc.com

Gumstix Inc

3130 Alpine Rd, Suite 288-606, Portola Valley, CA 94028, 650-206-2464, sales@gumstix.com,
www.gumstix.com

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Micro Laser Systems Inc

12841 Western Ave, Unit H, Garden Grove, CA
92841, 714-898-6001, sales@microlaser.com,
www.microlaser.com

Midwest Printed Circuit Services Inc

1741 Circuit Dr, Round Lake Beach, IL 60073,
847-740-4120, mpcs@midwestpcb.com,
www.midwestpcb.com

MilesTek

1506 Interstate 35W, Denton, TX 76207-2402,
800-958-5173, customerfirst@milestek.com,
www.milestek.com

Milnec Interconnect Systems

3947 W Lincoln Hwy, Bldg 192, Downingtown, PA
19335, 855-464-5632,
quote-requests@milnec.com, www.milnec.com

Minco

7300 Commerce Ln, Minneapolis, MN 55432,
763-571-3121, sales@minco.com, www.minco.com

Mistral Solutions

Product Engineering and Defense Solutions Div,
60 Adarsh Regent, Domlur Ext, Bangalore 560071,
India, 91-80-30731600, info@mistralsolutions.com,
www.mistralsolutions.com

Mixed Signal Integration Corp

2157 O'Toole Ave, Suite 50, San Jose, CA 95131,
408-434-6305, info@mix-sig.com,
www.mix-sig.com

Mobile Mark Antenna Solutions

1140 W Thorndale Ave, Itasca, IL 60143,
847-671-6690, info@mobilemark.com,
www.mobilemark.com

Mobile Desk/Mobile Office Solutions

8080 Beckett Center Dr, Suite 105, West Chester,
OH 45069-1873, 877-663-3375,
sales@mobiledesk.com, www.mobiledesk.com

■ Modular Devices Inc

1 Roned Rd, Shirley, NY 11967, 631-345-3100,
sales@mdipower.com, www.mdipower.com
Manufactures high-reliability hybrid DC/DC
converters and power systems for military,
aerospace and space applications. Patented
100K+ Proton rad-hard technology has been
incorporated into space proven derivatives and
semicustom parts. Built-in EMI filtering offers
efficient, noise-free outputs essential to reliable
operation of critical loads.
(See ad page 11)

Modular Industrial Computer Inc

6635 Lee Hwy, Chattanooga, TN 37421,
423-499-0700, marka@mic.com, www.mic.com

Molex Inc

Fiber Products Group Div, 5224 Katrine Ave,
Downers Grove, IL 60515, 630-512-8787,
fiberoptics@molex.com, www.molex.com/fiber

Momentive Performance Materials Inc

260 Hudson River Rd, Waterford, NY 12188,
614-986-2497, 4information@momentive.com,
www.momentive.com

Moog Protokraft

(sub of Moog Inc), 4545 W Stone Dr, Bldg 135,
Kingsport, TN 37660, 423-578-7200,
info@moog.com, www.protokraft.com

Mooring Tech

488 Edgewood Ave, Atlanta, GA 30312,
877-532-8088, contact@buytough.com,
www.mooringtech.com

Motion Maker Engineering

414 8th St SW, Forest Lake, MN 55025,
651-243-2520, polson@motionmaker.net,
www.motionmaker.net

Mouser Electronics

1000 N Main St, Mansfield, TX 76063,
817-804-3800, kelly.degarmo@mouser.com,
www.mouser.com

Moxa Americas Inc

601 Valencia Ave, Suite 100, Brea, CA 92823,
714-528-6777, oliver.wang@moxa.com,
www.moxa.com

MPL AG

Täferstr 20, Dättwil CH-5405, Switzerland,
41-56-483-34-34, info@mpl.ch, www.mpl.ch

■ MS Kennedy Products

(div of Anaren Co), 6635 Kirkville Rd,
East Syracuse, NY 13057, 315-701-6751,
g.overend@mskennedy.com,
www.anaren.com/msk

Provides hybrid microcircuits, motor controls,
amplifiers, voltage regulators, radiation hardened
electronic components, space and military
qualified microelectronics, power hybrids, and
custom hybrids.
(See ad page 5)

MTI Electronics

W133 N5139 Campbell Dr, Menomonee Falls, WI
53217, 262-783-6080, sales@mtielectronics.com,
www.mtielectronics.com

Murrietta Circuits

5000 E Landon Dr, Anaheim, CA 92807,
714-970-2430, sales@murrietta.com,
www.murrietta.com

NAI

7975 N Hayden Rd, Suite D105, Scottsdale, AZ
85258, 480-556-6066, info@nai-group.com,
www.nai-group.com

Nanowave Technologies

425 Homer Ave, Etobicoke, ON M8W 4W3, Canada,
416-252-5602, sales@nanowavetech.com,
www.nanowavetech.com

National Instruments

11500 N Mopac Expwy, Austin, TX 78759-3504,
877-387-0015, www.ni.com/vision

National Semiconductor

2900 Semiconductor Dr, Santa Clara, CA
95051-0608, 408-721-5000, www.national.com

National Test Equipment

1935 Plaza Real, Oceanside, CA 92056,
760-639-1700, sales@ntecusa.com,
www.nationltestequipment.com

Nelco Products

Mid Atlantic Div, 49 S Maple Ave, Marlton, NJ 08053, 866-635-2660, nelconj@verizon.net, www.nelcoproducts.com

Nelson Design Services Inc

3501 W Moreland Rd, Willow Grove, PA 19090, 215-784-9600, sales@nelson-design.com, www.nelson-design.com

Ness Engineering Inc

PO Box 261501, San Diego, CA 92196, 858-566-2372, nessengr@san.rr.com, www.nessengr.com

NextComputing

4 Townsend W, Bldg 17, Nashua, NH 03063, 603-886-3874, sales@nextcomputing.com, www.nextcomputing.com

NiCoForm Inc

72 Cascade Dr, Rochester, NY 14614, 585-454-5530, inform@nicofrm.com, www.nicofrm.com

Nightstick

(div of Bayco Products Inc), 640 S Sanden Blvd, Wylie, TX 75098, 800-233-2155, info@baycoproducts.com, www.mynightstick.com

The Night Vision Store

2422 Lilyfield Dr, Trophy Club, TX 76262-3414, 817-490-0501, sales@nightvisionstore.com, www.nightvisionstore.com

nLIGHT

5408 NE 88th St, Bldg E, Vancouver, WA 98665, 360-566-4460, sales@nlight.net, www.nlight.net

Noramco Wire & Cable

70 Glacier St, Coquitlam, BC V3K 5Y9, Canada, 604-472-6980, norbby@noramco.ca, www.noramco.ca

Nord-Lock Inc

(sub of Nord-Lock International), 1000 Gregg St, Carnegie, PA 15106, 412-279-1149, bolting@nord-lock.com, www.nord-lock.com

Nordson ASYMTEK

(sub of Nordson Corp), 2747 Loker Ave W, Carlsbad, CA 92010-6603, 760-431-1919, info@nordsonasymtek.com, www.nordsonasymtek.com

Noren Products Inc

1010 O'Brien Dr, Menlo Park, CA 94025, 650-322-9500, sales@norenproducts.com, www.norenproducts.com

North Atlantic Industries Inc

110 Wilbur Pl, Bohemia, NY 11716, 631-567-1100, info@naii.com, www.naii.com

Northrop Grumman Cutting Edge Optonics

20 Point W Blvd, St Charles, MO 63301, 636-916-4900, st-ceolaser-info@ngc.com, www.as-northropgrumman.com

Northrop Grumman Information Technology

9326 Spectrum Center Blvd, San Diego, CA 92123, 800-884-1336, www.is.northropgrumman.com

Northwire Inc

110 Prospect Way, Osceola, WI 54020, 715-294-2121, cableinfo@northwire.com, www.northwire.com

Nova Electric

Technology Dynamics Div, 100 School St, Bergenfield, NJ 07621-2915, 201-385-0500, howard@theallpower.com, www.novaelectric.com

NOVA Power Solutions Inc

(sub of LTI DataComm), 23020 Eaglewood Ct, Suite 100, Sterling, VA 20166, 703-401-4660, louie.leitao@novapower.com, www.novapower.com

Nufern

7 Airport Pk Rd, East Granby, CT 06026, 860-408-5000, info@nufern.com, www.nufern.com

NuWaves Engineering

132 Edison Dr, Middletown, OH 45044, 513-360-0800, support@nuwaves.com, www.nuwaves.com

OFSS

(div of Furukawa Electric), 2000 Northeast Expwy, Norcross, GA 30071, 888-342-3743, www.ofsoptics.com

Omega Engineering Inc

1 Omega Dr, Stamford, CT 06907, 203-359-1660, info@omega.com, www.omega.com

Omnetics Connector Corp

7260 Commerce Cir E, Minneapolis, MN 55432, 763-572-0656, sales@omnetics.com, www.omnetics.com

One Stop Systems Inc

2235 Enterprise St, Suite 110, Escondido, CA 92029, 760-745-9883, sales@onestopsystems.com, www.onestopsystems.com

OPHIR RF

5300 Beethoven St, Los Angeles, CA 90066, 310-306-5556, info@ophirrf.com, www.ophirrf.com

OptiConcepts Inc

PO Box 1170, Valdese, NC 28690, 828-320-0138, info@opticoncepts.com, www.opticoncepts.com

Optis

BP 275, Zo La Farlède, Toulon Cedex 9 83078, France, 33-4-94-08-66-90, info@optis-world.com, www.optis-world.com

OptoCity

645 Bashford Rd, Raleigh, NC 27606, 910-331-4862, tom@optocity.com, www.optocity.com

Optocon AG

Washingtonstr 16/16a, Dresden 01139, Germany, 49-351-8435990, info@optocon.de, www.optocon.de

OptoTest Corp

4750 Calle Quetzal, Camarillo, CA 93012, 805-987-1700, sales@optotest.com, www.optotest.com

OptoTherm Inc

2591 Wexford-Bayne Rd, Suite 304, Sewickley, PA 15143, 724-940-7600, sales@optotherm.com, www.optotherm.com

OSI Optoelectronics Inc

(div of OSI Systems Inc), 12525 Chadron Ave, Hawthorne, CA 90250, 310-978-0516, info@osioptoelectronics.com, www.osioptoelectronics.com

OTTO Engineering Inc

2 E Main St, Carpentersville, IL 60110, 847-428-7171, info@ottoexcellence.com, www.ottoexcellence.com

Oxford Instruments Industrial Analysis

300 Baker Ave, Suite 150, Concord, MA 01742-2124, 978-369-9933, industrial@oxinst.com, www.oxford-instruments.com/industrial

OZ Optics Ltd

219 Westbrook Rd, Ottawa, ON K0A 1L0, Canada, 613-831-0981, sales@ozoptics.com, www.ozoptics.com

P3 Technologies

383 Buell Rd, Rochester, NY 14624, 585-730-7340, markshaw@p3technologies.net, www.p3technologies.net

packIQ

1 American Way, Anderson, SC 29621, 877-233-8668, www.packiq.com

Palmer Wahl Temperature Instruments

234 Old Weaverville Rd, Asheville, NC 28804, 828-658-3131, info@palmerwahl.com, www.palmerwahl.com

Pamir Electronics Corp

603 N Gordon Dr, Exton, PA 19341, 610-594-8337, marketing@pamir.com, www.pamir.com

Pan Gulf Industrial Systems

PO Box 2473, Al Khobar, Eastern Province 31952, Saudi Arabia, 96-68-976-867, parvez@pgisystems.com, www.pgisystems.com

Parvus Corp

(sub of Eurotech), 3222 S Washington St,
Salt Lake City, UT 84075, 801-483-1533,
sales@parvus.com, www.parvus.com

Passat Ltd

116D Viceroy Rd, Unit 1-4, Vaughan, ON L4K 2M4,
Canada, 905-695-1088, info@passatinc.com,
www.passatltd.com

PCE Instruments UK Ltd

Units 12/13 Southpoint Bus Pk, Ensign Way,
Southampton, Hampshire SO31 4RF, UK,
44-2380-987-030, info@industrial-needs.com,
www.industrial-needs.com

PCI-Systems Inc

1250 Oakmead Pkwy, #210, Sunnyvale, CA 94085,
408-625-1090, engineering@pcisystems.com,
www.pcisystems.com

Pearson Machine Co LLC

81 Tosca Dr, Stoughton, MA 02072, 781-341-9416,
pearsonmachineverizon.net,
www.pearsonmachine.com

PennWell Marketing Solutions

1421 S Sheridan Rd, Tulsa, OK 74112,
240-595-2352, marketingservices@pennwell.com,
www.pennwellmarketing.com

Pentek Inc

1 Park Way, Upper Saddle River, NJ 07458,
201-818-5900, info@pentek.com, www.pentek.com

PerkinElmer

1330 E Cypress St, Covina, CA 91724,
626-967-9521, dave.pope@perkinelmer.com,
www.perkinelmer.com

Phase 1 Technology Corp

44 Jefryn Blvd, Suite Y, Deer Park, NY 11729,
888-732-6474, info@phase1tech.com,
www.phase1tech.com

Phoenix Contact

586 Fulling Mill Rd, Middletown, PA 17057,
800-888-7388, info@phoenixcon.com,
www.phoenixcontact.com

■ **Phoenix International**

812 W Southern Ave, Orange, CA 92865,
714-283-4800, info@phenxint.com,
www.phenxint.com

Manufactures rugged COTS mass data storage
systems all any host operating systems/networks.
Systems range in applications from multi-terabyte
fibre channel, iSCSI and SAS RAID, NAS, and
storage area network configurations, to plug-in
conduction cooled VPX and VME SSD storage
modules. Is an AS9100/ISO 9001 certified service
disabled veteran-owned small business.

(See ad page 31)

Photon Control Inc

8363 Lougheed Hwy, Suite 200, Burnaby, BC
V5A 1X3, Canada, 604-422-8861,
sales@photon-control.com,
www.photon-control.com

Photonic Sense GmbH

Am Goldberg 3, Eisenach 99817, Germany,
49-3691-7318-0, info@photonic-sense.com,
www.photonic-sense.com

Pickering Interfaces Inc

221 Chelmsford St, Suite 6, Chelmsford, MA 01824,
781-897-1710, ussales@pickeringtest.com,
www.pickeringtest.com

■ **PICO Electronics Inc**

143 Sparks Ave, Pelham, NY 10803,
914-738-1400, info@picoelectronics.com,
www.picoelectronics.com

Manufactures military, COTS, and industrial DC/DC
converters, high-voltage modules, AC/DC power
supplies, inductors, and transformers. MIL-PRF
units, environmental screening, and custom
specifications are available from an ISO 9000:2000
approved facility.

(See ad page 47)

PIC Wire & Cable

(sub of The Angelus Corp), N53 W24747 S Corporate
Cir, Sussex, WI 53089-0330, 262-246-0500,
sales@picwire.com, www.picwire.com

PIXELTEQ

8060 Bryan Dairy Rd, Largo, FL 33777,
727-545-0741, info@pixelteq.com,
www.pixelteq.com

Pleora Technologies Inc

340 Terry Fox Dr, Suite 300, Ottawa, ON K2K 3A2,
Canada, 613-270-0625, info@pleora.com,
www.pleora.com

Pole Zero Corp

5558 Union Centre Dr, West Chester, OH 45069,
513-870-9060, support@polezero.com,
www.polezero.com

Positronic

423 N Campbell Ave, Springfield, MO 65806-1007,
417-866-2322, info@connectpositronic.com,
www.connectpositronic.com

Powell Electronics

200 Commodore Dr, Swedesboro, NJ 08085,
800-235-7880, info@powell.com, www.powell.com

Praxis Optics

11127 Jordan Ave NE, Albuquerque, NM 87122,
505-239-9095, optalix@praxis-optics.com,
www.praxis-optics.com

Preciseley Microtechnology Corp

11421 Saskatchewan Dr, Edmonton, AB T6G 2M9,
Canada, 780-641-1925, info@preciseley.com,
www.preciseley.com

PrehKeyTec Inc

1130 W Lake Cook Rd, Suite 102, Buffalo Grove, IL
60089, 847-438-4000 x104,
dsquires@prehkeytecusa.com,
www.prehkeytecusa.com

Prior Scientific Inc

80 Reservoir Pk Dr, Rockland, MA 02370-1062,
781-878-8442, info@prior.com, www.prior.com

Process Technology

7010 Lindsay Dr, Mentor, OH 44060,
440-974-1300, info@process-technology.com,
www.processtechnology.com

Pro-Comm Inc

1105 Industrial Pkwy, Brick, NJ 08724,
732-206-0660, procomm222@aol.com,
www.procomm222.com

Projects Unlimited

6300 Sand Lake Rd, Dayton, OH 45414,
937-918-2200, info@pui.com, www.pui.com

Protective Packaging Corp

1746 W Crosby Rd, Carrollton, TX 75006,
800-644-4032, sales@protectivepackaging.net,
www.protectivepackaging.net

PureTech Systems

1950 W Rose Garden Ln, Suite 140, Phoenix, AZ
85027, 602-424-9842, info@puretechsystems.com,
www.puretechsystems.com

Pyromation Inc

5211 Industrial Rd, Ft Wayne, IN 46825,
260-484-2580, sales@pyromation.com,
www.pyromation.com

QTI Sensing Solutions

2108 Century Way, Boise, ID 83709,
208-377-3373, qtisales@thermistor.com,
www.thermistor.com

Qualmark Corp

10390 E 48th Ave, Denver, CO 80238,
303-254-8800, sales@qualmark.com,
www.qualmark.com

Quanta Laboratories

3199 De La Cruz Blvd, Santa Clara, CA 95054,
408-988-0770, test@quantalabs.com,
www.quantalabs.com

Quantum3D Inc

5400 Hellyer Ave, San Jose, CA 95138,
408-600-2500, sales@quantum3d.com,
www.quantum3d.com

Quantum Composers

212 Discovery Dr, Bozeman, MT 59718,
406-582-0227, sales@quantumcomposers.com,
www.quantumcomposers.com

Quell Corp

5639 Jefferson NE, Albuquerque, NM 87109,
505-243-1423, eeseal@quell.us, www.eeseal.com

Quicklogic Corp

1277 Orleans Dr, Sunnyvale, CA 94089-1138,
408-990-4000, www.quicklogic.com

Radisys

5435 NE Dawson Creek Dr, Hillsboro, OR 97124,
503-615-1100, info@radisys.com,
www.radisys.com

Radius Power

1751 N Batavia St, Orange, CA 92865,
714-289-0055, customerservice@radiuspower.com,
www.radiuspower.com

Rambus Inc

1050 Enterprise Way, Suite 700, Sunnyvale, CA
94089, 408-462-8000, www.rambus.com

Rapid Imaging Software Inc

1318 Ridgcrest Pl SE, Albuquerque, NM 87108,
608-824-1131, info@rapidimaging.net,
www.rapidimaging.net

Rave Computer Assoc Inc

7171 Sterling Ponds Ct, Sterling Heights, MI 48312,
586-939-8230, sales@rave.com, www.rave.com

Raycom Electronics

1 Raycom Rd, PO Box 250, Dover, PA 17315,
717-292-3641,
raycomsaleservice@electrotechnik.com,
www.raycomelectronics.com

Raytheon Vision Systems

75 Coromar Dr, Goleta, CA 93117-3090,
805-968-3511, rvsmarketing@raytheon.com,
www.raytheon.com/businesses/ncs/rvs

R Blaine Industries Inc

Polyimide & Hybrid Polymers Div, 1517 Hill Rd,
Suite 5F, Reading, PA 19602, 610-236-1445,
info@vtecpi.com, www.vtecpi.com

Real-Time Innovations

385 Moffett Pk Dr, Sunnyvale, CA 94089,
408-990-7400, info@rti.com, www.rti.com



Red Rapids

797 N Grove Rd, Suite 101, Richardson, TX
75081, 972-671-9570, sales@redrapids.com,
www.redrapids.com

Offers a catalog of signal acquisition and generation hardware products that are targeted at communication, telemetry, radar and surveillance systems. Products include signal converters, transmitters, receivers and FPGA DSP accelerators. All of the products are built around open architecture standards for embedded systems (XMC/VPX/cPCI) and server/desktop computers (PCIe).

Reelcraft Industries Inc

2842 E Business Hwy 30, Columbia City, IN 46725,
260-248-8188, reelcraft@reelcraft.com,
www.reelcraft.com

Reynard Corp

1020 Calle Sombra, San Clemente, CA 92673,
949-366-8866, sales@reynardcorp.com,
www.reynardcorp.com

RF Precision Products

(div of RF Industries), 7610 Miramar Rd, San Diego,
CA 92126, 858-549-6340, rfp2@rfindustries.com,
www.rfp2.com

■ RGB Spectrum

950 Marina Village Pkwy, Alameda, CA 94501,
510-814-7000, sales@rgb.com, www.rgb.com

Provides display processing, recording, and signal distribution solutions, specializing in command-and-control, simulation, and training. Products include multiviewers, multiscreen display processors, JPEG 2000 codecs and recorders, DVI matrix switches, and scan converters.
(See ad page 30)

Ridgetop Group Inc

3580 W Ina Rd, Tucson, AZ 85741, 520-742-3300,
information@ridgetopgroup.com,
www.ridgetopgroup.com

Rigel Engineering LLC

1690 S Tropical Trail, Merritt Island, FL 32952,
321-473-6999, sales@rigel-eng.com,
www.rigel-eng.com

Rocket EMS

2380 Bering Dr, San Jose, CA 95131,
408-858-1770, www.rocketems.com

Rockwell Automation Inc

1201 S Second St, Milwaukee, WI 53204-2496,
414-382-2000,
webmaster@rockwellautomation.com,
www.rockwellautomation.com

Rockwell Collins

1822 Deere Ave, Irvine, CA 92606, 949-221-5329,
www.rockwellcollins.com

rodartronic GmbH

(div of roda-computer GmbH), Gewerbepark
BWB 29, Bruckmühl D-83052, Germany,
49-8062-7268-0, info@rodartronic.com,
www.rodartronic.com

Rohde & Schwarz USA Inc

6821 Benjamin Franklin Dr, Columbia, MD 21046,
410-910-7800, info@rsa.rohde-schwarz.com,
www.rohde-schwarz.com

Ronco

70 Planchet Rd, Concord, ON L4K 2C7, Canada,
905-660-6700, info@ronco.ca, www.ronco.ca

Rosen Aviation LLC

1020 Owen Loop S, Eugene, OR 97402,
541-434-4637, pbloodworth@rosenaviation.com,
www.rosenaviation.com

RPMC Lasers Inc

203 Joseph St, O'Fallon, MO 63366,
636-272-7227, rpmlasers@aol.com,
www.rpmlasers.com

RUSSTECH Engineering Co Inc

16 Technology Dr, Suite 111, Irvine, CA 92618,
949-472-0880, russtengr@aol.com,
www.russtechengineering.com

RWC Testing & Lab Supplies

1821 N Zaragoza Rd, PMB 640, El Paso, TX 79936,
915-852-3375, customerservice@rwc-testing.com,
www.rwc-testing.com/store

Sacher Lasertechnik GmbH

Rudolf Breitscheid Str 1-5, Marburg D-35037,
Germany, 49-6421-305-290,
contact@sacher-laser.com, www.sacher-laser.com

Sacher Lasertechnik LLC

5765 Equador Way, Buena Park, CA 90620,
714-670-7605, sales@sacher.us,
www.sacher-laser.com

Saline Electronics

710 N Maple Rd, Saline, MI 48176, 734-944-2120,
dmcdonnell@electronics.net, www.electronics.net

Sandel Avionics

2401 Dogwood Way, Vista, CA 92081,
760-727-4900, sales@sandel.com,
www.sandel.com

San Francisco Circuits

1660 S Amphlett Blvd, #200, San Mateo, CA 94402,
800-732-5143, info@sfcircuits.com,
www.sfcircuits.com

Santa Barbara Infrared Inc

30 S Calle Cesar Chavez, Suite D, Santa Barbara, CA
93103, 805-965-3858, sales@sibir.com,
www.sibir.com

Savi Technology

3601 Eisenhower Ave, Suite 280, Alexandria, VA
22304, 571-227-7950, info@savi.com,
www.savi.com

Schleicher-Electronic

PO Box 88, Maynard, MA 01754, 508-331-8347,
rick.slagle@schleicher-electronic.com,
www.schleicher-electronic.com

Schroff GmbH

Langenalber Str 96-100, Straubenhardt D-75334,
Germany, 49-7082-794-0, info@schroff.de,
www.schroff.biz

Screening Systems Inc

1999 S Bascom Ave, Suite 700, Campbell, CA
95008, 949-855-1751, sales@scrsys.com,
www.scrsys.com

SEAKR Engineering Inc

6221 S Racine Cir, Centennial, CO 80111-6427,
303-790-8499, r2@seakr.com, www.seakr.com

Sealing Devices Inc

4400 Walden Ave, Lancaster, NY 14086,
716-684-7600, seals@sealingdevices.com,
www.sealingdevices.com

Semicoa Corp

333 McCormick Ave, Costa Mesa, CA 92626,
714-979-1900, jpark@semicoa.com,
www.semicoa.com

Sensitron Semiconductor

(div of RSM Electron Power Inc), 221 W Industry Ct,
Deer Park, NY 11729-4681, 631-586-7600,
sales@sensitron.com, www.sensitron.com

Sensor Developments Inc

1050 W Silver Bell Rd, PO Box 290, Lake Orion, MI
48359, 248-391-3000, sales@sendev.com,
www.sendev.com

Servometer

501 Little Falls Rd, Cedar Grove, NJ 07009-1291,
973-785-4630, info@servometer.com,
www.servometer.com

Sheldon Instruments

10393 San Diego Mission Rd, Suite 202, San Diego,
CA 92108, 619-282-6700, info@sheldoninst.com,
www.sheldoninstruments.com

Shore Microsystems Inc

45 Memorial Pkwy, Long Branch, NJ 07740,
732-870-0800, sbshore@yahoo.com,
www.shoremicro.com

Siemens Process Industries and Drives

3333 Old Milton Pkwy, Alpharetta, GA 30005,
770-751-2000, helpline.sii@siemens.com,
www.usa.siemens.com/industry

Signal Technology

(div of Crane Aerospace & Electronics) (sub of Crane
Co), 340 N Roosevelt Ave, Chandler, AZ
85226, 480-961-6269, mw@crane-eg.com,
www.craneae.com/mw

Signet FPD Inc

75 Columbia, Irvine, CA 92656, 949-380-3031,
sales@signetfpd.com, www.signetfpd.com

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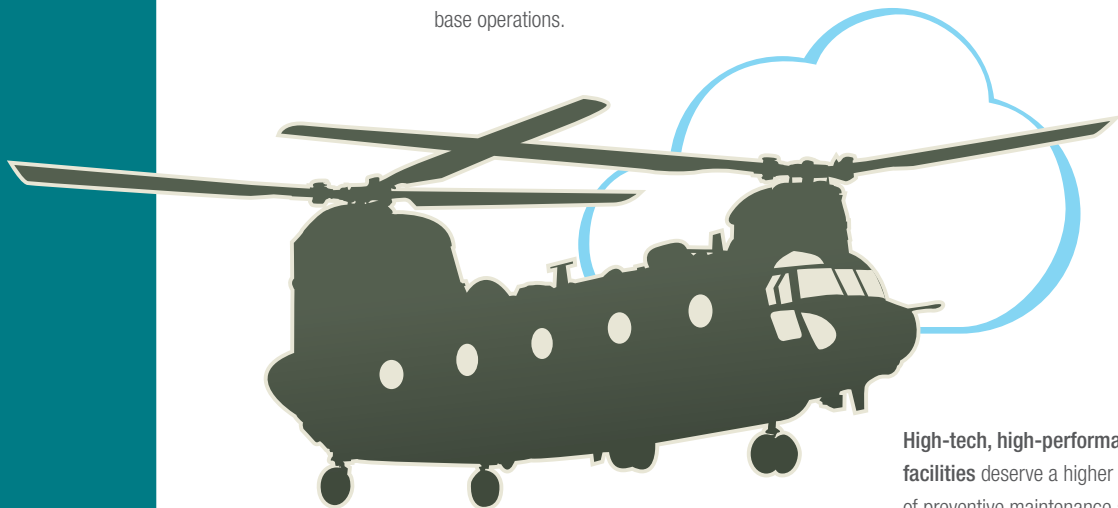


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