



**PRECISION STRIKE  
ASSOCIATION**  
Affiliate, National Defense  
Industrial Association

3rd Quarter  
**2005**  
Vol.18, No.3

**"Dedicated to advancing the art and science of  
precision engagement concepts and technology"**

## VISION STATEMENT

*We aspire to be the premier association dedicated to advancing the art and science of precision engagement concepts and technology.*

*To accomplish this, we will promote the development of systems and procedures in order to locate, fix, track, target, and attack fixed, moving, and relocatable targets.*

*We recognize that battlespace management, the network within which it functions, and the adjunct command and control requirements are crucial to success on the battlefield.*

*PSA has a global perspective and welcomes international participation.*

## USMC Gen. James L. Jones and Dale E. Klein Slated to Address PSTS-05

**T**op civilian and military leaders met in August to further refine future military capabilities in the ongoing Quadrennial Defense Review (QDR).

The new "force-planning construct" that puts increased emphasis on defending against terrorist threats was discussed. This emerging concept focuses on three capability elements: homeland defense, global war on terrorism and conventional major warfare.

These capability elements will be discussed at the Precision Strike Association's 15th Precision Strike Technology Symposium (PSTS-05) scheduled for 18-20 October at the Johns Hopkins University Applied Physics Laboratory Kossiakoff Conference Center.

The popular annual symposium will focus on accelerating precision strike technology for stability operations and protection of coalition forces. Two key defense leaders who figure prominently into the decision-making process are scheduled to keynote PSTS-05; General James L. Jones, USMC, and Dale E. Klein. General Jones is the Supreme

Allied Commander Europe and the Commander of the United States European Command. Dr. Klein serves as the Assistant to the Secretary of Defense for Nuclear, Chemical Biological Defense Programs.

General Jones' mission is to preserve the peace, security, and territorial integrity of the NATO member nations in Europe. He aims to maintain ready forces to conduct the full spectrum of military operations unilaterally or in concert with the coalition partners; to enhance transatlantic security through support to NATO; to promote regional stability; and to advance U.S. interests in Europe, Africa, and the Middle East.

The Honorable Dale Klein is Defense Secretary Donald Rumsfeld's top advisor for all matters concerning the formulation of policy and plans for nuclear, chemical, and biological defense programs. He is also responsible for matters associated with nuclear weapons safety and security, chemical weapons demilitarization, chemical and biological defense programs, and smoke and obscurants.

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Gen. James L. Jones, USMC



The Honorable Dale E. Klein

## IN THIS ISSUE

## Chairman's Column



### A Busy Summer

**B**y the time you read this we will have been

through the dog days of summer. But June through August included more than just lazy and hazy days. We have had our base reduction hearings with the Commission's report imminent. DoD worked to finalize the Fiscal Year 2007 budget request. And a long list of nominations for senior positions at the Pentagon was assembled. All this was accomplished with a backdrop of the Quadrennial Defense Review (QDR) in the works. Congress goes back in session with final marks on the FY06 DoD budget in progress. That should add a little heat as we head into autumn. Exciting times, with more to follow.

I'm sure most of you have been following the FY06 defense budget's deliberation and top-level budget formulation for FY07 to FY12. The results of the QDR will certainly impact many military service and weapons program top lines. I do not have a crystal ball, but I'm sure the results of a recent weapon study in the Office of the Secretary of Defense will produce procurement implications. Will all of the "J" programs continue as we know them today or will there be major modifications?

I mentioned the dog days of summer. Where did the term come from? In the summer, Sirius, the "dog star," rises and sets with the sun. During late July, Sirius is aligned with the sun, and the ancients believed that its heat added to the heat of the sun, creating a stretch of hot and sultry weather.

They named this period of time, from 20 days before the alignment to 20 days after, "dog days" after the dog star. Today, dog days occur during the period between July 3 and August 11.

Although it is certainly the warmest period of the year, the heat is not due to the added radiation from a far-away star, regardless of its brightness.

While on the subject, most would agree that we had a 'hot' time July 27-28 in Fort Walton Beach, FL where the Precision Strike Association held its 2005 PEO Forum. The agenda for the forum was sizzling along with the weather. We got great support from Major General Robert W. Chedister, USAF, PEO for USAF Weapons and Commander AAC, at nearby Eglin AFB, Judy Stokely, the AAC's Deputy for Acquisition, the local NDIA chapter and all of our "strike" community members down in the Florida panhandle. We had superb speakers and great attendance. Kudos to Brigadier General Phillip D. Coker, USA. He went well beyond the call of duty when he drove overnight from Atlanta to make his presentation. His efforts cannot go without credit. His presentation was well worth it. Thank you.

A sincere well done to Mike Underwood, Paul Greenberg and Ginny Sniegon for putting this outstanding event together. Also, thanks to Dawn Campbell who has to put all the little things together to make the PSA events throughout the year a big success.

Next on the agenda is the Precision Strike Technology Symposium (PSTS-05) at The Johns Hopkins University/Applied Physics Laboratory's Kossiakoff Center in Laurel, MD, October 18-20. PSTS is always one of our premier events. Hope to see you there.

That's the view from Wayne's World...

Wayne F. Savage  
Chairman of the Board  
Precision Strike Association

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## 2005 PEO Forum Wrapup

The Precision Strike Association (PSA) held its 2005 PEO Forum in Ft. Walton Beach, FL at the Emerald Coast Conference Center, 27-28 July.

The event was held in the hometown of the USAF Air Armament Center (AAC) and the PEO for USAF Weapons. The theme of the PEO Forum was *Precision Engagement – Creating Effects Based Operations for Future Battlefields*. The symposium co-hosted by the local NDIA chapter proved to be a great success with 182 attendees.

**Major General Robert W. Chedister, USAF**, Program Executive Officer (PEO) for USAF Weapons and Commander Air Armament Center, Air Force Materiel Command, provided the keynote address, offering a brief history of weapons development from the first bombs dropped in 1911 to the precision guided munitions of today. He discussed future opportunities for precision strike weapons and challenged the attendees with future technological opportunities.

Attendees were then treated to a Joint perspective from **Brigadier General James P. Hunt, USAF**—Deputy Director for Force Application in the Force Structure, Resources and Assessment Directorate, the Joint Staff (J-8). He noted that precision strike is a very important part of the force application portfolio—no matter what scenario we consider. He discussed precision strike from the non-kinetic aspect and reiterated that “precision strike is only as strong as the weakest link” and stressed the need for our systems to control maneuver.

He emphasized the ISR (Intelligence, Surveillance, Reconnaissance) and C2 (Command and Control) chal-

lenges of finding the right targets, positively identifying them and tracking them. It was absolutely imperative to get the right information to the right people at the right



MG Robert Chedister, USAF

time. This is especially critical with mobile or fleeting targets. Brig Gen Hunt believes we have a lot of work to do in this area, since our organizational structure and processes are not quite ready for this, and it may be the biggest challenge to precision strike operations.

He noted the importance of getting the data from sensor to weapon quickly and the need to get inside the enemy's decision cycle, plus having the authority for engagement and the absolute necessity for interoperability. He discussed the improvements and successes we have had in recent conflicts working with the British, Australians and New Zealand armed forces.

Brig Gen Hunt said keep the entire “Kill Chain” in mind as we look to future capabilities. He asserted that our biggest challenges are more than just precise munitions; they are finding the right target, getting permission to attack it, and then doing so before the enemy moves.

**Commander Mark “JR” Bowman, USNR**, Deputy Director for Joint Fires Integration at US Joint Forces Command (J851A), discussed the transition from service fires to joint fires. He explained the broad

continuum of requirements and coordination that his team was developing with the various services. Having an absolute imperative to develop trusted fires, the movement ahead requires “joint trust”, since no service works the battlefield alone anymore. He stressed that when he addressed “Fires”, he was referring to both lethal and non-lethal fires.

The challenges of joint fires integration required information to the right person at the right time, necessitated combat identification, looked to machine-to-machine interfaces for both legacy and new technology and delineating comprehensive policy, standards and equipment for information exchange.

**Thomas Robillard**, Director, Air-to Air Missile Systems Wing, Eglin AFB, FL, underscored the requirement for joint weapons, using as an example the AIM-9 air-to-air missile, a USN/USAF partnership since 1953.

Drawing on many years in the acquisition field, he said that joint capabilities must come from a “coordination of multi service and international stakeholders including industry, warfighters, laboratories, the services, OSD staffs and Congress to bring a system to fruition.” He asserted that “the process works best when ‘pulled’ by capabilities and needs, and the process takes five years or more to effect.” He stressed that systems do best if “pulled by the man and not pushed by the lab. The system needs to bring something new to the fight.”

Mr. Robillard jokingly stated that “Joint is not a four letter word” and that jointness must be the process.

See **Wrapup**, Continued on page 4

**Wrapup**, Continued from page 3

He then talked about the near term of precision engagement, including the Small Diameter Bomb, Universal Armament Interface, Net Ready Weapons and directed energy applications.

An Army panel then took the stage to discuss how precision engagement ensures dominant maneuvers. **Colonel Earnest Harris, USA**, Program Manager for Precision Fires Rockets and Missiles, started with a video of “real kinetic” weapons effects. He reviewed the various modern weapon systems presently employed and under development.

He was followed by **Lieutenant Colonel John Oxford, USA**, Project Manager for Sub-munitions, who briefed the Viper Strike system. He demonstrated how it is swift, silent and lethal, using a semi-active laser to minimize collateral damage.

**James Sutton**, Deputy Program Executive Officer for Ammunition, reviewed conventional and ‘leap ahead’ munitions. He described close combat systems, combat ammunition systems for indirect fires, as well as maneuver ammunition systems for direct fires. He emphasized the need for a joint services approach and noted that grenades, smoke markets, small caliber ammunition are things of the past and that the future is with force precision fuses, mid-range munitions and networked weapons.

**Christopher Grassano**, Deputy Product Manager for the XM982, reviewed the 155MM precision guided extended range munition for cannon artillery. Boasting that the Excalibur is the most insensitive artillery projectile and thus, very safe to handle, it provides ranges of 20 kilometers to the target with CEPs of 3.4-6.9 meters. On 22 June the Army signed a contract for low rate initial production. Fielding is to begin in March 2006.

**Greg Bischer**, Test and Evaluation Lead for Precision Guided Mortar Munitions (PGMM), addressed the close fight arena (about 1 to 1.5 kilometers) with an urban focus. He described the problem of collateral damage. He stated that the precision mortar munitions do not replace the traditional volume fires.

Recently-retired Major General **Charles H. Swannack, Jr., USA**, at lunch gave a riveting slide show and description of his recent tours in Iraq. He could not say enough about the quality and professionalism of the U.S. soldier, and the progress being made in Iraq.

The afternoon session was kicked off by **Colonel David Brown, USAF**, Commander of the Joint Fires Integration and Interoperability Team. Working for US Joint Forces Command, he summarized the many

challenges of training and capability assessments, which need to provide constructive feedback and qualitative information so that the services implement change. Only then is their work considered a success. He pointed to making their efforts a permanent organization that links joint fires requirements with emerging technology, joint training and improvement in doctrine, tactics, technology and procedures.

**Rear Admiral Timothy Heely, USN**, PEO for Strike Weapons and Unmanned Aviation, views the Navy as the maritime arm of the joint force and pointed out the continuing need to transition from the “cold war” mentality, with emphasis on littoral warfare, the asymmetric threat, the Global War on Terrorism and TST (time sensitive targeting). He believes the Navy requires flexible solutions for persistent ISR, precision weapons and smaller warheads to minimize collateral damage. He emphasized that FORCEnet is the enabler that links the kill chain.

**USMC Brigadier General Martin Post**, Assistant Deputy Commandant for Aviation, addressed the requirements for generating precision fires as accuracy, speed and lethality – getting the right weapon in the exact place at the right time. He talked to the digital trend in tactical targeting systems reducing the lulls in command and control tempo inherent in legacy, analogue and voice systems by increasing accuracy, speed and situational awareness.

Ending the first day’s presentations was **Randy Bigum**, Lockheed Martin’s Vice President of Strike Weapons. He started with a simple statement, “If you stand still, we can kill you, so the enemy has learned to go deep and keep on the move”. He then addressed the challenges of

See **Wrapup**, Continued on page 5

### Precision Strike Association

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**Wrapup,** Continued from page 4 moving and relocatable targets, providing a thought-provoking brief on using an air-to-air analogy to work the air-to-ground problem of mobile targets.

The next day, **Judy Stokley**, AAC's Deputy for Acquisition, reviewed the Pentagon mandate to do an integrated acquisition assessment to consider every aspect of the weapons procurement process. All should provide input to the process. She emphasized that this is a public forum.

**Brigadier General Philip D. Coker, USA**, Director, Capabilities Developments, Futures Center, from the US Army's TRADOC, gave a very thought provoking address with subtle humor. He talked about transformation as a human event moving on a continuum. He admits that the Army didn't previously do precision, but now it was embedded. He stated "we can smack stuff, but just can't

find the target well enough, and then it is compounded with potential blue on blue engagements." He cautioned that if "we can bring accuracy to the fight but can't bring target location and clear the area of friendlies, we have nothing."

He stressed that efficiently clearing fires is the biggest problem and that procedural process is usually the culprit. He reviewed future capabilities including course-correcting fuses, kinetic energy artillery with precision and extended ranges and advanced hypersonic weapons. He feels that directed energy solutions hold great promise.

More future weapons programs were briefed by **Lynda Rutledge**, AAC's Chief of Technology Transition and Concept Development Division within the Capabilities Integration Directorate. She addressed both near term and mid-to-far term capabilities.

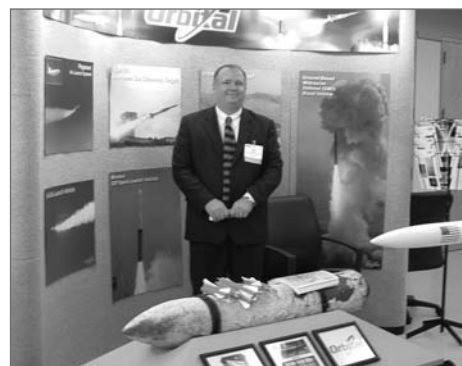
Two additional speakers from industry completed the PEO Forum: **Frank Caravella**, Program Manager for Raytheon Network Centric Systems; and, **Greg Gardner**, Vice President of Oracle, Homeland Security.

Both addressed the challenges of achieving joint command & control in networks. Mr. Caravella considered the challenges for both government and industry noting that changes are occurring in operational concepts, technology and standards. Mr. Gardner discussed the implementation of XML and BPEL languages to improve and enhance command and control, using mission capability packages as an example. In this complex world, the hurdles of culture, process and the willingness to share information must be overcome with the right incentives. ■



**EXHIBITORS**

- Raytheon Company*
- DAU-Huntsville*
- Kaman Aerospace Corp.*
- Orbital Sciences Corp.*
- PM Combat Ammunition*



# PRECISION STRIKE PEO FORUM

JULY 27-28, 2005

EMERALD COAST CONFERENCE CENTER • FT. WALTON BEACH, FL



- 1 **CDR Mark "JR" Bowman USNR**  
USJFCOM, J851A-Deputy,  
Joint Fires Integration
- 2 **Thomas Robillard**  
Director, Air-to-Air Missile Systems Wing,  
Eglin AFB, FL
- 3 **Colonel David Brown, USAF**  
Integration & Interoperability Team,  
HQ USJFCOM
- 4 **MG Chuck Swannack, USA (Ret)**  
Former CG 82nd Airborne Division Iraq



- 5 **U.S. ARMY PERSPECTIVE PANEL:**
  - **LTC John Oxford, USA**  
Product Manager, Viper Strike
  - **COL Earnest Harris, USA**  
PM, Precision Fires Rockets & Missiles,  
PEO Space & Missile Command
  - **James Sutton**  
Deputy Program Executive Officer,  
Ammunition
  - **MG Paul Greenberg, USA (Ret)**  
PSA Executive Director
  - **Chris Grassano**  
Deputy Product Manager, XM982 Excalibur
  - **Greg Bischer**  
Test & Evaluation Lead, PGMM



- 6 **RADM Timothy Heely, USN**  
PEO for Strike Weapons &  
Unmanned Aviation
- 7 **BG Martin Post, USMC**  
Assistant Deputy Commandant for Aviation
- 8 **Randy Bigum**  
Vice President, Strike Weapons Lockheed  
Martin Missiles and Fire Control
- 9 **BG Philip D. Coker, USA**  
Director, Capabilities Developments, Futures  
Center, United States Army Training and  
Doctrine Command



- 10 **Lynda Rutledge-Program Manager, NCW**  
Network Weapons ACTD
- 11 **Frank Caravella, PM**  
Raytheon Network Centric Systems
- 12 **Greg Gardner, Vice President-Oracle,**  
**Homeland Security**
- 13 **Bgen James P. Hunt, USAF**  
Deputy Director for Force Application,  
J-8 Force Structure Resources &  
Assessment Directorate, The Joint Staff

## B-52 to the Rescue

A Boeing B-52 Stratofortress from the 40<sup>th</sup> Air Expeditionary Group recently dropped three Boeing Joint Direct Attack Munitions (JDAM) on a cave of anti-coalition forces in Afghanistan, killing two and leading to the capture of ten others by coalition ground forces.

The mission was one of 22 close air support and armed reconnaissance sorties flown that day by coalition aircraft. Supporting Operation Enduring Freedom, the B-52 was providing close air support in the Oruzgan Province. Coalition troops came under small arms fire, and the bomber responded, officials said. The bombs hit the cave dead on and closed all three entrances.

For one young airman deployed from Minot AFB, ND, it was his first experience of seeing a bomber return after dropping live munitions, and one he said he will never forget. He has been in the USAF only 18 months.

"I didn't actually believe it until I saw it," said Airman 1<sup>st</sup> Class Marcus Thames, a weapons loader on his first deployment with the 40<sup>th</sup> Expeditionary Maintenance Squadron at a forward-deployed location. "When you see that plane with empty (weapons) racks, you know you completed your mission."

Master Sgt. James Klimpel, the weapons section superintendent, said the job at home station is all about training. The most intensive training takes place once a month in the load barn for every load crew at home station. They load each munition that they are certified on under the watchful eye of weapons standardization Airmen. "It's all timed," said Klimpel, also from Minot. "If they don't do it within the allotted time, they fail."

Thames said all that training certainly pays off when it counts. "This is my first time for everything, particularly actually loading live weapons," he said. "I did all that training at Minot, but this is the real deal."

The "Buff" is flying combat missions as the long-serving bomber continues to be modernized.

Along with successfully developing a new targeting capability for the B-52, 53<sup>rd</sup> Wing test managers and aircrews in June demonstrated a new \$8.6 million avionics system capability.

A B-52 was launched with Boeing's prototype integrated weapons interface unit that allowed the bomber to release, for the first time, eight 2,000 pound JDAMs from the internal bomb bay. The test took place at the Utah Test and Training Range.

Boeing developed the unit during a two-year sustainment program aimed at replacing the four aging line replaceable units currently carried in the B-52. The June 14 demonstration showed that the prototype interface unit, when fully developed and qualified for production, is capable of replacing the existing replaceable units and as a result, extending the combat role of the B-52.

The test sortie also demonstrated the B-52's capability to increase the number of JDAM weapons the B-52 can carry from 12 to 20, an increase of 60 percent. There is no existing program to formally pursue this capability, however, the demonstration allowed proof of the concept and provides future risk reduction.



Airman 1<sup>st</sup> Class Marcus Thames moves a JDAM that will be loaded on a B-52 Stratofortress. He is a weapons loader with the 40<sup>th</sup> Expeditionary Maintenance Squadron at a forward-deployed location and is from Minot Air Force Base, ND

Wing officials have also developed a new targeting capability for the B-52. Its newest modification involves a radio-modified Litening targeting pod and ground-based radio receiver equipment, collectively known as "Rover."

The Litening pod and Rover are used to transmit real-time imagery of close-air support targets between ground forces and aircrews, increasing precision in target identification and communication.

Meanwhile, the USAF has budgeted approximately \$250 million for a roughly two-year pre-system development and demonstration risk-reduction effort for the B-52 Stand-Off Jammer System. The USAF is expected to announce a winner in October.

It is anticipated that up to 16 B-52H aircraft will be equipped as fully mission capable for electronic attack. It is also envisioned that all operational B-52s will receive new electronic-support measures in a program worth as much as \$3 billion.

Even though it recently turned 50, the B-52 is still capable of dropping or launching the widest array of weapons in the U.S. inventory. And its lifespan has been calculated to extend beyond the year 2040. ■



# Supersonic JDAM Drop for Raptor

As the mid-afternoon sun blazed on the Mojave Desert and thunderclouds loomed in the distance, a sleek dark gray war bird took to the sky from Edwards AFB, CA to push the envelope of flight testing.

At the controls, Maj. John Teichert, a 411<sup>th</sup> Flight Test Squadron test pilot, pushed the F/A-22 Raptor past Mach 1, opened the weapons bay and released a guided bomb unit-32 1,000-pound joint direct attack munition, marking the first time a Raptor has dropped a JDAM at supersonic speed.

“Qualifying the Raptor to release GPS-guided bombs at supersonic speeds is a significant milestone for the program,” Teichert said.

“Releasing a bomb under such conditions provides a notable increase in Raptor tactical capabilities.”

The GBU-32 separation test vehicle that was released is the same size, shape and weight as a real bomb, but without the guidance kit.

In 2004, the Raptor proved it was capable of air-to-ground operations with subsonic JDAM releases. Other aircraft have released a JDAM at supersonic speeds.

“But the speeds at which we will eventually release the JDAM will far exceed any current aircraft’s JDAM envelope,” Teichert said.

Additionally, this was the first time a JDAM was released supersonically from an internal weapons bay, officials said.

Even with thorough mission planning and briefing, including several

contingencies, by the test team and the test conductor, the testing was not without its challenges.

Some of these challenges included limited range airspace to reach test conditions, longer range travel of the weapon after release, more difficulty with the photo chase aircraft keeping up with the Raptor and harsh conditions for the aircraft and the weapon at release.

“All these factors obviously increased the stress level of the mission,” Teichert said. “Attention to detail was heightened

in order to ensure a successful test.”

He credited the mission success to thorough coordination among the test team, the mission crew and the range controllers.

“Pilots and engineers had coordinated the details of the test during the test planning phase,” he said. “This close orchestration allowed the test to meet its objectives as well as demonstrate operational relevance.”

The Raptor is designed to operate high and fast where it has an enhanced tactical advantage over air-to-air and surface-to-air threats, the major said.

“Adding the capability of supersonic JDAM provides a substantial increase in bomb range to destroy lethal threats well outside of their engagement envelopes,” he said. “The Raptor is essential to the Global Strike concept, and supersonic JDAM optimizes that capability.”

Meantime, Northrop Grumman

has begun work on an F/A-22 modernization program that will add capabilities to the aircraft’s communications, navigation and identification (CNI) system to enhance network-centric operations for the next-generation, air-dominance fighter weapon system. The CNI avionics are being developed under contract to Lockheed Martin.

A key concept in the Pentagon’s vision for the future is network-centric warfare, linking sensors, communications systems and weapon systems in an interconnected grid that allows for seamless information flow to warfighters, decision makers and support personnel.

To support this vision, Northrop Grumman’s F/A-22 modernization program will ensure that the CNI architecture is compliant with the requirements of the Joint Tactical Radio System program. Northrop Grumman will also add Link-16 capability to the CNI system. Link-16 is a tactical data link that provides greater situational awareness through the jam-resistant transfer of voice and data between battle participants.

Northrop Grumman’s CNI system utilizes sophisticated software-defined radio technology to simultaneously support numerous capabilities such as various voice and data communications, automatic acquisition of fly-to points and friend-or-foe identification. The system can also dynamically reconfigure these functions to support priorities defined by missions.

Using software-defined radio technology, Northrop Grumman’s CNI system is a fraction of the size and weight of the single-function radios previously required to implement the same functions. ■



An F/A-22 Raptor releases a guided bomb unit-32 1,000-pound joint direct attack munition at supersonic speed for the first time near California’s Panamint Mountain range



## News Briefs

### \$79M Contract for Unitary Army Tactical Missiles

Lockheed Martin has received a \$79 million U.S. Army contract for 106 Army Tactical Missile System (ATACMS) Block 1A Quick Reaction Unitary missiles. These missiles will include the recently qualified new guidance, control and fuze systems.

Work on the contract will be conducted at the company's facilities in Dallas and Horizon City, TX. Delivery of the missiles is scheduled to begin in the third quarter of 2006 and will continue throughout 2007.

The ATACMS Block 1A Unitary Missile is combat proven in joint operations during Operation Iraqi Freedom (OIF), and is the latest addition to the current ATACMS family of munitions. The Block 1A Unitary missile comprises a proven unitary warhead, furnished by the U.S. government, which Lockheed Martin integrates into new ATACMS Block 1A missiles for precision attack out to 300 kilometers. The ATACMS Unitary variant provides the capability to attack high-payoff, time-sensitive targets with limited collateral damage.

The Army TACMS Unitary missile is a responsive, all-weather, long-range missile, with a high explosive, single-burst warhead fired from the Multiple Launch Rocket System (MLRS) family of launchers, including the MLRS 270A1 launcher and the High Mobility Artillery Rocket System (HIMARS). ■

### Harris Handles Jigsaw

Harris has been awarded a \$6.6 million research and development contract by the U.S. Army Communications-Electronics

Command (CECOM) to demonstrate the Jigsaw Laser Radar (LADAR) 3D-imaging test-bed system on a Dragonfly Pictures DP-5X Unmanned Aerial Vehicle (UAV).

The ability to reliably identify targets – tanks and other vehicles – hidden under foliage and camouflage was successfully demonstrated by Harris and MIT-Lincoln Laboratories (MIT-LL) during a Defense Advanced Research Projects Agency (DARPA)-sponsored proof-of-concept Jigsaw study. This demonstration was followed by an initiative to design a smaller, lighter, autonomous, better-performing Jigsaw sensor suitable for use on a medium-sized UAV.

Harris is providing systems integration services in cooperation with LADAR sensor developer MIT-LL and Dragonfly Pictures.

The work includes full implementation of a UAV version of Jigsaw, followed by experimentation and demonstrations. It concludes with in-depth analysis of data collected with the airborne test bed during flight campaigns using a helicopter and the DP-5X VTOL UAV. ■

### BACN in Development

Northrop Grumman has been selected by the USAF Electronic

See **News Briefs**, Continued on page 10

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**News Briefs,** Continued from page 9  
Systems Center to develop and integrate an airborne communications relay and information server that will provide warfighters with critical battle information.

Battlefield Airborne Communications Node (BACN) will provide a bridge for linking communications among legacy radios and intelligence, surveillance and reconnaissance systems for U.S. DoD networks.

BACN's ability to translate and share data from all battlefield communications channels using Internet protocols will resolve interoperability problems, provide warfighters with a predictive battle-space-awareness capability and give commanders greater flexibility and faster response time in executing the theater air plan.

The Northrop Grumman team will develop an aerospace-networking payload composed of Internet protocol-based radios, Gateway Manager, software-defined radios and Advanced Information Architecture (AIA), which will be managed by an airborne executive processor.

An experiment will assess the ability to adapt BACN capabilities to unmanned air vehicles, including Northrop Grumman's Global Hawk. The Northrop Grumman team will demonstrate BACN's capabilities during Joint Expeditionary Force Experiment '06 (JEFX) in the spring of 2006. ■

### Next Generation Anti-Jam GPS for F-35 JSF

Raytheon recently delivered the first flight-ready GPS system for installation in the first F-35 Joint Strike Fighter test aircraft.

The F-35's GPS sensor system was developed under a contract from Northrop Grumman, a principal

teammate on the Lockheed Martin Joint Strike Fighter (JSF) team. The F-35's GPS System supports the precision strike mission capability of the multi-role, stealthy strike fighter.

The system consists of a variety of key technologies including the Raytheon digital anti-jam receiver (DAR) and a multi-element, low observable antenna developed by Ball Aerospace. ■

### Raytheon Tackles Moving Ground Targets

The USAF has hired Raytheon to devise a way for aircraft, from a safe

distance, to detect, track and target hostile forces in motion on the ground.

"The U.S. owns the airspace but today's conflicts quickly move to the ground," Nick Uros, vice president for Raytheon's Advanced Concepts and Technology group, said. "We want to keep the war fighter in the air and on the ground out of harm's way as much as possible. One way to do this is to employ an automatic target-recognition system from a standoff location. Such a capability is on the future road maps of the Air Force, and we are pleased to be able to work with them to develop this important technology."

## PEOPLE

On Aug. 12, USN Adm. **Edmund P. Giambastiani, Jr.** assumed the duties of vice chairman, Joint Chiefs of Staff. He turned over command of U.S. Joint Forces Command to Army Lt. Gen. **Robert W. Wagner**, who had been his deputy commander.

USMC Gen. **Peter Pace** assumes the duties of chairman, Joint Chiefs of Staff, on Sept. 30, replacing USAF Gen. **Richard B. Myers** who retires from active duty on Oct. 1.

President Bush has nominated former Pentagon acquisition chief **Michael Wynne** to be secretary of the air force. Gen. T. **Michael Moseley** will formally succeed the retiring Gen. **John Jumper** as USAF chief of staff on Sept. 2. Moseley had been the vice chief. The Senate confirmed Lt. Gen. **John D. Corley** as the next vice chief. He will be promoted to the rank of general. He is currently the principal deputy for the assistant secretary of the air force for acquisition.

**Ronald M. Segal**, a USAF fighter pilot and NASA astronaut, was sworn in as the new undersecretary of the air force on Aug. 4. He had been the Pentagon's director of defense research and engineering. The White House plans to nominate Navy acquisition chief **John Young** to replace Segal at DoD.

Gen. **Bruce Carlson** now heads Air Force Materiel Command replacing Gen. **Gregory S. Martin**. Carlson had commanded the 8<sup>th</sup> Air Force. Martin retires after 35 years of service.

President Bush has nominated Lt. Gen. **Duncan J. McNabb** to command Air Mobility Command, picking up his fourth star in the process. The same goes for **Norton A. Schwartz** with assignment as commander, U.S. Transportation Command.

The White House has nominated Northrop Grumman executive **Donald Winter** to be secretary of the navy. He currently heads the firm's Mission Systems sector. Navy VADM **David C. Nichols** is going to U.S. Central Command as deputy commander.

Former PSA Board Member Rear Admiral (Select) **David "Deke" Philman** has been assigned as Deputy Commander, Joint Functional Component Command for Space and Global Strike, USSTRATCOM. Deke assumes his new position early October. Deke, congratulations!!! We are proud of you.

**Alexander Kossiakoff**, a missile pioneer who directed The Johns Hopkins University Applied Physics Laboratory, died of congestive heart failure Aug. 6. He was 91.

Such a system, which could be mounted on a manned or unmanned aircraft, would reduce the need for personnel on the ground or in the air near a target. Today's advanced high-resolution radar can monitor events from distances of more than 50 miles.

The goal of this second stage of the Air-to-Ground Radar Imaging (AGRI) program, will be to develop and demonstrate software that will permit current radar technology to take on this new mission. The first stage of the AGRI program yielded an automatic recognition capability for stationary targets.

Raytheon will test its proposal initially in October 2006 and conduct a final demonstration in June 2008. ■

### B-1B Stays Combat Ready

The U.S. Air Force's B-1 bomber continues to be upgraded for combat in the 21<sup>st</sup> Century.

A B-1B Lancer test program that combined testing of software upgrades along with integrating the 500-pound Joint Direct Attack Munition, or GBU-38, was completed early this year.

Airmen of the 419<sup>th</sup> Flight Test Squadron completed the last software test sortie on Feb. 22 in a flight to the Utah Test and Training Range that accomplished test points ranging from radar targeting to weapons



Two B-1B Lancer bombers fly in formation.

employment. In the final munition test flight Feb. 24, testers released six inert GBU-38 JDAMs in four fly-over passes at the Naval Air Warfare Center at China Lake, CA.

During the software upgrades, testers performed regression testing to verify that previous weapon employment, radar and navigation capabilities were not affected by the new software.

In May, B-1B Lancer bombers demonstrated their superior flexibility and air power capability by simulating 72 launches of the bomber's newest weapon, the Joint Air-to-Surface Standoff Missile during JASSM Thunder 05-01.

The exercise was the first operational-level planning-to-execution exercise for the B-1B bomber featuring its new JASSM capability.

The missile is an air-to-surface, self-propelled weapon with a single warhead that has an effective range of about 230 miles. It was designed to penetrate highly defended airspace as an independent cruise missile to eliminate high-value fixed targets. It has the ability to strike hard targets, soft targets or targets of opportunity with precision.

The missile is part of the B-1B Joint Standoff Weapon/JASSM Integration program, an extension of the B-1B's upgrade, and one part of the overall B-1B conventional mission upgrade program.

In June, the multi-mission bomber commemorates its 20<sup>th</sup> anniversary at Dyess AFB, TX. The Lancer has more than 20 years of service, has more than 100 world records for speed, payload, range and time to climb and has become the

## CALENDAR OF EVENTS

### Precision Strike Technology Symposium

**Date:** October 18-20, 2005

**Theme:** *Accelerating Precision Strike Technology for Stability Operations and Protection of Coalition Forces*

**Location:** The Johns Hopkins University/Applied Physics Laboratory, Kossiakoff Center, Laurel, MD

### Winter Roundtable

**Date:** January 25, 2006

**Theme:** *Precision Engagement—New Policies Creating Innovative Opportunities*

**Location:** Marriott Crystal City - Crystal Forum

### Annual Programs Review

**Date:** April 18-19, 2006

**Theme:** TBD

**Location:** Marriott Crystal City - Arlington, VA

For more information on these events, and other activities please contact the PSA office directly.

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bomber of choice for warfighters in all theaters.

The Lancer's history began in the 1960s when the need for a long-range conventional multirole bomber arose to replace the B-52 Stratofortress in its Cold War role to deliver nuclear weapons and penetrate the Soviet defenses.

The Lancer can carry 24 Global Positioning System-aided Joint Direct Attack Munitions (JDAM) at one time. It can also carry a combination of 24 Mk-84 2,000-pound bombs; 8 Mk-85 naval mines; 84

See **News Briefs**, Continued on page 12



**News Briefs,** Continued from page 11  
Mk-82 500-pound bombs; 84 Mk-62 500-pound naval mines; 30 cluster munitions; 30 wind-corrected munitions dispensers (WCMD), 24 AGM-158 JASSM or 12 AGM-154 Joint Standoff Weapons (JSOW).

The bomber most recently proved itself in operations Enduring Freedom and Iraqi Freedom. ■

### Successful Boosted Penetrator Test

Lockheed Martin recently demonstrated a key technology milestone for the integration of a boosted penetrator warhead with a long-range cruise missile that can be used against hard and deeply buried targets.

In the test, held at the New Mexico Institute of Mining and Technology, in Socorro, NM, the penetrator was expelled from a missile body using a small discharge pressurization device.

The firm made a simple alteration to the cruise missile body, allowing researchers to use the properties of the warhead along with kinetic energy to penetrate the target. The nose of the missile opens like a clamshell, allowing the warhead's booster to provide the required velocity.

The test successfully demonstrated the ability to propel the warhead from the main airframe without altering the airframe's flight path or angle of flight. In operation, the missile would carry the warhead from long ranges against a target. In the terminal phase, just before reaching the target, the warhead would be expelled from the nose of the missile, when a booster would ignite to propel the warhead to high velocity and impact on the target.

Other features of Lockheed Martin's dispenser system are planned for demonstration on the

Revolutionary Approach To Time-critical Long Range Strike (RAT-TLRS) program in 2006. ■

### Super Hornet Engages Moving Targets with JDAM

Boeing successfully demonstrated the capability of a single F/A-18E/F Super Hornet to engage moving land targets during a test at Naval Air Warfare Center, Weapons Division, China Lake, CA.

"This is just another step in our efforts to develop an all-weather multiple moving target engagement capability for the Super Hornet," said Chris Chadwick, Boeing's vice president for F/A-18 programs.

Real-time targeting updates were accomplished using the aircraft's existing Digital Communications System (DCS) to communicate over a standard military link to a 2,000-lb. Joint Direct Attack Munition (JDAM) equipped with a UHF weapon data link module. The weapon data link module included a miniature radio transceiver that transmitted link status back to the aircraft during weapon free-fall.

In the guided release demonstration, the position of the moving target, a radio-controlled panel-side truck, was continuously tracked by the Advanced Targeting Forward-Looking Infrared (ATFLIR) sensor onboard the Super Hornet. Periodic target updates were provided to the JDAM throughout the weapon's flight to the target. As a result, the F/A-18 weapon system successfully guided the inert bomb to within two meters of the moving target — close enough to destroy most moving targets.

During a previous flight, two-way UHF link connectivity was verified to 40 miles between a ground-mounted JDAM and aircraft in flight. The UHF weapon data link exceeded expectations in maintaining communications between the F/A-18 aircraft and the JDAM during weapon deployment.



F/A-18 Super Hornet takes off.

Further demonstrations of the Super Hornet's future precision engagement capabilities are planned for later this year and 2006. ■

### \$24.7M Contract for Joint Net-Centric Mission Execution System

The USAF has awarded Lockheed Martin a 2-year, \$24.7 million contract to continue development of a web-enabled mission execution system that will allow joint battle commanders to work together to carry out battlefield strike missions in real time.

The Web-Enabled Execution Management Capability (WEEMC) is designed to allow numerous commanders to collaboratively plan and execute time-sensitive strike missions, as well as search and rescue efforts. The system will link Army, Navy, Air Force, Marine, and Special Operations systems into a unified application, giving warfighters instant, integrated access

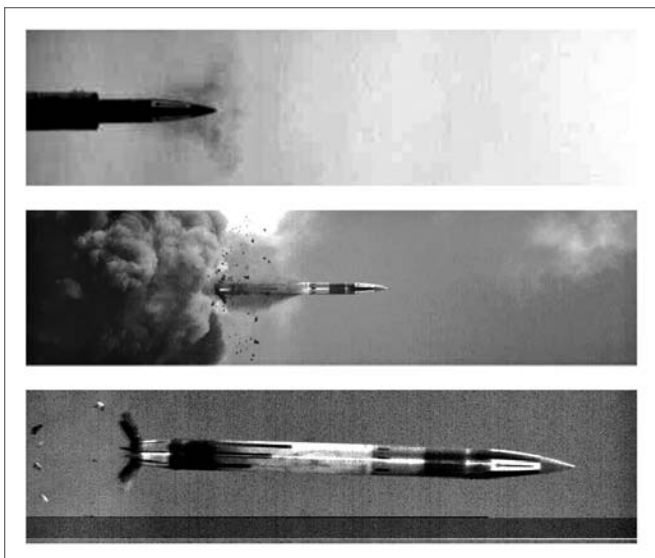
from any command and control location, including Navy ships, Air Operations Centers (AOCs), or forward deployed command posts.

In addition to an improved net-centric architecture, WEEMC offers additional mission coordination management applications that are not available today. Warfighters from all services will be able to collaborate in near-real time on combat search and rescue, special operations forces, and intelligence, surveillance and reconnaissance (ISR) missions. ■

### Lockheed Martin Develops Navy's Long-Range Land Attack Projectile

Lockheed Martin has received a five-year contract valued at \$120 million from BAE Systems for further development and test of the Long-Range Land Attack Projectile (LRLAP) for the Advanced Gun System (AGS) on the U.S. Navy's next-generation destroyer, the DD(X).

The cost-plus-award-fee contract calls for completion of a LRLAP to provide precise, rapid-response, high-volume, long-range fire support for U.S. Marines ashore.



LRLAP in test

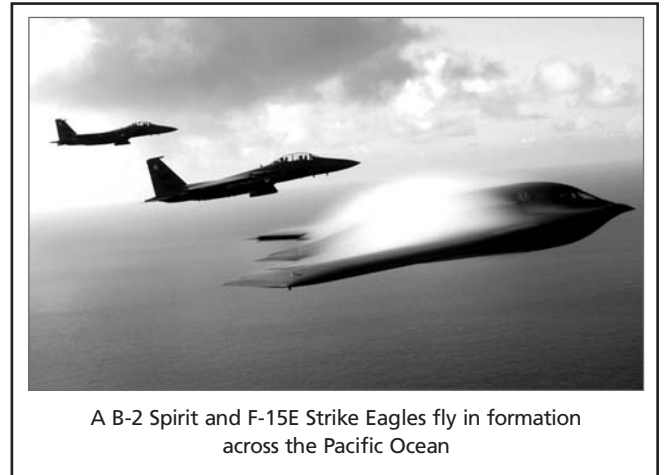
The new contract calls for additional development and tests in 2006-2008 and support to AGS qualification testing in 2009-2010. More than 100 projectiles will be delivered and tested under this contract. Full-rate production is expected to begin in 2011.

The DD(X) National Team, led by Northrop Grumman and Raytheon, recently completed the fourth and fifth consecutive, successful guided flight tests of the LRLAP, demonstrating that the projectile meets threshold range requirements.

The tests, which took place June 29 and July 27 at the San Nicholas Island test range off the California coast, broke a distance record for gun-launched munitions.

The tests continue the success of previous guided flights conducted in February and March, which demonstrated better-than-specified accuracy at a range of 32 nautical miles, and on June 23, when GF-04 set the record for range performance at 59 nautical miles inland.

The guided flight test series has conclusively demonstrated the projectile's ability to use an inertial measurement unit with in-flight updates from a global positioning system to extend range while simultaneously achieving precision-strike lethality in support of a Marine Corps coastal engage



A B-2 Spirit and F-15E Strike Eagles fly in formation across the Pacific Ocean

ment from a DD(X) stationed far offshore.

The test series has also demonstrated the burn and thrust of the rocket motor and survival of the airframe structure (including rocket-motor components), deployment of an aft-located fin assembly, performance of the obturator (which holds the gas behind the projectile until it leaves the muzzle), canard deployment, GPS acquisition, controlled flight, and impact at GPS coordinates programmed into the projectile at initialization. ■

### Tomahawk Program Office Merger

The U.S. Navy's Tomahawk missile program recently consolidated its management areas to provide the most efficient support to the Fleet. The consolidation follows a recommendation resulting from an assessment conducted by an independent consultant, in conjunction with the related Navy staffs.

The change involves the merger of PMA-282, the Tomahawk Weapon Control System program management office, with PMA-280, the Tomahawk All-Up-Round program management office.

See **News Briefs**, Continued on page 14

## News Briefs, Continued from page 13

Additionally, the Cruise Test Directorate of PEO (W) has become part of PMA-280. The name of the new organization will be PMA-280, the Tomahawk Weapons System program office.

According to a newly defined program mission statement, the office will be “the Navy’s premier acquisition command and life-cycle manager for the Tomahawk Weapons System providing the warfighter with a safe, effective, reliable, and maintainable weapons system.”

The Tomahawk program is part of the Program Executive Office, Strike Weapons and Unmanned Aviation (PEO(W)) co-located at the NAVAIR complex, on the Patuxent River Naval Air Station, MD. ■

## QDR Process Revs Up

The Quadrennial Defense Review (QDR) looks to make sure DoD is “arranged in the way that makes the most sense for the current situation,” a senior Pentagon spokesman said recently. The QDR is a congressionally mandated study used to analyze the full range of DoD activities. The Pentagon will present the review to Congress with the Fiscal 2007 defense budget request on Feb. 6.

The last review was conducted in 2001. Officials collected most of the information used in that review before the terror attacks that hit New York and the Pentagon. While officials worked to include experiences from the attacks and from

subsequent operations in Afghanistan, the review did not do justice to those experiences. “We have learned a lot since (2001),” the Pentagon’s Lawrence Di Rita said in a news conference.

“Obviously, a lot has happened since the last QDR,” Di Rita said. “The senior leadership of this department has established terms of reference for the ongoing QDR to look at a lot of activities, try and learn from what has happened since the last QDR, try and analyze various options, and come to some conclusions about how we’re organized.”

The QDR started as the “Bottom-Up Review,” released by then-Defense Secretary Les Aspin in October 1993. The review looked at the Pentagon’s role in the aftermath of the fall of the Soviet Union.

Congress called for the process to be institutionalized, and the QDR process began in 1996 with a finished report delivered by then-Defense Secretary William Cohen in 1997.

The process looks at all aspects of DoD, including the right mix of capabilities, department roles, missions and organizations, agency business practices, and DoD processes. The biggest difference between this review and those in the past is that for the first time the process is happening while the United States is at war. ■

## Viper Strike Finds Gold

The U.S. Special Operations Command recently awarded Northrop Grumman a \$22 million contract for the demonstration of the Viper Strike munition as a Stand-off Precision Guided Munition (SO PGM) on the AC-130 gunship.

The work will be performed out of Huntsville, AL, and is being incrementally funded based on performance. The initial increment of

work should be completed in December 2005 and all initial proof of concept work is to be completed December 2006. This is an Advanced Concept Technology Demonstration (ACTD) program.



Viper Strike also arms the Army’s Hunter UAV.

Meanwhile, Northrop Grumman has integrated a global positioning system (GPS) receiver into its Viper Strike laser-guided precision munition and successfully demonstrated GPS navigation in engineering flight tests.

The addition of GPS navigation is intended to provide highly accurate midcourse guidance, allowing the weapon to be launched from much greater altitude and standoff range than is possible with just the Viper Strike’s conventional semi-active laser (SAL) seeker. Once it is integrated with the SAL system, GPS will not only improve the survivability of the host aircraft but will allow it to attack widely separated targets located off its flight path.

Viper Strike is an unpowered, aerodynamically stable glider that measures 36 inches in length and weighs 44 pounds. It is intended for operations that require a flexible angle of attack (steep or shallow), particularly in mountainous terrain or built-up areas where strict rules of engagement are in force. It requires a “man in the loop” to laser-designate the target, which ensures the greatest possible accuracy and minimizes the likelihood of collateral damage. ■



Lawrence Di Rita



# PSTS-05 18-20 OCTOBER 2005

Kossiakoff Conference Center, JHU/APL, Laurel, MD

*Accelerating Precision Strike Technology for Stability Operations & Protection of Coalition Forces*

## Keynote & Select Speakers include:

General James L. Jones, USMC—Commander, USEUCOM & SACE (Invited)  
 Admiral John B. Nathman, USN—Commander, U.S. Fleet Forces Command (Invited)  
 Honorable James S. Gilmore III—Former Governor of Virginia  
 Honorable Dale E. Klein—Assistant to SECDEF for Nuclear, Chemical & Bio Defense  
 Dr. James A. Tegnelia—Director, Defense Threat Reduction Agency  
 Rear Admiral Tim Heely, USN—PEO for Strike Weapons & Unmanned Aviation, NAVAIR  
 P. Kevin Peppe—Vice President for Precision Engagement, Raytheon Company  
 Mike Knollmann—ADUSD (Joint & Coalition Operations Support), AS&C, OUSD(AT&L)  
 John Wilcox—ADUSD (Precision Engagement), AS&C, OUSD(AT&L)  
 Brigadier General Thomas P. Mancino, ARNG—Assistant Adjutant General of Oklahoma  
 Brigadier General Anthony A. Cucolo III, USA—Director, JCOA, USJFCOM  
 Rear Admiral Robert S. Harward Jr., USN—National Counterterrorism Center  
 Colonel James Dendis, USAF—International Cooperation Regional Manager, OUSD(AT&L)  
 Scott Rodgers—Air Force Intelligence Center  
 John B. Tuley—Officer for Targeting, National Geospatial-Intelligence Agency (NGA)

## Unclassified sessions will address:

Accelerating Technologies for Precision Engagement  
 Initial Quadrennial Defense Review Findings  
 Precision Engagement—Future Operations  
 Science and Technology Initiatives  
 Joint Concept Technology Demonstration Program  
 High Speed Weapons Technology + Networked Weapons  
 Int'l Technology Programs including Technology Cooperation-U.S. Tech Initiatives Abroad  
 Vision for NATO's Transformation  
 Stability Operations & Protection of Coalition Forces  
 Technical Sessions on **Targeting, C4ISR, Weapons & Effects**  
 Implementation of Congressional Advisory Panel Decisions Involving WMD

## Classified sessions will address:

Technical Session on Sensitive Topics  
 Overview of the Current Air-to-Surface Threats  
 Nuclear, Chemical & Biological Defense Programs  
 Countering the Proliferation of WMD  
 Current Joint Combat Operations in Afghanistan and Iraq  
 Training the Afghan National Army  
 Improving Target Location Error  
 Analysis from Current Operations

## PSTS 2005, Continued from page 1

Please join these two distinguished defense leaders and our extensive slate of dynamic technology leaders and experts at this important symposium as they focus on technologies to improve, transform, and accelerate strike capabilities. (Page 15 lists

select topics and speakers confirmed for PSTS-05.)

The program for the first two days will be UNCLASSIFIED and the third day's agenda will be conducted at the SECRET NOFORN and SECRET-RELEASABLE TO NATO levels. ■

## In the next Issue

Wrapup on Precision Strike Technology Symposium 2005

## PRECISION STRIKE ASSOCIATION CORPORATE MEMBERS

### GOLD

Aerojet Corporation  
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 BAE Systems Mission Solutions  
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