The PrecisionStrike Digest

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

PSA
PRECISION STRIKE ASSOCIATION
Affiliate, National Defense Industrial Association

MISSION STATEMENT

The Precision Strike Association is the premier professional organization dedicated to advancing the art and science of precision engagement concepts and technologies. The Association focuses on the Kill Chain by supporting the development of systems and procedures in order to find, fix, track, target, attack, and assess fixed, moving, and relocatable targets. PSA is organized as a not for profit, tax-exempt corporation.

USN Admiral Patrick Walsh, Dr. Ron Sega & USAF Lt Gen Henry Obering to Keynote PSTS-07

Required Precision Strike Capabilities and Technologies for the Long War is the theme for the Precision Strike Association's 17th Precision Strike Technology Symposium (PSTS-07). This vital and dynamic symposium is scheduled for 23-25 October 2007 at the JHU/APL Kossiakoff Center in Laurel, MD. PSTS-07 will be conducted at the SECRET/NOFORN level all three days. Technical session categories and presentation focus areas are highlighted on page 15.

Effective Precision Strike demands a timely and effective kill chain to attack some of the most important targets. PSTS-07 uniquely offers the opportunity to present to ones peers the latest advances and cutting edge research and thinking in areas of strike weapons, desired weapons effects, targeting, and required C4ISR. Further, technological advances—including dramatic improvements in precision weaponry—have allowed our military to generate considerably more combat capability with the same or, in some cases, fewer numbers of weapons platforms and with lower levels of manning.

Admiral Patrick Walsh, USN

Honorable Ronald M. Sega

Lieutenant General Henry A. Obering III, USAF

A very high-level Administration official and many of our executive-level speakers will talk about current "hot" topics by focusing on areas that include the level of military progress expected to win the war on terror-to changing the targeting landscape for the long war. Warhead replacement plans will even be addressed.

PSA takes great pride in featuring three very popular and gifted Defense leaders and visionaries—Admiral Patrick M. Walsh, USN, the Honorable Ronald M. Sega and Lieutenant General Henry A. Obering III, USAF. Admiral Walsh has been invited to focus on transforming the joint force and strengthening warfighting capabilities and perhaps present challenges to the precision strike community. Dr. Sega is expected to discuss critical technologies for the long war and share beneficial insights on tech-

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Chairman's Column

Behold…. a short quiz on the Kill Chain.

Which of the following best describes a valid method to Compress the Kill Chain?

A. Eliminate cultural "stovepipes" that prevent the rapid transmission and understanding of target information.

B. Shorten the processing time for targeting coordinate-seeking weapons by eliminating administrative tasks.

C. Reduce voice communications by fielding ubiquitous data communications networks.

D. Arm more persistent systems with precision weapons so that at any given moment in the battlespace those weapons can bear on targets.

E. All of the above.

And, of course all of us who have taken multiple choice tests know you should always choose: All of the above.

The point of this mind game is to stimulate your thinking as to the breadth of the Kill Chain. To help, the Precision Strike Association (PSA) Board of Directors has updated our Vision Statement. While the Kill Chain remains our focus, the essential elements are significantly expanded from just looking exclusively at weapons.

We encourage all association members to let the PSA Board of Directors and Staff know how well we are doing in promoting such an expanded focus. We are not in this for the money, but rather to provide our membership the opportunity to exchange meaningful knowledge about the precision engagement operational concept.

Having completed a very successful Precision Strike Summer Forum in mid-July, our PSA team is now concentrating on the upcoming Precision Strike Technology Symposium (PSTS-07) in October! A word of advise to any new member of PSA: you don't want to miss this annual event held at one of the finest venues available in the Washington DC area, the Kossiakoff Center at the Johns Hopkins University Applied Physics Lab near Columbia, MD.

For several years now, the Precision Strike Technology Symposium has been an all-classified conference. The Programs Committee elected to restrict attendance to consolidate all classified presentations to a single event. Given that advanced technology is the ongoing focus of PSTS, this is appropriate. We do regret the fact that those individuals without a U.S. security clearance may not attend, but we hope that the other unclassified PSA events held throughout the year meet their needs.

Watch for PSA registration material regarding PSTS-07, and don't miss attending the premier event scheduled for 23-25 October. With the theme Required Precision Strike Capabilities and Technologies for the Long War, the powerful program aims to be even better than last year's well-received event. I hope to see you there. (Go to page 15 for more information regarding PSTS-07.)

Bill Dalecky

Bill Dalecky
Chairman of the Board
Precision Strike Association

2007 Precision Strike Summer Forum Wrapup

The Precision Strike Association (PSA) conducted the 2007 edition of its very popular Precision Strike Summer Forum on 10-11 July 2007 at the Virginia Beach Resort Hotel, Virginia Beach, VA.

This year's theme *Joint Perspectives on Precision Engagement* considered how winning the war on terrorism mandates that the military services work together in a fully integrated manner.

The event featured outstanding speakers who discussed critical aspects of policy and execution relating to efficient and effective execution throughout the kill chain.

The event was held in a region of the United States known for its staunch support of the U.S. military. This part of the Old Dominion is home to a significant complement of U.S. Navy warships, top-of-line U.S. Air Force tactical aircraft and the command that develops doctrine for the U.S. Army. It is also home to Wayne Savage, a past PSA Chairman, and the 2007 Precision Strike Summer Forum Event Chair.

Colonel Eileen Bjorkman, USAF

Leading off the two-day event was Colonel Eileen A. Bjorkman, Director, Joint Test and Evaluation Methodology (JTEM) Joint Test and Evaluation Project.

A problem, said Bjorkman, is the fact that "processes and methods for designing and executing tests of system of systems in the joint mission environment are not well defined or understood. Nor is there a clear understanding of how to assess system performance as it pertains to capabilities supporting joint missions."

JTEM is chartered to investigate, evaluate and make recommendations to improve the ability to conduct testing across the acquisition life cycle in a realistic joint mission environment. To do this, JTEM is developing, testing and evaluating methods and processes for defining a distributed live and simulated joint test environment to evaluate system performance and joint mission effectiveness.

Al Resnick

The keynote speaker for the first day was Allan M. Resnick, the Director for Capabilities Development & Assessments at the Army Capabilities Integration Center (ARCIC), Training and Doctrine Command, Fort Monroe, VA. He is responsible for TRADOC plans, policies, procedures, and programs for Capabilities Developments and requirements-related functions.

Resnick provided an overview of Army precision strike doctrine and future precision weapons programs.

Next up on the podium was USN RADM Timothy Heely, Program Executive Officer for Strike Weapons and Unmanned Aviation (PEO(W)) who outlined the status of various armed unmanned aerial systems developments, including the Navy Unmanned Combat Air Sir System (N-UCAS).

Rear Admiral T. Heely, USN

The Joint J-UCAS program was terminated last year, with the Navy embarking on its own carrier-based unmanned combat air vehicle effort—selecting either Boeing or Northrop Grumman to demonstrate the feasibility of UCAS compatibility to aircraft carrier operations.

Northrop Grumman was ultimately selected to provide the Navy Unmanned Combat Air Systems Technical Demonstration. The $635.8 million contract will launch a technical effort to demonstrate the aircraft carrier suitability of an autonomous low-observable unmanned air vehicle, as well as demonstrate critical aircraft carrier suitability technologies in a relevant environment.

Specifically, the effort, which is scheduled to conclude in 2013, will involve shipboard operation, including catapult takeoffs, arrested landings and flight in the immediate vicinity of an aircraft carrier. The air vehicle will not carry weapons.

This specific contract is for technology development and demonstration and will not be an operational system. But through it, the Navy will develop knowledge, skills and technologies specific to operating an autonomous low-observable unmanned air vehicle in an aircraft carrier environment.

Specific products of the effort, referred to as "UCAS-D," are expected to include flight test data, test reports, trade studies, simulation, and detailed engineering analyses to enable future developmental efforts.

The contractor-provided system will include two unmanned, low-observable air vehicles, two mission control segments, and a support segment. The system will be capable of autonomous launch, recovery and operations. Flight testing is scheduled to begin in late 2009 and culminate with carrier flight operations in 2013.

Heely also discussed candidate weapons for the MQ-8 Fire Scout Unmanned Aerial System, including the Viper Strike, Precision Guided Mortar Munition (PGMM) and

the Compact Rapid Attack Weapon (CRAW). Both the SPIKE and LOGIR/APKWS are China Lake development effort, he noted.

Maj. General Tim Peppe, USAF (Ret)

Maj. General Tim Peppe, USAF (Ret), Director, Business Development for Northrop Grumman Integrated Systems, in Hampton, VA, served as Special Assistant to the Chief of Staff of the Air Force, for Air and Space Expeditionary Matters, before retiring after more than 33 years in uniform. In a prior assignments he served as the Air Force Chief of Safety. Over lunch, Peppe described Northrop Grumman's various precision strike systems, including the B-2 stealth bomber and in-development directed energy weapons.

He noted that his firm is working with Boeing on the Massive Ordnance Penetrator (MOP), a technology demonstrator program to develop a 30,000-pound conventional penetrating weapon that will defeat a specialized set of hard and deeply buried targets. It is designed to be carried aboard B-2 and B-52 bombers and deployed at high altitudes.

"Northrop Grumman is working on a lot of different things in precision engagement, a dynamic, physically constrained environment. There are needs out there, and we need to work as efficiently as possible," said Peppe.

CAPT Peter Murphy, USN

After lunch, Captain Peter Murphy, USN, Deputy Executive Officer for Naval Aviation and Tactical Systems, Office of the Under Secretary of Defense (AT&L), and PSA Programs Vice Chair, discussed the Pentagon's role in developing and fielding precision weapons in conjunction with the military services.

Murphy said the Pentagon is reducing the inventory of redundant weapons but more work is required. He also sees the need for common databases and analytical methods among the military services. "They are still too service focused versus joint focused. We need to do a better job matching operational needs with systems solutions. We need to get rid of biases and stovepipes," he believes.

USN CAPT Scott A. Stearney, Commander, Carrier Air Wing Seven, offered a 'real world' appraisal of the Navy's precision weaponry, having just returned from a deployment aboard the USS Dwight D. Eisenhower (CVN 69) in support of joint and coalition operations in the Middle East region. Over an eight-month period, his collection of tactical fixed-wing aircraft and rotorcraft flew 31,500 hours, conducting 12,000 sorties in which 135 precision weapons were expended.

CAPT Scott Stearney, USN

"He said "precision strike enabled freedom of maneuver for U.S. and coalition forces, setting the condition for tactical and operational success… Advanced digital battlefield systems and joint integrated training are key to successful engagements."

The first day of the Precision Strike PEO Forum concluded with a reception featuring appetizers, spirits and excellent networking opportunities. Afterwards, many attendees took advantage of the locale to sample the local seafood and beach hospitality.

The second and concluding day of the Precision Strike Summer Forum got underway early.

MG "Mike" Hostage III, USAF

USAF Maj. Gen. Mike Hostage, a second day keynote speaker, is the U.S. Joint Forces Command's Director for Joint Capability Development (J8) and serves as the lead joint integrator for all of DoD's uniformed component. He works with all combatant commanders, The Joint Staff, the U.S. military services, other Federal departments and agencies to combine all of the military's capabilities into a single focused effort – thereby connecting current capabilities to future concepts. He discussed Joint Command and Control Capability Portfolio Management (JC2 CPM) and how it will transform the force to efficiently and effectively execute precision engagement.

The Army Precision Strike Weapons, Developing Systems and Lessons Learned Panel was moderated by PSA Executive Director Paul Greenberg.

Sam Coffman

Representing the U.S. Army on the panel was Colonel Sam Coffman, U.S. Army, (Ret), Director, Futures Development Integration Center, Ft. Sill, OK. A speaker at the 2006 edition of the Precision Strike Summer Forum, Coffman offered an overview of the Army Strike Concept, discussed the lessons learned in using field artillery and talked about the use of precision munitions in current combat operations.

James Sutton, the U.S. Army's Deputy Program Executive Officer, Ammunition, described the status of

various Army precision strike weapons, including Excalibur, which is in low rate initial production, and the lower-cost GPS-guided Precision Guidance Kit (PGK), which makes 'dumb' artillery smart, and is in systems design and development (SDD).

James Sutton

The XM1111 Mid-Range Munition (MRM) is a precision-guided, 120mm, gun-fired smart ammunition that will provide a dual-mode, beyond-line-of-sight capability for the Future Combat System's Mounted Combat System. Beyond-line-of-sight is an extension of the traditional direct-fire

Audience participation was high.

mode, enabling standoff engagements at greater ranges. With a beyond-line-of-sight capability, armored vehicle gunners will be able to engage targets traditionally denied by intervening terrain or existing structures in an urban environment. Raytheon and General Dynamics Ordnance and Tactical Systems recently joined forces to bid for a MRM SDD contract. MRM will come in two versions: MRM-KE (kinetic energy) and MRM-CE (chemical energy).

Sutton also discussed two Networked Munitions, the anti-personnel XM-7 Spider and the Intelligent Munition System (IMS), which is in engineering and manufacturing development, and can take out both personnel and vehicles. Both can be programmed to self-destruct.

MG David Clary, USAF

Major General David Clary, Vice Commander, Air Combat Command, said the ACC is "fully committed to developing and perfecting precision engagement capabilities for the joint force since precision is the thread that runs through global persistent attack." He dubbed the F-22 Raptor "the great enabler for global strike" and the F-35 Lightning II "the means to achieving global persistent attack."

Clary said the next-generation Small Diameter Bomb is urgently needed to attack moving targets with precision and that more work is needed to develop the weapons needed to go after hard/deeply buried targets. He added that combat identification and reducing collateral damage need more work.

As the Commander of the Miniature Munitions Systems Group (MMSG) at Eglin AFB, FL, USAF Colonel Richard D. Justice is responsible for the U.S. military's highest priority miniature munitions, including the fixed-target kill Small Diameter Bomb I (SDB-I), first fielded in August 2006, and future multi-carriage smart munitions.

Colonel Richard Justice, USAF

He said "the very effective Joint Direct Attack Munition (JDAM) is the weapon of choice for the warfighters" and "the pre-eminent success story at Eglin AFB." Over 166,000 units have been produced of which 16,000 have already been used in combat operations. Justice said the Laser JDAM variant will reach the field next year, he added. He said ongoing development efforts at the MMSG include network-enabled weapons and the multi-mode seeker equipped SDB-II that will be able to hit moving targets in all weather conditions.

Dyke Weatherington

The PEO Forum concluded with Dyke Weatherington, Deputy, UAS Planning Task Force, Office of the Under Secretary of Defense (AT&L), who said that the U.S. military will be acquiring $25 billion worth of unmanned aerial systems between now and Fiscal Year 2013. Weatherington expects to see a "dramatic growth" in the purchase of ground and maritime robots in 5-7 years. Stated Weatherington: "Despite the widespread use of Shadow, Predator and small unmanned aerial systems, "we have not even scratched the surface in terms of how unmanned systems will satisfy the warfighters' needs." ■

There were many good questions regarding the briefings.

PSA would like to thank **ATK, Lockheed Martin, Northrop Grumman, Orbital Sciences Corporation, Raytheon, and Sargent Fletcher** for Sponsoring the **2007 Summer Forum**

Maj. Gen. Tim Peppe, USAF (Ret.) meets with PSA members over lunch.

Post-lunch conversations.

The Summer Forum was a networking opportunity.

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Summer Forum Exhibitors

Sargent Fletcher

Lockheed Martin

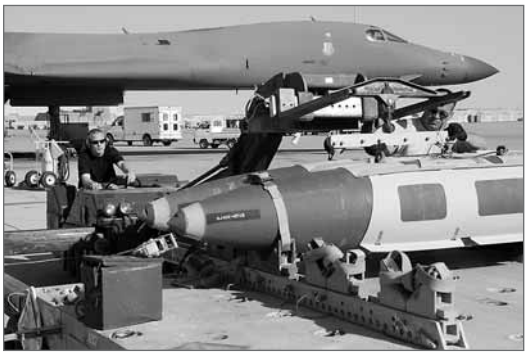
Orbital Sciences Corporation

Iraq Study Group Discussion on Capitol Hill

Several PSA Board members participated in a lively Iraq Study Group discussion with Rep. Frank Wolf (R-VA) on June 13, 2007. Wolf authored legislation creating the Iraq Study Group and believes that the Group's Report meets the test of developing a consensus on how to succeed in Iraq. Further, he believes the best way forward is for both the Congress and the President to embrace the recommendations of the Iraq Study Group, since the Report is the path to common ground. Renewed legislation has been introduced to fully implement all of the Report's recommendations. During the one-hour discussion, attendees touched on U.S. Army General David Petraeus' assessment on Iraqi achievements and shortfalls, concerns about Iran continuing to foster instability in Iraq, and the enemy's adaptation to our precise weapons technology. ■

Air Tactics Evolve to Achieve Effects for War on Terrorism

Achieving airpowers objectives more effectively is what more than 200 of the most proficient expeditionary airmen discussed at the quarterly Weapons and Tactics Conference in Bahrain in July.



Munitions specialists load a B-1 Lancer for a mission.

The Weapons and Tactics Conference is a venue for Air Force weapons officers along with joint and coalition subject matter experts to meet face to face with their counterparts in the theatre to improve their effectiveness both on and above the battlefield.

Having the current tactics leaders, the ones who are flying combat missions every day, get together to share ideas and best practices from operations Iraqi Freedom and Enduring Freedom is critical to success, said Col. William Mullins, the 379th Expeditionary Operations Group commander.

"The Weapons and Tactics Conference facilitates a tactics discussion at an operational level," said Colonel Mullins, a command pilot with more than 3,200 hours in the F-4 Phantom and F-15E Strike Eagle.

"This is our chance to ask ourselves if we're doing what we need to do to achieve the desired effects and decide what we can do to improve upon our tactics and our processes."

Prior to the conference, officials from each air wing in U.S. Central Command Air Forces submitted a list of their current issues and proposals for solutions. During the four-day event, working groups were divided among major airpowers divisions such as close-air support, combat search and rescue, weaponeering, airspace command and control, mobility, non-traditional intelligence, reconnaissance and surveillance or IRS, data links and training. The groups tackled issues in each area to come up with potential improvements.

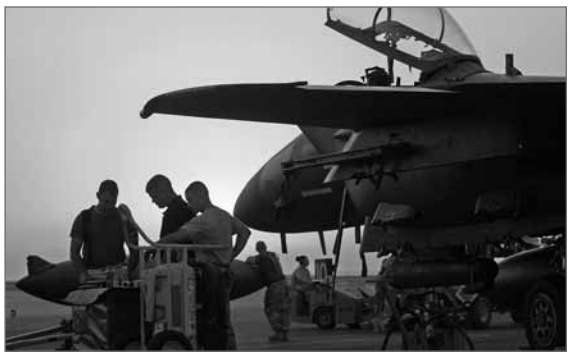
One topic they explored was how to integrate the RC-135 Rivet Joint's intelligence, surveillance and reconnaissance (ISR) capabilities with non-traditional ISR platforms such as fighter and bomber aircraft.

"We presented an idea of how to better facilitate the flow of information between ISR platforms, joint tactical attack controllers and other combat platforms such as F-16 Fighting Falcons and B-1B Lancers," said USAF Lt. Col. John Harrison, the 379th expeditionary operations support squadron commander and expert in the ISR aspect of the RC-135.

"What we came away with was the ability to directly support the warfighter on the ground while working hand-in-hand with the bomb droppers in addition to our job to listen and detect," he said.

After resolving as many issues as possible at the lowest levels, they had the opportunity to tell the boss what they need from him to better execute the mission. During the final day of the conference, the proposals were

See **Air Tactics,** Continued on page 10



The F-15E Strike Eagle figures into the USA's precision strike equation.

Airborne Laser Aircraft to Provide Missile Defense

A typical-looking 747 aircraft on the tarmac—distinguishable from other 747s only by its glass, bulb-shaped nose—could one day be the silver bullet that shoots ballistic missiles out of the sky.

But what's revolutionary about the prototype Airborne Laser (ABL) aircraft is that it won't use bullets to take out its target, explains U.S. Air Force Col. John Daniels, program director. It will use light.

"What makes this revolutionary is that you can engage targets at the speed of light – 186,000 miles per second," Daniels said. "So we can go from New York to Los Angeles before you can blink your eye. Think about that. You can't blink your eye faster than this weapon system or a beam of light goes across the country."

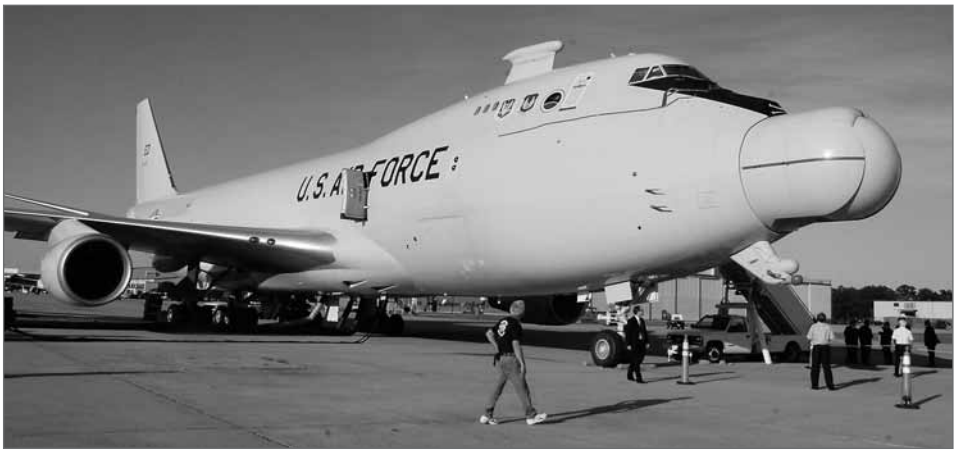
The Airborne Laser is being developed as an integral part of the ballistic missile defense system to protect the United States, its allies and its deployed troops against a ballistic missile attack. An advanced detection-and-tracking system, state-of-the-art optics and a high-energy laser would detect a missile launch and track it during the boost phase.

The world's largest turret assembly, encased in the glass-enclosed aircraft nose, would track the missile and determine a precise aim point. A laser would measure disturbances in the atmosphere and adjust the on-board optics to account for them.

Another laser would fire a beam—technically, a "megawatt-class chemical oxygen iodine laser beam"—to zap the missile until it breaks apart.

As futuristic as this concept sounds, the ABL project is moving steadily forward. Flight tests on the Airborne Laser are slated to wrap up this summer at Edwards AFB, CA.

Boeing, the ABL prime contractor, recently completed a key ABL flight, demonstrating the weapon system's ability to actively track an airborne target, compensate for atmospheric turbulence and fire a surrogate for its missile-killing high-energy laser.



A modified 747 aircraft serves as the prototype Airborne Laser, slated to become an integral part of the U.S. missile defense system.

During the test, the modified Boeing 747-400F took off from Edwards AFB, and used its infrared sensors and its track illuminator laser (TILL) to find and track an instrumented target board located on the USAF's NC-135E Big Crow test aircraft. The Big Crow then fired its beacon laser at the ABL aircraft to allow ABL to measure and compensate for laser beam distortion caused by the atmosphere.

Finally, ABL fired the surrogate high-energy laser (SHEL) at the Big Crow target board to simulate a missile shootdown. With the exception of ABL's beacon illuminator laser (BILL), this flight test demonstrated the entire engagement sequence from target acquisition to pointing and firing the SHEL.

ABL fired the TILL at the Big Crow target board for the first time in March. This latest test demonstrated ABL's ability to transition from passive tracking of a simulated missile plume to active tracking, by "walking" the TILL beam to the nose of the missile and using the TILL light returning from the edge of missile for precision tracking and determination of where to point the SHEL on the target. In addition, atmospheric turbulence compensation was performed concurrent with active tracking and SHEL firing.

The chemical laser has had more than 70 successful firings over the past three years, and will be installed aboard the aircraft starting later this year in preparation for the first shoot-down of a ballistic missile target, scheduled in mid-2009.

"We are going to put that big laser in the back… and then we're ready to shoot a missile down," Daniels said. "So it's a pretty exciting time to be on the program. The biggest challenge we have right now is integration. The optics system is working. The battle management system works well. We even tracked an (intercontinental ballistic missile) with the sensors on the airplane. … The laser works well on the ground."

See **Airborne,** Continued on page 10

Controllers Train to Put Bombs on Target, on Time

The days of carpet bombing are over. In today's military it's about surgical strikes and preventing unnecessary collateral damage.

Training to make this happen are teams of pilots and joint terminal attack controllers, called JTACs.

"It's all about accuracy," said one JTAC. "Those bombs that come off those jets, they're going to detonate wherever they hit. Our job is to make sure it hits the right place at the right time."

Pilots in the air work very closely with the JTACs on the ground.

It's important to work with JTACs because they're the ones who talk a pilot's eyes onto a target, said one Air Force pilot. "It's pretty serious business. We need to make sure we've positively IDed the target and are confident that there are no 'friendlies' in the area."

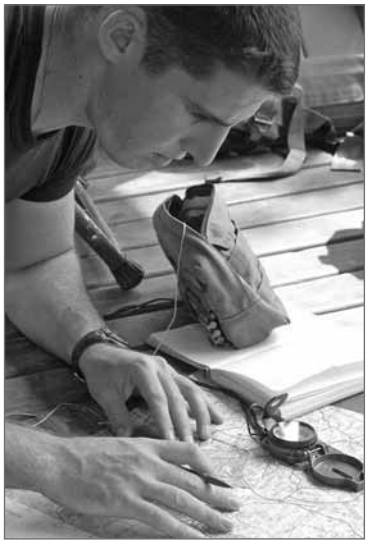
JTACSs assigned to the 604th Air Support Operations Squadron at Osan AB, South Korea, recently trained with 8th Fighter Wing pilots. JTACs, who exist in each service branch under different names, are recognized and qualified to provide close-air support to the units they are embedded with, and to direct combat aircraft onto an enemy target.

The controllers performed day and night missions with pilots from the 35th and 80th Fighter Squadrons. During the training, the pilots simulated dropping joint direct attack munitions, or JDAMs, as well as laser-guided munitions based on coordinates provided by JTACs and tactical air controllers.

Staff Sgt. Wef Bryant, a 604th ASOS controller, said "we're a liaison for the ground elements, which are typically Army, but it could be Marines or coalition forces. We also have the ability to coordinate local airspace and ensure the integration of all direct fire."

Joint controllers are continually faced with adapting to new threats and environments.

"These guys are ready for all types of environments," said Capt. Christopher Luczun, a 604th ASOS air liaison officer. "As far as the urban environment, the training they've experienced with the 8th Fighter Wing has focused on simulating the pinpointing (and elimination of) smaller-type areas with houses close together, all the while challenging the pilots to do talk-ons (with the JTAC), depending on the weather. This allows ordnance to be used on pointing out specific vehicles or, if need be, support convoy operations."



A Joint Terminal Attack Controller hones his ability to perform close-air support missions.

Air liaison officers, or ALOs, are charged with providing support to ground commanders with Air Force assets available to them. ALOs also have the task of assessing a battlefield situation while at the same time providing minute-to-minute recommendations on the best type of airpower to be used in the quickest amount of time possible.

JTACs are learning to use unmanned aerial vehicles, or UAVs. Throughout Iraq and Afghanistan, UAVs have augmented some missions traditionally held by other fighter aircraft.

"If anything, the Air Force needs more JTACs (on the ground)," the captain said. "They are in very, very high demand, especially in today's world. I don't ever see the need for JTACs going away. Once the Army sees the capabilities airpower brings to the fight, they really start to appreciate what the Air Force can do."

Just as important as placing sophisticated weapons on target is saving lives.

Advancing on an enemy as well as defending one's self are important, but ensuring friendly forces and non-combatants aren't on the receiving end of an F-16 Fighting Falcon's bomb is crucial, said Bryant, an Operation Iraqi Freedom veteran.

"As JTACs, the amount of training we go through to get certified was put in place for good reasons," he said. "During the development of forward air controllers, there was a lot more fratricide on the battlefield. A lot of the technological advances we have had with targeting and acquisition systems have come at a price, learning from the past on how to save the lives of friendlies."

Within U.S. Forces Korea, members of the 604th ASOS are assigned to both Army garrisons Casey and Red Cloud in South Korea. There, they train to support both South Korean and U.S. Army soldiers by providing close-air-support missions in the event North Korean forces launch an assault into the south.

Working closely with elements of the 2nd Infantry Division based at Casey, JTACs train with soldiers to help provide bombs on specific

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Controllers, Continued from page 9

targets at a moment's notice if an attack were launched against them. Each controller has the ability to coordinate air assets and, in some cases, artillery against an enemy position.

F-16s from either the U.S. or South Korea would be charged with circling overhead, delivering ordnance directed by a JTAC, and destroying the enemy. Because some ground units have the ability to move quicker than others, Bryant said the "fog of war" is a constant concern for any JTAC as they continually keep pilots updated with coalition positions.

"It's all about people," he said. "The biggest challenge is keeping track of friendly units to keep them safe while having a good read on what's going on around you. Constantly, you want to know if there are friendlies in another town near you so friendly aircraft know precisely where they're at."

The core of the controller's mission centers on putting ordnance on a specific location to destroy an enemy position. ■

Airborne, Continued from page 8

Putting all that capability together and having it operate effectively is a much more significant step, he said.

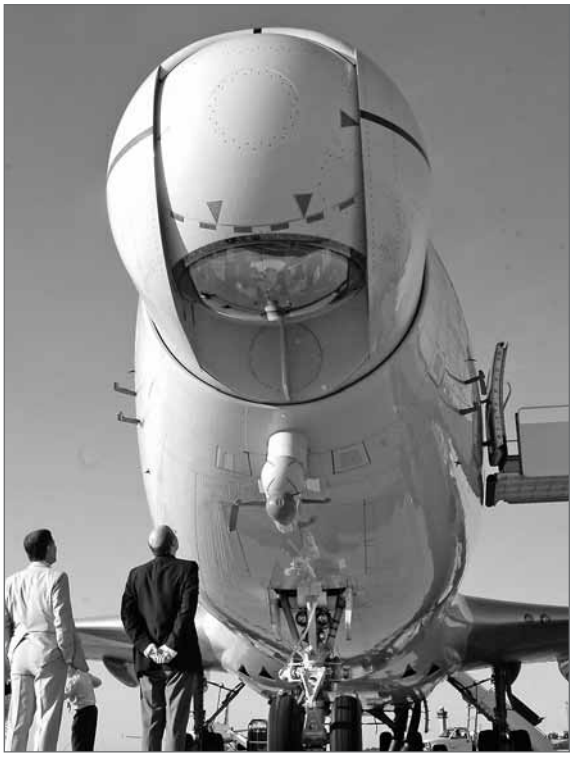
"When you put those big pieces together, and you get the software talking to each other and the systems, that's not trivial. It's really an integration challenge," he said. "No miracles are needed, but the integration step is not easy."

Lessons learned from this initial prototype, with the tail number "0001," will be incorporated into a "production representative" model that is easier to operate and maintain and less expensive to build, he said. "That's the whole purpose of this plane, to give us those lessons learned so we know what to do different on the second airplane."

Ultimately, the Air Force hopes to have seven ABL aircraft. Plans call for them to be based in the United States, at a base with a long runway and the infrastructure needed to support large aircraft.

"But they would be forward-operated, depending upon the threat," Daniels aid. "If you had threats in multiple parts of the world, it is probably commonsensical that a commander may decide to send a few planes one place and a few planes somewhere else."

Aircraft would take off loaded with enough chemicals that, with aerial refueling, could get where they needed to be quickly and be able to operate for as long as possible. A single chemical load would be able to destroy "many, many missiles," Daniels said. ■



The ABL recently tracked an airborne target, compensating for atmospheric turbulence and firing a surrogate of its high-energy laser.

Air Tactics, Continued from page 7

briefed to USAF Lt. Gen. Gary L. North, the CENTAF commander and coalition forces air component commander, since many of the solutions required general officer approval or direct coordination with the leaders of the other services.

"We have already seen the results of the conference in the ISR community and their integration into the (close-air-support) mission," said Mullins. "We're seeing results, and it's all good."

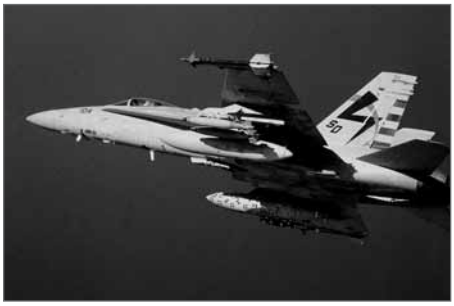
Attendees left with the ability to incorporate airpower better to achieve the objective at hand, whether that is putting bombs on target, providing shows-of-force, command and control or close-air support, and improving training programs back home so airmen are ready to fight on Day 1 of their deployment.

"The big take-aways were how to integrate the ISR capability with the non-traditional platforms, how we can improve our dynamic targeting cycle, manage our airspace better and how we can respond more quickly to critical situations on the ground," Mullins added. ■

News Briefs

EDO Receives Navy Contract for Additional Smart Racks

EDO has been awarded a $10.7 million contract to produce130 BRU-55 bomb-ejector racks used on U.S. Navy F/A-18 strike aircraft to carry precision-guided bombs. The contract, which also includes acceptance testing and engineering, is expected to be completed by June 2009. This is the Navy's third order of BRU-55 racks, bringing the total to 440.



The U.S. Navy will field more BRU-55 smart racks made by EDO.

These bomb release units (BRU) carry two precision-guided weapons on a single pylon, effectively doubling the weapon-load capacity of the aircraft. EDO's proprietary electronics enable individual targeting and release of each weapon. The BRU-55 rack is compatible with five of the six F/A-18 aircraft models.

"EDO has made significant investments in carriage-and-release technology to meet the growing demand for 'smart', lightweight, high-performance systems," said EDO CEO James M. Smith."

EDO has provided such equipment for the world's dominant jet fighters. For the F-22 Raptor, EDO produces the AMRAAM Vertical Eject Launcher (AVEL), which employs the company's state-of-the-art pneumatic ejection technology.

EDO is also developing weapon-release systems for major platforms of the future, including the F-35 Lightning II, the P-8A Poseidon, and the MQ-9 Reaper unmanned aircraft. ■

Boeing Awarded Laser JDAM Contract

Boeing has been awarded a $28 million U.S. Air Force quick reaction capability contract for delivery of Laser Joint Direct Attack Munition (LJDAM) weapon systems.

The contract will add 600 laser seekers (400 for the U.S. Air Force and 200 for the U.S. Navy) to the services' existing inventory of 500-pound bombs. Boeing will deliver the systems by June 2009.

"Laser JDAM's performance continues to exceed our highest expectations," said Dan Jaspering, Boeing Direct Attack program manager. "This weapon will fill a significant gap in capability currently encountered by our customers, specifically the ability to attack high-speed moving targets and targets lacking accurate coordinate data."

During recent demonstration tests at Nellis AFB, NV, USAF F-16 Fighting Falcons and F-15E Strike Eagles flying at 24,000 feet released 12 500-pound LJDAMs that hit

A good, precise weapon only gets better.

within lethal range of multiple high-speed moving targets. Using onboard targeting pods, the launch aircraft laser-designated the roofs of the target vehicles and guided the weapons to successful impacts.

The Laser JDAM sensor is a modular kit that is easily installed in the field. Mounted at the front end of existing JDAM weapons, the laser sensor enhances JDAM's already highly capable Global Positioning System/Inertial Navigation System.

Initial production deliveries for the U.S. military are scheduled to begin early next year. Several potential international customers have requested LJDAM price and availability information. ■

Boeing Awarded $30 Million to Upgrade B-52s

Boeing has been awarded a $30 million USAF contract to upgrade the B-52 fleet's Integrated Weapons Interface Units (IWIU), providing flight crews with enhanced smart weapon visibility and control.

"IWIUs represent a significant upgrade to the B-52 fleet," said Scot Oathout, Boeing B-52 program director. "This contract will allow us to upgrade existing fleet equipment and support future enhancements that will keep the B-52 flying a very important mission for our armed forces all over the world."

Boeing will replace the current, three-piece interface units with a single, state-of-the-art IWIU. Boeing will deliver the first kit in October 2008. ■

AARGM Achieves Major Milestone

Alliant Techsystems, PMA-242, the NAWC Weapons Division — China Lake, and the Italian Air Force recently conducted the first Developmental Test (DT) firing of an Advanced Anti-Radiation Guided Missile (AARGM) from an F/A-18 strike aircraft on the China Lake test ranges.

The test firing confirmed the effective integration of AARGM with the F/A-18 and the continued progress of fielding a long-range, precision strike capability against a wide array of time critical targets. The missile successfully achieved safe separation from the aircraft, navigated over an extended range to the designated target location, and guided to a direct hit. The successful flight test met all test objectives.

USN CAPT Larry Egbert, the Navy program manager for the HARM and AARGM programs said, "this event marks a major milestone in the AARGM program and demonstrates the positive results that a true international cooperative effort can yield. This successful test demonstrates the viability of an affordable Destruction of Enemy Air Defenses (DEAD) capability for U.S., Italian, and potentially other allied forces through the upgrade of legacy AGM-88 weapons."

The recent test was the first DT firing of the AARGM System Development and Demonstration (SD&D) phase and continues the tradition of success established with the Quick Bolt Advanced Concept Technology Demonstration (ACTD) and AARGM Advanced Technology Demonstration (ATD) phases of the program.

During those tests, AARGM achieved seven successful test flights. The AARGM program plans a series of additional launches during the SD&D phase. ATK expects to begin Low Rate Initial Production in FY08. When fielded in FY09, it will be the only extended range tactical supersonic strike weapon in U.S. and Italian inventory.

AARGM is a supersonic, air-launched tactical missile that will be integrated on the F/A-18 C/D, F/A-18 E/F, EA-18G and Tornado IDS/ECR aircraft. The missile is also being designed to be compatible with the EA-6B and U.S. and Allied F-16 aircraft.

Its advanced multi-sensor system, including a Millimeter Wave (MMW) terminal seeker, advanced digital Anti-Radiation Homing (ARH) receiver and a GPS/INS, is capable of rapidly engaging traditional and advanced enemy air defense targets as well as non-radar time-sensitive strike targets. The AARGM MMW seeker can operate in concert with the ARH to counter RF shutdown tactics or in a stand-alone mode to discriminate non-emitting time sensitive targets. AARGM is the successor to the AGM-88 HARM system. ■

AESA Enters Full-rate Production

The U.S. Navy's next-generation aircraft radar system was approved for full-rate production June 25.

PMA-265 was granted authorization to enter into full rate production for 437 next-generation APG-79 Active Electronically Scanned Array (AESA) radars.

"Our Super Hornet Block IIs and EA-18G Growlers with cutting edge radar technology, precise and networked enabled weapons in combination with joint interoperable and open architectures increases the combat effectiveness of all those operating in the battlespace," said USN CAPT "BD" Gaddis, PMA-265 program manager.

This milestone marks the end of a low rate production of 84 radars that began with delivery of the first LRIP 1 unit in July 2003. The AESA program started in 1999 and the radar had its first flight in July 2003. The program completed an operational evaluation in December 2006 and will commence follow-on test and evaluation in preparation for first deployment in 2008.

Australia is procuring 24 F/A-18F Block II Super Hornet equipped with AESA. ■

Boeing Selects Supplier for Super Hornet Block II IRST

Boeing has selected Lockheed Martin to supply up to 150 Infrared Search and Track (IRST) systems for Super Hornet Block II aircraft.

Boeing expects to receive the initial IRST development contract from the Navy in 2008. The total contract value is expected to exceed $500 million through the development and production phases of the program.

"Integration of IRST significantly enhances the capability of the Super Hornet Block II by providing multi-spectral air-to-air targeting," said Bob Gower, vice president, Boeing F/A-18 programs. IRST is a passive, long-range sensor system that searches for and detects long-wave IR emissions within its field of view. It can track several targets simultaneously and provide an effective air-to-air targeting capability, even when facing advanced threats with radar jamming equipment. ■

First Joint Standoff Weapon Block II Delivered

Raytheon in late May delivered the first Joint Standoff Weapon (JSOW) Block II — a new variant offering significantly lower unit costs and an additional payload option.

"This delivery is the culmination of an effort that began three years ago to significantly reduce the cost of this weapon," said John O'Brien, Raytheon's JSOW Block II program director.

Block II maintains the standoff and survivability attributes of the current JSOW and includes an improved anti-jam capability. Block II uses an advanced Global Positioning System (GPS)-aided inertial navigation

system that integrates the Raytheon Advanced Protection Technology Receiver and Selective Availability Anti-Spoofing Module.

Block II continues to maintain JSOW's low radar cross section and infrared signature. These are key stealth features that ensure a high probability of JSOW survival en route to highly defended targets.

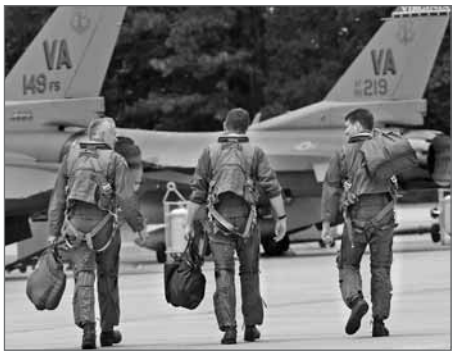
Raytheon is under contract to produce Block II JSOW-C missiles for the Navy and Marine Corps. The Block II unit cost has been reduced by more than 25 percent through airframe redesign to a major single piece, use of less expensive components, advanced technology and a reduction in the number of parts. JSOW's shelf life has also been significantly increased, eliminating major life-cycle costs.

"The Block II program enables me to provide more weapons with the required capability to the fleet within the same budget," said Captain Mat Winter, Navy JSOW program manager. "JSOW Block II is clearly a model program for unit cost savings."

Development of a new payload option for the JSOW-A is also part of the Block II program. This new version uses a 500-pound BLU-111 (MK-82) warhead and is designated the AGM-154A-1. This unitary variant eliminates concerns about unexploded ordnance from cluster munitions while maintaining the required effectiveness against a broad target set. It is primarily intended for the international market. ■

Virginia Air Guard Transitions to F-22 Raptor

The Virginia Air National Guard's 192nd Fighter Wing has become the first Air National Guard unit in the country to fly the F-22 Raptor. The transition from the F-16 Fighting Falcon to the F-22 took place June 20.



Lt. Col. Mark McCauley (from left), Col. Charles Smith and Maj. Mark Mitchum, pilots with the Virginia Air National Guard's 192nd Fighter Wing walk to their respective F-16 Fighting Falcons June 20 for their final flight in that aircraft. Pilots from the 192nd are transitioning from the F-16 to the F-22 Raptor and belong to the first Air National Guard unit to fly the Raptor.

More than 20 pilots in the wing are trained to fly the F-22 and a growing number of the wing's full-time and traditional status Air Guardsmen are working at Langley AFB, VA, changing the face of the Virginia ANG. Langley is home to the active-duty 1st Fighter Wing, the first Air Force unit to fly the F-22. ■

Conventional Ballistic Missile Weapon Under Development

Boeing recently received $9 million from the USAF to investigate a conventional ballistic missile capable of destroying targets at global range in less than one-hour flight time.

The study parameters make use of a Minotaur launch vehicle and a delivery vehicle designed to carry and dispense multiple BLU-108B/B sensor fused weapons to the target area.

The maximum use of existing system elements is intended to reduce the cost and development risk associated with a future acquisition The research work is to be complete by June 2009. Headquarters, Space and Missile Systems Center, Los Angeles AFB, CA, is the contracting activity. ■

First Powered Flight of MALD

Raytheon's Miniature Air Launched Decoy (MALD) recently demonstrated successful powered flight performance when launched from a USAF F-16 aircraft. The flight test took place at Eglin AFB, FL, under a development contract managed by the 728th Armament Systems Group. ■

Successful SDB II First Flight

Boeing and industry teammate Lockheed Martin successfully completed the first flight of the Small Diameter

CALENDAR OF EVENTS

Precision Strike Technology Symposium (PSTS-07)

(To be conducted at the SECRET/NOFORN level)

Date: October 23-25, 2007

Theme: *"Required Precision Strike Capabilities and Technologies for the Long War"*

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

Precision Strike Winter Roundtable

Date: January 23, 2008

Theme: *"Defining the Future of Precision Strike"*

Location: Crystal City Marriott, Arlington, VA

Precision Strike Annual Programs Review

Date: April 15-16, 2008

Location: Waterford Receptions, Springfield, VA

Precision Strike Technology Symposium (PSTS-08)

(To be conducted at the SECRET/NOFORN level)

Date: October 28-30, 2008

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

Sponsorship and exhibition opportunities are available for all events. For more information, please visit our website: www.precisionstrike.org.

News Briefs, Continued from page 13

Bomb Increment II (SDB II) weapon system May 22 at Eglin AFB, FL.

The Boeing SDB weapon system family, which includes the all-weather, moving target SDB II weapon, quadruples the number of weapons an aircraft can carry, enabling aircrews to attack more targets on each sortie.

After an F-15E Strike Eagle launched the SDB II, the munition opened its control fins and wings and successfully completed its planned mission. The flight test demonstrated compatibility with the SDB BRU-61 pneumatic carriage system, the SDB logistics system and the low-risk air vehicle and autopilot design derived from the operational SDB I system. The flight followed successful ground and captive flight tests also performed at Eglin AFB.

Boeing and Lockheed Martin won one of two U.S. Air Force contracts for the competitive risk reduction phase of the SDB II program in April 2006. The Air Force is expected to award a sole source contract for the SDB II system design and development phase by late 2009.

As the prime contractor, Boeing supplies the air vehicle — a derivative of SDB I — as well as the network data link system. Lockheed Martin, the principal supplier, is responsible for the multi-mode seeker system. ■

PSTS-07, Continued from page 1

nology gaps with our Allies in the GWOT. General Obering will present his vision of the challenges of deploying an effective Ballistic Missile Defense System and highlight missile defense and space activities that he believes would benefit the precision strike community. Their career highlights are reflected below:

Admiral Pat Walsh is scheduled to keynote PSTS-07 on opening day. Admiral Walsh recently became the 35th Vice Chief of Naval Operations. He is the number one assistant to the Chief of Naval Operations. Admiral Walsh has had a broad range of operational and command tours and flew combat missions in support of Operations Desert Storm and Provide Comfort. Most recently, he commanded U.S. Naval Forces Central Command and U.S. 5th Fleet. Further, he was a White House Fellow, Deputy Director for Strategy and Policy (J-5), and served concurrently as the Director, Navy Quadrennial Defense Review and Director, Navy Programming Division.

Admiral Walsh is a graduate of the United States Naval Academy and later pursued graduate studies in the International Relations curriculum at the Fletcher School of Law and Diplomacy, Tuffs University, as part of the Admiral Arthur S. Moreau Scholarship Program. Admiral Walsh graduated first in his class and received a Master of Arts degree in Law and Diplomacy, entered the Doctorate Program with distinction and subsequently received a Ph.D.

The Honorable Ronald M. Sega has been invited to present the keynote address on the second day of PSTS-07. Dr. Sega is the Under Secretary of the Air Force. He oversees the recruiting, training and equipping of approximately 700,000 people, and a budget of approximately $110 billion. Designated the DoD Executive Agent for Space, Dr. Sega develops, coordinates and integrates plans and program for space systems and the acquisition of all DoD space major defense acquisition programs. Prior to his current position, Dr. Sega served as the Director of Defense Research and Engineering in OSD. In addition to being a long-time technology advocate, Dr. Sega is a former astronaut. He made his first shuttle flight in 1994 aboard the Space Shuttle Discovery and completed his second shuttle flight in 1996.

Dr. Sega graduated with distinction from the U.S. Air Force Academy in 1974. The following year, he earned his Master of Science degree in physics from Ohio State University. In 1982, Dr. Sega received his Doctor of Philosophy in electrical engineering from the University of Colorado.

Closing day of PSTS-07 will feature Lieutenant General Henry Obering who is the Director of the Missile Defense Agency. As Presidentially-chartered and mandated by Congress, General Obering is responsible for acquiring highly effective ballistic missile defense systems for forward-deployed and expeditionary elements of the U.S. armed forces. Further, as Director, General Obering is the Acquisition Executive for all ballistic missile defense systems and programs. Prior to his current assignment, General Obering held numerous key positions where he served as the Air Force Inspector General, as the Mission Area Director for Information Dominance on the Air Staff, and even participated in 15 space shuttle launches as a NASA orbiter project engineer.

General Obering graduated cum laude in 1973 from the University of Notre Dame where he also was a distinguished graduate of Notre Dame's ROTC program. In 1980, he received his Master of Science degree in astronautical engineering from Stanford University. Later, he was a distinguished graduate of both the Industrial College of the Armed Forces and the Air Command and Staff College.

Please joint these distinguished Defense visionaries who will address this popular and informative symposium that is widely credited as the best technology symposium of its kind! ■

Agenda at a Glance

PRECISION STRIKE TECHNOLOGY SYMPOSIUM (PSTS-07)

23-25 OCTOBER 2007

JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB KOSSIAKOFF CENTER

Required Precision Strike Capabilities and Technologies for the Long War

— PSTS-07 Highlights—Briefing Topics —

Four Technical Sessions:

Targeting—C4ISR—Weapons—Effects

Keynote & Executive-level Speakers Presentation Topics:

Level of Military Progress Expected to Win the War on Terror
Transforming the Joint Force & Strengthening Warfighting Capabilities
Air Force's Role in *Return of the Bomber*
The Iraqi Perspectives Project—The History We Don't Know
(Adaptation to Precision—Iraq 1991-2003)
Precision Strike Intelligence Capabilities & Technology Improvements
(Enemy Adaptation to our Precise Weapons Technology)
Electronic Warfare Roadmap
Availability & Progression of Precision Strike Technology to the Warfighter
Critical Technologies for the Long War
Capabilities for Strategic Global Strike
Enabling Scientific & Technical Solutions for Protecting Our Nation
Joint Airborne Electronic Attack (JAEA) for the Long War
The Way Ahead for Sensor Platforms
Net-Enabled Weapon Systems—Industrial Base Strategies
Armed Unmanned Systems Panel
Threat Assessment
NATO's Comprehensive Approach to Operations in Afghanistan & Iraq
Missile Defense & Space Highlights
Target ID in a D&D Environment Using Multiple Sensor Modalities
Expeditionary Warfare & Coalition Integration
The Long War—Changing the Targeting Landscape
Reliable Replacement Warhead

PSTS-07 will be conducted at the SECRET/NOFORN level all 3 days

Details and Registration Informantion are available at www.precisionstrike.org

IN THE NEXT ISSUE
Wrapup on Precision Strike Technology Symposium 2007

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