



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

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"From Cruise Missiles Association to Precision Strike Association we have been dedicated to advancing the art and science of precision engagement concepts and technology for more than 20 years."

### 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.*

## National Security Challenges & the Way Ahead

**P**recision Strike in an Era of Affordable Constraints is the theme for Winter Roundtable 2012 (WRT-12) scheduled for Tuesday, January 17, 2012 at the Crystal Gateway Marriott. This popular one-day forum, sponsored by the Precision Strike Association (PSA), will address national defense policies, strategy and congressional perspectives.

PSA looks forward to a future filled with new challenges and opportunities for government and industry collaboration on precision engagement. The Winter Roundtable provides a forum that is focused on gaining insight into how the precision strike community should plan to address and meet the future key security challenges facing the United States in the precision strike arena.

The Warfighter continues to demand the most effective and affordable weapons systems. Therefore, PSA remains focused on shortening the Kill Chain by developing precision engagement programs that can be fielded rapidly to meet critical warfighter needs.

PSA is pleased to present Vice Admiral William E. Gortney, USN—Director of the Joint Staff—to keynote WRT-12. VADM Gortney is a key visionary to the Chairman of the Joint



Vice Admiral William E. Gortney, USN

Chiefs of Staff. When he previously served as Commander, U.S. Naval Forces, Central Command and Commander, 5th Fleet, Bahrain, Gortney was engaged in critical warfighting operations that focused on precision strike weapons. VADM Gortney will address opportunities and challenges for precision engagement, as well as lessons learned.

Additionally, several other top visionaries and strategy experts from the Congress, OSD, the Joint Staff, industry, and academia will help us better define the future of precision strike systems.

A special feature of our Winter Roundtable each year is presenting the William J. Perry Award to a very deserving individual or team of experts who have made significant contributions to the development and support of precision systems that have led to the strengthening of our vital national security interests. Dr. Paul Kaminski—Chairman, Defense Science Board—will make special remarks during the WRT-12 award ceremony.

Please join our distinguished leadership speakers as they highlight key national security challenges facing our great nation. See page 15 for a snapshot of major topics to be addressed during WRT-12. ■

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## Chairman's Column

I would like to start off by thanking the PSA Programs Chair, Ginny Sniegon, and the

Precision Strike Technology Symposium (PSTS-11) Co-Chairs Dr. John Walter, Suzy Kennedy, Earl Rudolf and Programs Vice-Chair CAPT Mike Flanagan, USN, for another excellent event. I cannot think of another forum that provided such timely, insightful topics and exceptional speakers as did our symposium in October 2011.

We were honored to have Ambassador John Bolton kick things off with a keynote address that left all in attendance yearning for more. He was followed by an incredible lineup of speakers, including the Honorable Robert Work, Under Secretary of the Navy, and others too numerous to list here in my small corner of the Precision Strike Digest.

We also presented the third annual Richard H. Johnson Award for Technical Achievement to Robert Widmer, father of the B-58 Hustler and a key contributor to many other weapon systems in use today, such as the F-16 fighter and Tomahawk cruise missile. See the PSTS-11 wrap-up in this issue for additional details on the annual event.

We look forward to seeing you in January 2012 for the much anticipated return of our Winter Roundtable. Check pages 1 and 15 of this issue for details.

As this column is written, we find ourselves less than a year away from a major election.

We are also faced with tremendous uncertainty as a result of Congress' so-called supercommittee's failure to reach an agreement, leaving \$1.2 trillion in automatic spending cuts

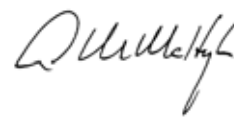
on track to begin in 2013 with roughly half coming from the Pentagon.

Their failure to reach a compromise sets in motion a year-long legislative battle that will have a profound impact on defense and the course of our Nation.

Let's hold our elected officials across the political spectrum accountable to serving the Nation and the electorate. November 2012 is just around the corner and we all have something to gain by exercising our Constitutional rights... all of them.

There is much to give us pause but even more to give thanks this holiday season, not the least being that we are still Americans, living in the greatest nation the world has ever witnessed.

If anyone can overcome the challenges we face it is Americans whose 'can-do' attitude, entrepreneurial spirit, strong moral compass (yes, it's still there), compassion for each other and patriotism have proven time and again that we have what it takes.



Andy McHugh  
Chairman of the Board  
Precision Strike Association



## PSTS-11 Wrap-up

Having the opportunity to engage and exchange ideas with leaders in the precision strike community was a pleasure, stated many speakers who addressed the SECRET/US ONLY 21<sup>st</sup> Precision Strike Technology Symposium (PSTS-11) at the Johns Hopkins University Applied Physics Laboratory Kossiakoff Center on October 26-27, 2011.

Midshipmen from the U.S. Naval Academy's Naval Weapons Course and the approximately 300 military and civilian attendees appreciated seeing state of the art technology and participating in military/foreign policy discussions with key military and civilian decision makers.

PSTS-11 was orchestrated by a Committee co-chaired by **Ginny Sniegon** and **Captain Mike Flanagan**, USN and conducted by Tri-Chairs **Dr. John Walter**, **Suzy Kennedy** and **Earle Rudolph** with engagement by several PSA Board members and a few members of the PSA Advisory Council. PSA Chairman **Andy McHugh** welcomed the participants to PSTS-11.

With the PSTS-11 theme **Kill Chain Challenges and Opportunities to Counter U.S. Global Threats** in mind, **Ambassador John Bolton**, former U.S. Ambassador to the United Nations and currently a Senior Fellow at the American Enterprise Institute, kicked off PSTS-11 by expressing his thoughts about the current budget turmoil. Then, Mr. Bolton talked about East Asia—particularly China and the complicated existence of North Korea and focused on a period of extreme vulnerability when the North Korean regime dies. Then, he highlighted the existing status of situations in Iran, Egypt, Syria, and Israel.

Mr. Bolton believes that Iran will continue to produce nuclear weapons, and noted that if Iran gets nuclear weapons that five or six other countries could have nuclear weapons soon thereafter. Iran must be forced back to the negotiating table, he stated.

Due to the severe threat that is growing every day, Mr. Bolton noted that we must have a strong national security with additional needed resources - not less, and above all, we must be prepared for a range of threats from areas other than the Middle East.

Next, **Dr. Ralph Semmel**, Director of the Applied Physics Laboratory, welcomed the PSTS-11 attendees and addressed the need to make the best use of limited resources by building on current capabilities in a disciplined process.

First up, was the **Intelligence Session on U.S. Global Threats**. **Rick Smith**, the Session Chair from DIA, set the scene and talked about concerns that keep him up at night. He noted that our adversaries are constructing hardened facili-

ties that protect national leadership, command and control, ballistic missiles, and WMD at an alarming rate.

Mr. Smith noted that due to advances in technology, these facilities are being constructed faster, cheaper, deeper, and harder than ever before. The U.S. requires advanced technologies from industry to find, characterize, defeat, and perform BDA on these next generation targets.

Then, Mr. Smith presented his session's speakers who addressed the Cyber Threat to Precision Weapons, Directed Energy Threats, Digital RF Memory Jammers, Kinetic Threat to Strike Weapons and Platforms, and Emerging Technologies in Penetrating Weapons.

**Rose Daley** from JHU/APL talked about the cyber threat to precision weapons. She addressed the cyber landscape and noted that cyber crime was the most lucrative activity today.

**Mike Deitchman** from the Office of Naval Research talked about the directed energy threat and discussed where the Navy is going with offensive systems.

**Jay Kistler** from ASD (Research and Engineering) in OSD highlighted changes to the Digital RF Memory Jammers and mentioned the successes of precision strike related to electronic warfighting training.

A representative from the Office of Naval Intelligence addressed the Kinetic Threat to Strike Weapons and Platforms.

The last briefer of the Intelligence Session **Ted Maguder** from the DIA focused on Emerging Technologies in Penetrating Weapons.

Keynote speaker **Honorable Robert Work**, Under Secretary of the Navy, had to fight hard on two fronts to join PSTS-11 attendees. His topic was not approved by DoD prior to his talk and he was summoned to Deputy Secretary Carter's office for a meeting at the time set for his PSA discourse.

Honorable Work overcame both obstacles with aplomb, moving his remarks ahead five hours and in it setting out clearly and concisely the pathway from Air-Sea Battle One (WWI) through Two (WWII) to Three, which he described as a seamless, cohesive teaming between the USAF and the USN to defend the fleet, win/keep air superiority, and attack on water and air the enemy.



Rick Smith



Rose Daley



Mike Deitchman



Jay Kistler



Ted Maguder

Ambassador  
John Bolton

Dr. Ralph Semmel



One scenario that was made clear by Mr. Work, the post WWII fight left the Services with two classes of super weapons (Atomic and Guided Missile), and the latter was “forced” by the uncontrollable power and effects of the former.

**Vice Admiral Scott Swift, USN**, Commander of the U.S. 7<sup>th</sup> Fleet, delivered his keynote address via secure VTC from afar in the Western Pacific. Since VADM Swift is one of our own—having served PSA on the Board of Directors—we were particularly excited to have him with us to hear his thoughts on the challenges we face in the Western Pacific.

VADM Swift expressed his appreciation to the precision strike community. He noted that from his vantage as Commander, U.S. 7<sup>th</sup> Fleet, the Asia-Pacific region is one of strategic importance with dynamic security challenges. As a deterrent and hedge against these challenges, effective strike technologies need to be part of our “tool box.”

To maintain our lead in precision strike capabilities, Swift stated that we cannot bind ourselves by the limitations and conventions of today — research and development in leap-ahead technologies is a must. Additionally, a system of systems approach to weapons and command and control (C2) systems development is required to ensure efficiency and interoperability among our joint forces, as well as our partners and allies.

Next, **Lieutenant Colonel Tim Farquhar, USAF**, from the J-8 Directorate, presented Brigadier General Steve Busby’s remarks on Top Weapons Systems Capability Gap Assessment.

Lt Col Farquhar specified the capability gaps identified by the Combatant Commanders within the Force Application portfolio. Then, he discussed the progress of weapon system development within the capability gaps and examined the issues of assessing and accepting risk within the context of DoD’s current fiscal realities. Lt Col Farquhar concluded with a discussion on the evolution of the Joint Capability Integration and Development system (JCIDS).

The first abstract was then presented by **Fred Harrison**, Vice President of Technology, MBDA, on the Boosted Penetrator Studies. Mr. Harrison focused on requirements and concepts of operation. Further, he talked about the history of the development of the Penetrator warhead.

During the luncheon, PSA Chairman Andy McHugh presented the third annual **Richard H. Johnson Award**. Recognizing an individual for outstanding personal technical achievements and significant contribution to precision strike, the 2011 Johnson



Honorable  
Robert Work



Vice Admiral Scott  
Swift, USN



Lieutenant Colonel  
Tim Farquhar, USAF



Fred Harrison

Award was presented posthumously to Robert H. Widmer. Known as the “father of the B-58 Hustler,” he passed away in July 2011. He was instrumental in the survival of the F-111 and the design of the F-16, and he successfully championed Strike System technologies that have provided a tactical and strategic edge for our warfighters while mentoring multiple generations of defense industry engineers. Receiving the award on behalf of Widmer’s family was Steve Roerman of Lone Star Aerospace. He spoke about the genesis of the award and described Widmer’s many contributions that made him so worthy of this award.

Following the luncheon, the second abstract was presented by **Dr. Robert Wardle**, Director, Advanced Technologies and Products, Alliant Techsystems, on Switchblade. Dr. Wardle described Switchblade as a single-use munition systems developed to fill this capabilities gap by reducing the kill chain reaction time in neutralizing fleeting high-priority targets.

Switchblade is a man-portable, precision guided, man-in-the-loop, low collateral damage munition that has been successfully demonstrated through multiple live-fire and OCONUS operational assessments. Demonstrated attributes of the Switchblade system include GPS and waypoint guidance using Falcon View; the ability to wave-off and reengage a target; vision based terminal phase guidance to target; proximity, point detonating, and command detonation fuzing; and a forward-fragmenting warhead.

During the afternoon session, **James “Hondo” Geurts**, DD for Acquisition, USSOCOM, talked about special operations precision strike challenges and future needs. USSOCOM continues to have interest and requirements in precision strike effects across the entire spectrum of special operations. While kinetic effects are certainly at the forefront, Mr. Geurts was quick to remind the audience that precision strike is a mindset and can also include other less traditional capabilities such as less-than-lethal, cyber, intelligence, etc.

Additionally, Mr. Geurts urged the community to be aggressive in developing an acquisition enterprise and workforce who can react quickly to an often uncertain future and who has many tools available to meet the demands of that uncertainty —planning for the unplanned.

**Lt Col Matthew Johnson**, USAF, Commander of the 36<sup>th</sup> Intelligence Squadron at Langley AFB, continued the afternoon session by reviewing the Air Force Targeting Center



PSA Chairman Andy  
McHugh with Steve  
Roerman accepting the  
3rd Annual Richard  
Johnson Technical  
Achievement Award on  
behalf of Robert  
Widmer’s family



Dr. Robert Wardle



James Geurts

(AFTC) support to operations in Libya and beyond. Lt Col Johnson noted that AFTC continued to increase its engagement and production in support of Air Components and Combatant Commands this year. AFTC and its Squadrons were critical production centers in support of Operation ODYSSEY DAWN—building the majority of the target materials, collateral damage estimates, and phase 1 battle damage assessment products.

Lt Col Johnson informed the participants that this successful prosecution of targeting reach-back served as a model for AFTC support to organizations globally. AFTC continues to support deliberate planning efforts—to include current work in the USPACOM and USSOUTHCOM areas of responsibility, as well as the continued expansion of the Joint Air to Surface Standoff Missile (JASSM) Terminal Area Model (TAM) library.

Next, **Tom Keck**, Vice President for Air Force Programs, Raytheon Missiles Systems, addressed the future of precision weapons. More precision is expected in the future across the kill chain, F2T2EA, to include left of launch cyber activity. Mr. Keck stated that requirements will include execution in permissive, contested and highly contested environments. Further, weapons will be dual role with scalable effects. Hard and Deeply buried target requirements continue to grow. More weapon agility will be required in include enhancements of tri-mode seekers. Mr. Keck reminded the audience that speed of targeting and execution will increase as the iPad generation figures out new ways to employ weapons. Also, directed energy (DE) weapons requirements will grow said Mr. Keck. The U.S. military and industry must be prepared to defend our systems from DE weapons.

Closing out the first full day of dynamic briefings was **Rear Admiral David “Decoy” Dunaway, USN**, the Commander of the Navy’s Operational Test and Evaluation Force, who candidly discussed the efforts he is coordinating within the Navy to improve the processes to make sure our systems work as a system of systems to create warfighting capability. These improvements include the Integrated Evaluation Framework and Integration & Interoperability process, complementing the JCIDS and PPBE processes by providing a true systems of systems assessment and reducing the chances of capability to acquisition mismatches. Including an integrated evaluation framework would provide the ability to operationally assess our acquisition programs from a systematic baseline, within a system of systems perspective, and tie testing to mission architectures—leading to better capability management and stewardship of our nation’s resources. Currently, most agree we need to look horizontally across the kill chains when assessing capabilities. As we rely



Lt Col Matthew Johnson, USAF



Tom Keck



Rear Admiral David Dunaway, USN

more and more on systems of systems for our critical capabilities, we need to look vertically at summing program of record attributes as well.

Day Two of PSTS-11 commenced with the final scheduled abstract by **Dr. Alan Zimm** from JHU/APL who discussed “Game Changing” strike technologies. Dr. Zimm spoke about the Japanese Attack on Pearl Harbor on Dec. 7, 1941. He made the point that the Japanese had introduced a number of “game changing” strike technologies. The attack on Pearl Harbor was the first application of a multi-carrier strike, with over 300 aircraft participating in the effort. However, all did not go well with the Japanese attack—with sufficient firepower and access to sink 14 priority targets, they applied killing levels of ordnance to only three, thus achieving only 21% of their predicted performance.

Dr. Zimm’s presentation examined the Pearl Harbor attack as an exemplar of “what can go wrong” when introducing new strike technologies. It examined the errors made by the Japanese, the impact of these errors on strike performance, and the ultimate source or cause of the error. Dr. Zimm talked about several failures including the “failure to view the new technology holistically,” the “failure to understand the implications of new technology on command authority” and “failure to consider data needs when making tactical decisions when employing the new technology.” The bottom line was that many of these lessons can be applied to new technologies being introduced today.

An added abstract on GPS was presented by **Colt Wallace**, a Senior Engineer from Rockwell-Collins. Mr. Wallace addressed advances in GPS technology which greatly improve jamming immunity and he described recently obtained test results.

The second day’s keynote speaker was **Major General David Halverson, USA, CG**, U.S. Army Fires Center of Excellence and Fort Sill. Major General Halverson has been a special friend of the precision strike community for several years and delighted the audience with his thoughts about the last decade of war that has seen the Army and the Fires force doing some heavy lifting. The operational environment, with its emphasis on Wide Area Security, has fundamentally changed how we provide Fires in the Joint environment. The primary change is that Fires in support of commanders and troops on the ground must be more precise than they were prior to the current fights.

Major General Halverson noted that this has major implications across the DOTML–PF spectrum, affecting our force structure, how we train, the equipment we employ, how we integrate into the joint and multinational environment, and how we provide effective precision fires within budget con-



Dr. Alan Zimm



Colt Wallace



Maj General David Halverson, USA

straints. The Fires community is continuing to adapt its force structure, systems and capabilities to reflect the lingering uncertainty of future threats. In the future, we must be able to conduct Combined Arms Maneuver and Wide Area Security simultaneously.

In either environment, the General stated that the ability to provide timely, integrated, precision fires will be critical to supporting the warfighter and our Joint and Coalition partners. Army Fires is a cost-effective precision engagement solution, the only all-weather Fires capability available to the Joint commander.

Following the conclusion of the his remarks, Lockheed Martin PSA Board Member Kenny Gele presented Major General Halverson with a copy of the AUSA print for this year (Precision Strike and Kill).

**Brigadier General Ole Knudson, USA**, the PEO for Missiles and Space, Redstone Arsenal, followed Halverson and addressed the Army's missiles systems issues. As the former program manager for the Excalibur precision artillery munition, Knudson is no stranger to the Precision Strike Association. During the past seven years, he has participated in multiple panel discussions and has provided timely program updates to our association.

During PSTS-11, BG Knudson's insights were eagerly welcomed by all in attendance as he provided a brief overview of the Army's missile and space programs and how these products are performing in the asymmetrical environment of current operations. Next, he discussed emerging technologies within the Army's missiles and space program and also shared his ideas for continuing development of these systems within a resource constrained environment.

Finally, Knudson reminded participants of the need to continue fighting for a streamlined acquisition process in order to deliver the absolute best technology to our nation's warriors at the time that they need it. Both Brigadier General Knudson and Major General Halverson remained on hand to continue discussions with attendees following their presentations.

Next, **Captain Jim Laingen, USN**, from OPNAV N2/N6F4 presented the Navy's vision of integrating tactical data link requirements across the kill chain and how this vision can enable increased warfighting effectiveness while reducing cost. First, an overview of tactical networking reliance by the Joint force and challenges facing them was presented, including advanced threats, electronic attack, and cyber. The challenges also include improved U.S. capabilities that require advanced networking capabilities not achievable on our current systems such as Link 16.

Captain Laingen then described the broad requirements OPNAV believes are required to meet these challenges, including optimizing platforms, sensors and weapons through



Brigadier Gen Ole Knudson, USA



Captain Jim Laingen, USN

advanced networks, ensuring they are interoperable, affordable, survivable and able to tie into the broader Global Information Grid (TIG) and ISR networks. To refine these requirements for budgetary decisions, N2N6 initiated the Integrated Targeting and Fire Control (ITFC) roadmap effort, the concept and initial output of which was briefed. Specifically, the ITFC effort attempts to look at the integration of planned platforms and sensors in certain "vertical" kill chain elements (such as FIND, FIX, TARGET, etc.) in order to improve their capabilities against challenging targets, without requiring substantial improvements to the individual systems. This family-of-systems (FoS) approach will maximize capability through targeted investments.

Finally, Captain Laingen covered how this ITFC effort had developed the Navy tactical data link strategy, consisting of investments in current networks to keep them viable, investments in advanced tactical data links and building an enterprise approach to incrementally improve capabilities in an austere budget environment.

**Colonel Hank Castelain, USAF**, from the Office of the Director, Operational Test and Evaluation was the next briefer. He focused on the kill chain and test and evaluation and addressed how well are weapons meeting effective/suitable ratings. Colonel Castelain informed the participants that the difficulty in evaluating weapons for effectiveness and suitability is two-fold. Effectiveness is measured against Key Performance Parameters (KPPs)—these must be operationally well defined and matched to a clear concept of operations (CONOPS). The slow acquisition process for these complex weapons combined with rapid technological advancements can create a misperception of capabilities based on evolving CONOPs. It is critical to keep the KPPs and CONOPs aligned.

Secondly, many of these weapons are quite complex—a systems of systems if you will needing interface with the aircraft, networks, satellites, etc. Reliability and measuring it are more and more difficult and intertwined. A proper Reliability Growth approach will ensure improvements throughout developmental testing and beyond. Going to Operational Testing (OT) without a robust RG plan is not a strong approach with today's weapons.

**West Anderson**, the Director of Boeing's Field Office at Barksdale AFB, was the next briefer. West informed the audience that although a large part of the Air Force's budget plans will be devoted to the procurement of a new bomber, considerable work is being done to the current legacy platforms to keep them capable well into the future. He then briefed the Long-Range Strike Family of Systems—Status of Legacy Bombers and covered some of the unique attributes of our Nation's current long-range strike bombers such as being able to operate in both the nuclear and conventional role, employing over very long distances with a



Col Hank Castelain, USAF



West Anderson



large variety of diverse payloads, and most importantly they are able to be recalled by command leadership.

Then, West covered the status of two of the three bombers which are Boeing built aircraft—the B-1 and B-52. He covered the structural life on both the B-1 and B-52, and showed that both platforms have service lives well beyond 2040. West covered details of each of the major sustainment and modernization programs of record for each of these bombers and the capability they will bring to the warfighter, as well as insight into follow-on programs that the Air Force is considering for the legacy platforms. Finally, his presentation conveyed that current bomber modernization does not reduce the need for a new bomber to meet evolving threats and that both current platforms and a new bomber will be need to meet future requirements.

**Lieutenant General Tom McInerney, USAF (Ret)**, a Fox News Analyst, joined the luncheon participants to present thought provoking remarks that focused on 10 years of the Global War Against Radical Islam (GWARI) with an assessment and description of an Endgame. The General emphasized the importance of identifying the threat as Radical Islam in all its different manifestations—al Qaeda, Taliban, Hezbollah, Hamas, Muslim Brotherhood (MB) et al.

McInerney reminded us that Iraq was initially very successful until there was failure to understand the Iraqi situation and an insurgency followed. This can be attributed to a leadership failure. We may be now facing a major strategic blunder by removing all our forces by Dec. 31, 2011. History will rank this with the failure of the Carter Administration to support the Shah of Iran and now 30-plus years of Iranian radicalism. Afghanistan is proving even tougher because of Pakistani's politics. We are not going to win hearts and minds but must adopt a Counter terrorism strategy with more aggressive rules of engagement.

The "Arab Spring" is turning into an Arab Winter. McInerney believes that Egypt is about to succumb to the MB, Libya is infested with Radical Islamists, Jordan's King Abdullah is paying more attention to the MB, and Tunisia voted in a MB-leaning government recently while Yemen is in danger of falling into al Qaeda hands. Moderate Islam must oppose Radical Islam's attacks against the West. In any case, we must understand this ideology to defeat it. His remarks led to a very spirited question and answer period.

The afternoon session commenced with **Dr. John Corley**, Director of the Capabilities Integration Directorate, Eglin AFB, briefing on the Hard Target Munition. Dr. Corley informed the participants that the USAF is taking a multi-pronged approach to maintain/improve its ability to hold hard targets at risk. This includes improvements to legacy penetrators (BLU-109s/BLU-113s) to enhance fuze survivability and system reliability.



Lt Gen Tom McInerney, USAF (Ret)



Dr. John Corley

The Massive Ordnance Penetrator (MOP) Quick Reaction Capability (QRC)'s recent success provides a new capability to the warfighter. A family of small boosted penetrators and tunnel defeat weapons is being planned to accommodate the future force structure.



Precision Strike Advanced Systems Technologies Session:  
Dr. Peter Erbland, Robert Ekstrom, Gene Estep,  
Rear Admiral William E. Shannon III, USN, Earle Rudolph,  
Steve Dowling, Dr. Spiro Lekoudis, Commander Byron Jenkins, USN

Final session of PSTS-11 focused on Technologies–Precision Strike Advanced Systems. **Dr. Spiro Lekoudis**, Director of Weapons Systems, Office of the ASD for Research and Engineering in OSD, chaired the session and presented the scene setter overview. Dr. Lekoudis informed the audience that both technology and threats evolve in time. The twists and turns of such evolution make the job of those who work precision strike topics exciting and challenging. He noted that one thing has been clear for a while—our reaction time to such evolutions must shorten. Great help can come from the continuing, quantitative and vigorous assessment of architectures that drive technologies, as well as technologies that inform architectures. It's only by clever implementation of such processes that we will expand our capabilities—an imperative for the future.

Dr. Lekoudis' overview was a great introduction to briefings by six technologists and weapons systems leaders who addressed a variety of advanced technologies and related topics.

First up was **Gene Estep** who is the Chief of the Strategic Planning and Assessment Division at the Air Force Research Laboratory at Eglin AFB. Mr. Estep reminded the participants that U.S. airpower dominance is not to be taken lightly in the face of today's escalating and sophisticated adversarial air challenge.

Threats are more challenging he pointed out, as the Air-Sea Battle operational concept clearly shows. Numbers of aircraft available are down significantly over the past decade, and making matters worse, the challenges get more difficult for the weapons development community as the 5<sup>th</sup> and 6<sup>th</sup> generation of aircraft will carry their weapons internally vs. externally on the 4<sup>th</sup> generation platforms. In addition, weapons development has historically lagged aircraft development, and that is no different today. What this does is put increased emphasis on the weapons development community to provide superior weapons technology to enable today's 5<sup>th</sup> and 6<sup>th</sup> generation of aircraft to deliver superior precision effects on target anytime, anywhere.

Mr. Estep stated that with increased threat ranges of our adversarial weapons, increased range from our weapons will be required. With internal weapons bays driving smaller weapons, the explosives within the weapons must be more energetic, with as much as 4X the energy from the explosive payloads vs. previous generations. In addition, the weapons will need to have more range, increased lethality, superior guidance, and must be hardened to withstand enemy defenses.

The Munitions Directorate of AFRL is investing in the development of affordable, game changing technologies that will enable the Air Force the options to pursue weapons capabilities that will meet their needs—when they need them, on time and on cost. Technologies currently being developed will support capabilities such as a High Speed Strike family of solutions, High Velocity Penetrator solutions, and Variable/Selectable Effects weapon solutions, among others. AFRL is developing technologies that will provide weapons for numerous classes of platforms, including 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> generation fighter aircraft, the Long-Range Strike Bomber, and Unmanned Aerial Vehicles, including the small man-portable class.

Finally, the AFRL Munitions Directorate is always looking for additional opportunities to partner with Industry, both large and small, Academia, and other Government agencies to help stretch the available funds even further to do more for our Joint Warfighter. AFRL is engaged, and is working to be more relevant, more responsive, and as always, to continue to develop and mature high quality technologies to help the U.S. Air Force fly, fight, and win.

**Robert Ekstrom**, the Lab Director for the Weapons Systems Center for Integration, NAVAIR Warfare Center Weapons Division at China Lake, briefed next. Mr. Ekstrom focused on weapons systems laboratory integration initiatives and technologies. He also talked about some of the laboratory challenges related to joint integration and mentioned current activities related to joint and coalition interoperability programs.

Then, **Rear Admiral Bill Shannon, USN**, PEO for Unmanned Aviation and Strike Weapons in NAVAIR, discussed Tomahawk in the 21<sup>st</sup> Century. RADM Shannon presented highlights of Operation Odyssey Dawn and talked about the system's high level of accuracy. Further, he stated that the Tomahawk Weapon System is capable of time sensitive tasking and noted that the Special Operations Forces are focused on this.

Following RADM Shannon was **CDR Byron "Jenks" Jenkins, USN**, from OPNAV (N88). Jenks talked about the Offensive Anti-Surface Warfare (OASuW) effort and noted that it is well into the Material Solution Analysis Phase and positioned to conclude this phase in FY12. He said that OPNAV is very pleased with the many efforts accomplished during the past years' Analysis of Alternatives (AoA) to support leadership decisions. As the AoA concludes, OPNAV will continue to refine the preferred material concept into a comprehensive preferred system concept for OSD approval and milestone entry decision. The various Kill Chain enablers will ensure a suitable capability is delivered to the Fleet. Jenks

emphasized that it is imperative that all organizations work together to bring this warfare capability to fruition.

Next, **Dr. Peter Erbland**, Deputy PM for HTV-2 in DARPA's Tactical Technology Office, briefed the Falcon Hypersonic Technology Vehicle (HTV-2). The objectives of the HTV-2 are to develop and test an unmanned, rocket-launched, maneuverable, hypersonic air vehicle that glides through the Earth's atmosphere up to Mach 20 speed.

Dr. Erbland discussed the program status of the two conducted flight tests and noted that extensive data had been captured for critical areas of interest. Further, he stated that the 2<sup>nd</sup> flight provided new insights and lessons. An investigation is well underway to determine causes and corrective action.

The concluding speaker of the symposium was **Steve Dowling**, Director, Counter WMD Directorate of the Defense Threat Reduction Agency (DTRA). He presented an excellent overview on Hard and Deeply Buried Target Defeat Science and Technology which clearly outlined the very difficult challenges associated with addressing the Hard Target Defeat Problem now and in the future.

Dowling provided an overview of the threats and potential vulnerabilities associated with Hard Target structures and the Chemical, Biological, Radiological and Nuclear Weapons of Mass Destruction Threats that may be developed and/or stored in Hardened Targets. The briefing also outlined current and future thrusts being explored at DTRA in advancing new solutions to the problem and summarized existing gaps, requirements, and near-term avenues to be pursued in effecting long-term solutions to the Hard Target Problem.



Major General David Halverson, USA with USNA Midshipmen

Many of the speakers and participants thanked the PSA for conducting a "first class" symposium. **Major General Halverson, USA**, said: "I eagerly anticipate the future contributions of the Precision Strike Association as we continue to enhance our precision engagement operations." ■



Photo to left:  
Dick Rumpf, Dr. John  
Walter, Ambassador  
John Bolton and  
Ginny Sniegon



# Exhibitors for PSTS-11



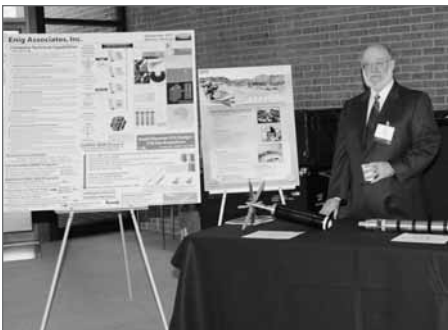
Air Force Research Laboratory



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ITT Corp Integrated Structures (ES/IS)



Lockheed Martin Corporation



Northrop Grumman Laser Systems



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**PSA would like to thank the following corporations for sponsoring PSTS**

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**Marotta Controls**

**Northrop Grumman Corp.**



Honorable Robert Work with USNA Midshipmen and their instructor



Andy McHugh, Rear Admiral David "Decoy" Dunaway, USN and James "Hondo" Geurts

## Army Acquires Switchblade Agile Muniton

**A**eroVironment received a \$5 million contract on June 29 from the U.S. Army Close Combat Weapons Systems (CCWS), Program Executive Office Missiles and Space (PEO MS), for the Switchblade agile munition covering engineering services and operational systems for deployment with the U.S. soldiers.

This award represents the culmination of years of development, testing, demonstrations and customer evaluations. The prototype Switchblade system previously received Safety Confirmation and underwent Military Utility Assessment with the U.S. Army in the fall of 2010. The award is for rapid fielding of this capability to deployed combat forces.

The Switchblade air vehicle launches from a small tube that can be carried in a backpack and transmits live color video wirelessly for display on AeroVironment's standard small unmanned aircraft system (UAS) ground control unit. Upon confirming the target using the live video feed, the operator then sends a command to the air vehicle to arm it and lock its trajectory onto the target.

Flying quietly at high speed the Switchblade delivers its onboard explosive payload with precision while minimizing collateral damage. With the ability to call off a strike even after the air vehicle is armed, Switchblade provides a level of control not available in other weapon systems.

"The unique capabilities provided by the Switchblade agile munition for standoff engagement, accuracy and controlled effects make it an ideal weapon for today's fight and for U.S. military forces of the future," said Bill Nichols, deputy product director at the Army's Close Combat Weapons Systems project office.

Instead of requiring support from weapon systems controlled by other operating units, operators will be able to use the ground launched Switchblade variant to respond to enemy combatants with precision fire from a significant standoff distance, when and where required.

"Our dedicated team developed this breakthrough solution with a focus on satisfying important customer needs," said Tom Herring, AeroVironment senior vice president and general manager of Unmanned Aircraft Systems. "Just as our small unmanned aircraft systems provide game-changing reconnaissance capabilities to ground forces, Switchblade provides a revolutionary rapid strike capability to protect our troops and give them a valuable new advantage on the battlefield." ■



Switchblade Agile Muniton

### Plan Now for Precision Strike Summer Forum

The Precision Strike Association will be hosting a PEO Summer Forum at the Patuxent River Naval Air Station Rivers Edge Conference Center in June 2012. The theme of this event will be "Integration and Interoperability...Getting More from Less." We will be addressing the What, When, Where, Why, and How of Integration and Interoperability... What does integration and interoperability mean, Why is it so important, How do we achieve integration and interoperability, Where have we seen successes, and When will we be seeing more?

The symposium will be a two day event, preceded by the 2<sup>nd</sup> Annual PSA golf event.

Malyna Swyter and Suzy Kennedy are the POCs for the symposium. Please contact either of them if you would like to help in planning the symposium or if you would like to suggest a potential agenda item or speaker. We especially need help in identifying Air Force and Army topics and speakers.

We look forward to a fun and exciting event!!

## Viper Strike Flies to MBDA

**M**BDA Inc., the wholly owned U.S. subsidiary of missile manufacturer MBDA, has purchased Northrop Grumman's Viper Strike munitions business, located in Huntsville, AL. Terms of the agreement were not disclosed.

The purchase is MBDA Inc.'s first acquisition in the U.S. and is part of the company's growth strategy based on a combination of acquisitions, organic growth, and partnerships with other U.S. prime contractors.

"The move will help position MBDA as a leading precision munitions firm in the U.S. and gives the company a stronger capability in the growing market to create and produce new weapons for unmanned aerial systems (UAS)", the company said in a statement.

The current Viper Strike facilities, located in Huntsville and on the US Army's Redstone Arsenal, will allow MBDA to design, build, and assemble complete precision-guided weapons in one location, as well as bring in new business to MBDA's existing facilities in Huntsville.

Jerry Agee, CEO of MBDA Inc. said: "Acquiring the combat proven Viper Strike weapon system and facility allows us to take an important step in our strategy to research, design and produce the world's finest weapons that meet the current and future needs of U.S. armed forces. The Viper Strike line is a perfect addition to our portfolio and allows us entree into the fast growing armed UAS business segment."

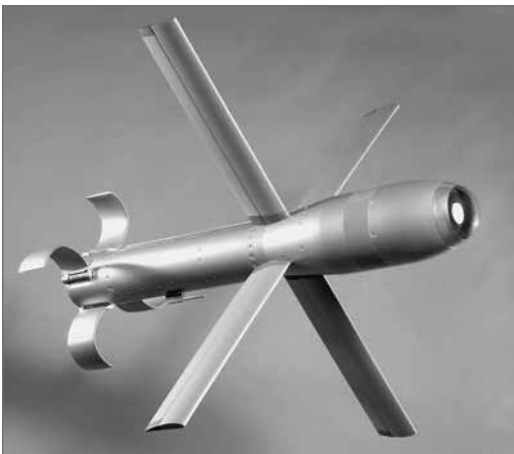
MBDA Inc. now owns two design, development, and manufacturing locations: the Huntsville Viper Strike operating unit, and the Westlake Village, CA operating unit.

Viper Strike is a low-collateral damage, precision guided weapon designed for both manned and unmanned aircraft. The 44-pound, covert glide weapon allows U.S. Army, USAF, Special Forces, and USMC aircraft to precisely engage targets in urban and complex terrain environments. It combines a GPS Inertial Navigation System and a Semi-Active Laser seeker to provide maximum operational flexibility.

MBDA's CEO, Antoine Bouvier stated: "This acquisition is a demonstration of our commitment to continue to grow in the US. We are excited by the opportunity this production facility provides us to continue to design, build and deliver first-class missiles to US armed forces. We now have over 60 missile systems fielded, in production, or in development and equip over 90 armed forces around the world. We can leverage the economies of scale of this wide customer base and product line to provide excellent missile systems, like Viper Strike, to the US warfighter."

Alabama Senator Richard Shelby said, "I am pleased that MBDA will be joining the robust and growing Huntsville defense community. Viper Strike weapons have been a key asset for our troops in Iraq and Afghanistan and I am proud that they will continue to be produced in Alabama. MBDA's plan to grow the business going forward represents a strong vote of confidence in the Alabama workforce and is great news for the local economy."

The transaction has received all necessary US government regulatory approvals. ■



Viper Strike Munition



Viper Strike Munition on Hunter UAS



## News Briefs

### Marotta Controls' Pressure Regulators for LRASM-B

Marotta Controls has won a contract from Lockheed Martin Missiles and Fire Controls, Grand Prairie, TX, to develop a pressure regulator for the Long Range Anti-Ship Missile (LRASM-B) fuel pressurization system.

The Defense Advanced Research Project Agency (DARPA) selected Lockheed Martin to develop two variants of the LRASM missile — LRASM-A, which is a stealthy air-launched version of the missile, and LRASM-B which is a high-speed ship-launched missile.

The LRASM-B is a conventionally armed ship-launched, standoff missile system that is under development for the USN. Focused on anti-surface warfare, the missile will include onboard sensors and processing capabilities that will enable it to engage adversaries and maneuver in a GPS denied environment. It will also enable the engagement of critical targets at extended ranges.

Marotta's pressure regulator is a component of the LRASM-B fuel pressurization system, regulating pressure from a helium storage vessel which is in turn used to pressurize the missile fuel system. The pressure regulator contains an integral relief valve to prevent over-pressurization due to downstream pressure within the regulator. ■

### Mike Bohanan Joins Marotta Controls

Marotta Controls says Mike Bohanan has joined the company as Senior Director, Business Development, Weapons Systems. He is a former USAF officer and career aviation professional with over 30

years experience in program management in both military and civilian aerospace. Bohanan spent more than fifteen years with Honeywell Aerospace in various roles and most recently worked with DRS Technologies where he was responsible for business operations and engineering for their avionics group. A graduate of the USAF Academy, he served as a senior fighter pilot and instructor pilot in the A-10, the F-4 and AT-38B. ■

### A Lighter Load for Soldiers

The Watervliet Arsenal recently released its first shipment of redesigned 60mm lightweight mortar barrels that are part of a new U.S. Army contract valued at more than \$9.5 million.

These new mortar systems are up to 20 percent lighter than the previous versions and this is the first major redesign of the widely used infantry mortar system since the late 1970s, said Col. Mark F. Migaleddi, the Arsenal Commander. "What we have been able to achieve by using advanced manufacturing techniques to machine a new materiel called Inconel was to help lower the weight of the 60mm mortar system by about nine pounds," he said.

After years of process refining and development, a revolutionary "flowform" manufacturing process is now a reality at the Arsenal. "Because the flowform process uses cold forging versus heat forging, we are able to forge lighter weight Inconel barrels," Migaleddi said.

The Army's first M224A1 60mm Lightweight Company Mortar Systems were tested in June by the

1<sup>st</sup> Special Forces Group at Fort Lewis, Wash., with great success.

The average load for a 60mm assistant gunner is 122 pounds and so, reducing the weight of the mortar system by more than nine pounds has proven in testing to not only reduce crew fatigue, but has also reduced crewmen's movement time over a cross-country course, said Peter Burke, PEO Ammunition's deputy product manager for Guided Munitions and Mortar Systems.

The 60mm mortar system is used primarily by the infantry as an indirect fire weapon when a high angle trajectory is required to hit enemy troops, materiel, and positions. The new mortar system will fire the same family of munitions as the previous model and at the same rate of fire.

The Army will replace all of its 1,550 60mm mortar systems and the Arsenal's share of this fleet-wide replacement program is about 500 mortar barrel assemblies. The Arsenal's contract runs through fiscal year 2013. ■



60mm LW Mortar

### ATK Awarded AARGM Contract

ATK has been awarded a \$54.4-million contract by the U.S. Navy for a third lot of low-rate initial production (LRIP) Advanced Anti-Radiation Guided Missiles (AARGM). The contract authorizes production of AARGM missiles and associated support equipment for the U.S. Navy and Italian Air Force.

AARGM is currently in the Initial Operational Test and Evaluation (IOT&E) phase and has undergone more than 300 hours of missile flight testing with the Navy in the last twelve months, including over 200 hours and multiple live fires in the IOT&E phase. Upon

IOT&E phase completion in early 2012, the missile will achieve Initial Operational Capability (IOC) with the FA-18C/D Hornet aircraft.

AARGM is also being integrated into the Navy's EA-18G Growler electronic warfare and FA-18 E/F Super Hornet aircraft, as well as the Italian Air Force Tornado ECR electronic combat and reconnaissance aircraft. As a contributing sensor with advanced lethal defense suppression capability, AARGM is expected to greatly enhance the electronic warfare capabilities for the Growler and the Tornado ECR aircraft.

ATK commenced low rate production for AARGM in 2008 and was awarded a second LRIP contract in 2010. This third LRIP contract award will bring the total number of production missiles for the U.S. Navy and Italian Air Force to 115.

AARGM is a supersonic, air-launched tactical missile carried on the FA-18, EA-18G and Tornado ECR aircraft. The missile has designed compatibility with the F-35, EA-6B, and U.S. and Allied F-16s.

AARGM's advanced multi-sensor system includes a Millimeter Wave (MMW) terminal seeker, advanced Anti-Radiation Homing (ARH) receiver and Global Positioning System/Inertial Navigation System (GPS/INS) capable of rapidly engaging traditional and advanced enemy air defense threats as well as non-radar time-sensitive strike targets.

The AARGM system, an upgrade to the USN AGM-88 HARM system, is a U.S. and Italian international cooperative major acquisition program with the USN as the executive agent.

Upon IOC, AARGM will be the only tactical extended-range, supersonic, multi-role strike weapon in U.S. and Italian inventory. ■

### APKWS Aces Test

The U.S. Navy and Marine Corps recently successfully fired the first shots of the Advanced Precision Kill Weapon System II (APKWS) from a UH-1Y helicopter, in preparation for fielding in 2012.

The successful shots, which took place at Naval Air Warfare Center Weapons Division in China Lake, CA, Sept. 9-13, mark the start of APKWS testing on the UH-1Y, and are part of the program's low-rate initial production phase.

Developed by BAE Systems, the APKWS semi-active laser guidance section integrates with existing 2.75-inch rocket motors and warheads, giving aviators a highly precise weapon that is effective against soft and lightly armored targets while minimizing collateral damage. BAE Systems designed the system's laser guidance and control section.

During the tests, Marine pilots fired a total of six shots from a UH-1Y against stationary targets with ranges varying from 1.5 to 5 kilometers. The initial shots from UH-1Y mark the first time a MK152 warhead has been fired from any aircraft, allowing safer operation aboard ships than the previous M151 warhead.

APKWS brings three essential operational benefits to those in combat. First, the BAE Systems guidance section is designed for compatibility with current 2.75-inch rocket motors, warheads, and fuzes, enhancing the capability of the existing 100,000-unit inventory of unguided rockets. Second, the system provides the lowest collateral damage for precision engagement, while at the same time giving the military greater



APKWS

## CALENDAR OF EVENTS

### Precision Strike Winter Roundtable and William J. Perry Award Ceremony

Date: January 17, 2012

Theme: Precision Strike in an Era of Affordable Constraints

Location: Crystal Gateway Marriott, Arlington, VA

### Precision Strike Annual Review

Date: March 20-21, 2012

Location: Emerald Coast Conference Center, Ft Walton Beach, FL

### Precision Strike Summer Forum & Golf Event

Date: June 2012 (Exact date TBD)

Location: PAX River Naval Base, Pax River MD

### Precision Strike PEO Forum

Date: September 2012 (Exact date TBD)

Location: LMCO Conference Facility, Huntsville AL

### Precision Strike Technology Symposium

Date: Oct. 30 — Nov. 1, 2012

Location: JHU/APL – Kossiakoff Center, Laurel MD

SECRET — U.S. only

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flexibility to engage the enemy. Finally, the unit cost is on track to meet the Navy's objective against lower value targets.

The Navy assumed acquisition oversight of the APKWS program in 2008. In addition to its planned use on rotary-wing platforms, the Navy has entered into a Joint Concept Technology Demonstration program with the USAF to evaluate the suitability of APKWS for fixed-wing platforms.

Initial Operating Capability of APKWS on the Marine Corps AH-

1W and UH-1Y helicopters is scheduled for the spring of year 2011.

### US Army Places First Order for Carl-Gustaf

Saab has signed a contract with the U.S. Army for the company's Carl-Gustaf man-portable weapon system. This marks the first time the Army has bought the 84mm recoil-less rifle system. The Army and U.S. Special Operations Command placed a combined order with a total value of MUSD 31.5 (MSEK 209).



Carl-Gustaf

"This is very positive and it further proves the capability of the Carl-Gustaf system. It also shows the high level of trust our customers have for the system," says Tomas Samuelsson, Senior Vice President and Head of Saab's business area Dynamics.

"Saab is thrilled that the U.S. Army has joined with our existing US Special Operations Command customer in using the Carl-Gustaf system", said Saab North America President, Dan-Ake Enstedt.

The Carl-Gustaf system has along and successful history, and has successively been modernized and adapted to meet new requirements. A true multi-role, man-portable shoulder-fired weapon, the system is in use in more than 40 countries worldwide. With the Carl-Gustaf M3 version, Saab offers state-of-the-art capability for demanding customers investing in the future. ■

### LM Demos JAGM Fixed-Wing Rocket Motor Maturity

Lockheed Martin recently conducted the first test firing of its Joint

Air-to-Ground Missile (JAGM) reduced-smoke rocket motor, demonstrating the functionality and maturity of the design.



JAGM

The reduced-smoke rocket motor is designated for use on the F/A-18E/F Super Hornet and other high-speed tactical fixed-wing aircraft. Aerojet, Lockheed Martin's rocket motor supplier, ignited a static rocket motor at its Orange, VA facility. The rocket motor burned for the full duration, achieving predicted thrust levels and turn-down ratio and meeting all test objectives.

The reduced-smoke rocket propellant is a formulation used in Aerojet's heritage AIM-120 Advanced Medium-Range Air-to-Air Missile (AMRAAM) motor. It required only minor burn-rate tailoring for use with JAGM.

Meanwhile, by September Lockheed Martin performed more than 8,600 hours of tests on its JAGM cooled seeker, proving its operational capability and low risk.

Aircraft intended to carry JAGM include the U.S. Army's AH-64D Apache attack helicopter, MQ-1C Gray Eagle unmanned aerial system, and OH-58D Cockpit And Sensor Upgrade (CASUP) Kiowa Warrior armed reconnaissance helicopter; the U.S. Marine Corps' AH-1Z Viper attack helicopter; and the U.S. Navy's MH-60R Seahawk armed reconnaissance helicopter and F/A-18E/F Super Hornet jet fighter.

Initial operational capability (IOC) of JAGM on the Apache, Viper and Super Hornet is scheduled for 2017. IOC for the Seahawk, OH-58D CASUP and Gray Eagle is 2018. ■

### Successful Artillery Precision Guidance Kit Testing

Office of the Project Manager, Combat Ammunition Systems (OPM-CAS) and ATK have successfully completed Precision Guidance Kit (PGK) Engineering and Manufacturing Development (EMD) Phase 3 Design Verification guided flight testing (GFT) during a recent 48-round test at Yuma Proving Ground, AZ.

During this stringent test, PGK significantly exceeded expectations and requirements for both reliability and safety while demonstrating accuracy that exceeds the 30-meter Circle Error Probable (CEP) objective requirement.

During this end-of-Phase 3 GFT, structured to challenge PGK in the harshest gun launch environments, PGK demonstrated consistent, reliable performance following tactical vibration and temperature conditioning in both extreme heat and cold environments.

Additionally, PGK-fuzed rounds were fired from both the M109 Paladin 155mm Self-propelled Howitzer and the M777A2 155mm Lightweight Towed Howitzer to ensure consistent performance across platforms.

These results prove PGK's ability to dependably guide 155mm artillery projectiles over the operational envelope tested, significantly exceeding both Phase 3 reliability requirements as well as objective accuracy requirements.

Preliminary results indicate readiness to continue to the next EMD phase, including Army consideration of a potential PGK accelerated fielding option.

PGK is a low-cost, guided fuze that fits within the deep intrusion fuze well of U.S. high explosive artillery projectiles. PGK performs in-flight course corrections that greatly reduce artillery dispersion. ■



*Please plan to join us!*

# Precision Strike Winter Roundtable (WRT-12)

## 17 January 2012

### Crystal Gateway Marriott — Arlington, VA

#### Theme

### Precision Strike in an Era of Affordable Constraints

#### Keynote Speaker

**Vice Admiral William E. Gortney, USN**

**Director, Joint Staff, The Joint Chiefs of Staff (confirmed)**

#### Confirmed Focus Areas

- Congressional Outlook—Supporting Our National Security Commitment
- Joint Strategic Planning System Process—National Military Strategy
- New Quadrennial Roles & Mission Review
- S&T Priorities in Support of Precision Engagement
- Precision Strike Opportunities & Challenges
- Can America Afford a Kumbaya Security Policy
- Unmanned Capabilities in a Fiscal Constrained Environment
- Congressional Staffers' Panel—Priorities & Issues
- Acquisition Strategies for Fielding Affordable Capabilities Rapidly
- Challenges in Producing Affordable Precision Munitions
- Information Assurance & Precision Engagement—How Accurate is the Data

#### Presentation

**16<sup>th</sup> Annual William J. Perry Award**

*(Special remarks by Dr. Paul Kaminski—Chairman, Defense Science Board)*

Information & Registration — Call: 703-247-2590

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IN THE NEXT ISSUE...

Winter Roundtable Wrap-up

# Membership Application – Precision Strike Association

I hereby apply for membership in the Precision Strike Association. My understanding is this entitles me to invitations to appropriate Association activities, the quarterly newsletter and other benefits.

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