THE INTEGRITS DIGEST

MAY 18, 2023

TEAM SPOTLIGHT: Hypersonics

Team Spotlight

When we asked for your feedback in the 2022 Climate Pulse Survey, we received a number of comments expressing a desire to learn more about not only the future of IntegrITS—but also the future of our industry as a whole. We have so many members of the IntegrITS Family who are a wealth of information and expertise when it comes to this topic, and today we get to hear from our Chief Operating Officer, Steve Fox. He provides valuable insight into a field that comes up often in conversations surrounding the future of Defense: HYPERSONICS.

Hypersonics

One of the hottest topics in the DoD and other militaries around the world is the term, Hypersonics -- Hypersonic Weapons and Hypersonic Missile Defense. Two great resources regarding these systems are the Congressional Budget Office (CBO) and Congressional Research Service (CRS) reports from January 2023. As described in these documents, the United States, along with some other major countries (more specifically China and Russia), are working on their respective hypersonic programs.

Hypersonics (cont.)

Hypersonic weapons, like ballistic missiles, fly at speeds of at least Mach 5, or roughly 1 mile per second! Unlike ballistic missiles that follow a ballistic trajectory mostly outside the atmosphere, hypersonic missiles spend most of their flight inside the earth's atmosphere. This allows the missiles to use aerodynamic design features to maneuver. There are two primary categories of hypersonic weapons:

- Hypersonic Glide Vehicles (HGV) are launched from a rocket before gliding to a target.
- Hypersonic Cruise Missiles (HCM) are powered by high-speed, air-breathing engines, or "scramjets", after acquiring their targets.

Russia reported fielding its first hypersonic weapons in December 2019, and news reports say they have used them in the war in Ukraine. Some experts believe China fielded hypersonic weapons as early as 2020. The United States is not expected to field hypersonic weapons until the end of FY2023.

The United States has actively pursued the development of hypersonic weapons as a part of its Conventional Prompt Global Strike (CPGS) program since the early 2000's. The CPGS program developed the intercontinental Hypersonic Technology Vehicle-2 (HTV-2), conducting tests in 2010 and 2011. In 2012, the DoD shifted its focus to shorter-range hypersonic missiles. They dropped the term "global" and renamed the program: Conventional Prompt Strike (CPS). During this same time period, the U.S. Army began the **Advanced Hypersonic Weapon (AHW)** program which was successfully tested in 2011 at the Pacific Missile Range Facility (PMRF).

AHW-1 Launch at PMRF

Hypersonics (cont.)

The AHW evolved into the Common Hypersonic Glide Body (CHGB). That glide-body design forms the basis for missiles for the Army (Long-Range Hypersonic Weapon (LRHW)) and the Navy (Intermediate Range Conventional Prompt Strike (IR-CPS) weapon).

The HTV-2 also evolved into DARPS's Tactical Boost Glide (TBG) vehicle, which formed the basis for the Air Force's medium-range **Air-Launched Raid Response Weapon (ARRW)**. The ARRW missile is designed to be launched from B-52 bombers.

The more dominant DoD hypersonic efforts include the following programs:

- U.S. Navy – Conventional Prompt Strike (CPS)
- U.S. Navy – Offensive Anti-Surface Warfare Increment 2 (OASuW Inc 2), also known as Hypersonic Air Launched OASuW (HALO)
- U.S Army – Long Range Hypersonic Weapon (LRHW)
- U.S. Air Force – AGM-183 Air-Launched Rapid Response Weapon (ARRW)
- U.S. Air Force – Hypersonic Attack Cruise Missile (HACM)
- DARPA – Tactical Boost Glide (TBG)
- DARPA – Operational Fires (OpFires)
- DARPA – Hypersonic Air-breathing Weapon Concept follow-on (MoHAWC)

The DoD is currently developing hypersonic weapons under the Navy's Conventional Prompt Strike (CPS) program, which is intended to provide the U.S. military with the ability to strike hardened or time-sensitive targets with conventional warheads, as well as through several Air Force, Army, and DARPA programs. These development efforts support the concept that hypersonic weapons could enhance deterrence, as well as provide the U.S. military with an ability to defeat capabilities such as advanced air and missile defense systems. These capabilities form the foundation of U.S. competitors' Anti-Access/Area Denial (A2/AD) strategies.

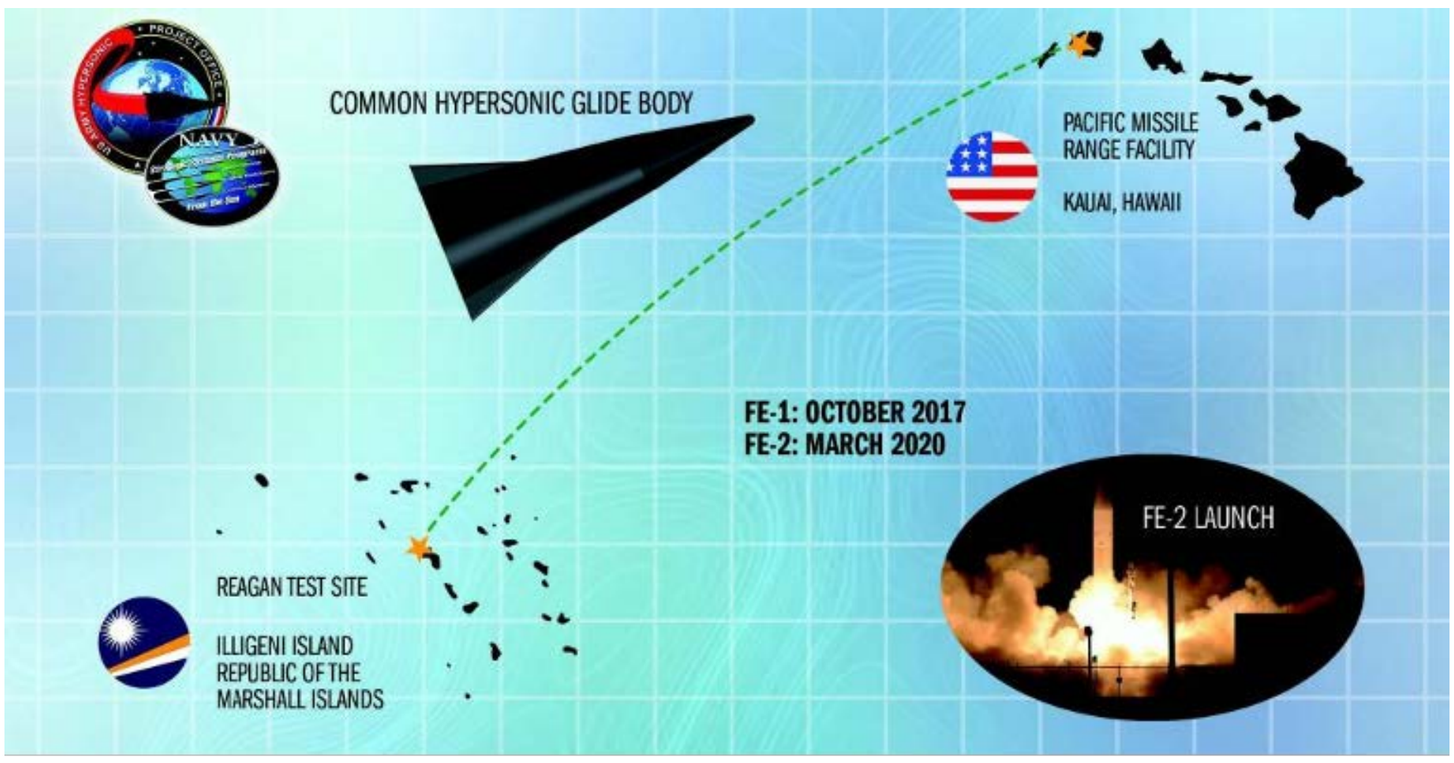
Hypersonics (cont.)

The combination of long range, high speed, and maneuverability distinguishes the hypersonic weapons from conventional strike weapons in the current DoD inventory. In theory, hypersonic weapons could be launched from outside the range of A2/AD systems and could reach targets within minutes over medium to intermediate ranges (i.e., ~600 miles for air launched weapons, and about 1,900 miles for ground/sea launched weapons).

DoD hypersonic cruise missiles are based on scramjet technology being developed under DARPA's Hypersonic Air-Breathing Weapon Concept (HAWC) program since 2014. The Air Force's HAWC Program--the Hypersonic Attack Cruise Missile (HACM)--is described in budget documents as aiming to achieve a long-range, prompt strike capability. The Navy was involved with DARPA's flight tests in support of its own HAWC program, the Offensive Anti-Surface Warfare (OASuW) Increment 2, commonly known as the Hypersonic Air-Launched OASuW (HALO) Program.

IntegrITS Hypersonic Program Support

IntegrITS personnel supporting the Pacific Missile Range Facility (PMRF) and the Birk Flight Test Facility (BFTF) at Edwards AFB are providing key support to some of these major DoD hypersonic programs.



FE-1 and FE-2 Missions

Hypersonics (cont.)

Our PMRF Team supported three major hypersonic test missions, **AHW-1** in 2011 and FE-1 and FE-2 in 2017 and 2020 respectively. The AHW-1 mission support spanned over 9 months and included:

- mission planning
- instrumentation and infrastructure assignments/coordination
- technical support during the live fire mission
- data collection and distribution post-mission

Additionally, IntegrITS provided a WB COSIP C-Band Radar Senior Engineer/Subject Matter Expert (SME) onboard PMRF's Mobile AT-sea Sensor System (MATSS) vessel for radar mission planning, radar operations and data collection while at sea for 3 weeks. The Team also provided post-mission data distribution. The lessons learned and data collected during this mission were used to support the subsequent FE-1 and FE-2 missions to test the Army/Navy's Common Hypersonic Glide Body (CHGB). During these two missions, IntegrITS once again provided WB COSIP Radar Sr Engineer/SME services onboard the MATSS vessel for extended at-sea periods.

B-52 with ARRW

The IntegrITS "South Base" Support Team is a coherent organization with complementary capabilities supporting the BFTF and its two primary Flight Test Squadrons (FLTS). The 419th FLTS supports the USAF's bomber aircraft (B-1 Lancer, B-2 Spirit, and B-52 Stratofortress (or BUFF)). The 452nd FLTS supports the USAF's Global Hawk Unmanned Aerial Vehicle (UAV) aircraft. These two FLTS provide test and evaluation (T&E) services for their respective aircraft for airframe structures, electronics, and associated weapon systems.

Hypersonics (cont.)

The IntegrITS South Base IT Support Team indirectly supports the Air Force's ARRW and HACM programs through their direct IT support services to the 419th FLTS and the aircraft used to test these Air Force hypersonic weapon programs. The most recent support has been for the IT services needed by the 419th FLTS in support of its B-52 aircraft used to test the ARRW weapon. Additionally, our IT Support Team provides IT services for various ongoing 419th FLTS programs to extend the life of the B-52 airframe another 30 years. These same IT services will continue for the 419th FLTS as the B-52 is utilized to support future HACM testing.

IntegrITS is proud to have employees whose daily work efforts have direct impact on major programs like the hypersonic weapons being developed by the DoD. Through their dedication and the quality services they provide, our customers will be able to field the latest hypersonic technologies, weapons, and military capabilities to our Warfighters and Nation.

A Tribute to Barney

In our prior Digest, we made the sad announcement that Barney Cummings had passed away. Our announcement was brief, so we carved out space in this Digest to honor his memory. One of Barney's dearest friends was Barbara Gibson, who is also a member of the IntegrITS Family. We asked her to write a tribute to Barney. Thank you, Barb, for sharing the following poem to honor our colleague and friend.

Barney Cummings

09/10/56~05/01/23

Recently I lost my friend,
A paradox of a fellow.
One minute he was a conspiracy theorist,
And the next moment he was mellow.

He was an education man,
With a degree from Oregon State.
His “IT” work was brilliant,
While his social skills innate.

He was a major sports enthusiast,
Baseball, skiing, and outdoor things.
And yet he was a couch potato,
With the coziness a sofa brings.

He was an over achiever with the purest of intensions,
However, the follow through just wasn’t there.
His actions were always genuine,
Leading much to his despair.

He was in-fact quite a conundrum,
And frustrating to no end.
But no matter where that took us,
he will always be my friend.

The next time you’re driving on an old country road,
And spot a wooden barn.
Raise your hand or tip your head,
And softly say “Hey Barn”

He would like that.

-Barbara Gibson

Tip of the Week

Are you looking for tools that might help decrease your social media use? We were reading an article this week about teens and social media stress, and there was a resource mentioned that could be helpful to social media users of all ages. The article suggests using social media "friction" to slow one's use. There are a number of "friction" apps that use interventions like running a clock to show you how much time you're spending on an app, blocking news feeds, hiding recommended content, encouraging users to meditate after a certain amount of time on an app, and so much more. Here is a list of a few "friction" apps the article recommends:

- HabitLab
- Freedom
- Forest

Employee Referral Bonus Program

At the end of each quarter, everyone who refers a prospective employee *who makes it to the interview process* will be entered into a raffle for a $500 gift card. We will select two winners from this pool of contestants—meaning two people have the chance to win a $500 gift card each quarter! Furthermore, we will enter all employees who refer a job applicant into another raffle (regardless of the stage they make it to in the hiring process), with the winner receiving a $250 gift card.

As of today, we have quite a long list of openings across multiple IntegrITS locations (*IntegrITS Opportunity Central*). Let's work together to find the best candidates for these open positions!

COMING SOON

We'll be back on the first Thursday of June with a message from Mr. Carter in The CEO's Corner.

COMMENTS/QUESTIONS

If you have any comments or questions about this week's newsletter, email us at news@integrits.com.

We have also created a website where we are storing the archives of all our newsletters to date: https://integrits.com/digest-archives/.

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