

Product Architecture - The Hypersonic Challenge



Picture of Avangard hypersonic weapon – nuclear and non-nuclear warheads

When the West realized the reality of the threat from the next generation of hypersonic missiles a former U.S defense secretary said “Trying to hit one of these things is like trying to hit a rifle bullet with another rifle bullet”. How right he was and still is as we see the reality of these uncrewed hypersonic weapons developed by Russia and China. The skeptics eventually became convinced and our Western development initiatives were kicked into action with billions of dollars committed for new defense solutions both space based and land based. We also saw new leadership in collaboration; for example between several of the U.S defense primes and Israel with new innovations for hypersonic anti-missile missiles.

One of the keys to dealing with the lethality of these new weapons (nuclear and non nuclear capable) is their ability to be highly maneuverable on entering the Earth’s atmosphere unlike their predecessor inter-continental ballistic missiles. With atmospheric flight time being minutes not hours this requires defense solutions to be fully automated with new AI architectures. Threat representation for defense evaluation is also a key to assuring integrity – one of the core competences within the work undertaken by David Gardner and his team within the GADS organization based in the UK.

From a lethality point of view one of the key attributes of hypersonic weapons is “time compression” making many of the current defense solutions in the West simply not effective as they cannot respond anything like quick enough. From entry into the Earth’s atmosphere to “target kill” we are talking minutes and the role of AI has become one of the new essential ingredients in dealing with the incoming threat, whether it is a glide vehicle

decelerating from Mach 20 to Mach 3 or 4 before impact, or the cruise missile variety such as we have now seen doing its dirty work in the Ukraine.

These weapons have their vulnerability though

- Detectable pre-launch / prep routines before weapon release
- Highly visible IR signatures during rocket powered / scramjet powered flight.
- Plasma shield interference effects impacting on-borne radar systems
- Predictable ballistic trajectories
- Minimal defense against laser weapons

The partnership ASP has with GADS Ltd. provides a unique combined skill set for both the defense primes and the US government.

- Defense intelligence analysis and modeling.
- Satellite based defense solutions
- Assessment of Russian and Chinese weapon capabilities and the performance attributes / vulnerabilities
- Concept design / development of AI based system solutions.
- Concept design and validation of defense solutions.
- Concept and system design of threat representation and testing.



Zircon hypersonic missile released from a Russian Navy ship.

Some examples of key Western programs to combat the new hypersonic threats

Glide Breaker

- Now entering phase 2 to validate speeds to Mach 5.

- DACS system - Divert and attitude Control System.

A major goal of phase 2 has involved further developing a “divert and attitude control system (DACS)” which allows an “interceptor kill vehicle” to target hypersonic missiles in flight.



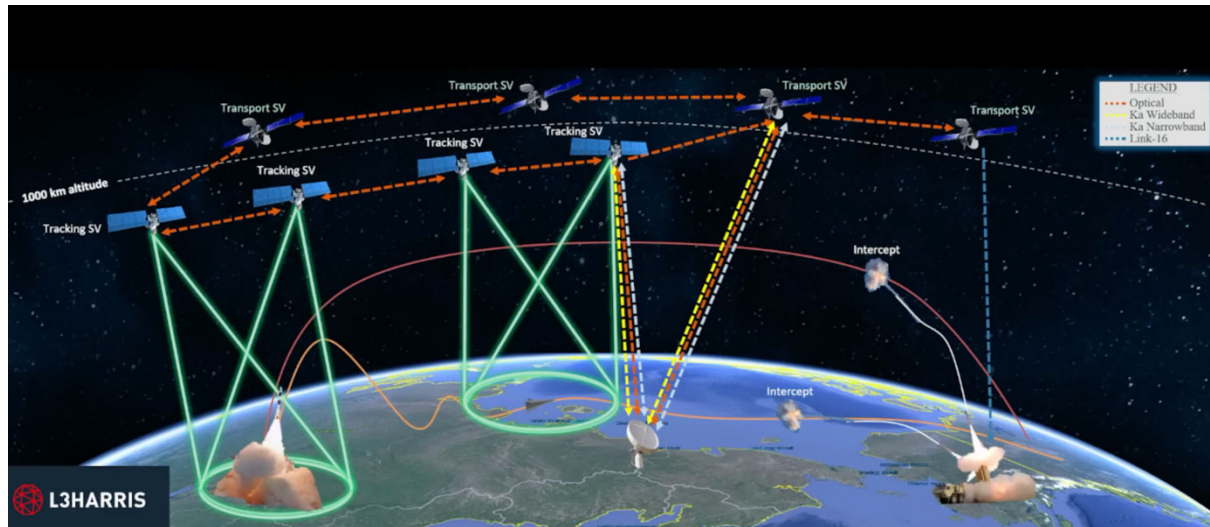
Northrup Grumman Hypersonic spy plane - SR 72



- Designed and developed by Lockheed-Martin
- Propulsion based on combination of gas turbine engine and scramjet.
- Speeds to Mach 6.
- Ability to target and despatch weapons from the edge of space.

HBTS – Hypersonic and Ballistic Tracking Space Sensor

- To provide “birth to death” tracking of incoming ballistic and hypersonic weapons.
- To be integrated into the Space Development Agency’s missile tracking layer - new architecture consisting of hundred’s of satellites in low Earth orbit with its own communication network.
- Detection and tracking of all enemy weapons.



ASP / GADS partnership



- * Unique combination of expertise covering uncrewed air vehicle solutions (supersonic / hypersonic) and innovative AI embodiment solutions for satellite and ground based programs.
- * ASP and GADS are assessed and certified in accordance with U.S regulatory and UK defense standards
- * Both ASP and GADS are renowned for the successful innovation and implementation of “disruptive” and highly effective system solutions
- * Combined wide range experience in providing high quality independent advice to governments and primes.
- * Proven track record in achieving risk and cost reduction for hi tech critical programs.