

# SPACE AND MISSILE DEFENSE

# MARKET REVIEW

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## INTRODUCTION »

The Chertoff Capital team recently attended the Space and Missile Defense Symposium, where decision makers from nearly every branch of the U.S. military were on hand to discuss the latest trends and budgetary priorities in space, missiles, C4ISR, and defense technology. With defense agencies prioritizing investments in these domains, the Space and Missile Defense market has become a top sector for merger and acquisition (M&A) activity. This summary highlights our findings from the Symposium and summarizes the recent transactions in the Space and Missile Defense (SMD) market.

## DEFENSE DEPARTMENT AGENCIES PURSUING SPACE AND MISSILE DEFENSE RELATED INVESTMENTS »

Amid rising geopolitical tensions with North Korea, China, and Russia, the Trump Administration continues to prioritize the expansion and unification of the country's combatant commands, including a shift towards advanced missile and space defense capabilities to keep pace with the technological advancements of U.S. adversaries. The Department of Defense (DOD) is prioritizing these initiatives, with SMD-focused investments receiving prioritization from policymakers.

**MISSILE DEFENSE AGENCY** – With a FY20 budget request of \$9.4 billion, the Missile Defense Agency's (MDA) budget outlook is more favorable than that of prior administrations. MDA is focused on identifying and implementing investments in next-generation technologies while sustaining and expanding legacy programs. MDA has taken an expanded role in the broader White House defense strategy and, more specifically, the long-delayed Missile Defense Review (MDR) that was unveiled in January. The MDR highlights key areas for R&D investment to support longer-range laser technologies and space-based defense capabilities.

To complement the introduction of the MDR, the agency has also identified several emerging priorities that may create significant opportunities for new contracting channels. Under the FY20 budget request, MDA plans to allocate \$90 million for space-based missile defense technology, including the space-based Kill Assessment program, Space Tracking & Surveillance System (STSS), and MDA Defense Space Center. The agency also plans to allocate \$305 million to maturing sensor technology and investing in laser component technology that will ultimately drive towards a demo of the space-based Directed Energy Intercept laser. Other notable budget allocations include \$108 million to develop space sensors for missile tracking and \$720 million to accelerate hypersonic missile activities and development across five programs.

**U.S. ARMY** – Army's Space and Missile Defense Command (SMDC) plays a central role in the Army's modernization strategy and in its investments in missile defense and space-based capabilities. The Army's \$12.4 billion RDT&E budget request for FY20 will drive significant re-programming efforts and bolster several missile defense programs across SMDC. As part of this build-out, the Army released its new Air & Missile Defense (AMD) strategy in March that emphasizes the use of an agile AMD force executing multidomain operations through an integrated, tiered, and layered missile defense architecture. This strategy is built on four "lines of effort": (1) developing the right material solutions; (2) building the correct force structure for multidomain operations; (3) providing ready and trained AMD forces; and (4) building capacity to maintain forward presence with allies. To support the further expansion of the SMDC mission, the command has employed a strategic acquisition strategy that is centered around achieving dominant capabilities while controlling for lifecycle costs, promoting effective competition within the industry, and improving professional organization and architecture of the SMDC workforce.

AMD prioritizations include the following:

- **Missile Defense**

- o FY20 budget request includes \$1.4 billion in funding for Army AMD's "Big Four" programs:

1. Mobile Short-Range Air Defense (MSHORAD)
2. Indirect Fire Protection Capability (IFPC)
3. Lower Tier Air and Missile Defense Sensor (LTAMDS)
4. Integrated Air and Missile Defense Battle Command System (IBCS)

- **Space**

- o Functions include:

1. Theater missile warning to deployed forces
2. Supporting military SATCOM around the globe
3. Providing friendly force tracking
4. Providing GEOINT/SIGINT to warfighters

**U.S. AIR FORCE** – The Air Force, spearheaded by its Space and Missile Systems Center (SMC), continues to place a greater focus on the modernization of its ground-based defense systems, in support of the Armed Forces' broader missile defense mission. The ultimate goals of the organization include taking advantage of commercial space technology to make ground systems more flexible, resilient to cyberattacks, and responsive to the warfighter. The overall approach is much more focused on an enterprise-wide solution that will improve the service and durability of the nation's satellite network across the board. To accomplish this, the organization is partitioned into three divisions:

- 1. Data Transport:** the movement of data from national satellites to the appropriate destination for analysis – a key initiative under this division is the modernization of the Air Force Satellite Control Network
- 2. Tactical Command and Control:** establishment of a common baseline for satellite command and control to ensure the resilience and integrity of the nation's satellite network, which will include a single ground system that can fly all satellites remotely – a key initiative under this division is the Enterprise Ground Services program
- 3. Operational Command and Control:** development of software applications for the Air Force's space command centers – the National Space Defense Center and the Combined Space Operations Center

In addition to the development of the SMC, Air Force is also working to modernize its decades-old Air Force Satellite Control Network through its Multi-Band Multi-Mission project, which looks to create a unified satellite network with increased capacity and resiliency.

**SPACE DEVELOPMENT AGENCY AND SPACE FORCE** – On August 9th, Vice President Pence unveiled the Pentagon's plan to formally introduce a Space Force, which will ultimately serve as the sixth branch of the U.S. Armed Forces, stating "The need for an independent space force is clear...as competitors and potential adversaries such as China and Russia have developed new weaponry geared toward destroying or interrupting U.S. satellites." To address this global threat, the Administration has enacted a four-step plan to facilitate the foundation and growth of the agency:

1. Create the U.S. Space Command as a new unified combatant command, which is set to formally begin operations August 29 and be led by Air Force General John Raymond, to establish the U.S.' space war-fighting doctrine, tactics, techniques, and procedures;
2. Build an elite group of space officers ("Space Operations Force"), which will operate similarly to SPECOPS and support the combatant command by providing expertise in times of crisis and conflict;
3. Develop the Space Development Agency (SDA) to serve as a new joint procurement arm for space products; SDA will leverage advanced prototyping and experimentation to achieve technological breakthroughs; and
4. Name a civilian to the post of assistant secretary of defense for space.

These initiatives have already gained traction in Congress, creating ample opportunity for future higher-end and higher-tech contracting opportunities: *"We have been warning for years of the need to protect our space assets and to develop more capable space systems. We are glad that the Pentagon is finally taking these steps in enhancing our space strength."* – Representatives Mike Rogers (R-Alabama) and Jim Cooper (D-Tennessee) in a joint statement.

Regarding the SDA, which is currently led by Former Director of the Tactical Technology Office Fred Kennedy: *"The SDA will define and monitor the Department's future threat-driven space architecture and will accelerate the development and fielding of new military space capabilities necessary to ensure our technological and military advantage in space for national defense...The SDA will unify and integrate efforts across the Department to define, develop and field the novel and innovative solutions necessary to outpace advancing threats."* – former Defense Secretary Patrick Shanahan

## SPACE AND MISSILE DEFENSE RELATED INVESTMENT PRIORITIES »

Outlined below are several areas of advanced technology that DoD has prioritized and will look to the contractor base to field.

### 1. HYPERSONICS

- Near-peer competitors like China and Russia have been extremely active in hypersonic testing with 23 nations and have demonstrated varying degrees of expertise in hypersonic technology
- The President's FY20 budget request asks for over \$7.8 billion in R&D funding to support its portfolio of six hypersonics programs that involve all service branches as well as DARPA
  - o Many of these programs are being managed as "joint interest" efforts with more than one service branch involved, with the goal of promoting collaboration and cost-sharing to quickly develop a hypersonics capability
  - o The conventional prompt global strike mission sits within the Pentagon and focuses on strategic hypersonic capabilities; individual service branches are exploring several systems that might one day provide the U.S. with long-range conventional prompt global strike capabilities
- The 2019 Missile Defense Review released by the Office of the Secretary of Defense established a policy framework to respond to these emerging threats, through a balance of missile deterrence, active and passive missile defenses, and attack operations
  - o Going forward, the U.S. and allied missile defense strategy will primarily focus on countermeasures against ballistic, cruise, and hypersonic threats

- Major hypersonics programs include:
  - HCSW (Air Force) – focused on integrating mature technology into air-launched hypersonics delivery systems
  - ARRW (Air Force) – Air Force-DARPA collaboration on hypersonics, which will produce an operational prototype by 2023
  - CPS (Navy) – R&D for sub-launched CPS
  - LBHW (Army) – Development of a tactical hypersonic system to defeat A2/AD capabilities as part of LRPF

*“If we talk about ballistic missile defense or hypersonic offense and we talk about proliferating architectures, we need many dozens, many hundreds, maybe thousands of assets...This takes us back to the Cold War where at one point we had 30,000 nuclear warheads and missiles to launch them. We haven’t produced at that kind of scale since the wall came down.”*

**– Undersecretary of Defense for Research and Engineering Michael Griffin**

## 2. DIRECTED ENERGY

- In its FY20 budget request, DoD has prioritized directed energy capabilities, including developing air, missile, and military base defenses; testing and procurement of lasers; and R&D for scalable high-energy density applications
  - The Navy budgeted \$299 million for laser-based defense systems
  - The Air Force is investing \$1.5 billion to test and prototype game-changing technologies, with directed energy as a key priority
  - Army’s RDT&E budget request funds several directed energy programs
- These increased spending efforts stem largely from the formally acknowledged and proliferating threat of unmanned aircraft systems and other air-based technological developments from U.S. adversaries that pose a concern for national security
- Major direct energy programs include:
  - MEHEL (AFC/SMDC) – Stryker-based 5kW class laser system developed to inform requirements for future laser systems and to support tactics, techniques, and procedures
  - MMHEL (AFC/SMDC) – Stryker-based 50kW class laser demonstrator for a Maneuver-Short Range Air Defense solution
  - HEL TVD (AFC/SMDC) – Integration of a 100kW class laser system on a Family of Medium Tactical Vehicles
  - HELMTT (AFC/SMDC) – 50kW class laser system integrated in a Heavy Expanded Mobility Tactical Truck

*“More than any other of the areas in my portfolio, I think the leverage of directed energy is so high...that is right at the top of my investment priorities...My principal goal for directed energy actually is to have it stop being ‘the technology of the future’ and move it into the fleet, move it into the field.”* - **Undersecretary of Defense for Research and Engineering Michael Griffin**

### 3. SPACE-BASED CYBER RESILIENCY AND SYSTEMS ENGINEERING

- A July 1 report released by Chatham House regarding the cybersecurity of NATO’s space-based strategic assets suggested an increased focus on the protection of satellites that face constant cyber threats
- The report adds that the critical dependency in space has resulted in new risks and an everchanging cyber landscape that disproportionately affects mission assurance, which has created significant demand for investment in mitigation measures and in the resilience of space systems overall for national defense purposes
  - The impact of a compromised satellite would be devastating for allied forces across the realms of GPS capabilities, C5ISR, missile defense, space situational awareness, and environmental monitoring
- Policymakers have identified several key systems solutions for which enhancements will be made during the initial term of the SDA. These include:
  - Defensive cyber, anti-spoofing, and anti-jamming capabilities
  - Satellites at different orbits that provide coverage redundancy
  - Cross-networked satellites and ground systems enabled by artificial intelligence
  - Improved launch and payload capabilities
  - Sensor satellites detecting activity around the globe and in deep space
  - Optimizing space-to-ground data linkage through improved bandwidth management, hardware, and software
- Acting Director of the SDA Derek Tournear, stated that space defense solutions “must be driven by threats, be cost-effective, and be shown to directly benefit the warfighter,” and that the “trade space is wide open.”
- Undersecretary of Defense for Research and Engineering Michael Griffin added that because the timeline in which adversaries were acquiring advanced technologies is “three to five years versus the 10 to 15 years in the U.S., immediate action is required to establish and advance the nation’s space defense mission.”

### 4. SPACE-BASED SENSING AND COMMUNICATIONS

- Through a joint effort between MDA and SDA, the U.S. is developing a low-Earth orbit constellation comprised of hundreds of satellites capable of detecting and tracking hypersonics and other high-tech weapons
  - This effort has already received support of the Trump Administration and Congress, with \$108 million being allocated to development efforts

- The recent proliferation of hypersonics demands a new approach to sensing and protecting the nation and its allies against missile attacks:
  - o “It’s the only solution for tracking a maneuvering delivery system like a hypersonic glide vehicle...the reason for that is geography, or rather the shape of the Earth. You can try to fight the curvature of the Earth, and you will lose every time.” – Thomas Karako, Senior Fellow at the Center for Strategic and International Studies
  - o The satellite constellation aims to leverage low cost infrastructure that will enable SDA and MDA to get more advanced sensors into orbit as quickly as possible – SDA is aiming to have initial tech demo satellites in orbit by 2021, with additional added in subsequent years
- Despite these efforts, many policymakers remain wary that the development of defense against hypersonics and other advanced weaponry is progressing too slowly, which may put pressure on the government to expedite its research efforts, creating significant opportunity for industry

## M&A FOCUS – BUYERS TARGETING SPACE AND MISSILE DEFENSE COMPANIES »

Fueled by the strong funding environment highlighted on the prior pages, M&A activity in the SMD market is robust, with both Strategic and Financial buyers seeking acquisition targets in the sector. Buyers ranging from the large original equipment manufacturers (OEMs), to mid-tier engineering and services firms, to private equity-backed platforms are all actively targeting firms that possess unique differentiators and barriers to entry in the SMD market. The following represents recent transactions in the sector.

DATE	TARGET	BUYER	TARGET DESCRIPTION
Announced			Provides space robotics, satellite antennas and subsystems, surveillance and intelligence systems, defense and maritime systems, and geospatial radar imagery
Announced			Manufactures satellite communication antenna systems used in commercial, defense, and scientific applications, as well as provides related radio frequency products and electronics
Aug 19			Provides intelligence analysis services and solutions to primarily the National Geospatial-Intelligence Agency

DATE	TARGET	BUYER	TARGET DESCRIPTION
Jul 19			Provider of SIGINT-focused hardware and software solutions for tactical applications to the US defense, special forces, and intelligence communities as well as select US allies
Jun 19			Provides software and systems integration, space protection and resiliency, satellite ground systems and operations, cybersecurity engineering, cloud solutions, and data engineering
Mar 19			Provides real-time spectrum management, C4ISR, and cyber products and solutions to the IC and DoD
Jan 19			Provides RDT&E support and a full spectrum of mission-critical maintenance and sustainment services for fixed and rotary-wing, tilt-rotor, and unmanned aircraft
Sep 18			Provides ISR platform modification engineering, custom system design, software development, flight test services and PED technical support for special operations environments
Aug 18			Designs and manufactures ground station antenna systems used for Telemetry, TT&C, EOS DB reception, RADAR, SRSAT, and custom tracking applications
Jun 18			Provides the intelligence community, DoD, NASA and other customers with space systems mission planning, space exploration and satellite operations, protection and resiliency
May 18			Provides space systems technology solutions, including systems engineering & integration, cyber, systems modeling & simulation, data analytics, and mission solutions

DATE	TARGET	BUYER	TARGET DESCRIPTION
Apr 18			Designs and manufactures high-frequency RF and microwave microelectronics, components, and assemblies for the space, defense, and telecommunications sectors
Dec 17			Provides precise timing distribution, GPS, and GNSS solutions for both commercial and military markets
May 17			Provides high-accuracy positioning sensor technologies, providing advanced design, manufacturing, and testing for reliable and resilient products and systems

## CONCLUSION »

The SMD segment of the National Security market is growing rapidly, fueled by strong budgetary funding, bipartisan prioritization, and rapid advancements in technology. Strategic and Financial buyers alike are prioritizing targets in the sector, particularly those that provide unique capabilities, technology differentiation, and proprietary positions with sought-after customers on long-term contracts. This is culminating in strong deal activity and attractive valuations across the market. Therefore, we expect buyers to continue to prioritize M&A in the SMD market for the remainder of 2019 and in 2020.

## ABOUT CHERTOFF CAPITAL »

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The Chertoff Capital team is interested in meeting with companies and investors focused on the Space and Missile Defense market. Please direct all inquiries to the investment banking professionals listed below.



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Sources: Space & Missile Defense Symposium; Defense News; Infobase