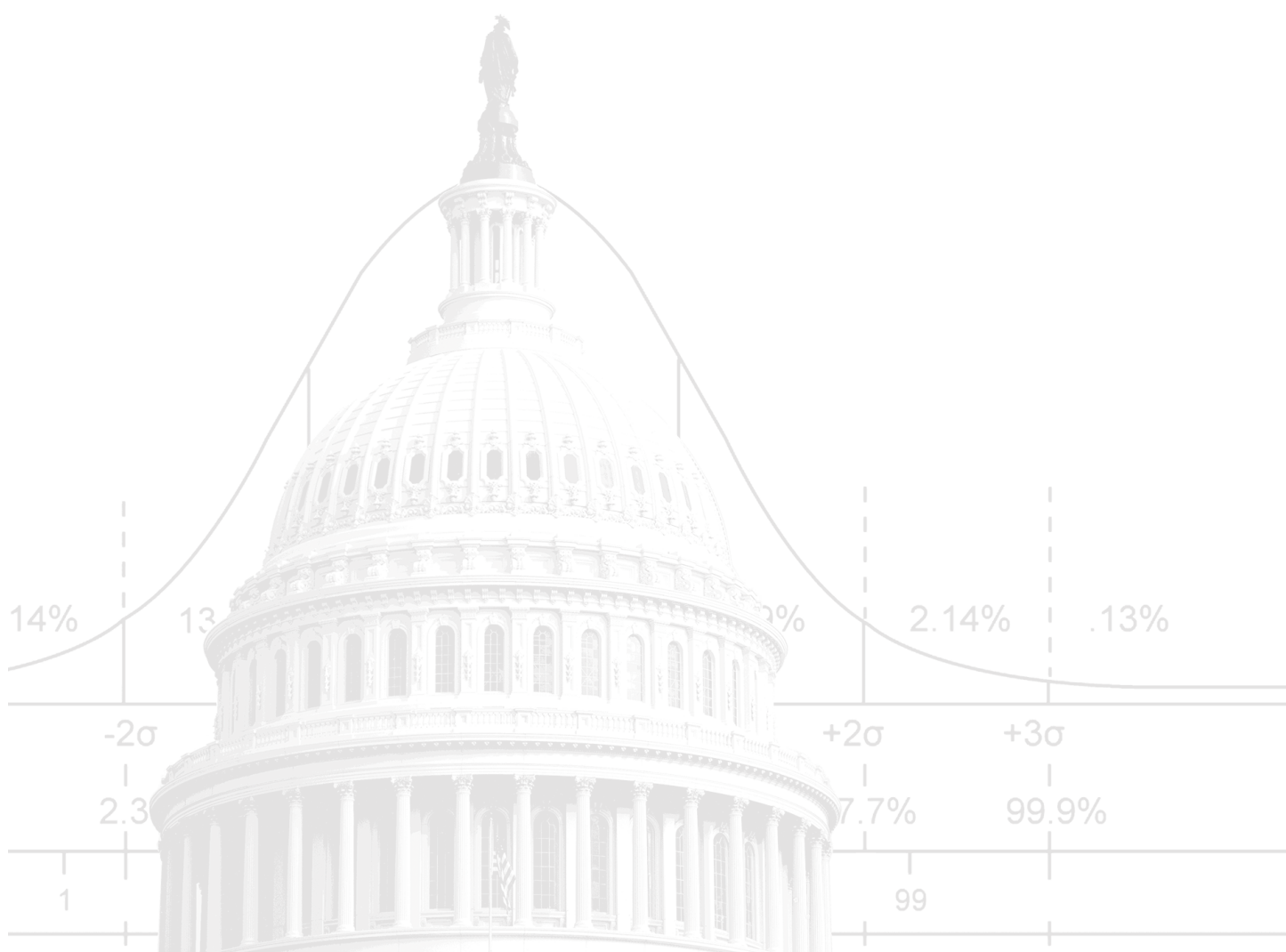


M&A ANALYSIS: NORTHROP GRUMMAN & ORBITAL ATK



COMPANIES INCLUDED

Aerospace Corp.
AMTEC Corp.
Armtec Countermeasures Co.
BAE Systems PLC (BAESY)
Ball Corp. (BLL)
Boeing Co. (BA)
California Institute of Technology
Charles Stark Draper Laboratory
Chemring Group PLC (CHG)
Colt Defense LLC
FN Herstal SA
General Dynamics Corp. (GD)
Harris Corp. (HRS)
Hellfire Systems LLC
Johns Hopkins University Applied Physics Lab
Kaman Aerospace Corp.
L3 Technologies Inc. (LLL)
Leidos Inc. (LDOS)
Lockheed Martin Corp. (LMT)
Northrop Grumman Corp. (NOC)
Olin Corp. (OLN)
Orbital ATK Inc.
Raytheon Co. (RTN)
Russian Space Agency (Roscosmos)
SpaceX
Textron Inc. (TXT)
United Launch Alliance

GOVINI CLIENT MARKET VIEWS

[Space Vehicles Market](#)

[Munitions Market](#)

[Missiles Market](#)

NORTHROP POSITIONS FOR NEAR-TERM SPENDING GROWTH IN MISSILES AND MUNITIONS AND LONG-TERM GROWTH IN SPACE

Northrop Grumman's acquisition of Orbital ATK is one of many strategic investments being made by industry that will reshape the competitive landscape of the defense industrial base.

Orbital ATK offers Northrop access to platforms, which provides full integration capabilities in high growth segments. The first two segments, Guided Missiles and Space Vehicles, are critical to strategies for developing offsetting capabilities in the next highly contested domain space. The third segment, Munitions, is a source of steady cash flow.

This analytic report presents Govini's *Northrop Orbital ATK Acquisition Taxonomy*, a roadmap for tracking how Northrop will leverage Orbital ATK's existing technology and market presence to build competitive solutions that will fundamentally alter the competitive landscape.

Key Findings

- Orbital ATK averaged \$2.2 billion in annual capture of unclassified contract obligations over the last five years, with 49.1 percent coming from Munitions, 37.2 percent from Space Vehicles and 13.7 percent from Guided Missiles. Its annual contracts were 21.9 percent higher in FY16 than in FY13, signaling a strong rebound from sequestration with growth coming from Space Vehicles, followed by Guided Missiles and then Munitions.
- Orbital ATK's 8 percent growth in Space Vehicle capture significantly outpaced the overall market, with nearly all of its contract obligations coming from NASA. Orbital ATK is positioning itself for future growth as agencies embrace reusable platforms. The combined entity surpasses two peers, SpaceX and the Aerospace Company. Spending on Space Vehicles increased by an annual rate of 2.6 percent.
- Orbital ATK is the fifth largest vendor in the Guided Missiles segment, capturing \$1.4 billion over the last five years. Nearly all of its capture comes from Guided Missiles Platforms, which is the ingredient necessary for Northrop to become a full integrator.
- The acquisition puts Northrop's Guided Missile capture on par with Boeing, its direct competitor for replacing the aging Minuteman III intercontinental ballistic missile system. Spending on Guided Missiles increased by an annual rate of 5.5 percent.
- Orbital ATK is the dominant leader of the Munitions market, accounting for 22.2 percent of total segment spending. Boeing, the second largest vendor, accounts for only 13.4 percent of segment spending. Orbital ATK gains its competitive advantage from Small-Medium Caliber Ammunition and Artillery sub-segment spending, accounting for 57.3 percent and 33.7 percent respectively.
- Orbital ATK's strong competitive position in Munitions is advantageous especially given the strong growth in segment spending. Total spending increased the most of all three segments by an annual rate of 5.6 percent over the last five years and is poised to continue its growth in future years.

NORTHROP ORBITAL ATK ACQUISITION TAXONOMY

Space Vehicles accounted for the largest share of spending with 48.1 percent from FY13 to FY17. Guided Missiles followed with 36.5 percent and Munitions with 15.5 percent. Overall Munitions spending grew the most by an annual rate of 5.6 percent over the five years, followed by Guided Missiles with 5.5 percent and Space Vehicles with 2.6 percent.

Among Taxonomy sub-segments, Missile Guidance & Control had the largest annual growth rate of 20.1 percent from FY13 to FY17. The next largest, Major Platform Components is also within the Missiles segment and grew by 14.5 percent. Within Space Vehicles, Basic R&D grew by an annual rate of 12 percent and within Munitions Bombs grew by 12.6 percent and Small-Medium Caliber Ammunition grew by 10.1 percent.

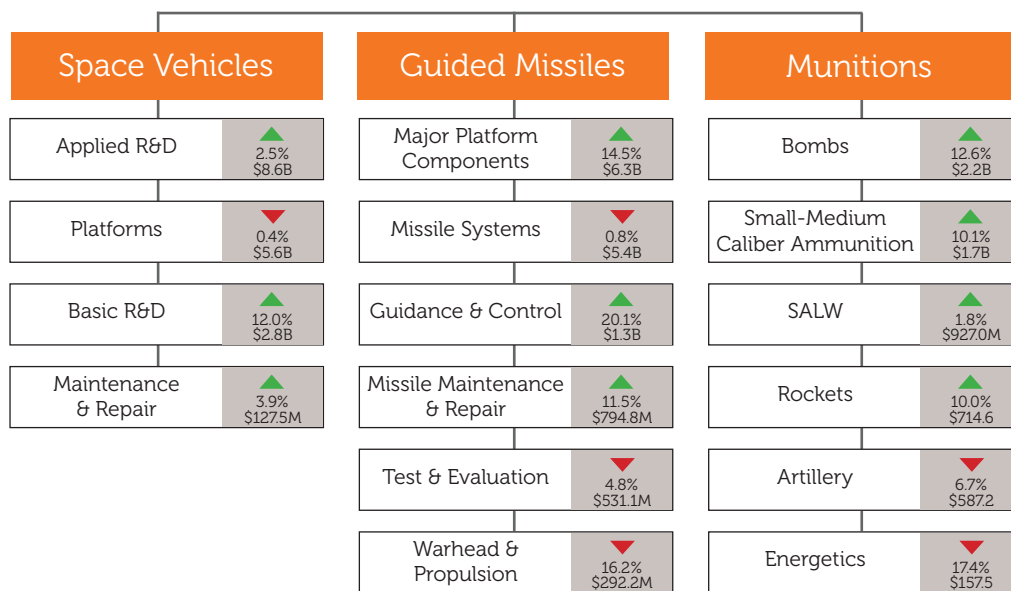


Exhibit 1: Govini's Northrop Orbital ATK Acquisition Taxonomy consists of three broad segments (orange boxes) resembling existing Orbital ATK capabilities and ultimately 16 sub-segments (white boxes) defining the company's technical approach. The hierarchical organizational structure is designed to deliver insight ranging from high-level spending trends in the markets that Northrop is entering through the acquisition to granular details on specific contracts and competitive solutions. Current year spending and the five-year compound annual growth rate (CAGR) from FY13 to FY17 are noted for each sub-segment. Final values for FY17 are estimated based on public spending data that were available through October 1, 2017.

Orbital Acquisition Helps Northrop Strategically Position in Critical Space and Defense Markets

The acquisition boosts Northrop's overall market position to 4 from 10, passing peers including General Dynamics, SpaceX and United Launch Alliance, when viewed through the lens of Govini's *Northrop Orbital ATK Acquisition Taxonomy*, which covers the Space Vehicles, Guided Missiles and Munitions segments.

Space and Defense technologies are converging rapidly in order to build asymmetric advantages for future warfare. Space will be the next highly contested domain and the Federal Government is investing heavily in offsetting technologies to expand its offensive and defensive capabilities.

Northrop's acquisition of Orbital ATK provides benefits for delivering such capabilities over the short-term and the long-term. The two short-term plays include missiles and munitions, and the long-term play is space vehicles. All three have high potential for the future and augment Northrop's existing capabilities in each market.

Orbital's largest contribution to Northrop's bottom line will be from Munitions. The segment accounted for 49.1 percent of Orbital ATK's Federal revenue over the last five years. Space Vehicles is also set to deliver for Northrop as it accounted for 37.2 percent of Orbital's Federal revenue from FY13 to FY17. Guided Missiles accounted for only 13.7 percent of revenue, but as a combined entity that share will grow, especially if Northrop wins its competition with Boeing to replace the Minuteman III intercontinental ballistic missile system.

Combined Northrop + Orbital ATK Addressable Market Segments

■ Northrop Grumman ■ Orbital ATK ■ Others

Top Contractors for All Addressable Market Taxonomy Segments

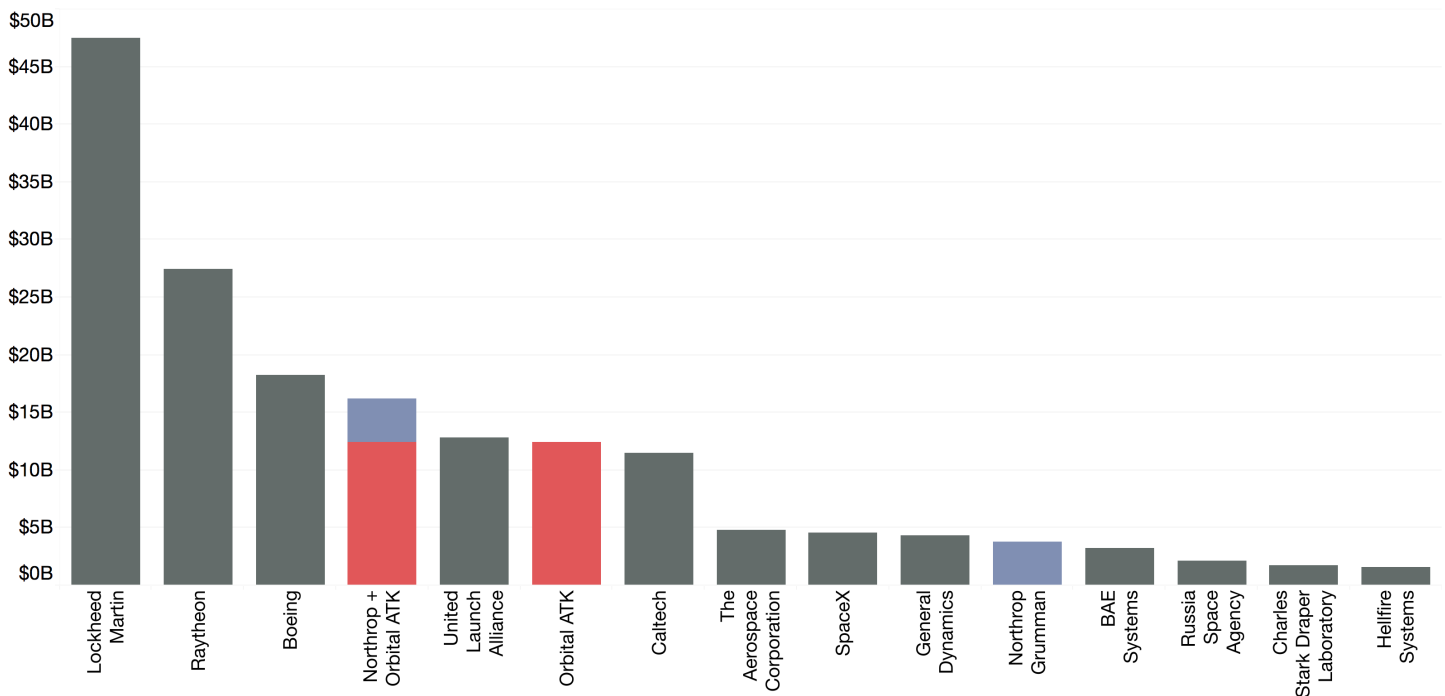


Exhibit 2: Northrop Grumman rivals its System Integration peers in new markets with the acquisition of Orbital ATK. The combined entity's capture totaled \$16.2 billion from FY13 to FY17 and places it fourth when compared to other vendors that compete in markets where Orbital ATK has a strong presence.

Acquisition Positions Northrop Against Boeing and Lockheed Martin in Space Vehicle Market

The space market is poised for rapid growth. Technological advancements have driven down the cost of access and satellite demand has grown significantly. Federal spending on space vehicles alone increased by 3.7 percent to \$17.2 billion in the most recent year.

While the Federal Government is a critical player in the space market it is not the only one. Although commercial spending outweighs federal spending, the government makes its greatest contribution through research and development. Applied R&D accounted for 50.3 percent of space vehicle spending from FY13 to FY17 and Basic R&D accounted for 14.2 percent.

The largest contractor, Lockheed Martin, generates most of its revenue from deep space exploration, geospatial positioning, earth observation and R&D programs. Boeing, the second largest, is a prime to the Commercial Crew Program for delivering the next-generation spacecraft and rockets used to launch astronauts to the International Space Station (ISS).

This acquisition alters the competitive landscape of space vehicles and the combined entity surpasses two peers, SpaceX and the Aerospace Company. SpaceX is a close peer and is also a prime to Commercial Crew and holds ISS resupply contracts. The combined entity will hold contracts for rocket boosters and managing system integration for the James Webb telescope.

Space Vehicles Segment

■ Northrop Grumman ■ Orbital ATK ■ Others

Top Space Vehicles Segment Contractors

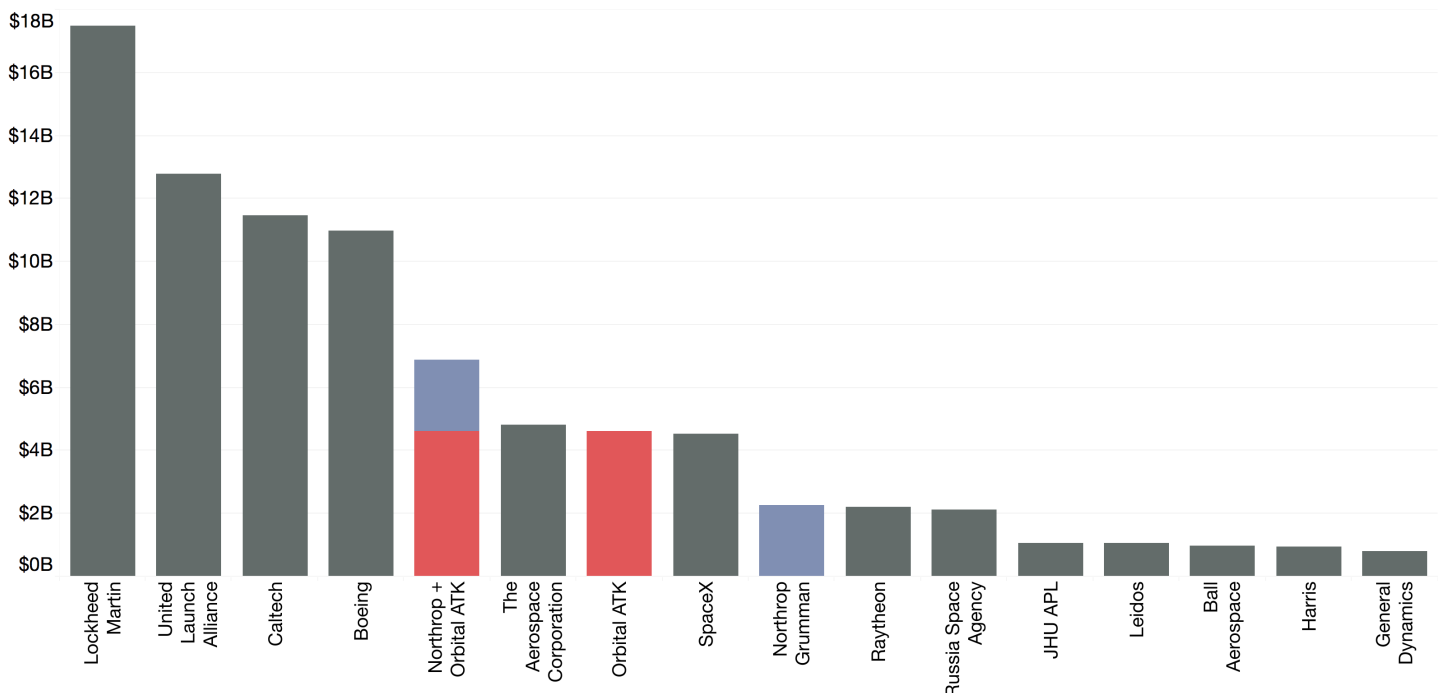


Exhibit 3: Prior to the acquisition, Northrop Grumman had little presence in Space Vehicles as the eighth largest contractor. The combined entity rises to the fifth largest overall, and fourth after excluding Caltech, facilities manager of NASA's Jet Propulsion Laboratory (JPL). The two dominant players, Lockheed and Boeing, are set to face off against emerging players SpaceX and the newly combined entity.

Orbital Provides Northrop Access to Space Platforms in Market Dominated by R&D

In many ways NASA can be considered the gatekeeper of the U.S. science and technology portfolio, particular when it comes to offsetting technologies. The agency is not only known for its effective technology development process, but also forward-thinking mechanisms for procurement and commercialization.

The technology development process begins with Basic R&D intended to solve mission critical requirements. If successful, the research is pushed into applications for test and evaluation and eventually is integrated with platforms that have critical roles in multi-year mission programs, or Applied R&D.

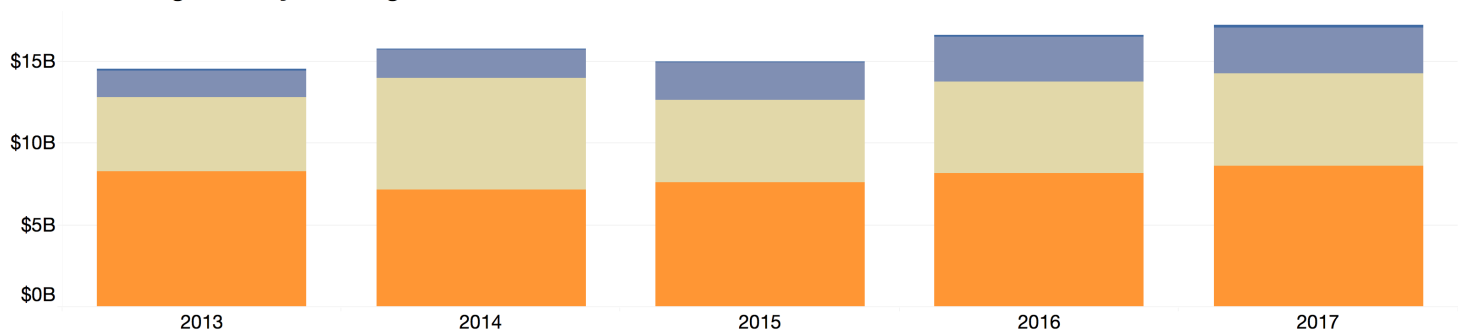
Large contracts are typically awarded in the Applied R&D and Platform stages, which is what Northrop is gaining access to with this acquisition. Orbital's rocket boosters span multiple NASA programs including ISS resupply, Ares I-X and Joint Polar Satellite System.

As NASA and Air Force move to reusable platforms, Orbital ATK and SpaceX have helped to diversify the Space Vehicles market. Lockheed and ULA's share of Platforms has dropped 11 percentage points from FY13 levels while Orbital ATK increased their share by 7.3 percentage points over the same period. Coupled with Northrop's R&D performance, the new entity will have a significant foothold in the two largest Space Vehicle sub-segments.

Space Vehicles Sub-Segments

Applied R&D Platforms Basic R&D Maintenance & Repair

Contract Obligations by Sub-Segment



Vendor Market Share

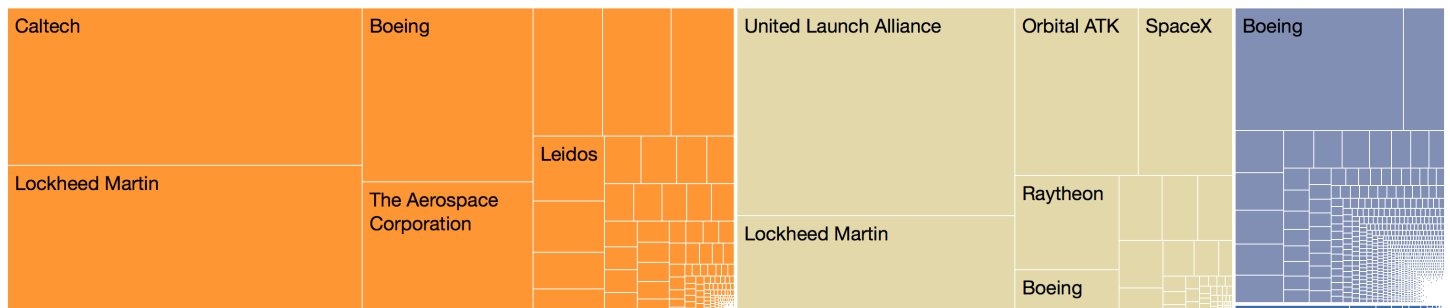


Exhibit 4: Applied R&D and Platforms account for a combined 85.6 percent of Space Vehicles segment spending. Top integrators are positioned across the two largest sub-segments, but the landscape is shifting. Northrop possesses critical offsetting sensor technology and market presence, and the acquisition of Orbital ATK provides the necessary ingredient of access to Platforms.

Missile Market Set to Swell from \$350 Billion Nuclear Force Modernization Investment

The guided missile market is in transition. Precision weapons are gaining autonomous capabilities, hypersonic technologies are maturing, and existing intercontinental ballistic missile systems are being replaced.

Replacing the ground-based intercontinental ballistic missiles system, the 1980's era- Minuteman IIIs, will alone cost \$85 billion according to the Pentagon's office of Cost Assessment and Program Evaluation (CAPE). Modernization of all three components of the nuclear triad including land-based intercontinental ballistic missiles (ICBMs), strategic bombers, and submarine-launched ballistic missiles will cost a total of \$350 billion over the next decade.

Orbital ATK provides Northrop Grumman with critical components for effectively competing in this market. Interceptor boosters are the obvious capability that will prove valuable should Northrop win its ICBM competition against Boeing. Propulsion and control systems for other tactical missile systems are another added value along with other key guided missile components like warheads, fuzing, sensors and composite structures.

Lockheed Martin and Raytheon dominated the guided missile market over the last five years capturing 80 percent of spending on guided munitions but that is set to change as Boeing and Northrop are brought back into the fold. One of the two will win the ground-based ICBM competition and better position themselves for the other components of the nuclear triad.

Guided Missile Segment

■ Northrop Grumman ■ Orbital ATK ■ Others

Top Guided Missile Segment Contractors

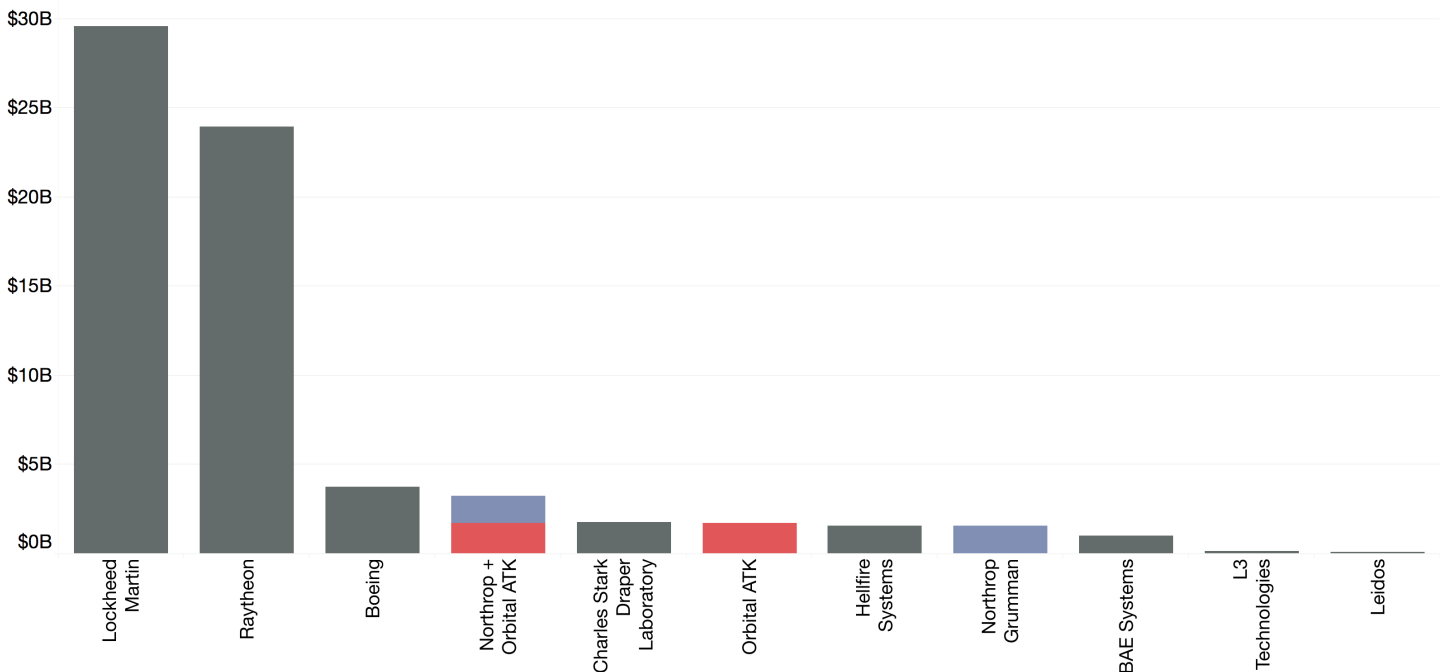


Exhibit 5: Lockheed Martin and Raytheon dominated Guided Missiles over the last five years. However, modernization of the nuclear triad presents opportunity for emerging players Boeing and Northrop. Northrop's acquisition of Orbital ATK provides clear indication that they are very serious about competing for missile contracts and becoming a full-scale integrator.

Northrop Gets a Platform to Break into High Growth Guided Missile Market

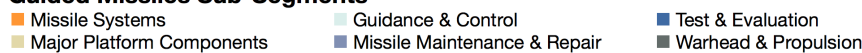
Precision weapons, advanced sensors, and targeting networks have historically played a critical role in the U.S.'s ability to project power. However, potential adversaries have beefed up anti-access/area-denial (A2/AD) capabilities creating "no-go" zones for U.S. forces.

The evolving challenge creates opportunity for advanced technology development in the guided missile market that totaled \$14.6 billion in FY17. The spending is 27.1 percent greater than in FY13 when sequestration cuts were greatest. Spending growth is projected to continue in FY18 through marquee programs including Lockheed's Long-Range Anti-Ship Missile (LRASM) and its Joint Air-to-Surface Standoff Missiles Extended Range (JASSM-ER).

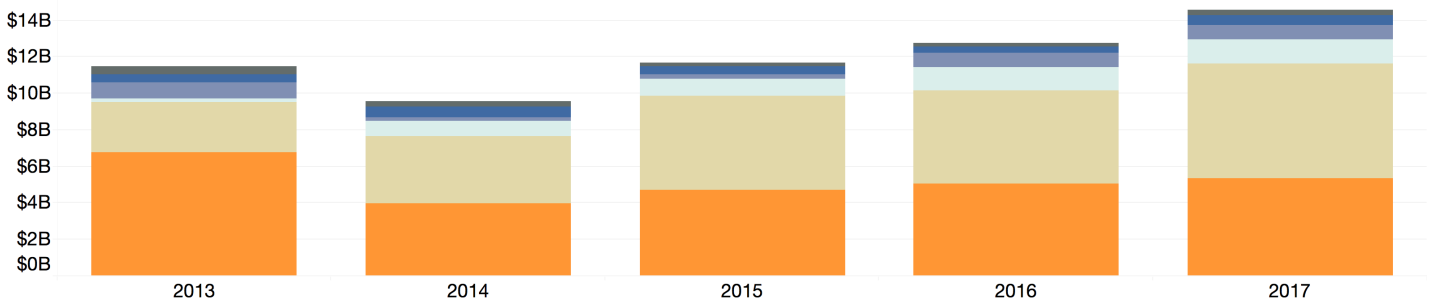
Guided Missile Systems present a unique opportunity for defense system integrators. Integrators typically deliver end-to-end solutions including the systems, major components, and maintenance and repair. For example, leaders Lockheed Martin and Raytheon captured 81.2 percent of spending in the three sub-segments because they won nearly all of the guided missile program work. With such little work shared with others, the integrators tend to own and develop proprietary related technologies rather than outsourcing it, which is one of several reasons why Northrop needed to buy Orbital ATK to become a player in the guided missile market.

Increased spending in the largest sub-segments, Missile Systems and Major Platform Components, drove a 14.4 percent increase in overall Guided Missile spending in FY17. The smallest sub-segments, Warhead & Propulsion and Test & Evaluation, increased the most by 51.3 percent and 57.6 percent respectively.

Guided Missiles Sub-Segments



Contract Obligations by Sub-Segment



Vendor Market Share

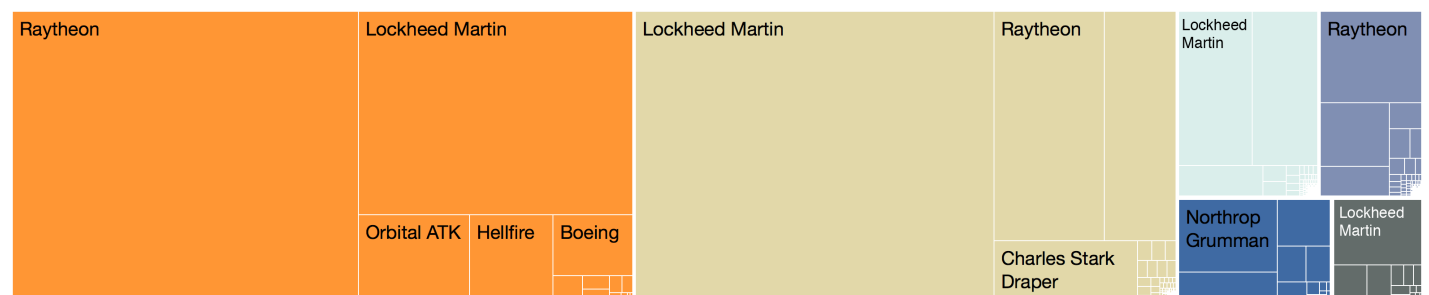


Exhibit 6: Lockheed Martin and Raytheon captured the most spending by a large margin, combining for 81.2 percent over the last five years. Competition for nuclear modernization contracts will bring others including either Boeing or Northrop into the competitive landscape.

High Overseas Operational Tempo Drives Expansion in Munitions Market

Federal spending on munitions increased significantly in recent years and will remain elevated for years to come. FY16 marked one of the largest annual rises on record of 53 percent to \$6.2 billion and spending remained elevated in FY17.

Expanded air campaigns and continued support of local security partners in Iraq and Afghanistan are among factors that drove the FY16 spending spike. Air-support and advisory efforts appear to be continuing, and even increasing, under President Trump as the DoD intensifies overseas operations and works to replenish global munitions stockpiles.

As a result, Bombs and Small-Medium Caliber ammunition increased dramatically by 59.7 percent and 30.7 percent respectively over the last five years. Other stand-off munitions, such as Artillery and Rockets, have experienced consistent spend levels since FY13. With airstrikes in Afghanistan, Iraq, and Syria already outpacing 2016 totals, the Munitions market is expected to sustain robust growth in the near term.

By acquiring Orbital ATK, Northrop Grumman will catapult to the forefront of the Munitions market. Among the top vendors in the market, Orbital ATK has held the dominant position ahead of Boeing and General Dynamics since FY13. In contrast, Northrop Grumman is a relative newcomer to munitions market. For entrenched competitors, therefore, Northrop Grumman's swift entrance may challenge previously uncontested sub-segments, as the system-integrator leverages expertise and performance across its markets.

Munitions Segment

■ Orbital ATK

■ Others

Top Munitions Segment Contractors

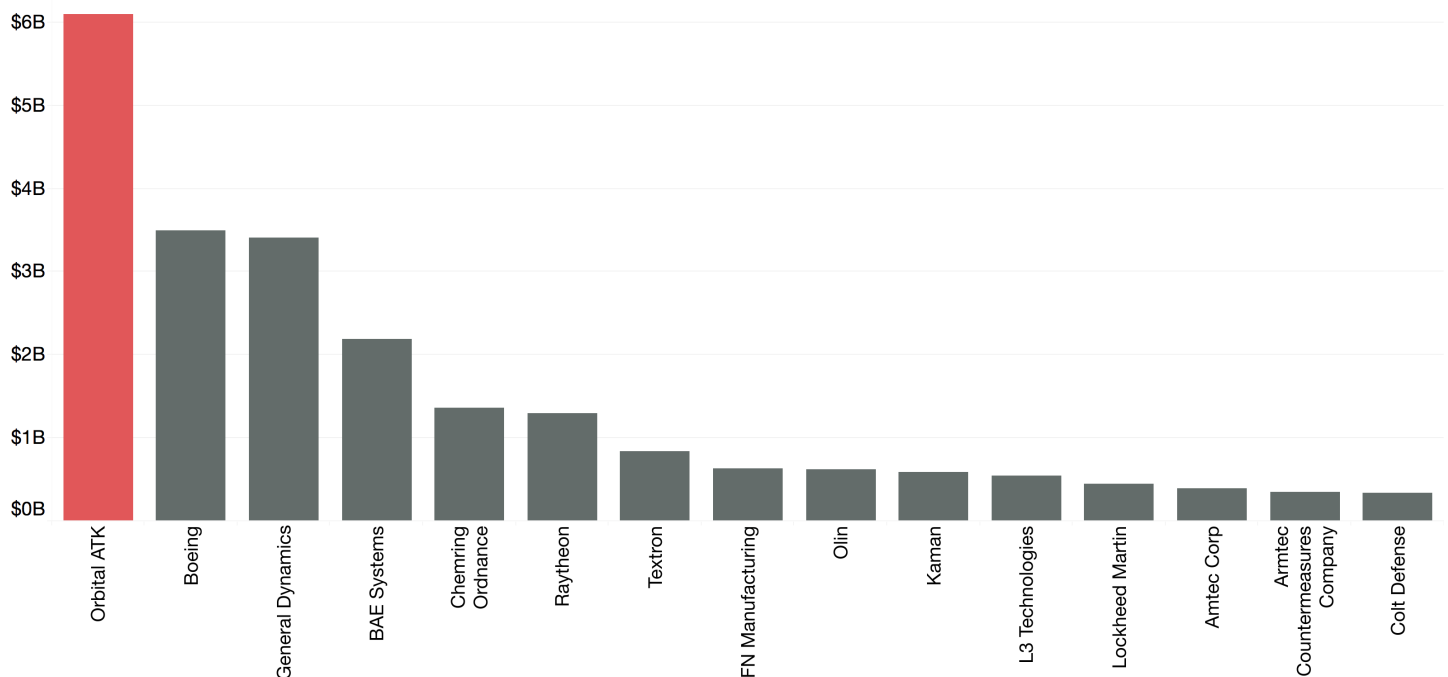


Exhibit 7: Orbital ATK holds a commanding presence in the munitions market because of its Small and Medium caliber products. Boeing and General Dynamics trail significantly, placing second and third among the top vendors.

Bombs and Small-Arms Ammunition Propel Munitions Market Higher

For a leading sensor and systems-integrator like Northrop Grumman, Orbital ATK offers an eclectic entrance into the Munitions market. One point is precision-guided subcomponents and another is legacy kinetic non-NATO munitions as Orbital is a leading provider of both.

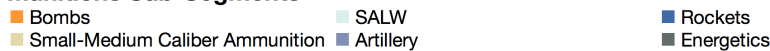
U.S. bomb spending is surging to match overseas operations. The total dropped in Operation Inherent Resolve and Operation Freedom's Sentinel totaled 39,589 as of the end of FY17, representing a 23.4 percent spike over FY16 levels.

Bombs make up the single largest sub-segment of the Munitions market accounting for 29.9 percent of total spending over the last five years. Spending on precision-guided ordnance and related bombs grew by 12.6 percent since FY13, with a large spending spike of 59.7 percent in FY16. Heightened replenishment is expected to continue as U.S. airstrikes in FY17 hit a three-year high across Iraq, Syria, and Afghanistan.

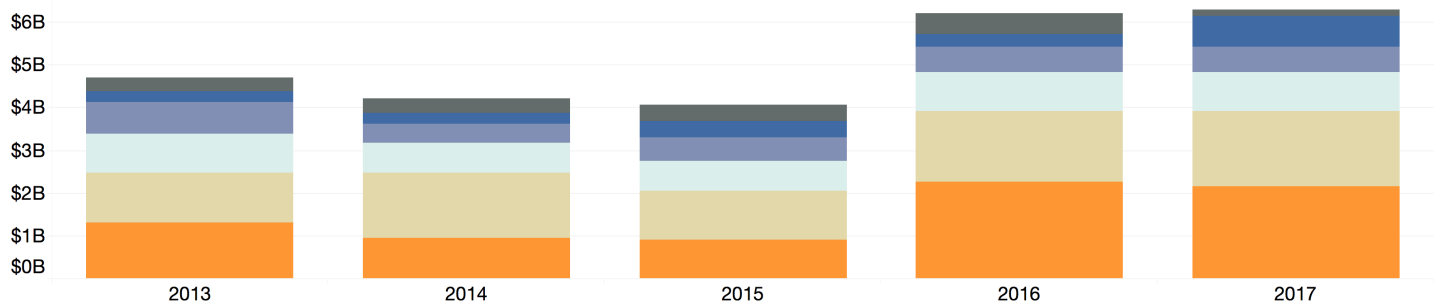
Small-Medium Ammunition represents the second largest subsegment with 28.4 percent of total munitions spending. Much like bombs, spending on Small-Medium Ammunition surged in FY16 by 30.7 percent. As the dominant leader of the market, Orbital ATK accounts for 57.3 percent of subsegment spending, primarily by supplying non-NATO ammunition for the Afghan National Police Force and the Afghan National Army.

Orbital ATK also captures the greatest share of Artillery spending with 33.7 percent over the last five years. Its dominant market share is in part due to delivering Precision Guided Kits (PGKs) for Army and Marine artillery.

Munitions Sub-Segments



Contract Obligations by Sub-Segment



Vendor Market Share

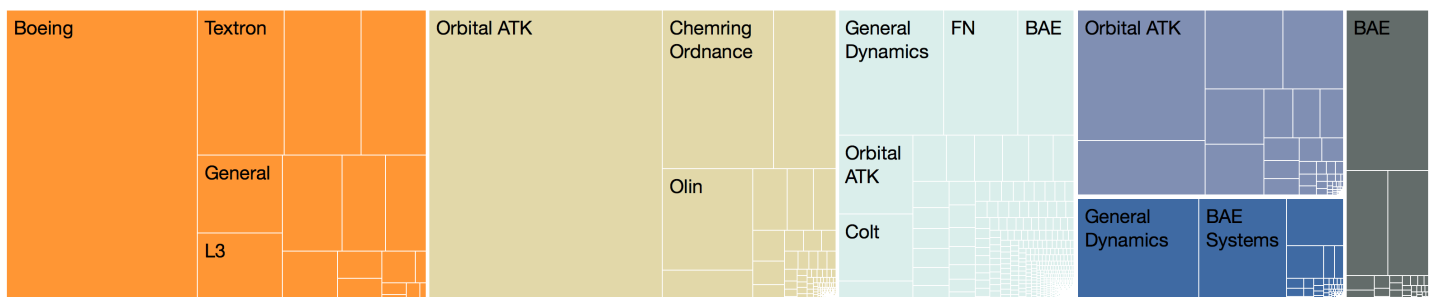


Exhibit 8: Across vendors, Orbital ATK has a dominant position in Small-Medium Caliber and Artillery munitions, representing 57.3 percent and 33.7 percent of obligated dollars respectively.

Conclusion

Northrop Grumman's smart acquisition of Orbital ATK is multifaceted in that it has several possibilities for achieving success. The most obvious possibilities are in Missiles and Space Vehicles, but Munitions offers advantages too.

The acquisition doesn't come without big changes to Northrop's balance sheet. The deal entails \$7.8 billion in cash, financed with debt, and the assumption of \$1.4 billion in existing Orbital ATK long-term debt. Cash flow from Orbital's high growth, high margin Munition business will bolster servicing this debt.

Through the acquisition, Northrop gets access to critical rocket booster technology that serves solutions in critical markets - missile defense and space launch. The technology will also serve as a stepping stone for further development in areas like hypersonics and other offsetting capabilities for space, the next highly contested domain. The acquisition also brings a formidable position in the high growth munitions market, which Northrop can either spin-off, manage for steady cash flow, or integrate with its growing presence in the simulation and training market.

Northrop's move comes amidst several others in industry that are having profound effects. Its closest peers - Raytheon, Boeing and Lockheed Martin - are also seeking to strengthen integration capabilities by owning weapons platforms or systems. Lockheed bought into the rotary market through its purchase of Sikorsky and Northrop is doing much of the same in space and missiles.

Strategic moves are also being made to counter the growing clout of platform integrators. The combination of United Technologies Corporation (UTC) and Rockwell Collins is an example of how consolidation is taking place on the other end of the spectrum with suppliers. The \$30 billion deal places engines and advanced avionics, two critical aircraft components, under one roof.

While Northrop's \$9.2 billion acquisition of Orbital ATK is a big move, it certainly will not be the last in an industry that is rapidly consolidating. Lower defense spending on fewer programs that require more sophisticated multi-function systems is pushing integrators to seek strategic competitive advantages by owning platforms and systems. Added value comes where the multi-function capabilities serve several markets. Suppliers are not standing idle and are moving to consolidate within critical components of the supply chain in order to maintain pricing power.

Northrop's acquisition of Orbital ATK provides critical components to compete at scale with its integrator peers. In the near-term, Orbital's booster technology will allow Northrop to better compete against Boeing for replacing the existing land-based intercontinental ballistic missile system (ICBM). Even if Northrop loses the high-stakes ICBM competition, owning a platform positions Northrop as a full-scale integrator in key markets including space launch and missiles.

Methodology

Govini creates decision-grade information that allows clients to tackle their most difficult problems. Govini takes a unique taxonomic approach to breaking apart the market and its players, and provide insights only available through its Strategic Intelligence Platform. These analytic reports are designed to categorize Federal Government contract obligations and budgets into segments and sub-segments. Because some contracts are broad in scope, they may be included under multiple categories within a taxonomy to ensure an accurate, granular and evidence-based reflection of the market.

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