Space

The Orbit #20: breaking down SDA's Proliferated Warfighter Space Architecture

Industry Overview

18 January 2024

Equity
Americas
Space

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LHX, LMT, Sierra awarded $2.5bn in T2 Tracking contracts

On January 16, the SDA awarded three firm-fixed price contracts to L3Harris ($919mn), Lockheed Martin ($890mn), and Sierra Space ($740mn) for Tranche 2 Tracking Layer (T2TL) of its Proliferated Warfighter Space Architecture (PWSA) program. Each company is contracted to build 18 sensing satellites that are projected to enter operation in mid-2027.

RKLB awarded extension to T2 Transport Layer – Beta

Earlier this month (January 8), Rocket Lab was awarded a $515mn contract (incl. $26mn in incentives/options) to build an additional 18 satellites for the existing Tranche 2 Transport Layer – Beta contract. The extension comes after SDA Director Derek Tournear announced on December 7 that the agency was seeking to add 18 Beta satellites.

Possible collective contract value of over $10bn

Across Tranches 0-2, the SDA is seeking to procure ~476 satellites for communication and sensing purposes. While current contract values estimate a cumulative value of up to $9.8bn, we would expect the eventual collective value of all PWSA contracts to exceed $10bn. See inside for a breakdown of the current PWSA contracts. There are also plans to build upon the initial tranches with Tranches 3 and 4, with an expected operational commencement of FY2028 and FY2030, respectively. There is also the prospect of additional tranches beyond 2033. We believe these could expand the total addressable market for satellite manufacturers, suppliers, and launchers well beyond $10bn.

Tracking Layer to serve as missile defense watchdog

Establishing a resilient space infrastructure was a focal point of the SDA's formation in 2019. The resulting PWSA program, previously referred to as the National Defense Space Architecture (NDSA) until January 2023, was born out of the DoD's need for space-based sensing and communication in LEO. The program was broken down into seven layers, each reflecting a different function: 1) **support**, 2) **tracking**, 3) **transport**, 4) **navigation**, 5) **battle management**, 6) **custody**, and 7) **emerging capabilities**. The two main layers, **Tracking** and **Transport**, are constellations themselves. The Tracking Layer will provide infrared sensing and Earth observation capabilities to track potential missile threats. This layer is expected to consist of 88 satellites.

Transport Layer enables resilient space communications

The Transport Layer constellation will be more numerous in number compared to its Tracking counterpart. This layer is intended to provide resilient communications across the satellite network. These satellites will utilize Optical Inter-Satellite Links (OISLs), which are much harder to disrupt and intercept than traditional radio frequency crosslinks. The Transport Layer is expected to consist of 356 smaller, lower tech satellites to enhance the constellation's resiliency in the event of an anti-satellite attack.

SDA – Space Development Agency

DoD – Department of Defense

LEO – Lower Earth Orbit

Refer to important disclosures on page 7 to 10. Analyst Certification on page 6. Price Objective Basis/Risk on page 4. **12647493**

Timestamp: 18 January 2024 03:00AM EST

Exhibit 1: Space Development Agency (SDA) Proliferated Warfighter Space Architecture (PWSA)

Across Tranches 0-2, the SDA is seeking to procure ~476 satellites for communication and sensing purposes. While current contract values estimate a cumulative value of up to $9.8bn, we would expect the eventual collective value of all PWSA contracts to exceed $10bn.

Tranche	Layer	Satellites	Est. Contract Value	Value per satellite	Contractor(s)	Announced	Entry Into Service
0	Transport	20 (1 ground testbed)	$282mn	$14.1mn	York Space Systems, Lockheed Martin	Aug-20	2Q23
	Tracking	8	$343mn	$42.9mn	SpaceX, L3Harris	Oct-20	2Q23
1	Transport	126	$1.8bn	$14.3mn	York Space Systems, Lockheed Martin, Northrop Grumman	Feb-22	3Q24
	Tracking	28	$1.3bn	$46.4mn	L3Harris, Northrop Grumman, RTX	Jul-22	2Q25
	Demonstration and Experimentation System (T1DES)	12	$200mn	$16.7mn	York Space Systems	Oct-22	FY25
2	Transport - Alpha	100	$1.3bn	$13.5mn	York Space Systems, Northrop Grumman	Oct-23	3Q26
	Transport - Beta	90	$2.1bn	$22.9mn	Lockheed Martin, Northrop Grumman, Rocket Lab	Aug-23/Jan-24	3Q26/3Q27
	Transport - Gamma	20	TBD	TBD	TBD	Oct-23 (RFI)	3Q26
	Tracking	52	$2.5bn	$49.0bn	L3Harris, Lockheed Martin, Sierra Space	Jan-24	mid-2027
	Demonstration and Experimentation System (T2DES)	~20	TBD	TBD	TBD	Jun-23 (RFI)	2027 (?)

Source: BofA Global Research, Department of Defense, Space Development Agency

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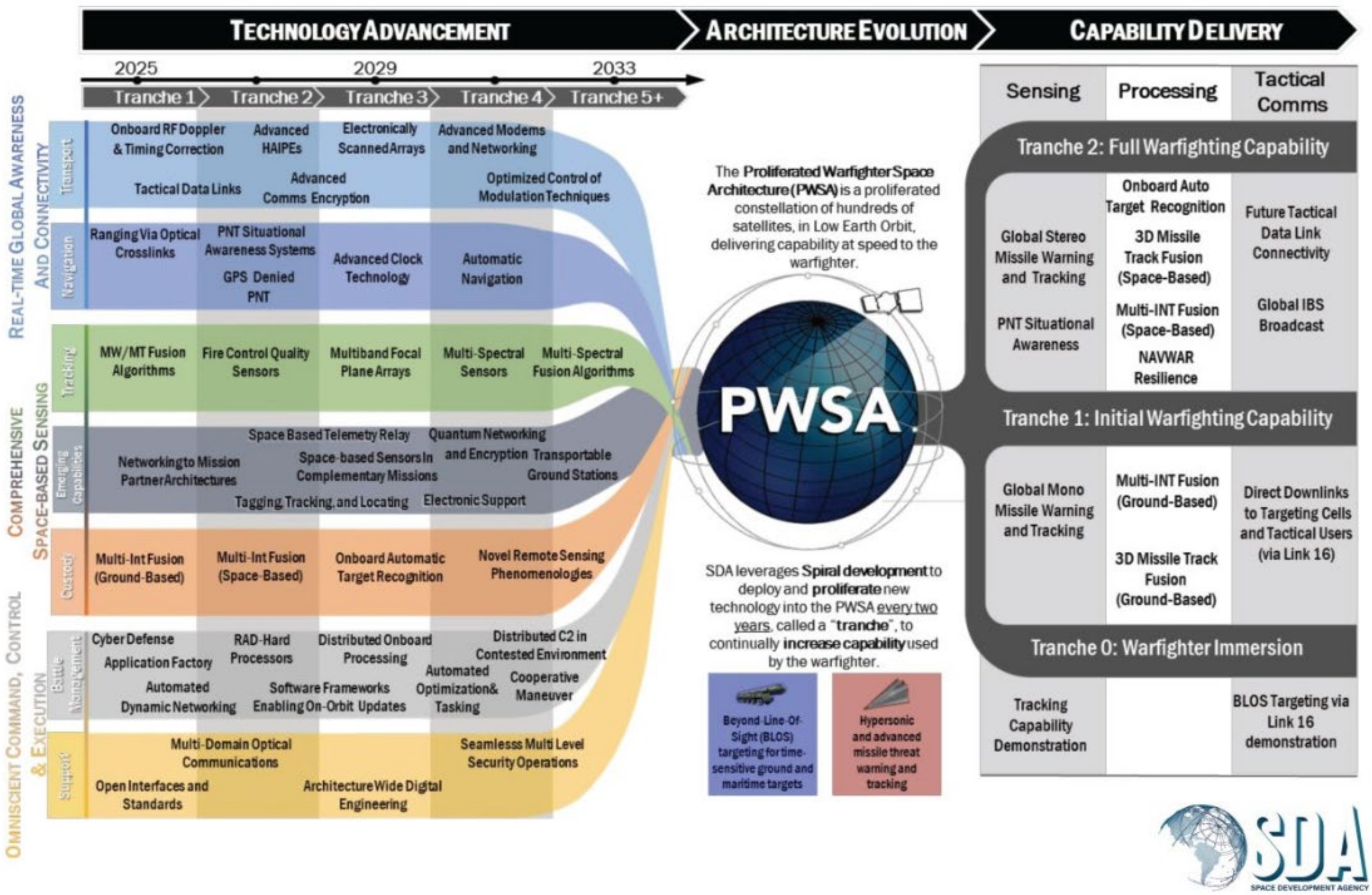
Exhibit 2: Space Development Agency (SDA) Proliferated Warfighter Space Architecture (PWSA)
The PWSA program, previously National Defense Space Architecture (NDSA), was born out of the DoD's need for space-based sensing and communication in LEO



Source: Space Development Agency

BofA GLOBAL RESEARCH

Beneficiaries within our coverage universe: CACI

Within our coverage universe, CACI International (NYSE: CACI) is also a potential beneficiary of the SDA PWSA program through its SA Photonics business. SA Photonics, which was acquired back in December 2021, specializes in optical communications, which involves point-to-point transmission that is much harder to disrupt and/or intercept than traditional radio transmission. SA Photonics is already producing optical communication terminals for DARPA's Blackjack program satellites. In September 2023, CACI's CrossBeam Optical Communication Terminal (OCT) successfully completed Interoperability Testing (OIT) for the SDA Tranche 1 data relay and tracking network.

Exhibit 3: Stocks mentioned
Prices and ratings for stocks mentioned in the report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
CACI	CACI US	CACI International	US$ 330.03	B-1-9
LHX	LHX US	L3Harris	US$ 204.54	B-2-7
LMT	LMT US	Lockheed Martin	US$ 456.47	B-2-7
NOC	NOC US	Northrop Grumman	US$ 473.88	B-1-7
RTX	RTX US	Raytheon Tech	US$ 85.05	B-3-7
RKLB	RKLB US	Rocket Lab	US$ 4.92	C-1-9

Source: BofA Global Research

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Price objective basis & risk

CACI International (CACI)

Our PO of $385 is based on a 0.9x relative EV/EBITDA multiple to the defense primes on CY24 estimates. This equals 13x EV/EBITDA. In our view, the company's renewed capital deployment strategy (opportunistic share repurchases) offsets the discount related to the lack of dividend (vs. peer group). The company continues to execute its tech strategy, disciplined approach to M&A, and is well positioned with respect to DoD priorities. However, the discount vs. primes reflects supply chain pressures in the near term and headline risk from political control impacting defense spending (relatively harder for short-term cycle companies).

Downside risks are cuts to the DoD budget vs. anticipated, problems finding acquisition targets, integrating M&A, hiring the right personnel, containing its costs, estimating costs and executing on fixed price contracts, sustaining reputational risk and future awards.

Upside risks are a better than anticipated federal budget allocated to innovative technologies and modernization, inexpensive and well integrated M&A activity, unexpected capital return to shareholders in the form of dividends, market share gains in the mission technology arena, better than expected margin expansion.

L3Harris (LHX)

Our PO of $210 is based on an 15.8x 2024E P/FCF multiple. The P/FCF multiple reflects a 0.8x relative multiple to the S&P 500 on '25 estimates. Improved sentiment on defense spending offset by operational hurdles is reflected through a relative valuation in line with the LHX and defense historical average, in our view.

Upside risk to our PO could result from LHX winning more content on new and existing programs vs. our expectations. Downside risk to our PO could result from continued supply chain challenges and LHX not integrating LLL and HRS as we expect. Integration challenges could put a strain on cash and impact our FCF estimates.

Lockheed Martin (LMT)

We derive our PO of $465 using a discounted cash flow (DCF) analysis that factors in a discount rate of 8.8%, an implied long-term growth rate of 2.3%, and an FCF growth rate of 5% for years 2027-2032e.

Downside risks: as LMT derives nearly 30% of revenue from the Aeronautics division, should the company run into any execution issues on the F-35 program, we believe this could materially affect the company's financials in addition to posing headline risks. Execution risk on defense programs could result in cost overruns and margin contractions. Unexpected cancellations to programs in both commercial and military could materially impact Lockheed Martin as a result. Orders from international programs are difficult to time due to the complexity of the process. Thus, we could see some lumpiness with regard to international orders.

Upside risks: F-35 program performs better than anticipated, defense spending is higher than expected, and LMT continues to buy back more shares than we forecast, driving higher EPS growth.

Northrop Grumman (NOC)
We derive our PO of $615 based on a DCF analysis that reflects a 5% Y/Y growth rate for 2025-2030e, a 2.7% long term growth rate and a 7.7% discount rate. The US Defense Budget Authorization has grown at a 1.8% CAGR in constant dollars since post World War II. Considering the most profitable production phase of the B-21 Raider program starts in about ten years and the GBSD will enter production at the end of this decade, we expect NOC's next terminal growth rate could exceed the historical growth rate of US defense spending.

Downside risks to our PO are that execution risk on defense programs could result in cost overruns and margin contractions, and unexpected cancellations to programs in both commercial and military could materially impact NOC.

Raytheon Tech (RTX)
Our PO of $78 is based on a DCF analysis that factors in a discount rate of 11.5%, a 4% next five year growth rate, and a terminal growth rate of 4%. Both the next five year and terminal growth rates are a blend of US defense and global commercial aerospace growth. We note that our FCF assumptions do include some risks associated with a larger-than-anticipated scope and cost to fix the P&W GTF powder metal issue.

Upside risks to RTX revenue and profits include if the GTF issues are fixed faster and smoother than anticipated, if the comm'l aero and bizjet recoveries are better than expected, if margins fare better than we are forecasting, if the company executes on existing programs better than expected, or if gains share in the international market or makes a materially accretive acquisition.

Downside risks to PO are a downturn in commercial aviation due to the natural business cycle or an exogenous event such as a terrorist attack or a pandemic, additional complications related to the GTF powder-metal issue present further risks, a severe global economic slowdown affecting top-line growth as 45% of sales are generated outside the US, execution risk on defense programs or unexpected cancellations to programs, and uncertain timing around orders from international programs.

Rocket Lab (RKLB)
Our PO of $10 is based on a long-term DCF of Base, Bull, and Bear cases for different revenue and cash generation scenarios between now and 2035. Our DCF factors in a 14.5% discount rate and assigns 33% probability to the Base case, 33% probability to the Bull case, and a 33% probability to the Bear case. We employ a lower discount rate relative to peers to account for the company's more mature launch capabilities. In our view, the equal weighting fairly reflects current investor risk appetite, momentum for new technology space stocks, and the perceived viability of Rocket Lab's business model compared to peers.

Downside risks to our PO are persistent COVID-19 restrictions in New Zealand, production delays, constellation launch market remaining captive to certain providers, setbacks to the economic recovery, inability to achieve M&A synergies, and setbacks to Neutron vehicle development.

Upside risks to our PO are better-than-expected cost cutting and margin expansion, well integrated M&A activity, market share gains in satellite components and services, higher reutilization levels, and better-than-expected commercialization of the Neutron launch vehicle.

Analyst Certification

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US - Aerospace and Defense Coverage Cluster

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BUY				
	AerCap Holdings N.V.	AER	AER US	Ronald J. Epstein
	Air Lease Corporation	AL	AL US	Ronald J. Epstein
	Boeing	BA	BA US	Ronald J. Epstein
	Booz Allen Hamilton	BAH	BAH US	Mariana Perez Mora
	BWX Technologies, Inc.	BWXT	BWXT US	Ronald J. Epstein
	CACI International	CACI	CACI US	Mariana Perez Mora
	Cadre Holdings Inc	CDRE	CDRE US	Ronald J. Epstein
	Crane Co.	CR	CR US	Ronald J. Epstein
	Embraer	ERJ	ERJ US	Ronald J. Epstein
	General Dynamics	GD	GD US	Ronald J. Epstein
	Howmet Aerospace Inc.	HWM	HWM US	Ronald J. Epstein
	KBR	KBR	KBR US	Mariana Perez Mora
	Leidos Holdings	LDOS	LDOS US	Mariana Perez Mora
	Leonardo DRS, Inc.	DRS	DRS US	Ronald J. Epstein
	Northrop Grumman	NOC	NOC US	Ronald J. Epstein
	Palantir Technologies	PLTR	PLTR US	Mariana Perez Mora
	Parsons Corporation	PSN	PSN US	Mariana Perez Mora
	RBC Bearings Inc	RBC	RBC US	Ronald J. Epstein
	Rocket Lab	RKLB	RKLB US	Ronald J. Epstein
	Teledyne Technologies Inc	TDY	TDY US	Ronald J. Epstein
	TransDigm Group Inc.	TDG	TDG US	Ronald J. Epstein
NEUTRAL				
	Albany International	AIN	AIN US	Ronald J. Epstein
	Garmin	GRMN	GRMN US	Ronald J. Epstein
	HEICO Corporation	HEI	HEI US	Ronald J. Epstein
	Hexcel Corporation	HXL	HXL US	Ronald J. Epstein
	L3Harris	LHX	LHX US	Ronald J. Epstein
	Lockheed Martin	LMT	LMT US	Ronald J. Epstein
	Textron	TXT	TXT US	Ronald J. Epstein
UNDERPERFORM				
	Bombardier	BDRBF	BDRBF US	Ronald J. Epstein
	Bombardier Inc.	YBBD B	BBD/B CN	Ronald J. Epstein
	CAE Inc.	YCAE	CAE CN	Ronald J. Epstein
	CAE Inc.	CAE	CAE US	Ronald J. Epstein
	Huntington Ingalls Industries	HII	HII US	Ronald J. Epstein
	Mercury Systems	MRCY	MRCY US	Ronald J. Epstein
	Raytheon Tech	RTX	RTX US	Ronald J. Epstein
	Spirit AeroSys-A	SPR	SPR US	Ronald J. Epstein
RVW				
	Triumph Group	TGI	TGI US	Ronald J. Epstein

Disclosures

Important Disclosures

Equity Investment Rating Distribution: Aerospace/Defense Electronics Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	Count	Percent
Buy	31	62.00%	Buy	23	74.19%
Hold	11	22.00%	Hold	9	81.82%
Sell	8	16.00%	Sell	6	75.00%

Equity Investment Rating Distribution: Global Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	Count	Percent
Buy	1895	53.62%	Buy	1083	57.15%
Hold	832	23.54%	Hold	454	54.57%
Sell	807	22.84%	Sell	383	47.46%

[R1] Issuers that were investment banking clients of BofA Securities or one of its affiliates within the past 12 months. For purposes of this Investment Rating Distribution, the coverage universe includes only stocks. A stock rated Neutral is included as a Hold, and a stock rated Underperform is included as a Sell.

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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster[R2]
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

[R2]Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

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