

Launchspace Technologies Corporation



*"Protecting Space and the Future
\$1 Trillion Space Economy"*

Space-based Data and Orbital Debris Remediation



- Unseen threats from adversaries put our \$ multi-billion national security satellites, and therefore our country, at risk from attack
- Orbital debris in low Earth orbit (LEO) is a major threat to the upcoming \$1 Trillion space economy as well as astronauts, satellites and the International Space Station (ISS)
- It's currently not possible to safely manage the forecasted 100,000 new satellites on orbit in the next 10 years and 1+ trillion pieces of small orbital debris that are currently too small to detect and track (Space Traffic Management - STM)

Launchspace believes it has the only comprehensive solutions that can address these problems that affect safe spaceflight and the global space economy

The solutions to the above problems should enable Launchspace to grow to large annual recurring revenues because these problems require a permanent solution

Market, Customers and Revenue Opportunities



Global space commerce is a **\$420 billion market** which is expected to grow to **\$ 1 Trillion** in 5 years and **\$2 - \$3 Trillion** in 10 years (Department of Commerce)

It's extremely at risk due to orbital debris, the inability to track a forecasted 100,000 satellites in 2030 (Space Traffic Management - STM) and threats from adversaries

1. Revenue from Sensor Satellites

Data Sales

USAF contact, Pentagon, NASA and Space Force expected, commercial satellite operators

2. Orbital Debris Removal Revenue

NASA Space Act Agreement and orbital debris solution on the ISS with Airbus

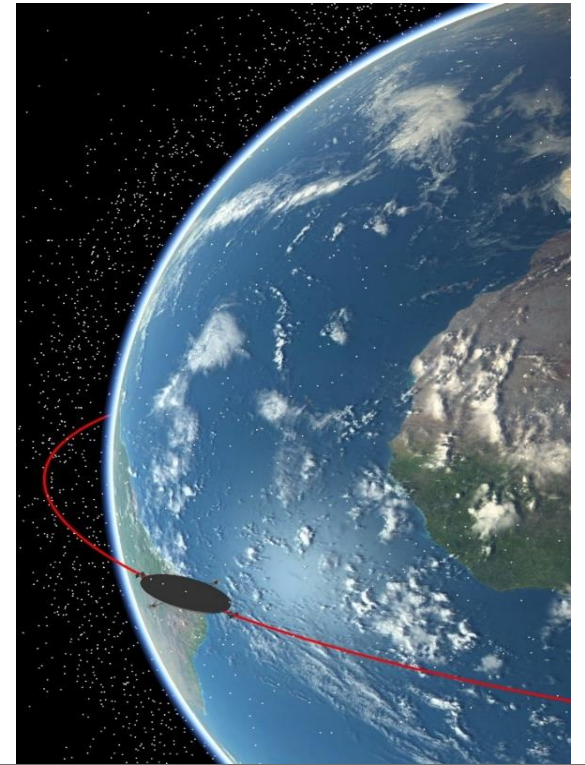
Annual recurring subscription revenue since orbital debris, STM and threats never go away

Launchspace's Solution: Two Equatorial Orbiting Constellations

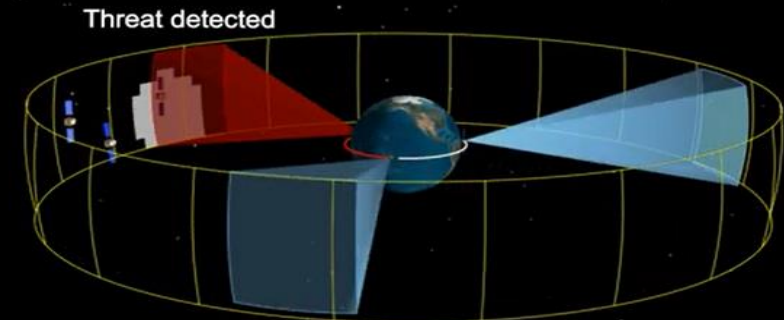
- The sensor satellite constellation will provide precision **Data** on satellites, orbital debris and threats
- **Debris Removal spacecraft** remove small orbital debris
- **Data** from the sensor constellation will enable astronauts, satellites and the ISS to maneuver out of the way of large orbital debris while Launchspace remediates small orbital debris with our orbital debris removal spacecraft

The combination of National Security Space (NSS), civil (NASA, NOAA) and commercial customers using our solutions could save the U.S. Government billions of dollars, maintain permanent safe space operations for spaceflight and help ensure continued U.S. superiority in space

**Orbital Debris
Removal Spacecraft**



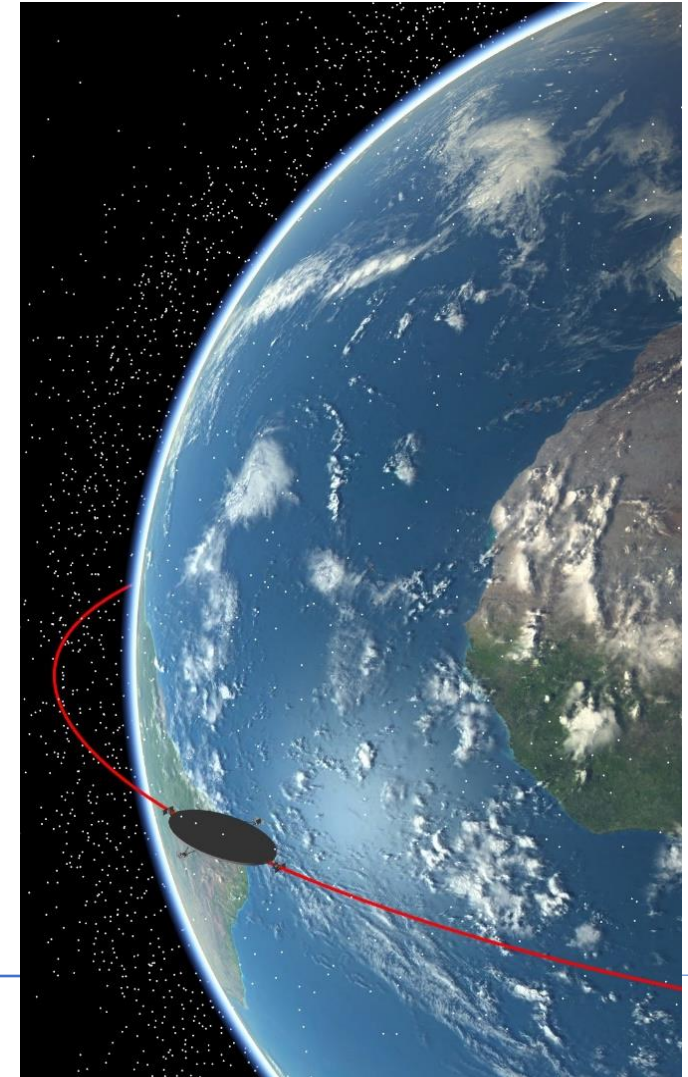
Why Space-Based Sensor Satellites



Launchspace's Orbital Debris Solution



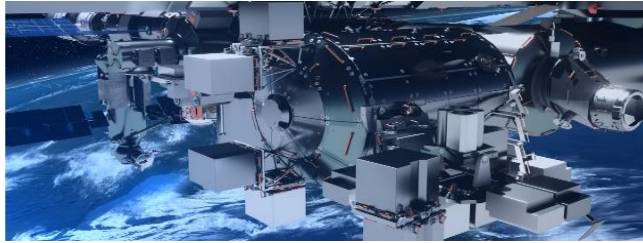
- All orbital debris in low Earth orbit (LEO) crosses the equator every 50 minutes
- Launchspace's debris remediation spacecraft will capture small orbital debris as it crosses the equator
- There is a data gap between 1 mm and 2 cm where 1+ trillion pieces of small orbital debris can't be seen but is an extreme threat to astronauts, satellites and the ISS
- Launchspace will use space-based sensors to see smaller orbital debris and maneuver our debris removal spacecraft to remove the debris threat for paying customers
- Launchspace has 4 patents for clearing orbital debris in equatorial orbits and maneuvering spacecraft away from threats



Launchspace Orbital Debris Roadmap



**Airbus
Bartolomeo
Platform**

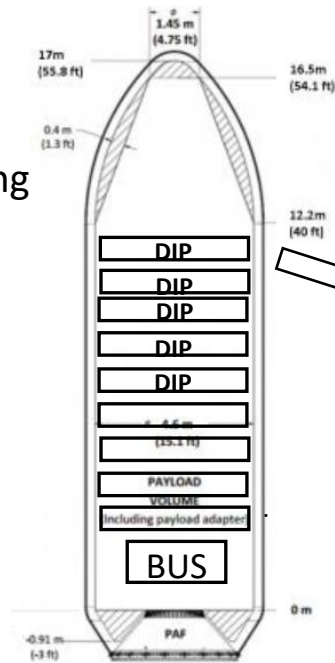


DIP Structure Profile



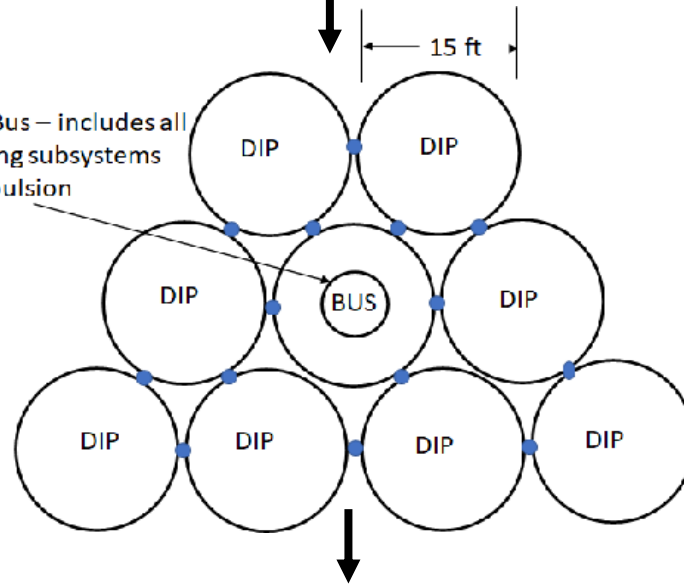
ISS debris remediation and enhanced spacecraft shielding demonstrator

**Falcon 9
Payload Fairing**

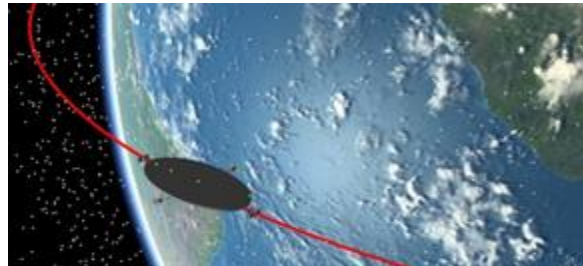


Debris Impact Pad (DIP)

Control Bus – includes all supporting subsystems and propulsion



Initial Operational Capability (IOC) put on orbit with a Falcon 9 launch vehicle



On-Orbit Full operational orbital Debris Impact Pad (DIP) with control buses

Why Space-Based Sensor Satellites



- In solving the orbital debris and space traffic management (STM) problems, Launchspace is able to detect and track threats from adversaries with greater precision than is currently available from ground-based radar and optical solutions
- Launchspace's space-based sensor spacecraft could result in multiple Space Force and Department of Defense (DoD) contracts that are very large

Why Space-Based Sensor Satellites



Space around the Earth is dangerously congested with satellites and orbital debris



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Space around the Earth and between the Earth and the Moon (Cislunar space) is increasingly vulnerable to attack from adversaries



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Competitors



- Competitors are focused on large orbital debris removal
 - Removing large debris would cost tens of \$ billions and for the most part, is unnecessary
 - Launchspace believes that the selective removal of only problematic large orbital debris combined with precision data from space-based sensors and the removal of small orbital debris is the only comprehensive solution that makes sense from both a technical and economic standpoint
 - Launchspace's enhanced sensor satellites will provide data that will enable satellites, spacecraft and the ISS to simply maneuver out of the way of large orbital debris
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Space-based Sensor Data and Orbital Debris Remediation



Past Deals:

- Space Force funded study on closing major observation (capability) gaps in our ability to detect and track threats (space domain awareness) that project our national security satellites and our country from attack
- Commercial customer for funding Launchspace to integrate into their launch vehicle

Current Deals:

- Airbus: our International Space Station (ISS) partner. Launchspace's orbital debris solution will be on their Bartolomeo platform with an in-kind contribution of \$5.24 million towards our ISS solution
- NASA Space Act Agreement – NASA is designing customized materials for Launchspace's orbital debris solution. Launchspace believes it is the only company in the world that has a NASA Space Act Agreement to create technology for orbital debris remediation
- NASA's ISS National Lab: Putting our orbital debris solution on the Airbus ISS platform and bringing it back to Earth after 1 year so Launchspace can examine how our **space qualified** technology performed

Space-based Sensor Data and Orbital Debris Remediation



Sales Pipeline

- Space Force: National Security Space (NSS) - three opportunities:
 - Orbital debris solution
 - Critical sensor satellites for national security applications
 - Launchspace expects a cooperative research and development agreement (CRADA) for securing sensor technology for a national security mission
- Space Florida: Manufacturing space for fabrication and testing our orbital debris solution and possible grants

Commercial customers will ultimately be the focus for our orbital debris remediation and data solutions

Financials – Orbital Debris



Launchspace believes contracts can usually go one of two ways with the following projected margins:

Funding of spacecraft program

8 – 10% profit margin (fee) for military applications, 6 – 8% for civil applications (NASA, NOAA) and market price for commercial customers. We assumed a 9% profit margin.

ISS project is \$2.9 million (launch to the ISS is in about 20 months)

The Initial Operational Capability (IOC) program will be approximately \$100 million (3 – 4 years). The final orbital debris spacecraft will be about \$300 million. We forecast 1, 2, 4, 6 full operational orbital debris spacecraft being put on orbit in 2027, 2028, 2029 and 2030, respectively.

In a public-private partnership, the company puts up at least 1/3 of the money towards a program but profit margins are much higher – risk and reward

Financials – Sensor Spacecraft



Funding of LTC's spacecraft program

The profit margins are the same as in orbital debris

However, data from sensor spacecraft are often paid one of two ways, or a combination of the two:

1. You get paid for all program costs + profit margin (fee)
2. You get paid a cost per observation fee with much less money up-front towards your program – another public-private partnership opportunity that is higher risk but higher reward. Cost per observation is the fee paid for every observation in space. It can range from about \$.50 per observation for very low-value data that has multiple sources to over \$20 per observation. There are typically thousands of observations per day per sensor and there will be 1 – 2 sensor payloads per sensor satellite. The forecasted revenue per high-value sensor payload is \$ millions per year and we plan on 24 – 26 sensor spacecraft on orbit, with 1 - 2 sensor payloads per sensor satellite

Sources and Uses of Funds



Launchspace
Technologies

The current funding round will raise up to \$1,069,975 from investors. The money will be used to enable Launchspace to achieve next-step milestones and the payments required to put our technology on the ISS, execution costs for legal and contractor payments, operating expenses and repayment of debt. The founders of Launchspace have invested over \$2 million in money and time.

Use of Funds

Compensation for managers	\$	162,500
Contract Engineers	\$	216,900
Airbus Hosting on the ISS	\$	37,150
Orbital debris technology repayment	\$	75,000
Promissory notes repayment	\$	97,000
Board payments	\$	18,000
Patents and Legal Fees	\$	100,000
Travel	\$	12,000
Insurance	\$	4,500
NASA Space Act Agreement Costs	\$	103,500
Debt Repayment	\$	97,000
Marketing and PR	\$	20,000
Audited Financials	\$	10,000
IT Consulting for Secure Network	\$	5,000
Office and Equipment	\$	30,027
Space Foundation Membership (Space Symposium)	\$	6,500
Additional Fundraising Costs	\$	22,469
Intermediary Fees	\$	52,429
Total	\$	1,069,975

Launchspace Team

John H. Bauman, CEO and Co-founder



Serial technology entrepreneur and pioneer in IP over satellite TV, broadband, microelectronics, mobile and many other technologies

Marshall H. Kaplan, PH.D, CTO and Co-founder



First to study orbital debris with a NASA funded grant. World renowned in orbital mechanics and spacecraft, launch vehicle and space systems design

Congressman Bob Walker



The leading public policy advisor in the space industry. Trusted advisor to U.S. presidents and the leadership at NASA, the Space Force, the Pentagon and CEO's of defense contractors

GP Sandhoo, Spacecraft Program advisor



GP was the superintendent for all spacecraft programs at the Naval Research Lab and is a Senior Executive Service (SES) member of government

Chris Rollins, PH.D, Sensor Scientist, (Research Support Instruments-RSI)



Has headed up sensor research and engineering on multiple national security NASA and NOAA (weather) programs

Bob Cenker, PE, Spacecraft Design and Architecture



35 years spacecraft bus design and architecture, former space shuttle astronaut

Rich Colarco, Project Manager



Deputy Commander for USAF Space Surveillance Network, Deputy Division Chief, Air Force Space Command for developing and fielding all USAF space tracking capabilities

Dennis Poulos, Cislunar Project Manager (Poulos Air and Space)



Consultant providing Space Domain Awareness, Orbital Debris, Orbital Servicing, Assembly, and Manufacturing and numerous advanced space and hypersonic development programs

Ramping up to 31 team members for Launchspace's first sensor spacecraft and orbital debris platforms

Summary



- Launchspace provides innovative solutions for orbital debris remediation and enhanced situational data for commercial, civil and national security customers
- Launchspace believes it has the only NASA Space Act Agreement that creates technology resulting in a commercial partnership with NASA that addresses orbital debris
- Recurring subscription revenues from commercial and government customers should continue for the foreseeable future because these problems require a permanent solution

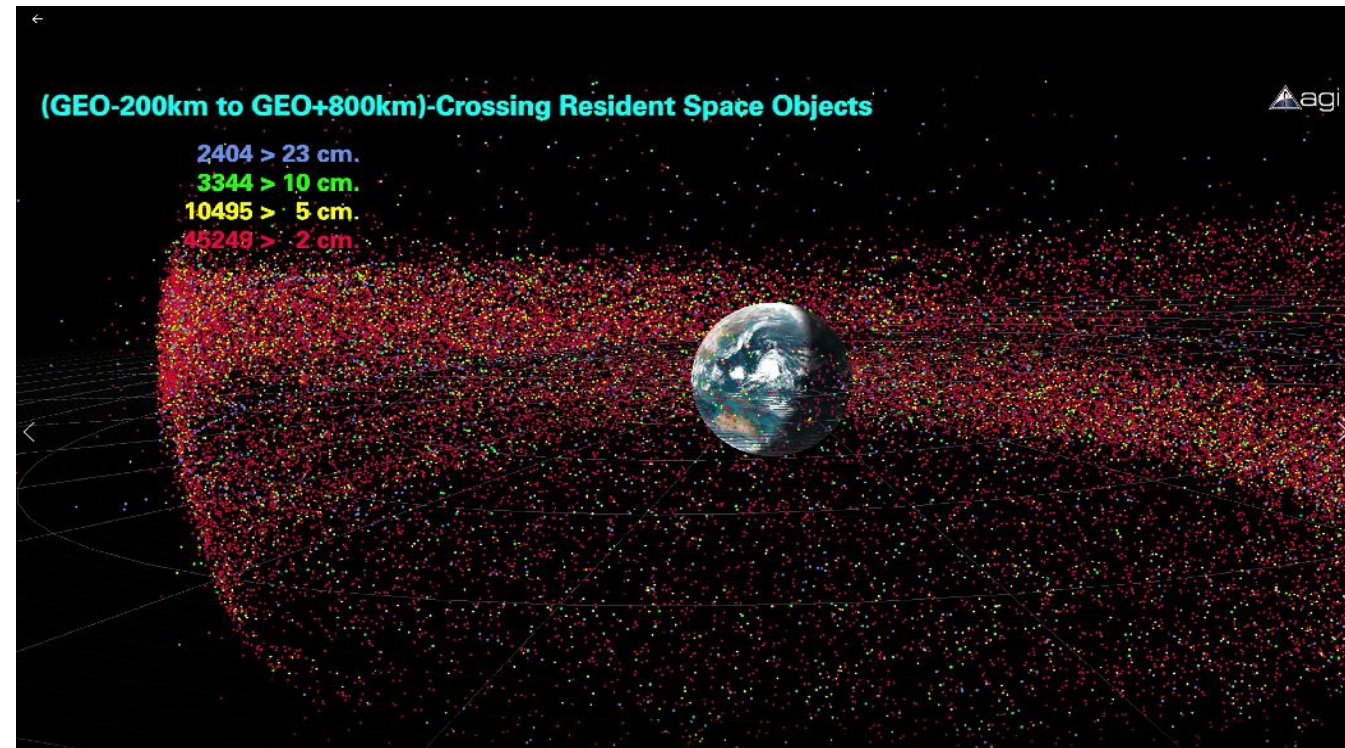
Launchspace Technologies Corporation (LTC)



Comprehensive and Enhanced:

- Data solutions for national security, civil and commercial customers*
- Orbital Debris Tracking and Removal*

www.launchspacetechnologies.com



Courtesy of Analytical Graphics (AGI)

Space Traffic Management – High Satellite Collision Risk



#	Operator	# S/C	Current RSO catalog average number			~200,000 RSO catalog average number		
			Collisions in 10 years	3km warnings in 10 years	1km maneuvers in 10 years	Collisions in 10 years	3km warnings in 10 years	1km maneuvers in 10 years
1a	Boeing V-band	1,120	0.1053	394,426	43,825	2.2404	8,392,631	932,515
1b	Boeing V-band	828	0.0816	305,630	33,959	1.7725	6,640,044	737,783
1c	Boeing V-band	1,008	0.5155	1,931,184	214,576	8.514	31,893,494	3,543,722
1	Boeing V-band	2,956	0.7024	2,631,240	292,360	12.527	46,926,169	5,214,020
2	CubeSat 380	100	0.0001497	33,687	3,743	0.00115	259,532	28,836
3	CubeSat 600 (= Planet)	100	0.00075	169,376	18,819	0.0114	2,556,868	284,096
4	CubeSat 800	100	0.00174	391,512	43,501	0.0226	5,086,080	565,120
5	Globalstar	40	0.0637	23,871	2,652	1.3566	508,527	56,503
6a	HawkEye 360	6	0.0000816	11,744	1,305	0.00128	184,271	20,475
6b	HawkEye 360	6	0.0000746	10,739	1,193	0.0008421	121,239	13,471
6c	HawkEye 360	6	0.0000681	9,807	1,090	0.000972	139,954	15,550
6	Hawkeye 360	18	0.00022422	32,289	3,588	0.003094	445,464	49,496
7	Iridium	71	0.184	369,385	41,043	2.0483	3,843,728	427,081
8	LeoSat	140	0.0129	105,405	11,712	0.2795	2,281,475	253,497
9	OneWeb	648	0.0363	296,613	32,957	0.8126	6,633,300	737,033
10	Orbcomm	31	0.2953	94,602	10,511	3.0618	981,006	109,001
11	SpaceX	4,000	0.4866	3,971,912	441,324	8.8417	72,177,201	8,019,689
12	Spire	100	0.000868	195,348	21,705	0.0136	3,070,006	341,112
13	Terra Bella	28	0.0022	30,878	3,431	0.0460	646,144	71,794

