2016 Nano/Microsatellite Market Forecast

Small Sat 2016 | Logan, Utah

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Our Overall Team

SpaceWorks®

- Systems analysis
- Systems engineering
- Preliminary design

- Concept development
- Market research
- Cost and business case analysis

Generation Orbit

- Flight test platforms
- SmallSat launch systems
- Liquid upper stages
- In-space stages

Terminal Velocity Aerospace, LLC

- Reentry systems
- Recoverable capsules
- Heat shields
- Precision landing

Blink Astro

- CubeSats for M2M/IoT
- Beam-forming antennas
- Low power ground transmitters
- Modular design & assembly

We are an Atlanta-based group of innovative space businesses focused on commercial markets, space systems analysis, and low-cost space hardware

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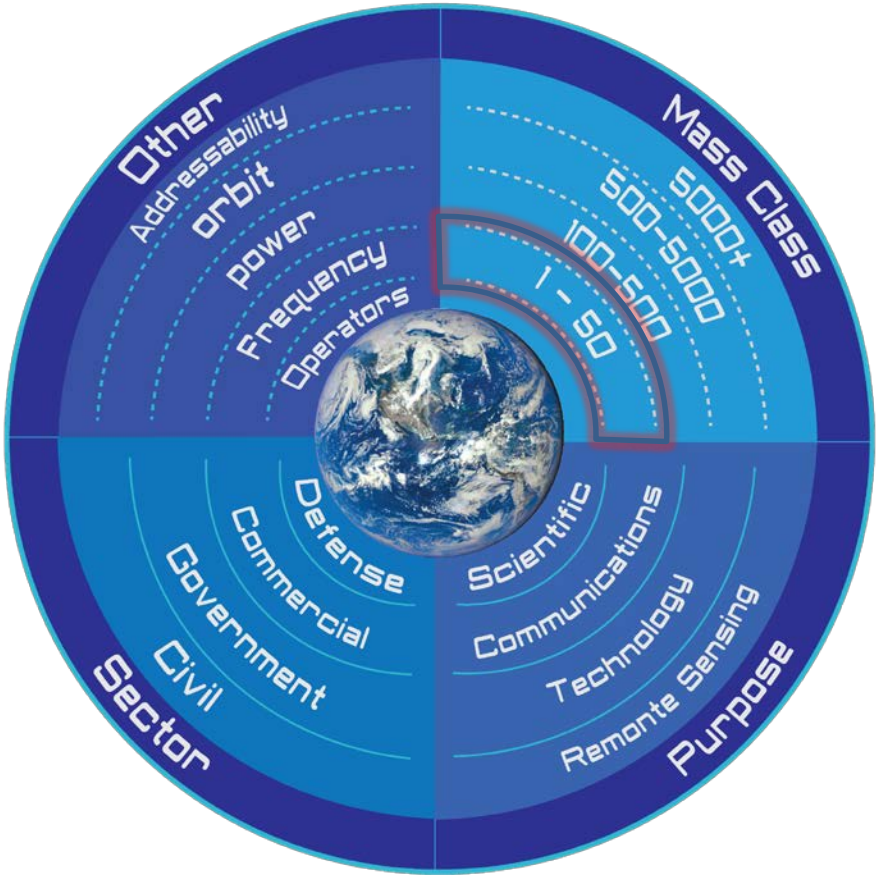
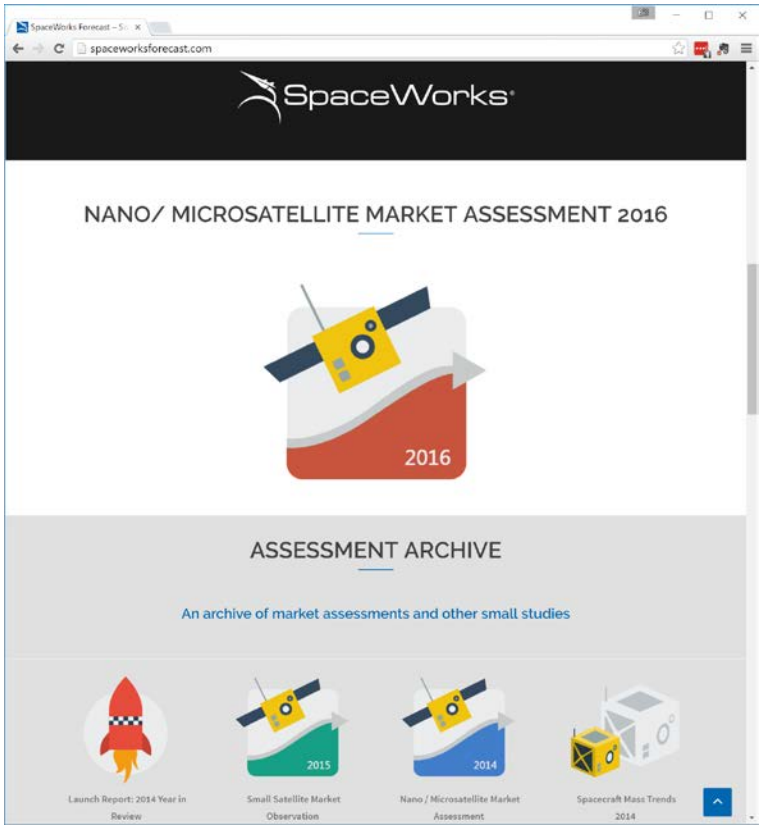
SpaceWorks Forecasting





Since 2010, SpaceWorks has published annual nano/microsatellite market reports based on our proprietary launch demand database
All public reports available at spaceworksforecast.com

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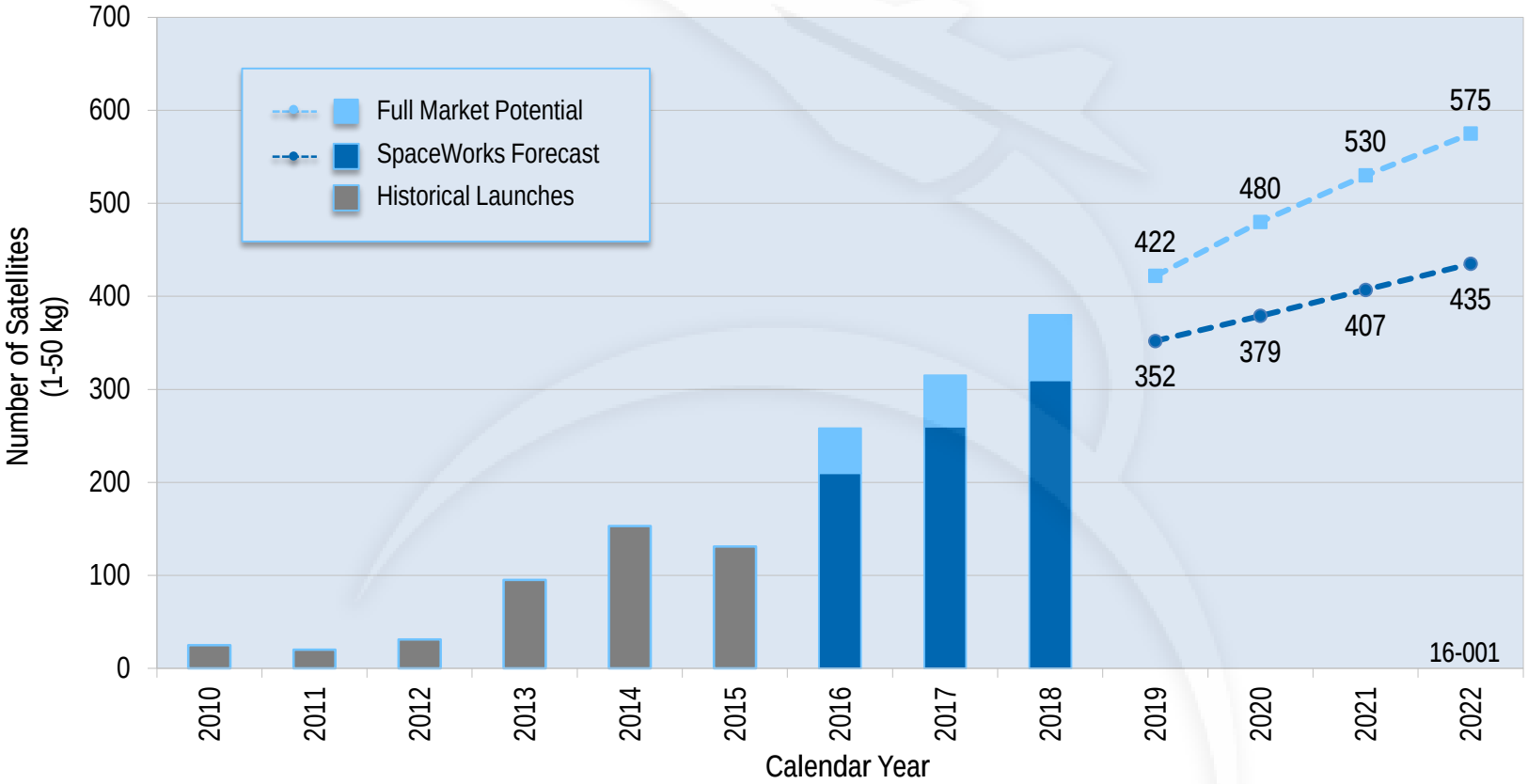
Nano/Microsatellite Launch History and Forecast (1 - 50 kg)

Projections based on announced and future plans of developers and programs indicate as many as 3,000 nano/microsatellites will require a launch from 2016 through 2022



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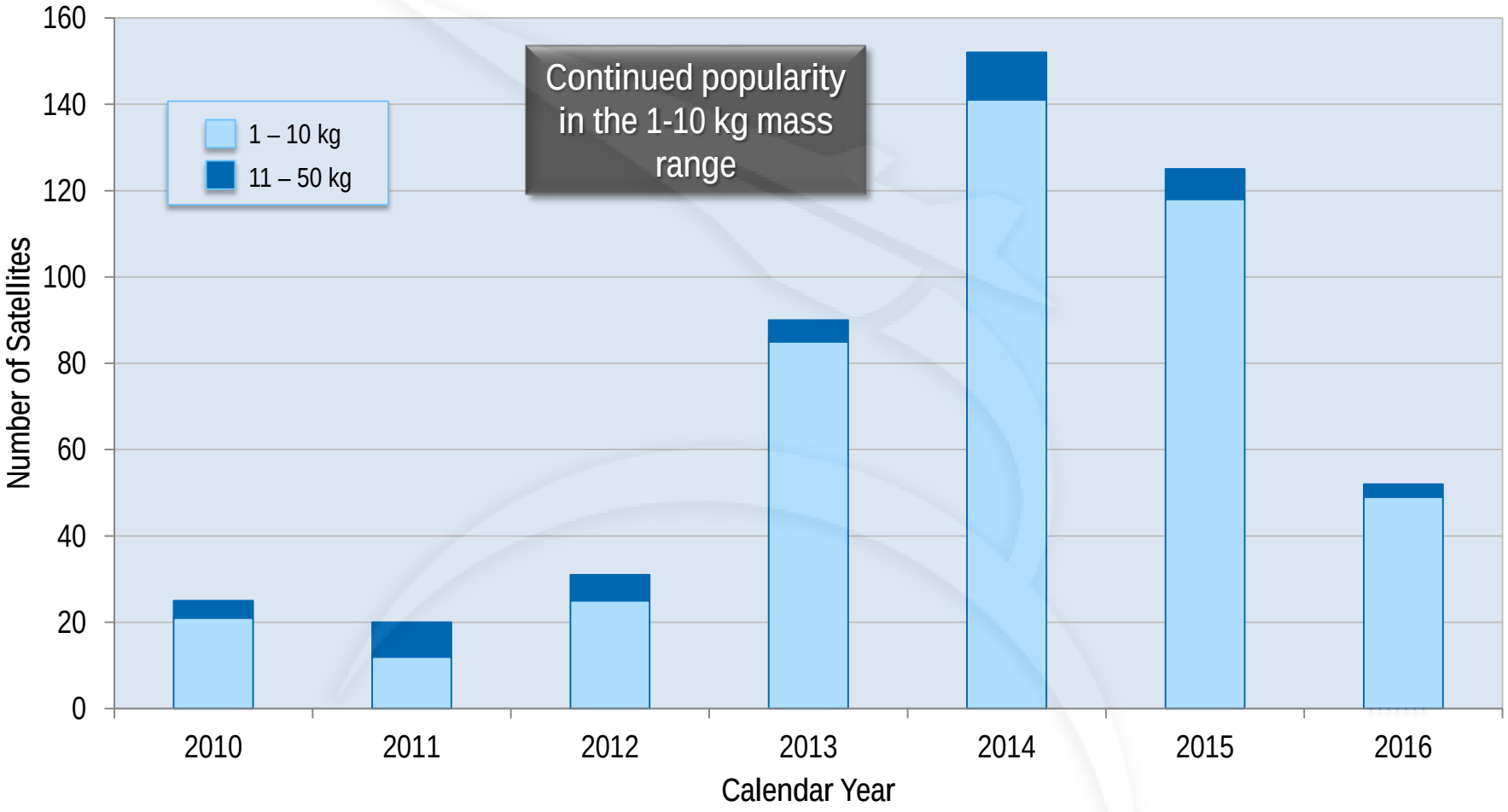
Nano/Microsatellites Launched: 2010 – 2016Q2 (1 - 50 kg)



Two launches in 2nd Half 2016 will add over 100 nano/microsatellites, making 2016 (OrbitalATK OA-7, Spaceflight Services SHERPA)

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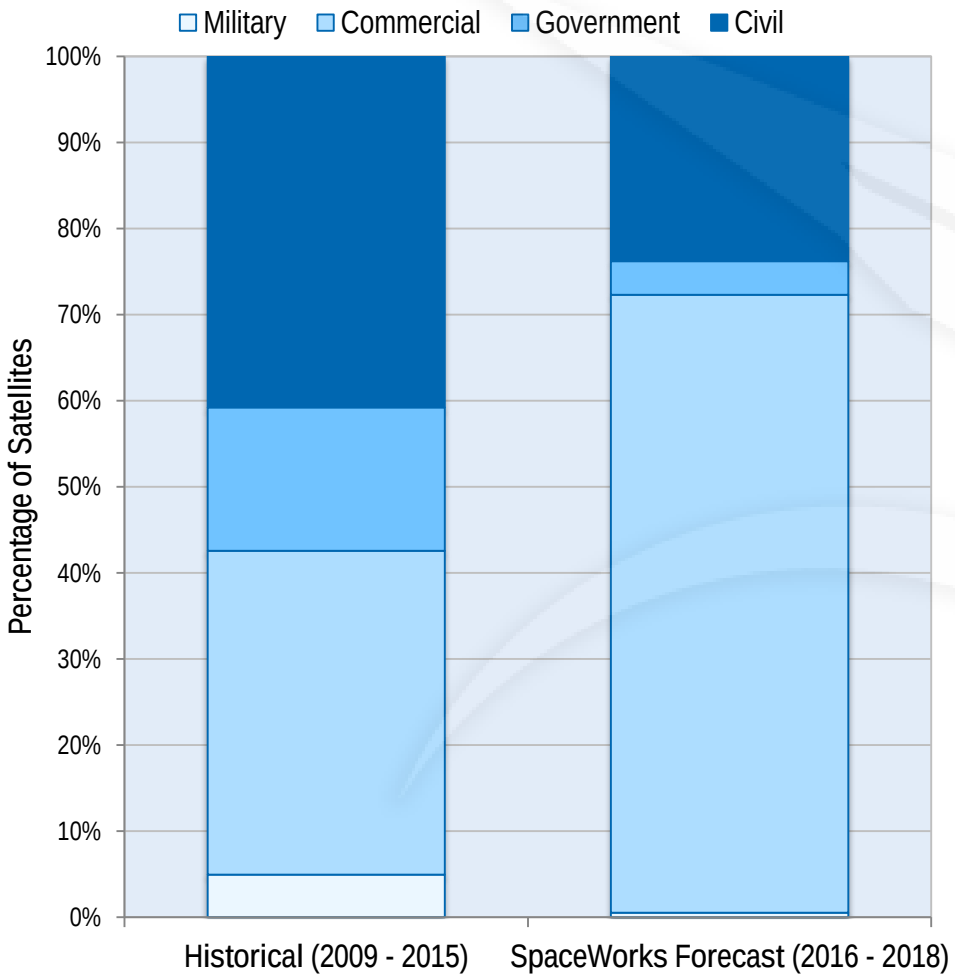
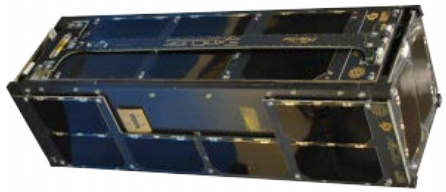
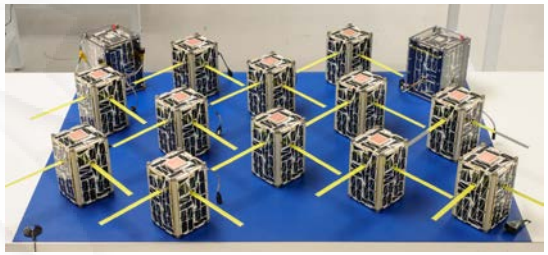
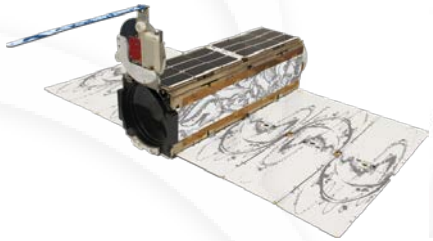
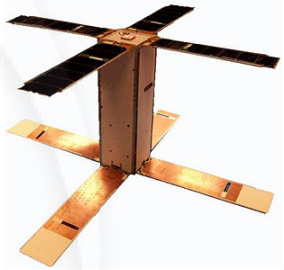
Nano/Microsatellite Trends by Sector (1 – 50 kg)











The commercial sector will increase its proportional representation over the next three years, to the extent that it will soon account for the majority of spacecraft launched in the 1 – 50 kg class

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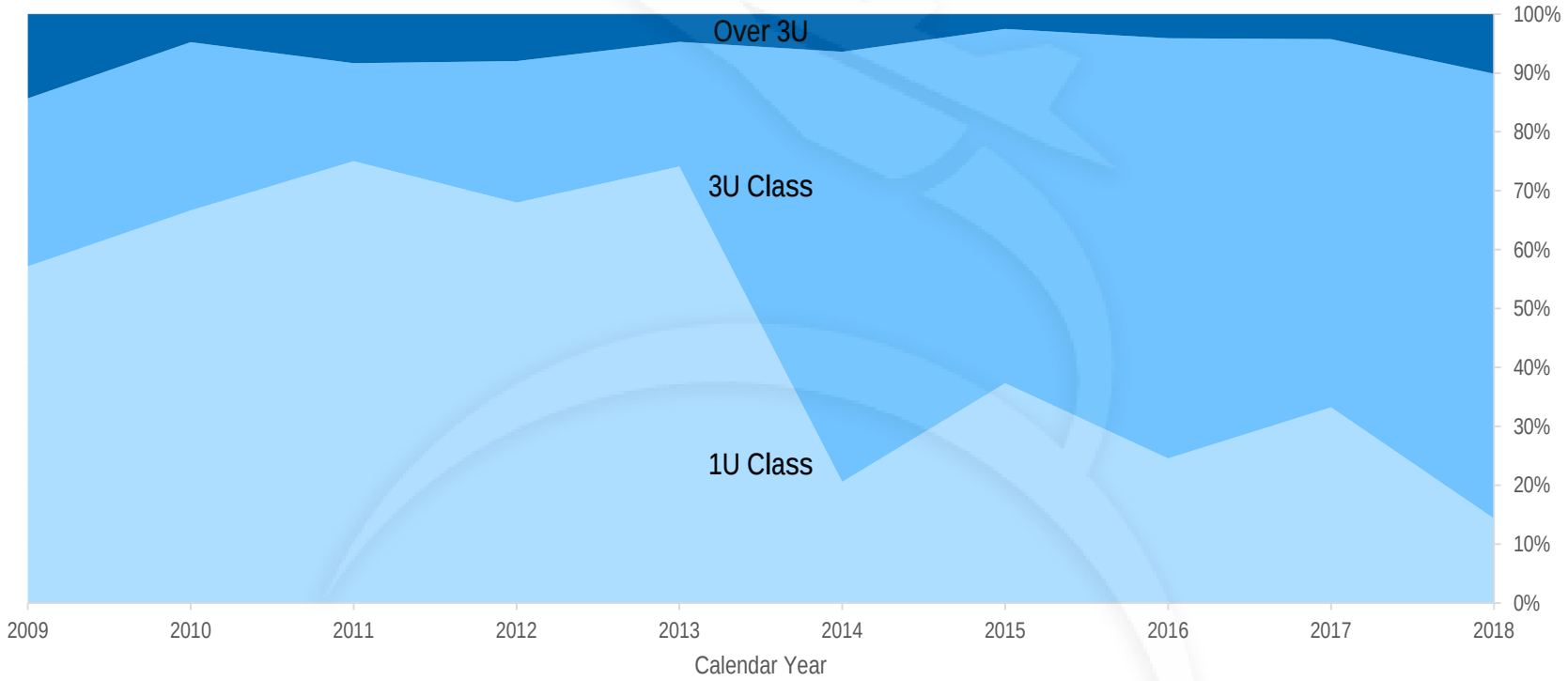
Nanosatellite Size Trends (1 - 10 kg)

While still widely used by academia, 1U class CubeSats will comprise less than 30% of the market in the future (compared to 71% from 2009 to 2013)



Over 60% of future nanosatellites (1 - 10 kg) will be in the increasingly popular 3U size class (compared to only 23% from 2009 to 2013)

* Please see End Notes 2, 5, 6, and 8.

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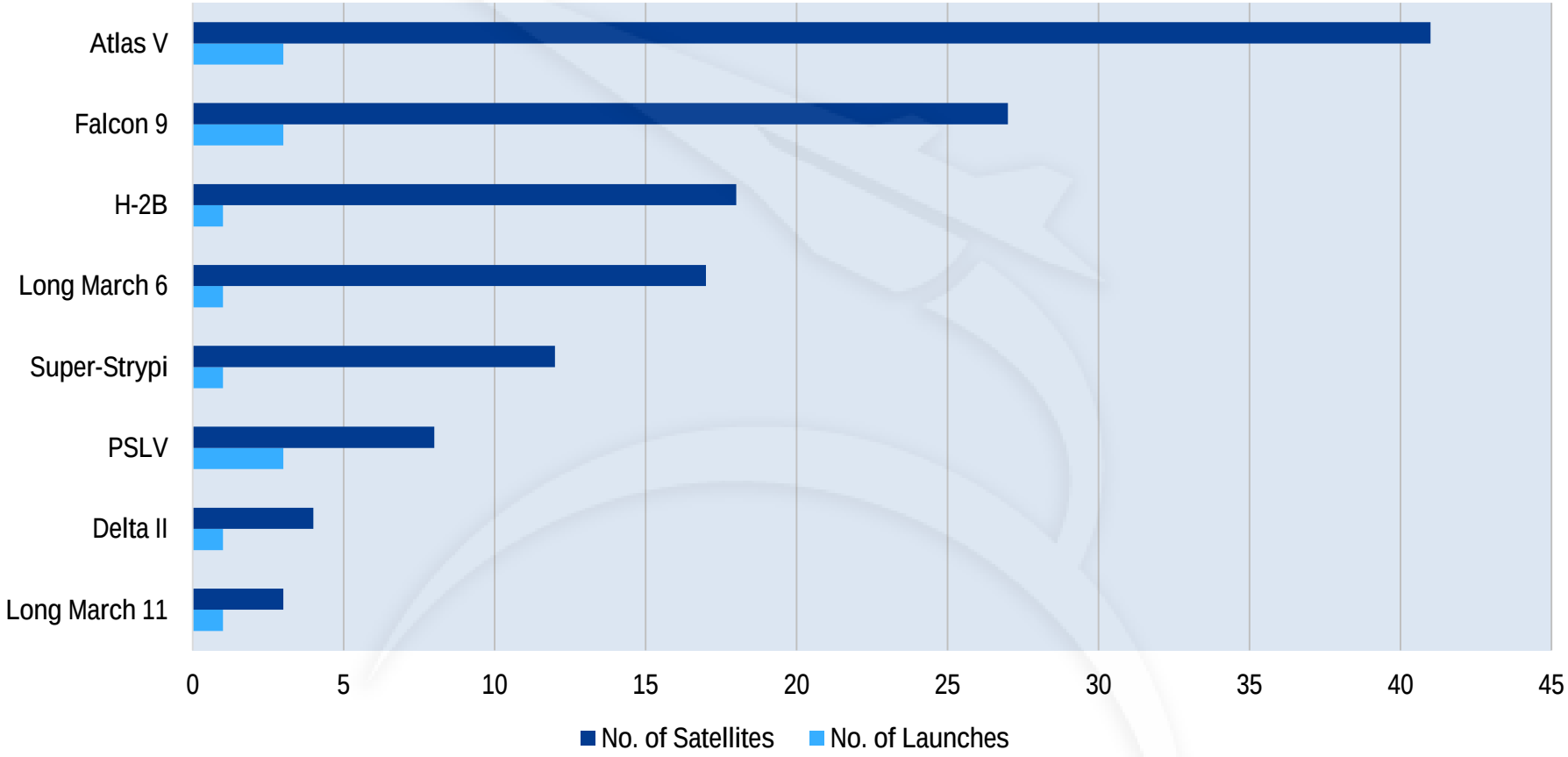
2015 Nano/Microsatellites Rides to Space



Low cost piggy-back opportunities on medium and heavy-lift launch vehicles have attracted small satellite payloads; Many small dedicated launchers under development could change this trend

* Please see End Notes 1 and 2.

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Emerging Launch Vehicles and Launch Providers

Launch System	Stated IOC	Target Price
Sandia Super Strypi	2015	$54K/kg
Firefly Alpha	2016	$21K/kg
Rocket Lab Electron	2016	$30K/kg
Virgin Galactic LauncherOne	2017	$45K/kg
Swiss Space Systems SOAR	2017	$44K/kg
Zero2Infinity Bloostar	2017	*tbd*
Generation Orbit GOLauncher 2	2018	$57K/kg
Vector Space Systems Vector 1	2018	*tbd*
PLD Space Arion-2	2021	*tbd*
NanoRacks	2013	$60k/kg

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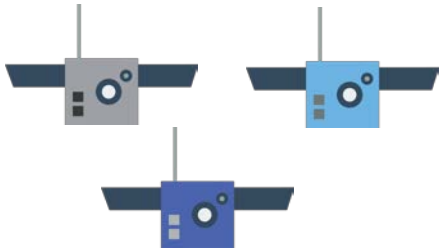
Increasingly Dynamic Market



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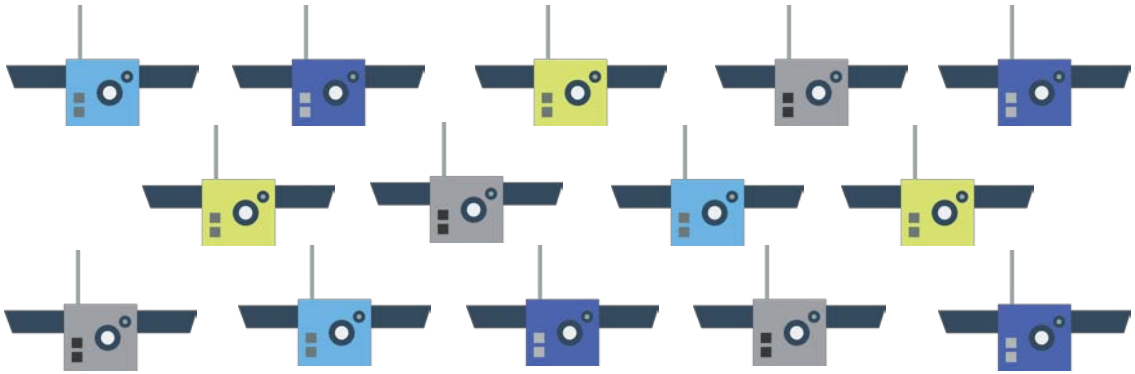
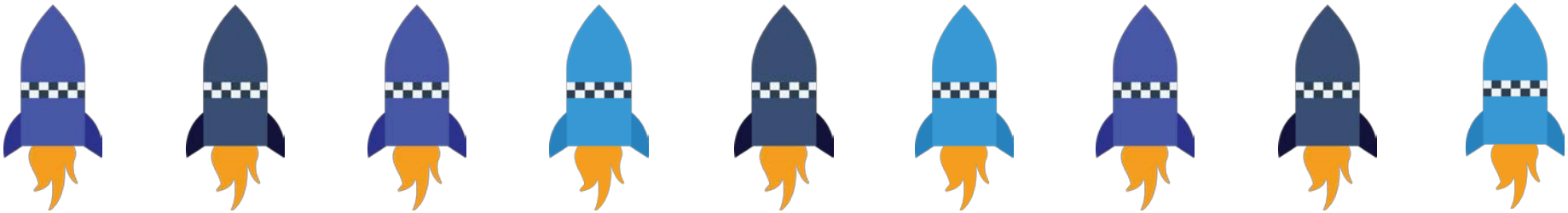
Increasingly Dynamic Market





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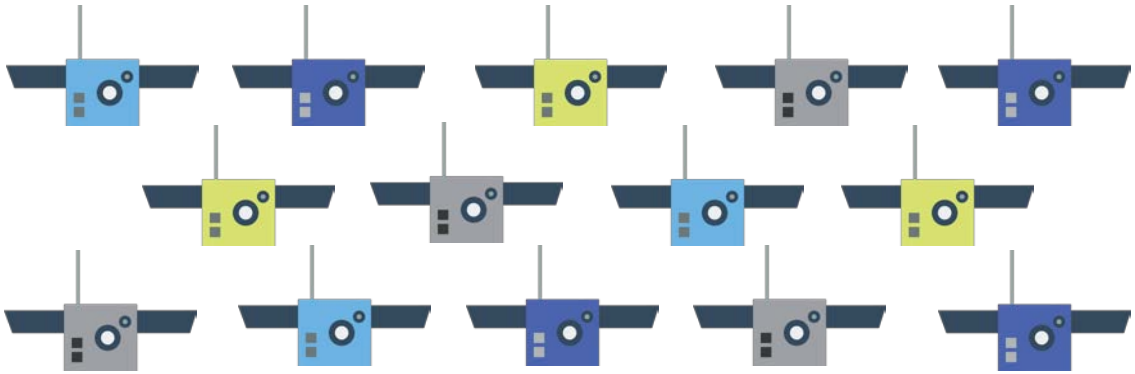
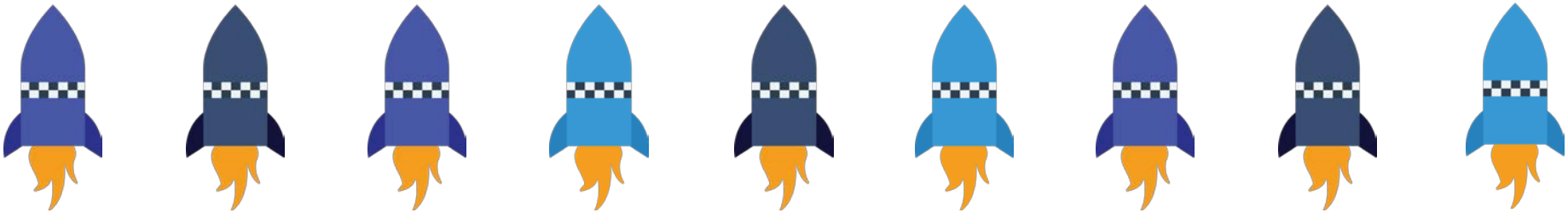
Increasingly Dynamic Market





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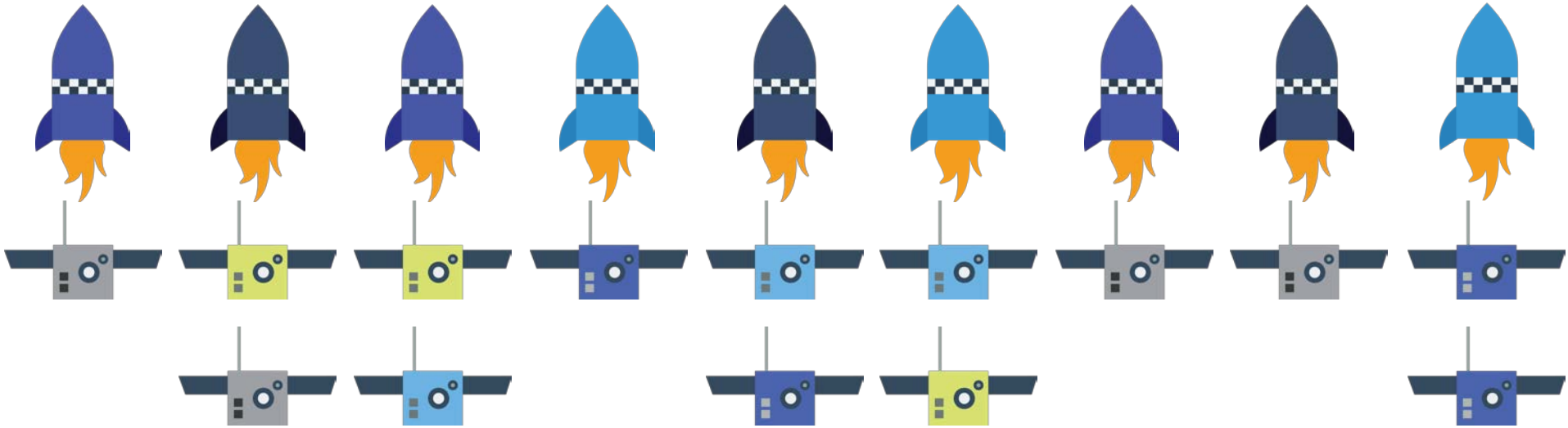
Increasingly Dynamic Market

- MarketMatch developed to predict outcomes in this complex market
- Economic simulation that manifests future launches based on preferences of satellite operators and pricing options from launch providers
- Identifies capture rate, flight frequency, and ROI for launch providers



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Summary

- Continued growth at double digit rates in the future driven by the commercial operators of nano/microsatellites
- Numerous small launch vehicles in development to provide dedicated service for small satellites potentially at a premium
- Predicting the future of the space industry is becoming more difficult, but SpaceWorks has the experience and tools to help guide your business decisions

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