Small Satellite Market Observations
Key metrics for continued market success

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Overview of Past SEI Nano/Microsatellite Market Assessments

- SpaceWorks has monitored the small satellite industry since 2008 and produced nano/microsatellite market assessments since 2010
- All of the past assessments are available online at www.spaceworksforecast.com

Past Market Assessments: 2010 - 2014

Recent Market Assessment: February 2015
SpaceWorks projected 140 to 143 nano/microsatellites would launch in 2014; 158 satellites actually launched.

94 of the 158 satellites were provided by commercial, Earth observation companies.
### Nano/Microsatellite (1 - 50 kg) Mass Trends

1U (~1 – 3 kg) satellites were scarce in 2014; 3U (~4 – 6 kg) satellites are becoming increasingly popular.

<table>
<thead>
<tr>
<th>Percentage Contribution</th>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
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</thead>
<tbody>
<tr>
<td>Historical (2009 - 2013)</td>
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<td></td>
<td></td>
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<td>1 - 3 kg</td>
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<td>4 - 6 kg</td>
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<td>7 – 10 kg</td>
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43 nano/microsatellites (1-50 kg) have launched so far in 2015; by this same time last year, 123 satellites had already launched.
Key Metrics for Nano/Microsatellite Market Success

Launch Vehicle Flexibility

More Launch Vehicle Options

Barriers currently exist that could prevent the nano/microsatellite (1-50 kg) market from reaching its full potential.
Metric #1: Launch Vehicle Flexibility

Failures can significantly impact launch timelines; flexibility is limited

Antares-130 Failure
(CRS-3 + 29 CubeSats)

Atlas V Launch
(CRS-4 + 45 CubeSats)

Falcon 9 v1.1 Failure
(CRS-7 + IDA-1 + 8 CubeSats)

Falcon 9 v1.1 Launch(es)
(~100 nano/microsats in 2015 backlog)
Metric #2: More Launch Vehicle Options

In the last five years, less than 15% of attempted launches had nano- and microsatellite (1-50 kg) payloads onboard.
Metric #2: More Launch Vehicle Options

From 2013 – Aug. 2015, nearly 300 nano- and microsatellites were launched by 12 launch vehicle families

- India: PSLV
- Russia: Soyuz 2.1, Dnepr
- Europe: Vega
- China: Long March
- Japan: H-II
- US: Antares, Falcon 9, M-I, D-II, D-IV, Atlas V

Launches (2013 - Aug. 2015)
Small Satellite Launch Vehicles Continue to Emerge

~20+ small satellite launch vehicle companies emerged to address launch issues facing small satellites

Compared to small satellite startups, little investment is reaching new commercial launch companies

Initial operational capability (IOC) dates continue to slip

Small satellite launch vehicle companies will need unique services, frequent launch opportunities, and competitive prices to succeed
Conclusions

- 2014 was a busy year: 158 nano/microsatellites launched; market dominated by commercial, Earth observation satellites

- Operators starting to favor larger, more capable satellites

- The launch market as it relates to smalls satellites is imperfectly competitive; launch failures can significantly influence the industry’s growth

- Less than 15% of launches in a given year include nano/microsatellites; launches are offered by a similarly small number of vehicles

- Small satellite launch vehicle companies will poised for success if offerings, launch frequency, and prices are better than status quo
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