Spaceflight Business Model

Our Model
Arrange launch opportunities for secondary payloads by contracting directly with the Launch Service Providers (LSP) and Secondary Payload Providers

Rideshare Model
Primary Payload

- Secondary Payload Provider (1)
- Secondary Payload Provider (2)
- Secondary Payload Provider (n)

Benefits for Satellite Developers
Established relationships with broad launch market
Fully arranged launch, from contract to orbit
Experienced party representing customer as single point of contact
Experienced payload integrators with existing dispensers and interfaces

Benefits for Launch Service Providers
Spaceflight provides broad access to small satellite payload market
Experienced party as representative of ALL secondary payloads (negotiation with single party)
Standardized interface control, documentation, test reports
<table>
<thead>
<tr>
<th>Past Launches</th>
</tr>
</thead>
</table>

## Antares A-One 2013

<table>
<thead>
<tr>
<th>Customer</th>
<th>Launch Provider</th>
<th>Size</th>
<th>Payload</th>
<th>Deployer</th>
<th>Launch Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planet Labs</td>
<td>Orbital Sciences</td>
<td>3U</td>
<td>Dove 1</td>
<td>ISIPOD</td>
<td>04/19/2013</td>
</tr>
<tr>
<td>NASA Ames</td>
<td>Orbital Sciences</td>
<td>1U (3x)</td>
<td>PhoneSats</td>
<td>ISIPOD</td>
<td>04/19/2013</td>
</tr>
<tr>
<td><strong>Total Launched:</strong></td>
<td></td>
<td><strong>4</strong></td>
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</table>

## Soyuz April 2013

<table>
<thead>
<tr>
<th>Customer</th>
<th>Launch Provider</th>
<th>Size</th>
<th>Payload</th>
<th>Deployer</th>
<th>Launch Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planet Labs</td>
<td>Roscosmos</td>
<td>3U</td>
<td>Dove 2</td>
<td>ISIPOD</td>
<td>04/19/2013</td>
</tr>
<tr>
<td><strong>Total Launched:</strong></td>
<td></td>
<td><strong>1</strong></td>
<td></td>
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</tbody>
</table>

## Dnepr November 2013

<table>
<thead>
<tr>
<th>Customer</th>
<th>Launch Provider</th>
<th>Size</th>
<th>Payload</th>
<th>Deployer</th>
<th>Launch Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planet Labs</td>
<td>Kosmostras</td>
<td>3U</td>
<td>Dove 3</td>
<td>ISIPOD</td>
<td>01/21/2013</td>
</tr>
<tr>
<td><strong>Total Launched:</strong></td>
<td></td>
<td><strong>1</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

## Cygnus / ISS January 2014

<table>
<thead>
<tr>
<th>Customer</th>
<th>Launch Provider</th>
<th>Size</th>
<th>Payload</th>
<th>Deployer</th>
<th>Launch Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planet Labs</td>
<td>NanoRacks/ISS</td>
<td>3U (28x)</td>
<td>Flock 1</td>
<td>NanoRacks</td>
<td>01/09/2014</td>
</tr>
<tr>
<td>University of Peru</td>
<td>NanoRacks/ISS</td>
<td>1U</td>
<td>UAP-SAT</td>
<td>NanoRacks</td>
<td>01/09/2014</td>
</tr>
<tr>
<td>Southern Stars</td>
<td>NanoRacks/ISS</td>
<td>1U</td>
<td>SkyCube</td>
<td>NanoRacks</td>
<td>01/09/2014</td>
</tr>
<tr>
<td><strong>Total Launched:</strong></td>
<td></td>
<td><strong>30</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Launched To Date: 36
Launch Demand - Segmentation

Spaceflight maintains a customer relationship management (CRM) launch demand database and has gained unique insights into small sat launch and orbit preferences.

Launch Demand Segmented by:

• Mission Type (civil, defense, commercial)
• Mission Profile (remote sensing, technology demonstration, communication, etc.)
• Spacecraft form factor (1U, 3U, 6U, etc.)
• Customer Country of Origin
• Launch Year
• Altitude and Inclination Preference
• Spacecraft with/without propulsion
Launch Demand

Spaceflight is tracking missions for 350 spacecraft, which is roughly 11 mt

# of Spacecraft Launch Demand by Form Factor (2014-2017)

- **1U**
- **12U**
- **MicroSat 25-50kg**
- **MicroSat 181-300kg**
- **3U**
- **27U**
- **MicroSat 51-100kg**
- **MicroSat 101-180kg**
- **6U**
- **MicroSat < 25 kg**

*Data Set is from Spaceflight's Proprietary Market Intelligence Database*

CubeSat trend is toward larger 3U to gain greater performance
Launch Demand

As a percentage of total demand by mass, MicroSats dominate total spacecraft mass seeking launch.

*Data Set is from Spaceflight’s Proprietary Market Intelligence Database
CubeSats Can Ride the Coat Tails on Commercial Launches
SHERPA is a hosted payload and in-space transportation solution that supports orbit raising and maneuvering of secondary payloads in low earth orbit, geosynchronous orbit placement, low lunar orbit insertion, and interplanetary capability.

**Custom ESPA Ring**
- Five 24 inch ports
- Supports up to five 300 kg – 120 x 100 x 140 payloads

**Avionics Deck**
- Power, communication, pointing, and payload interfaces

**Propulsion Deck**
- Propellant and Pressurant tanks
- Primary thrusters

**SHERPA Performance**

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Propellant System</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHERPA 400</td>
<td>2 Tank Monopropellant</td>
</tr>
<tr>
<td>SHERPA 1000</td>
<td>4 Tank Monopropellant</td>
</tr>
<tr>
<td>SHERPA 2200</td>
<td>4 Tank Bipropellant</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mission Duration</th>
<th>3 Years Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power per Payload</td>
<td>50 W Orbit Avg Power</td>
</tr>
<tr>
<td>Payload Downlink</td>
<td>Up to 100 Mbps</td>
</tr>
<tr>
<td>Attitude Knowledge / Accuracy</td>
<td>&lt; 15 arcsec / &lt; 50 arcsec</td>
</tr>
<tr>
<td>RAM Capacity for Payload Data</td>
<td>4 GB</td>
</tr>
</tbody>
</table>

**SHERPA 400**
- Total Ideal Delta-V Capability (m/sec)
- Total Payload Systems Mass (kg)

**SHERPA 1000**
- Total Ideal Delta-V Capability (m/sec)
- Total Payload Systems Mass (kg)

**SHERPA 2200**
- Total Ideal Delta-V Capability (m/sec)
- Total Payload Systems Mass (kg)
Inaugural flight on a U.S. based Launch Vehicle
Q3 2015 - 450 X 720km 98 Degrees 10:30 LTDN
Up to 1000 kilograms of Secondary Payloads
Customers range from CubeSats to 150kg microsats

Limited Capacity Available!
Discounted Pricing Available
Contact us after the presentation if interested
### Commercial Mission Pricing

**Spaceflight is the ONLY rideshare provider to offer public commercial pricing**

<table>
<thead>
<tr>
<th>Payload Type</th>
<th>Containerized Payloads</th>
<th>MicroSat Class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1U</td>
<td>3U</td>
</tr>
<tr>
<td>Length (max) cm</td>
<td>10.0</td>
<td>34.0</td>
</tr>
<tr>
<td>Height (max) cm</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Width (max) cm</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Mass (max) kg</td>
<td>1.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Price – Orbital (LEO)</td>
<td>$125k</td>
<td>$325k</td>
</tr>
<tr>
<td>Price – Orbital (GTO)</td>
<td>$250k</td>
<td>$650k</td>
</tr>
<tr>
<td>Price – Orbital (GSO / LLO)</td>
<td>$490k</td>
<td>$995k</td>
</tr>
</tbody>
</table>

Commercial pricing based on payload size and mass  
Launches for payloads ranging from CubeSats to MicroSats  
Mission pricing for Low Earth Orbit to Low Lunar Orbit  
*** Discounts available for launching multiple spacecraft

**Non Standard Options:**

- Constellation Deployment  
- Privacy Shroud for Security/Confidential Payloads  
  SHERPA Orbit Maneuvering:  
  - Altitude and Inclination  
  - In Space Transportation to the Moon, Mars, and Beyond
Spaceflight Networks will own and operate a global network of 11 of ground stations to provide communications connectivity through our dedicated networks operations center.

Phase 1 (green) – 2015: Alaska, Washington state, southern New Zealand, Guam
Phase 2 (yellow) – 2016: Hawaii, Huntsville, Massachusetts
Phase 3 (red) – 2017: Southern Argentina, Mauritius, Perth, Norway
Spaceflight Networks Service Packages and Pricing

Antennas
- Parabolic dish with radome (X & S)
- Yagi antennas (UHF)

Dedicated antenna lease – S/ X Band and UHF
- 24/7 use of a single antenna
- Monthly payment

On Demand Access - S/ X Band and UHF:
- Use of an antenna on an “as needed” basis to support your spacecraft mission
- Pay by the minute

****Firm pricing will be available June 1st, 2014
Summary

Spaceflight offers full-service space access solutions for small satellites!

We find you the optimal launch
Access to nearly all launch service providers across the globe provides many launch options on a number of launch vehicles. Secondary payload aggregation is key to finding the right orbit and at the right price.

We support your launch campaign
Our staff of experienced engineers and legal counsel is at your disposal to ensure your satellite has a seamless launch campaign - from providing design guidance and testing support to navigating regulatory compliance and ITAR.

We integrate your satellite to the launch vehicle
Spaceflight is launch vehicle and deployment hardware agnostic. We use the best deployment mechanisms that meet your mission requirements. Spaceflight physically mates your satellite to the launch vehicle and conducts tests to ensure safe and successful deployment on orbit.
Adam Hadaller
Mission Manager

www.spaceflightservices.com
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