“Working RideShare for the U Class Payload”

RideShare Workshop 2014

JPL

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Launch Services Program

NASA
What is a U Class Payload?

U class are payloads that are of a form factor of the 1U CubeSats – 10cm Cubed

We know of the 1U…3U…6U…12U…etc. and the carriers they use

   P-POD  CSD  ISIS POD  NLAS

There may be a standard for the CubeSat however the LV interface is not standard….$$$$$
Over the past three years these small spacecraft have grown in popularity in both the Government and the Commercial market.

This chart shows an increase in the number of NASA CubeSats selected and yet a very low launch rate. Why the low launch rate?

- Funding, more money = more launches
- CubeSat being selective about the orbit
- CubeSats not being ready

This trend is expected to continue with current manifesting practices. The backlog of CubeSats continues to grow including more sophisticated science missions with unique orbit requirements.
CubeSat Launch Initiative
Selection Process

**University CubeSat Missions**
CubeSat Missions
CubeSat Missions
CubeSat Missions

**NASA CubeSat Missions**
CubeSat Missions
CubeSat Missions
CubeSat Missions

**Non-Profit CubeSat Missions**
CubeSat Missions
CubeSat Missions
CubeSat Missions

**Selection Representatives**
HEOMD
STMD
SMD
Education

**Launch Services Program**
performs manifesting and management of CubeSats integration on ELVs

Launch Services Program serves as a technical advisor to the selection process

CubeSat Missions Selection List
CubeSat 1
CubeSat 2
CubeSat 3
CubeSat N
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<td><img src="#" alt="ELaNa I" /></td>
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<td><img src="#" alt="ELaNa X" /></td>
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<td><img src="#" alt="ELaNa VI" /></td>
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<td><img src="#" alt="ELaNa IX" /></td>
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<tr>
<td>Commercial</td>
<td><img src="#" alt="ELaNa V" /></td>
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<td><img src="#" alt="ELaNa VII" /></td>
<td><img src="#" alt="ELaNa VIII" /></td>
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<td><img src="#" alt="ELaNa X" /></td>
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**In Work**

**Manifested**

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<tr>
<td>Launched</td>
<td>Manifested</td>
<td>Un-Assigned</td>
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<td>16</td>
<td>53</td>
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## Missions and Systems

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<tr>
<th>ELaNa I</th>
<th>ELaNa II&amp;VI</th>
<th>ELaNa III</th>
<th>ELaNa IV</th>
<th>ELaNa V</th>
<th>ELaNa VII</th>
<th>ELaNa VIII</th>
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<tbody>
<tr>
<td>Taurus (Minotaur C)</td>
<td>Atlas V NRO Developed</td>
<td>Delta II</td>
<td>Minotaur I ORS Developed</td>
<td>Falcon 9 (Aft End)</td>
<td>Super Strypi ORS Developed</td>
<td>ISS</td>
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The vision of the Small Payload Team at LSP is to have the capability to deploy the U class payload off every US launch vehicle as a rideshare.

This will provide additional opportunities for the U class payload.

Currently we have capability to deploy from Atlas V, Minotaur-C, Delta II and Falcon 9.

Development work needs to be performed on both Delta IV and Antares to complete the US Fleet.
Not only are U spacecraft launching on rockets, they are now being deployed off of the ISS.

LSP is taking advantage of these opportunities to place CSLI CubeSats on Orbit.

Also a NanoLauncher System is in work for the dedicated launch of CubeSats.
LSP considers rideshare or small/secondary payloads as those payloads in the 1kg to 180 kg range. Payloads above 150kg could fly as a small payload on a commercial launch vehicle.

The diagram below shows the current capabilities that have flown or are scheduled to fly in the near future.
LSP Capabilities

LSP provides small/secondary payload integration and launch services to meet our customer’s requirements.

To meet these requirements, LSP’s contract mechanisms allow for the procurement of secondary/small payload services from our launch vehicle provides.

LSP continues to perform feasibility studies as well as develop small/secondary payload system on NASA ELV fleet vehicles.

Review of LSP’s small satellite integrated missions reveals both the number of small payloads launched and their mass regions.

<table>
<thead>
<tr>
<th>Mass Region</th>
<th>1-10kg</th>
<th>11-50kg</th>
<th>51-100kg</th>
<th>101-180kg</th>
<th>181-375kg</th>
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<tbody>
<tr>
<td># Secondarys flown to date</td>
<td>33</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>1*</td>
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* Mission was flown in a DPAF
So in Closing…

Is the concept of RideShare working for S/C other than the ESPA and U class?

How many 500kg to 2000kg RideShares have been coordinated and flown to date?

Are there future missions that are considering flying as RideShare?
Questions