ELaNa Mission Update

CubeSat Developer’s Workshop 2016

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ELaNa Mission Manager
NASA Launch Services Program
Recent Launches

**ELaNa IX – December 6, 2015 – Atlas V**
- MinXSS, University of Colorado - Boulder
- STMSat-1, St. Thomas More Cathedral School
- CADRE, University of Michigan

**ELaNa XI – May 20, 2015 – Atlas V**
- LightSail-A, The Planetary Society/ARC

**ELaNa XII – October 8, 2015 – Atlas V**
- Fox-1, AMSAT
- BisonSat, Salish Kootenai College
- ARC, University of Alaska – Fairbanks
- LMRST-Sat, JPL

**ELaNa VII – November 3, 2015 – Super Strypi**
- Argus, Saint Louis University
- PrintSat, Montana State University
Upcoming Launches

ELaNa XIII – NET June 2016 – Falcon 9
- ISARA, JPL
- EcAMSat, ARC

ELaNa XVI – May 2016 – Antares II
- KickSat-2, Cornell University

ELaNa XIV – Jan 2017 – Delta II
- RadFxSat, Vanderbilt University and AMSAT
- EagleSat-1, Embry-Riddle Aeronautical University
- Golden Eagle-1, Marquette University
- MiRaTA, MIT

ELaNa XV – Mar 2017 (U/R) – Falcon 9 Heavy
- LEO / StangSat, Cal Poly / Merritt Island H.S.
- ARMADILLO, University of Texas – Austin
# CubeSat Mission Manifest

<table>
<thead>
<tr>
<th>LV Provider</th>
<th>FY 2016</th>
<th>FY 2017</th>
<th>FY 2018</th>
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<tbody>
<tr>
<td><strong>NASA</strong></td>
<td></td>
<td>ELaNa XIV 1/20/17</td>
<td>ELaNa XVIII 10/31/17</td>
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<tr>
<td></td>
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<td>JPSS-1 (DII) 5*</td>
<td>ICESat-2 (DII) 3*</td>
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<td>MarCO May 2018 InSight (AV) 2*</td>
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<td><strong>NASA ISS</strong></td>
<td>ELaNa XVI 6/24/16 (U/R) OA-5 1*</td>
<td>ELaNa XVII 12/30/16 OA-7 TBD*</td>
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<td><strong>NRO</strong></td>
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<td>ELaNa 22 OA-8 6/1/17 TBD*</td>
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<td><strong>ORS/STP</strong></td>
<td>ELaNa XV 3/1/17 (U/R) STP-2 3*</td>
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<td>Commercial</td>
<td>ELaNa XIII NET June 2016 FORMOSAT-5 2*</td>
<td>ELaNa XIX June 2017 VCLS (RL) TBD*</td>
<td>ELaNa XX Dec 2017 VCLS (VG) TBD*</td>
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<td>ELaNa 21 Mar 2018 VCLS (FF) TBD*</td>
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* # CubeSat Missions

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<tr>
<th>Launched</th>
<th>Manifested</th>
<th>Un-Assigned</th>
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<tr>
<td>46</td>
<td>41</td>
<td>35</td>
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• New class of commercial launch vehicle service at KSC, dedicated for U-class satellites
• Improved CubeSat manifesting via NASA’s CubeSat Launch Initiative (CSLI)
• As reliability is demonstrated, some providers may be appropriate for future less risk-tolerant NASA missions
• Milestones-based payment structure; limited LSP insight through milestone reviews
• A single demonstration flight was awarded to Firefly, Rocket Lab, and Virgin Galactic
• Statement of Work: Minimum 60kg to LEO (425km), orbit inclination 33 to 98 degrees, launch date no later than April 15, 2018
• Companies are responsible for LV development costs
• Each mission will carry 12 to 18 CubeSats
Other Initiatives

• SLS EM-1
  – Efforts to procure and qualify dispenser and associated vibration isolation and thermal protection systems are continuing

• “CubeSat 101” Document
  – Working with Cal Poly to develop and distribute a guidebook for CubeSat developers
Words to the wise…

• The ISS is an awesome deployment platform, however if you are planning on or protecting for a deployment from the ISS, be sure to read/understand the NanoRacks ICD and design your hardware accordingly – ISS requirements are NOT the same as those typically enforced for ELV missions

• Orbital debris mitigation isn’t just a good idea…it’s the law – design your hardware and mission for compliance

• No CubeSat team is an island – Talk to those who have gone before you to avoid repeating their mistakes and share lessons learned whenever you can

• No license, no launch – start working you regulatory license applications AS SOON AS POSSIBLE to avoid unpleasantness

• Please be patient with the manifesting process, matchmaking takes time
Questions