



ELaNa Mission Update

CubeSat Developer's Workshop 2016

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Recent Launches



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

ELaNa IX - December 6, 2015 - Atlas V

- MinXSS, University of Colorado Boulder
- STMSat-1, St.Thomas More Cathedral School
- CADRE, University of Michigan











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



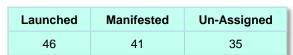
| LV Provider | FY 2016 | | FY 2017 | | FY 2018 |
|---------------|---|--|---|---|---|
| NASA | | ELaNa XIV 1/20/17 JPSS-1 (DII) 5* | | ELaNa XVIII 10/31/17 ICESat-2 (DII) 3* | MarCO May 2018 InSight (AV) 2* |
| NASA ISS NRO | ELaNa XVI 6/24/16 (U/R) OA-5 1* | ELaNa XVII 12/30/16 OA-7 TBD* | ELaNa 22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





* # CubeSat Missions







Venture Class Launch Services (VCLS)

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LAUNCH SERVICES PROGRAM

- 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