

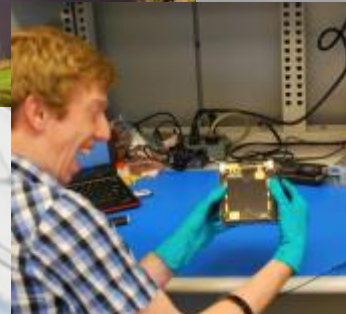
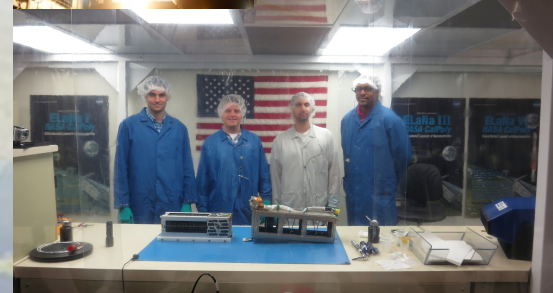
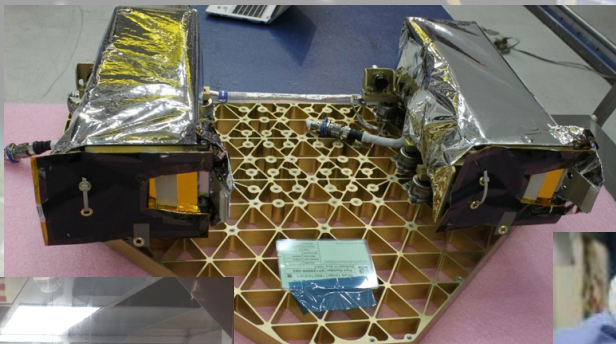
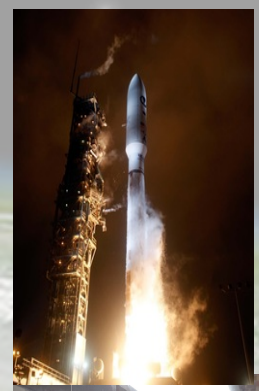


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What has LSP been doing the past 12 months?



“We have been
Manifesting...Integrating...and
Launching... CubeSats”





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ELaNa Launches

Aug 2013 – Aug 2014



LAUNCH SERVICES PROGRAM



- **ELaNa IV – ORS 3**
(Nov 19, 2013)
- **11 CubeSat**
Missions



- **ELaNa II – NROL-39**
(Dec 5, 2013)
- **4 CubeSat Missions**



- **ELaNa V – CRS 3**
(Apr 18, 2014)
- **5 CubeSat**
Missions

Partnerships have been key in launching CubeSats



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ELaNa IV (Nov 19, 2013)



- KYSat II (Kentucky Space)
- DragonSat -1 (Drexel University)
- Copper-Cube: (St. Louis University)
- TJSat (Thomas Jefferson HS)
- SPA-1 Trailblazer (University of New Mexico)
- PhoneSat (AMES)
- ChargerSat – 1 (UAH)
- Lunar Orbiter/Lander CubeSat (Vermont Technical College)
- Swamp Sat (University of Florida)
- CAPE-2 (The University of Louisiana at Lafayette)
- UNP-6 (University of Hawaii)





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ELaNa II (Dec 5, 2013)



- CUNYSAT-1 (Medgar Evers College, City University of New York)
- IPEX: Intelligent Payload Experiment (JPL)
- McubedII (University of Michigan / JPL)
- FIREBIRD (Montana State University)





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ELaNa V (Apr 18, 2014)



- All-Star/THEIA (Colorado)
- PhoneSat (AMES)
- TSAT (Taylor University)
- KickSat: (Cornell University)
- SporeSat (AMES)





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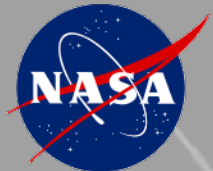
Launches next 12 months



NASA CubeSat Missions scheduled for launched over the next 12 months since August 2014

- ELaNa X (Nov 5, 2014)
 - » 3 CubeSat Missions
- ELaNa VII (NET Nov, 2014)
 - » 2 CubeSat Missions
- ELaNa VIII (Oct, 2014) - ISS
 - » 1 CubeSat Missions
- ELaNa IX (Apr, 2015) - ISS
 - » 3 CubeSat Missions
- ELaNa XI (NET May, 2015)
 - » 2 CubeSat Missions
- ELaNa XII (NET Aug, 2015)
 - » 4 CubeSat Missions





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ELaNa Missions Manifest



ELaNa Missions Manifest

LV Provider	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	
NASA  LSP	 ELaNa I March 4, 2011 Glory – Taurus 3 CubeSats	 ELaNa III Oct 28, 2011 NPP – DII 5 CubeSats		 ELaNa V Apr 18, 2014 CRS#3 – F9 5 CubeSats	 ELaNa X Nov 5, 2014 SMAP – DII 3 CubeSats	 ELaNa NET OCT, 2016 GOLauncher 2 3 Carriers	 ELaNa Nov. 2016 JPSS-1 – DII 3 Carriers  ELaNa Oct 2017 ICESat II – DII 3 Carriers	
ISS					 ELaNa VIII Oct 2014 ORB-3 1 CubeSats	 ELaNa IX NET Apr 2015 ORB-4 3 CubeSats		
NRO 		 ELaNa VI Sept 13, 2012 NROL-36– DII 4 CubeSats	 ELaNa II Dec 5, 2013 NROL-39 – AV 4 CubeSats		 ELaNa XI NET May 2015 AFSPC-5 4 CubeSats	 ELaNa XII NET Aug 2015 NROL-55 – AV 2 CubeSats		
ORS 			 ELaNa IV NET 11/19/13 ORS-3 11CubeSats	 ELaNa VII NET Nov 2014 ORS-4 2 CubeSats				
Commercial						 ELaNa Dec 2015 CubeSats	 ELaNa Dec 2016 CubeSats	 ELaNa Dec 2017 CubeSats



Manifested



In Work

Launched	Manifested	Un-Assigned
32	16	53



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CubeSat IDIQ



- **The current services contract with CalPoly for new awards will expire in Dec 2014**
 - All task are to be completed by December 2015
- **Five new contractors have been selected to provide hardware and services for NASA CubeSat Launches**
 - **Five Year contracting period worth a total of \$9.5 Million**
 - » 406 Aerospace LLC of Bozeman, Montana
 - » Applied Technology Associations of Albuquerque, New Mexico
 - » Spaceflight Inc. of Tukwila, Washington
 - » TriSept Corp. of Chantilly, Virginia
 - » Tyvak Nano-Satellite Systems LLC of Irvine, California



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CSLI Call #6



Release Date: July 31 , 2014

Response Date: November 25, 2014 @ 4:30 PM EST

<https://prod.nais.nasa.gov/cgi-bin/eps/synopsis.cgi?acqid=161828>

Just Google – NASA CSLI

Objective

NASA Human Exploration and Operations Mission Directorate is anticipates making launch opportunities for a limited number of CubeSats on launches or deployed from the ISS currently planned for 2015-2018.

NASA will provide integration and other services as necessary to complete the launch activity.

NASA will not transfer any funds to collaborators under Agreements negotiated in response to this Announcement.



CSLI Call #6



Benefit to NASA

Investigation must demonstrate a benefit to NASA by addressing goals and objectives of the NASA Strategic Plan and/or the NASA Education Vision and Goals.

Merit Review

Prior to submission each CubeSat investigation must have passed an intrinsic merit review. In the review, goals and objectives of the proposed investigation must be assessed to determine scientific, educational or technical quality of the investigation.

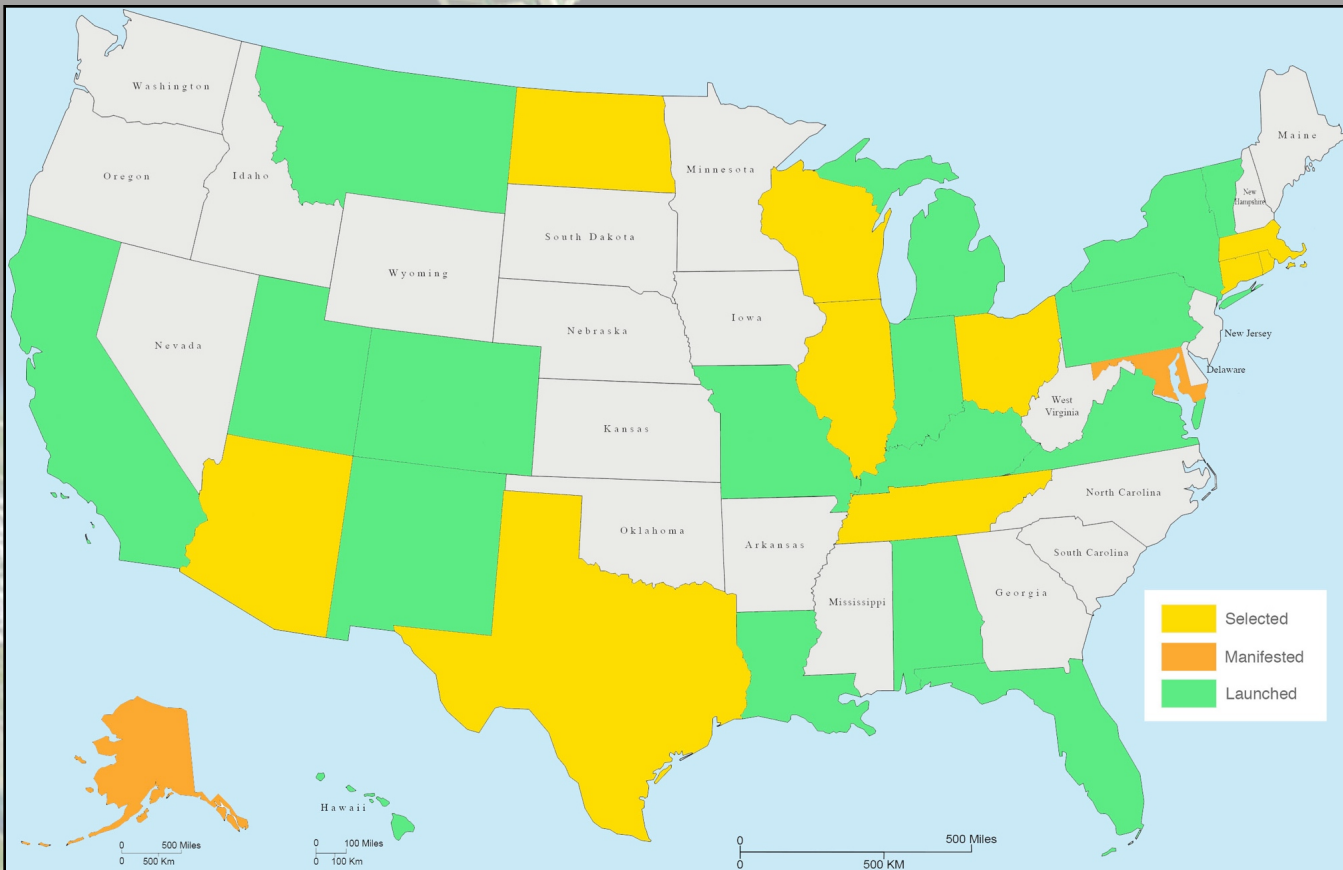
Feasibility Review

Prior to submission each CubeSat investigation must have passed a feasibility review in which the technical implementation, including feasibility, resiliency, risk and probability of success, was assessed.



LAUNCH SERVICES PROGRAM ■

Goal to broaden NASA's CubeSat Launch Initiative to reach all states by targeting the 21 "rookie states" that have had no previous presence in space.



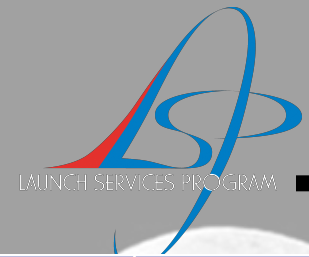
Previous CubeSat Launch Initiative selectees are encouraged to partner with and / or mentor organizations from these states.

Sensitive But Unclassified



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Missions and Systems



ELaNa I	ELaNa II&VI	ELaNa III & X	ELaNa IV	ELaNa V	ELaNa VII	ELaNa VIII & IX
Taurus (Minotaur C)	Atlas V NRO Developed	Delta II	Minotaur I ORS Developed	Falcon 9 (Aft End)	Super Strypi ORS Developed	ISS
Third Stage One 3U Carrier	ABC/Cullite Eight 3U Carriers	Second Stage Three 3U Carriers	NASA Ames dispenser Eight 3U Carriers	Aft End Surf Board Six 3U Carriers	NASA Ames dispenser Eight 3U Carriers	NanoRacks





Missions and Systems



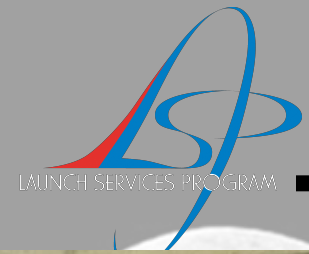
- Not only are CubeSats launching on rockets, they are now being deployed off of the ISS
- LSP is taking advantage of these opportunities to place CSLI CubeSats on Orbit
- Also a Nano-Launcher System is in work for the dedicated launch of CubeSats
 - Sept 2013 a GO launcher launch vehicle was placed on contract to launch three 3U CubeSats in late 2016





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Light Weight CubeSat Deployer



- Rail Pod developed by Tyvak under a NASA contract to reduce the mass of the deployer system
- Reducing the mass of a standard PPOD from 3.0Kg to 1.25Kg for the Rail POD
 - This is valuable when launched on a Nano-Launcher system with limited performance
- System has been qual'd to NASA GEVS levels
- Working to secure first flight in 2015





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Challenges



- CubeSats are starting to act more like Primary Missions
 - Science Requirements are becoming complex
- CubeSats not being ready and asking for a later launch
 - Changes to the readiness date they submitted in their proposal
 - More difficult to manifest and determine which launch to secure
- Launches
 - Tougher negotiations with launch service providers
 - » Launch Service Provider not interested in launching CubeSat missions
 - » Few Commercial missions to integrate CubeSats (Contracting
- Licenses
 - FCC
 - NOAA
- Orbital Debris
 - Policy may get more stringent for CubeSats
- Funding!
 - More Funding = More Launches....Current budget is limited



Summary



- Launched 32 CubeSats mission to date as ELaN
- Plans for 6 ELaN missions over the next 12 months
- CSLI
- Five new contractors will provide hardware and integration services
- Nano-Launcher system on contract for the sole purpose of launching CubeSats
- Development of a light weight CubeSat Deployer system that can be used on small launch vehicle
- Challenges



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Questions