



# CubeSat Launch Initiative Status Update

**Scott Higginbotham**  
Mission Manager  
NASA-KSC Launch Services Program



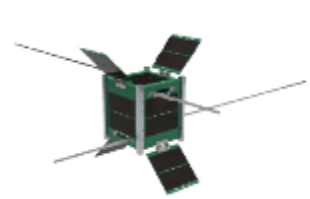
# CubeSat Launch Initiative



NASA's CubeSat Launch initiative (CSLI) provides access to space for CubeSats developed by the NASA Centers and programs, educational institutions, and non-profit organizations giving CubeSat developers a low-cost pathway to conduct research in the areas of science, exploration, technology development, education, or operations

The Launch Services Program (LSP) finds the ride and sees it through...





# CSLI: How It Works



## NASA Announcement of Opportunity

- NASA solicits proposals through an annual Announcement of Opportunity (AO)
- Educational Organizations, Non-Profits and NASA Centers submit proposed CubeSat Missions in response to AO

## NASA Review

- NASA Selection Committee reviews proposals and makes prioritized selections

## Selectees Develop/Design/Build CubeSat

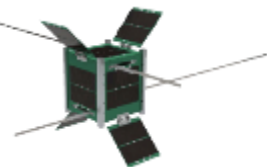
- Selectee raises all funds necessary for satellite construction and test
- Selectee builds and tests satellite
- Selectee provides NASA completed satellite for integration for launch

## NASA Assigns CubeSats to Manifested Launches

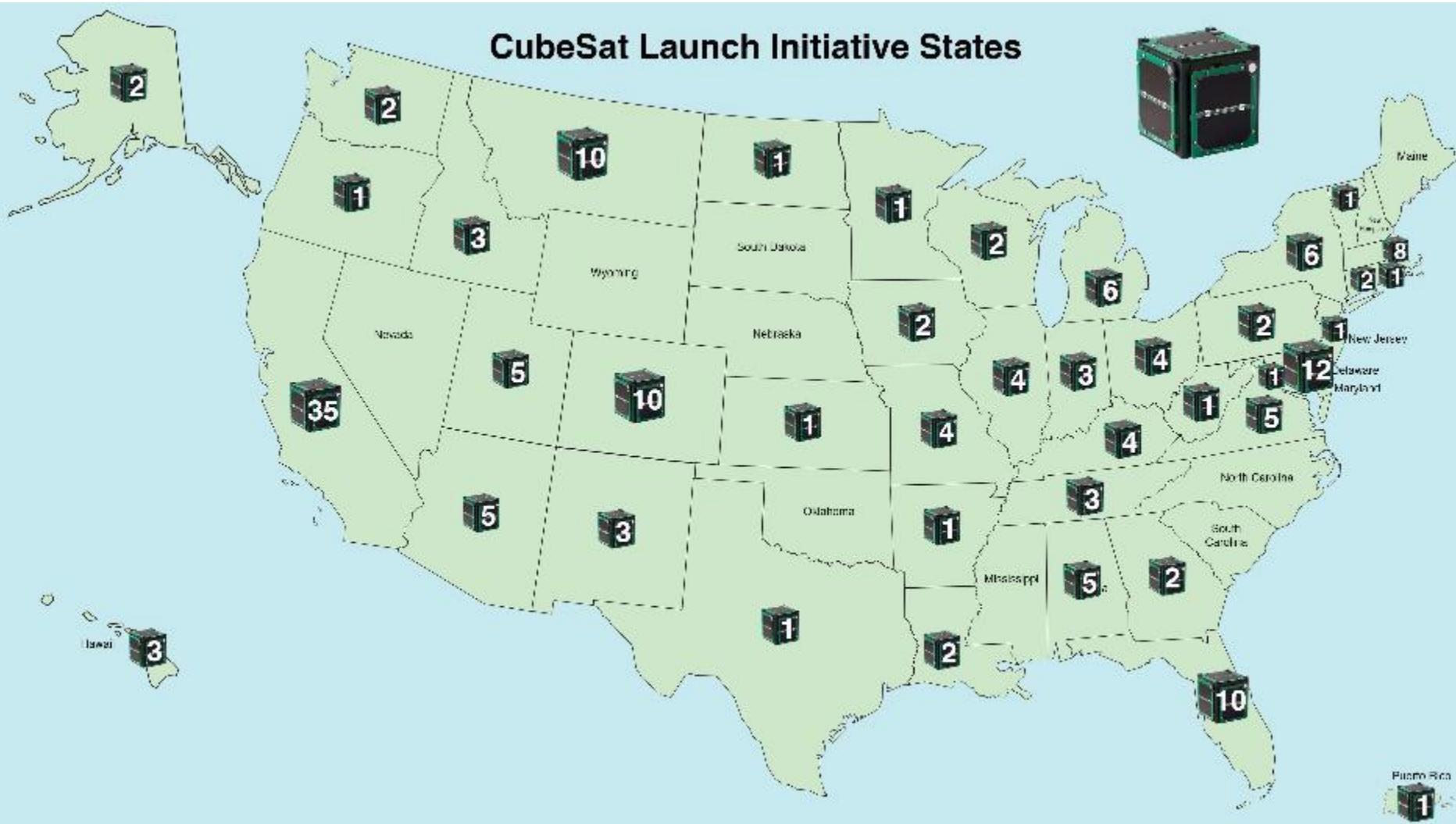
- NASA manifests CubeSat as auxiliary payload on available flights (bundled into ELaNa mission complements)
- NASA funds launch service and mission integration effort
- NASA analyzes CubeSat design to ensure proper use of the space environment, satisfaction of reentry requirements, and to verify that satellite will do no harm
- Cooperative Research and Development Agreement executed between NASA and Selectee

# 2009–2019 CSLI Selections

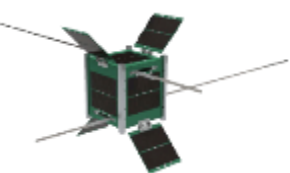
176 Projects – 93 Organizations – 39 States



## CubeSat Launch Initiative States



# CubeSat Launch Initiative 2019 Selections



# CubeSat Launch Initiative

National Aeronautics and  
Space Administration



*176 Missions Selected - 88 CubeSats Launched - 93 Organizations - 39 States*

**ELaNa**  
NASA  
CalPoly

Roberts Space Institute  
University of Colorado  
BOSSA  
Launching Education Into Space

*Glory March 4, 2011*

Educational Launch of Nanosatellite



**ELaNa III**  
NASA  
CalPoly

North Carolina State University  
Utah State University  
University of Michigan  
Montana State University  
Launching Education Into Space

*NPP October 28, 2011*

Educational Launch of Nanosatellite

**ELaNa VI**  
NASA  
NRO  
CalPoly

Michigan State University  
University of Colorado  
Bozinger  
California Polytechnic State  
University SLO  
University of Colorado Boulder  
Launching Education Into Space

*NROL-36 September 13, 2012*

Educational Launch of Nanosatellite

**ELaNa IV**  
NASA  
CalPoly  
STP  
ORS

University of Colorado Boulder  
University of Colorado Boulder  
University of Colorado Boulder  
Launching Education Into Space

*ORS-3 November 19, 2013*

Educational Launch of Nanosatellite

**ELaNa II**  
NASA  
NRO  
CalPoly  
SRI NPS

Montana State University  
University of Michigan  
JPL California Polytechnic  
State University  
New York College CUNY  
Launching Education Into Space

*NROL-39 December 6, 2013*

Educational Launch of Nanosatellite

**ELaNa V**  
NASA  
CalPoly

UNO, University  
Northern University  
Colorado State Grant  
Ames Research Center  
Launching Education Into Space

*SpX-3 April 18, 2014*

Educational Launch of Nanosatellite

**ELaNa VIII**  
NASA  
NanoRacks

RACE/JPL  
Launching Education Into Space

*ORB-3 October 28, 2014*

Educational Launch of Nanosatellite

**ELaNa X**  
NASA  
CalPoly

Montana State University  
JPL University of Michigan  
California Polytechnic State University  
Launching Education Into Space

*SMAP January 31, 2015*

Educational Launch of Nanosatellite

**ELaNa XI**  
NASA  
NRO  
CalPoly  
NPS  
SRI

The Planetary Society  
Launching Education Into Space

*ANPC-5 May 20, 2015*

Educational Launch of Nanosatellite

**ELaNa XII**  
NASA  
NRO  
CalPoly  
NPS  
SRI

JPL  
AMSAT  
Space Systems Institute  
University of Colorado Boulder  
Launching Education Into Space

*NROL-55 October 8, 2015*

Educational Launch of Nanosatellite

**ELaNa VII**  
NASA  
ORS  
CalPoly

Montana State  
University  
Saint John's University  
Launching Education Into Space

*ORS-4 November 3, 2015*

Educational Launch of Nanosatellite

**ELaNa IX**  
NASA  
NanoRacks

University of Colorado  
University of Michigan  
University of Michigan  
Launching Education Into Space

*OA-4 December 6, 2015*

Educational Launch of Nanosatellite

**ELaNa XVII**  
NASA  
NanoRacks

AAU  
Wabash Hall University  
University of Iowa College  
Dartmouth College  
University of Central Florida  
University of Maryland System  
Launching Education Into Space

*OA-7 April 18, 2017*

Educational Launch of Nanosatellite

**ELaNa XXII**  
NASA  
NanoRacks

HARP  
OPEN  
REBLE  
ASTERIA  
LAICE  
OSIRIS-3U  
Launching Education Into Space

*SpX-12 August 14, 2017*

Educational Launch of Nanosatellite

**ELaNa XIII**  
NASA  
ARC  
ORS  
SpaceFlight  
MEI

ISARA/JPL  
EcamS@VANO  
Launching Education Into Space

*OA-8 November 12, 2017*

Educational Launch of Nanosatellite

**ELaNa XIV**  
NASA  
TYVAK

Space Systems Institute  
University of Colorado Boulder  
University of Colorado Boulder  
University of Colorado Boulder  
Launching Education Into Space

*JPSS November 18, 2017*

Educational Launch of Nanosatellite

**ELaNa 23**  
NASA  
NanoRacks

OpenRFI  
Hawaii  
SRI  
TELEST-D  
California  
EDUSat  
Nepesin  
Launching Education Into Space

*OA-9 May 21, 2018*

Educational Launch of Nanosatellite

**ELaNa 18**

Space Systems Institute  
University of Colorado Boulder  
University of Colorado Boulder  
University of Colorado Boulder  
Launching Education Into Space

*ICESat-2 September 15, 2018*

Educational Launch of Nanosatellite

**ELaNa XVI**  
NASA  
NanoRacks

University of Colorado  
University of Colorado  
University of Colorado  
Launching Education Into Space

*NG-10 November 17, 2018*

Educational Launch of Nanosatellite

**ELaNa 24**  
NASA  
Spaceflight

Irvine CubeSat  
STEM Program  
The Weiss School  
Launching Education Into Space

*SSOA December 3, 2018*

Educational Launch of Nanosatellite

**ELaNa 21**  
NASA  
NanoRacks

Space Systems Institute  
UNITE  
Launching Education Into Space

*SpX-16 December 5, 2018*

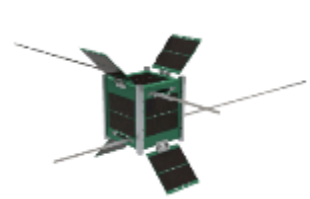
Educational Launch of Nanosatellite

**ELaNa XIX**  
NASA  
CSLI  
VCLS  
ROCKET LAB

TRISat  
NRO  
Launching Education Into Space

*Rocket Lab December 11, 2018*

Educational Launch of Nanosatellite

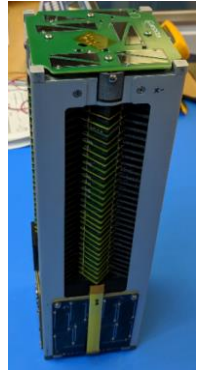
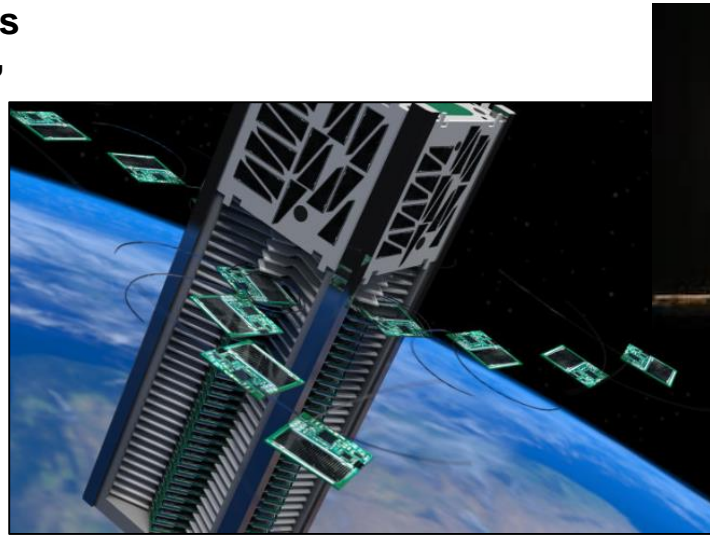
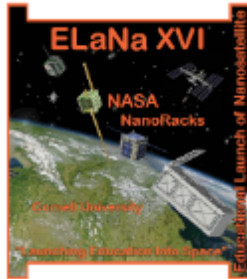


# Recent ELaNa Missions



## ELaNa-16 – November 17, 2018 – CRS NG-10 / Antares

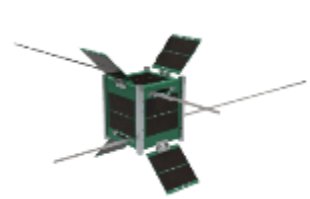
- KickSat-2 (3U) – NASA Ames
  - Deployed 105 “sprites”



## ELaNa-24 – December 3, 2018 – Spaceflight Industries SSO-A (Sun Synch Express) / F9

- IRVINE02 (1U)
  - Irvine CubeSat STEM Program
- WeissSat1 (1U)
  - The Weiss School



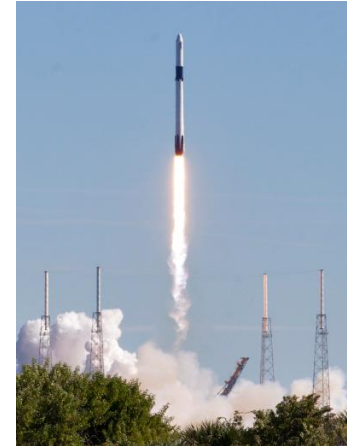
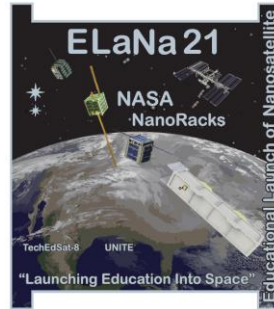


# Recent ELaNa Missions



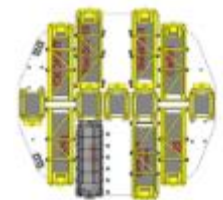
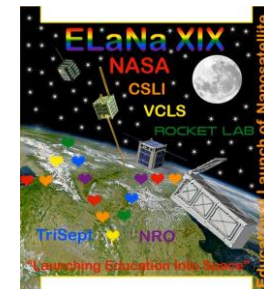
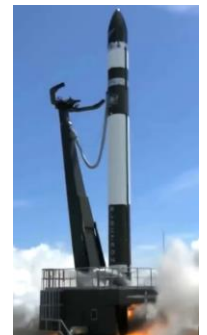
## ELaNa-21 – December 5, 2018 – CRS SpX-16 – F9

- UNITE (3U) – University of Southern Indiana
- TechEdSat-8 (1x6U) – NASA Ames

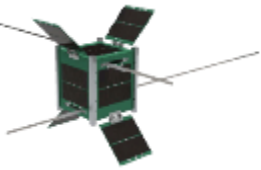


## ELaNa 19 – December 16, 2018 – VCLS-E Rocket Lab Electron

- CubeSail (3U) – University of Illinois
- CeREs (3U)– NASA GSFC
- NMTSat (3U) – New Mexico Institute of Mining and Technology
- CHOMPTT (3U) – University of Florida
- ALBus (3U) – NASA GRC
- STF-1 (3U) – West Virginia University and NASA IV&V
- ISX (3U) – SRI/Cal Poly
- RSat (3U) – US Naval Academy
- Shields-1 (3U) – NASA LRC
- Project DaVinci (3U) – North Idaho STEM Charter Academy/LCF Enterprises



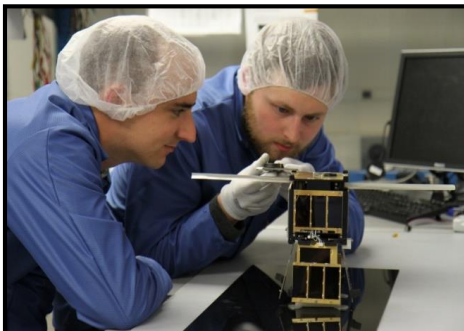




# Upcoming ELaNa Missions



ELaNa Mission	Primary Mission	Launch Vehicle	NET Launch Date	Launch Site	CSLI CubeSats
ELaNa 26	NG-11	Antares	April 17, 2019	Wallops	3
ELaNa 15	STP-2	Falcon Heavy	June 22, 2019	KSC	3
ELaNa 27	SpX-18	Falcon 9	July 8, 2019	Cape Canaveral AFS	1
ELaNa 20	VCLS/Virgin Orbit	LauncherOne	August 1, 2019	Mojave	12
ELaNa 29	STP-27VP	LauncherOne	Q4 2019	TBD	2
ELaNa 25	NG-12	Antares	October 19, 2019	Wallops	18
ELaNa 28	SpX-19	Falcon 9	December 4, 2019	Cape Canaveral AFS	3



***Total Manifested 42***

# CSLI Scorecard and Plans for 2019



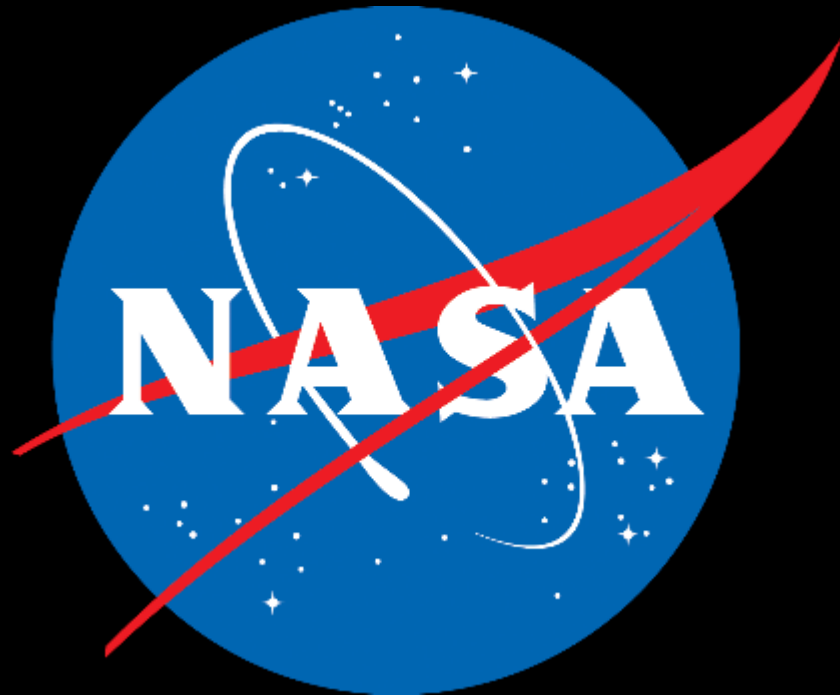
## Scorecard

- 88 CubeSats launched to date
- 42 CubeSats manifested to launch in 2019
- 58 CubeSats in development and not yet manifested
  - 3 of the 58 are on contract with a launch provider, but are awaiting formal manifesting
  - 17 of the 58 were recently selected as part of CSLI call #10
  - 38 of the 58 are compatible with an ISS deployment orbit

## Plans for the remainder of 2019

- Continue to reach out to and educate prospective and current developers
- Continue to actively “shepherd” manifested developer teams
- Continue to work with regulators to understand, influence, and communicate evolving requirements
- Continue to explore and leverage commercial, DoD, and NRO launch opportunities
- Keep launching stuff as safely, quickly, and efficiently as possible!





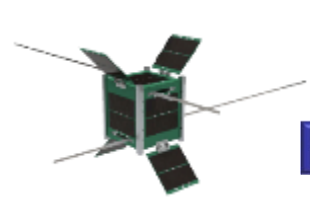
# Past ELaNa Missions



CubeSat Mission	Primary Mission	Launch Date	CSLI Selected Spacecraft
ELaNa I	Glory	Mar 4, 2011	3
ELaNa III	NPP	Oct 28, 2011	6
ELaNa VI	NROL-36	Sep 13, 2012	4
ELaNa IV	ORS-3	Nov 19, 2013	11
ELaNa II	NROL-39	Dec 6, 2013	5
ELaNa V	CRS SpX-3	Apr 18, 2014	5
ELaNa VIII	ORB-3	Oct 28, 2014	1
ELaNa X	SMAP	Jan 31, 2015	4
ELaNa XI	AFSPC-5	May 20, 2015	1
ELaNa XII	NROL-55	Oct 8, 2015	4
ELaNa VII	ORS-4	Nov 3, 2015	2
ELaNa-IX	OA-4	May 16, 2016	3
ELaNa XVII	OA-7	Apr 18, 2017	3
ELaNa XXII	SpX-12	Aug 14, 2017	3
ELaNa XIII	OA-8	Nov 12, 2017	3
ELaNa XIV	JPSS-1	Nov 18, 2017	4
<b>ELaNa 23</b>	<b>OA-9</b>	<b>May 21, 2018</b>	<b>7</b>
<b>ELaNa 18</b>	<b>ICESat-2</b>	<b>September 15, 2018</b>	<b>4</b>
<b>ELaNa XVI</b>	<b>NG-10</b>	<b>November 17, 2018</b>	<b>1</b>
<b>ELaNa 24</b>	<b>SSO-A</b>	<b>December 3, 2018</b>	<b>2</b>
<b>ELaNa 21</b>	<b>SpX-16</b>	<b>December 16, 2018</b>	<b>2</b>
<b>ELaNa XIX</b>	<b>Rocket Lab</b>	<b>December 11, 2018</b>	<b>10</b>

**26  
In  
2018!**

**Total Spacecraft Launched: 88**



# RadSat-g (3U), MemSat (1U), EQUISat (1U) and EnduroSat (1U)

