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NASA-PEA-PROVIDED ACCESS TO SPACE--CUBESATS SALMON-3 2018 HELIO SCIENCE MO PRE-PROPOSAL CONFERENCE AUGUST 24, 2018

Anne E Sweet

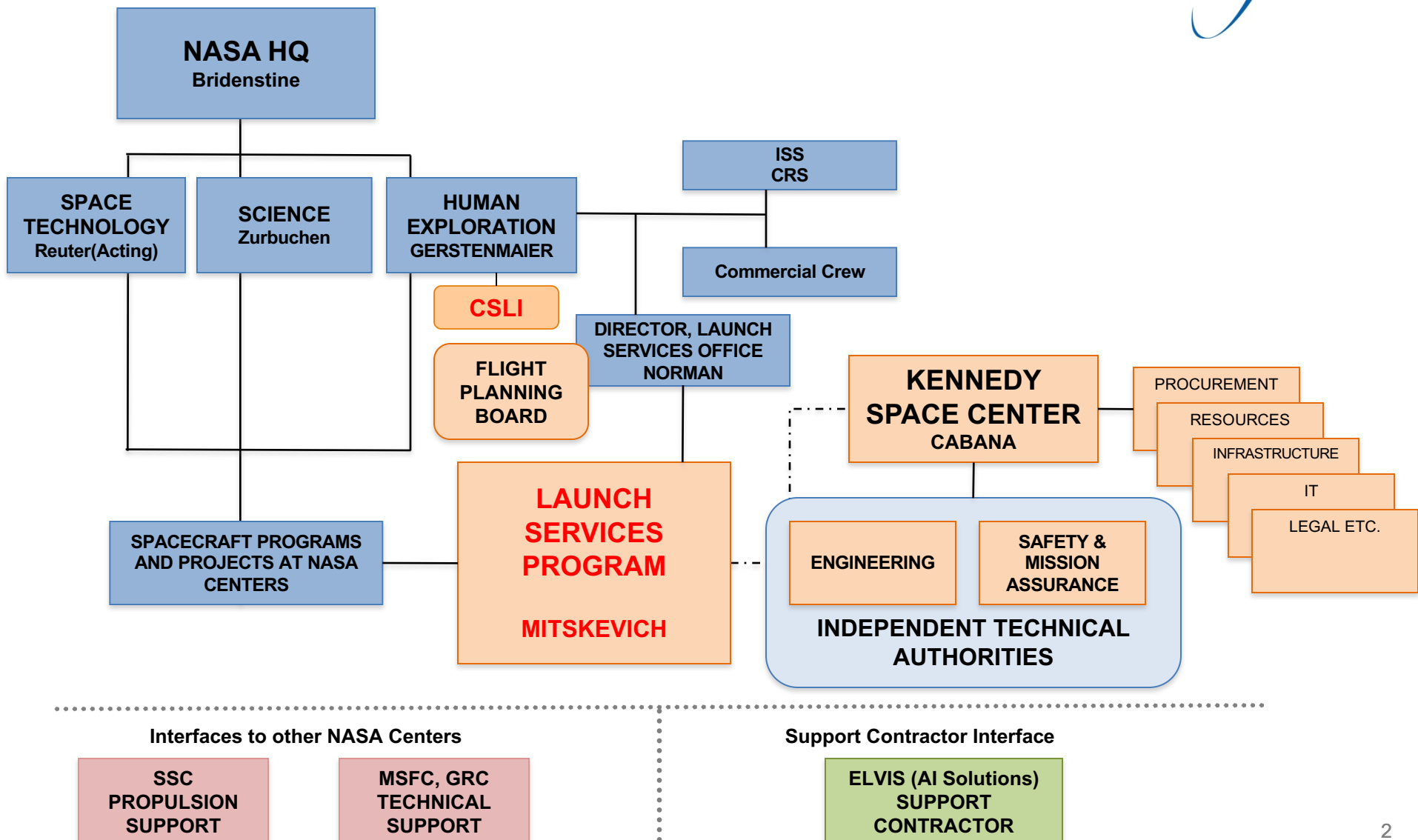
NASA HQ, Launch Services Office

CubeSat Launch Initiative



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CSLI and Launch Services Program Relationships (NASA/HEOMD/KSC)



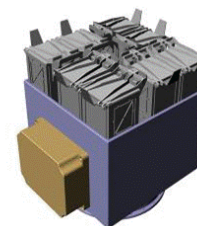
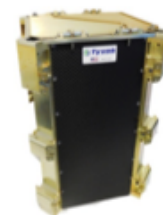
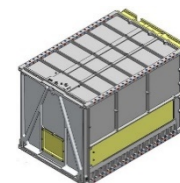
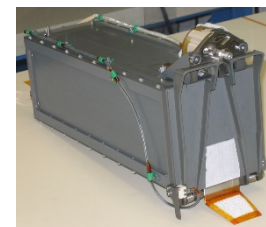


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CubeSat Options available for 2018 Helio Science MO



- **Proposals in the form of CubeSats are allowed under the 2018 Helio Science MO up to 12U, including CubeSat constellations up to a total of 24U equivalent**
- **Access to Space varies in cost (or “Reduction of PEA Cost Cap”)**
 - No cost for $\leq 12U$ to ISS
 - No cost $\leq 3U$ to other LEO
 - 6U to other LEO is \$450K
 - 12U to other LEO is \$1.95M
 - CubeSat constellation up to 24U is $\leq \$3.75M$
 - **All quotes already factor in SMD and CSLI contributions**
- **The form factor for 6U is either 1x2x3 or 1x1x6 (ISS only)**
- **The form factor for a 12U is either 2x2x3 or 1x2x6 (ISS only)**
- **Alternate (PI-provided) access to space is allowed; PI covers all costs**





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Options available for this AO (cont'd)



Reduction of PEA Cost Cap	Volume (interface)	Payload Max Launch Mass	Orbits	Availability of Opportunities (H/M/L)	Launch Vehicles	LV Risk	Comments
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CubeSats

1U		no charge	10x10x11.35 cm	*1.33 kg	400-500km @ 51.6deg circ for ISS or Cygnus deploy multiple for others	High	ISS (Dragon/Cygnus)	G	all LVs and accommodations are operational
3U		no charge	12 x 12 x 36 cm	*4 kg		Medium	Atlas V / Falcon 9	G	LV is LSP Certified; accommodations are operational
6U		no chrg to ISS orbit \$450K to other LEO	12 x 24 x 36 cm 12 x 12 x ~72 cm (ISS only)	*12 kg		Medium	Venture Class	Y	No LSP certification; accommodation not operational
12U		no chrg to ISS orbit \$1950K to other LEO	23 x 24 x 36 cm 12 x 24 x ~72 cm (ISS only)	*24 kg					

*At the cost of flexibility in manifesting/integration, violation of these mass limits may be allowed. Contact the LSP POC listed below.

SmallSat or CubeSat Constellations (up to a total of 24U)

Surf Board		\$3.75M	**four 3U dispensers/board **two 6U dispensers/board **two surf boards/launch	~30 kg/board	multiple	Low	Falcon 9	G	LV is LSP Certified; 1st flight of accommodation is pending
Aft Bulkhead Carrier			**51x51x ~87 cm smallsat or eight 3U or four 6U cubesat dispensers; one ABC/launch	80 kg	multiple	Medium	Atlas V	G	LV is LSP Certified; accommodation is operational
C-Adapter Platform			**23 x 31 x 33 cm smallsat	45 kg	multiple	Low	Atlas V / DeltaIV	G	LV is LSP Certified; accommodation is not operational

** see provider websites for updated interface details

ESPA Class Secondaries on IMAP mission

ESPA Grande		no charge/port	***	***	***	High	Falcon 9/Atlas V	G	LV is LSP Certified; ESPA Grande is operational
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*** see NASA's Mission Specific Evolved Expendable Launch Vehicle Secondary Payload Adapter (ESPA) System Interface Specifications (SIS) For Heliophysics Missions of Opportunity in the Program Library.

Primaries

VCLS Class		\$10M	1.1m dia (smaller dia above 0.6m height)	0-150 kg	500km SS to 45 deg	Medium	Rocket Lab's Electron	Y	Achieved 1st launch; No LSP Certification; For high risk-tolerant payload
		\$15M		0-300 kg	500 km SS		Virgin Orbit's Launcher One	R	Awaiting 1st launch; No LSP Certification; For high risk-tolerant payload

LSP Point of Contact: Garrett Skrobot at 321-867-5365 or garrett.l.skrobot@nasa.gov



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Summary



- It is the Launch Service Program's goal to ensure the highest practicable probability of mission success while managing the launch service technical capabilities, budget and schedule.
- Questions on CubeSat access to space must be officially submitted to:

Anne Sweet

NASA Headquarters

Launch Services Office

Phone: 202-358-3784

Email: anne.sweet-1@nasa.gov

NASA Launch Services is ready to respond to your mission specific questions