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LAUNCH SERVICES PROGRAM

# NASA LAUNCH SERVICES PROGRAM

## EVI-6 PRE-PROPOSAL WEB CONFERENCE

MAY 6, 2022

Garrett L. Skrobot  
Flight Projects Office



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# Purpose of this Presentation



**The purpose of this presentation is to provide information regarding the NASA Launch Services Program (LSP).**

For the Earth Venture Instrument – 6 (EVI-6) solicitation, NASA will be responsible for;

- the hosting arrangement and the access to space for instruments,
- the access to space for Small Satellites (including CubeSats).

Although the likelihood that NASA can provide the appropriate access to space to the proposed mission is not an evaluation factor, it will be considered for selection.

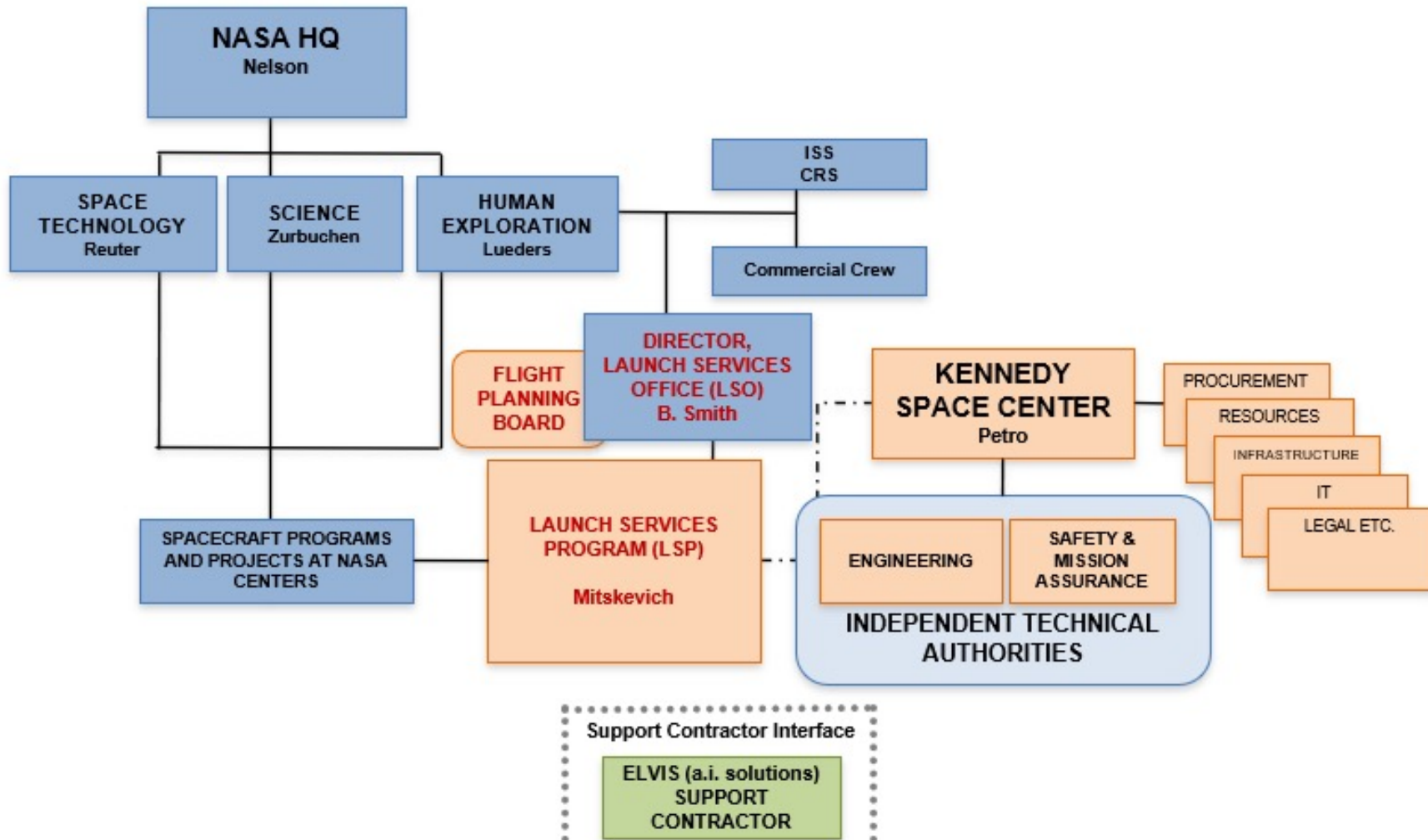


# NASA LSP Relationships (HEOMD/KSC)



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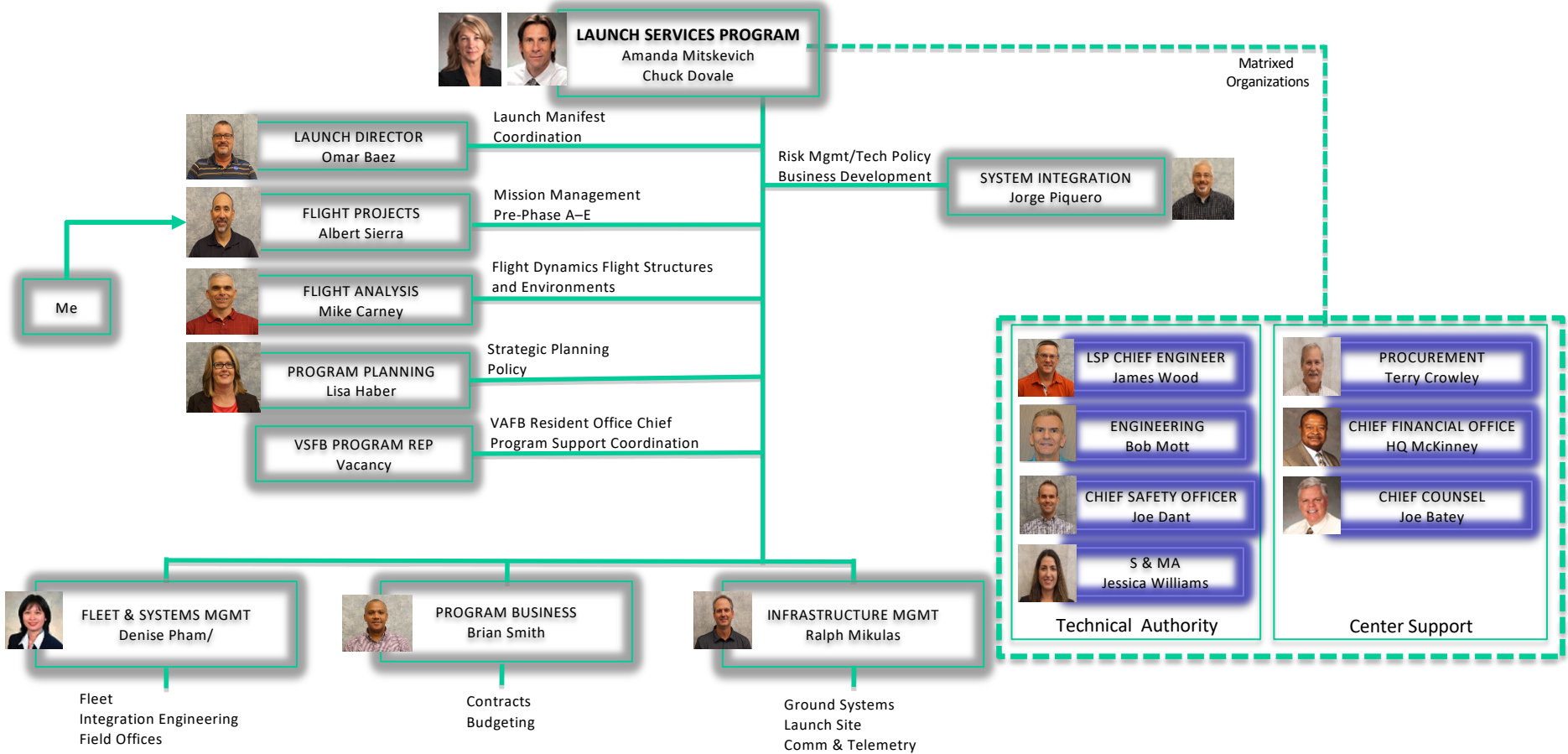


# NASA LSP Organization Structure



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# NASA LSP Functional Structure NLS-2

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- NASA Launch Services Program (LSP) procures/provides a Launch Service
  - Its more than the basic launch vehicle
  - We don't buy a tail number
  - This is a commercial Firm Fixed Price procurement with additional insight and oversight
- To enable this, LSP has two functional sides
  - Mission integration
    - » Mission Integration Team (MIT) assigned to each mission
    - » Manages mission specific procurement, integration, and analysis
    - » Includes launch site integration and processing
  - Fleet management
    - » Personnel assigned to each contracted rocket
    - » Includes resident offices within the production facilities of all active providers
    - » We watch the production and performance of entire fleet – we certify the manufacture's production line, not just a particular unit (tail number)
    - » We have a say in any change/upgrade/anomaly
- LSP maintains the final go or no-go for launch for NLS-2 procured missions
- Interface with Safety and Mission Assurance
  - Safety
  - Quality



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# EVI-6 Solicitation



EVI-6 PEA Section 1.2 states “This EVI-6 PEA calls for PI-led investigations requiring development and operations of Class D space-based Instrument(s) or Class D Small Satellite observatories (SmallSats) including CubeSats. The instrument(s) or SmallSat(s) are to be developed and delivered for flight on a NASA-arranged spaceflight mission of opportunity. NASA will be responsible for both the hosting arrangement and the access to space for instruments and for the access to space for SmallSats.” NASA may choose;

- Commercial FAA-Licensed Launch Services
  - » Launch Services (LS) to be provided under new Venture-class Acquisition of Dedicated and Rideshare (VADR) Contract
  - » Domestic Launch Vehicle (LV) certified as category 1 per NPD 8610.7D
  - » Modified technical oversight approach per NPD 8610.7D *Launch Services Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Missions* will be executed for MO AO for Class D payloads.
- Rideshare Access to Space
  - » Via a Secondary Payload Adapter (SPA), e.g., ESPA/ESPA Grande. May utilize one or multiple SPA ports
- All missions are subjected to Do No Harm if integrated as a rideshare mission.
- Applicable Rideshare User Guide can be found at in the EVI-6 Library.



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# **Commercial FAA-Licensed Launch Services; NASA LSP Procured**



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## Commercial FAA-Licensed LS



- Assumption of a specific LV configuration as part of the EVI-6 proposal will not guarantee that the proposed LV configuration will be selected.
- Domestic LV on its first flight will be permitted; however, prior to launch the vehicle will be certified as Category 1 per NPD 8610.7D, *Launch Services Risk Mitigation Policy for NASA-Owned or NASA-Sponsored Payloads/Missions* (see EVI-6 AO Library).
- A modified technical oversight approach per NPD 8610.7D Launch Services Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Missions will be used for Class D missions.





# Commercial FAA-Licensed LS-CubeSats

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- The base CubeSat dimensions are 10x10x11 centimeters (one "Cube" or "1U"), or approximately four inches
- CubeSats for this AO can be 1U, 2U, 3U, 6U, or 12U in volume and typically weigh is no more than 1.33 kilogram (about 3 pounds) per 1U Cube
- CubeSats are typically low-cost, high risk-tolerant payloads
- May be deployed from standard deployers, such as the "Poly-Picosatellite Orbital Deployer (P-POD)" or other commercial dispensers
- P-POD's versatile, small profile, tubular design holds three 1U CubeSats or can integrate CubeSats of different lengths (i.e., up to 3U)
- The proposer must procure their selected deployer for the mission and provide requirements in an interface requirements document prior to launch service procurement. Allows the proposer to;
  - » Conduct environmental testing as required
  - » Perform fit checks as required
  - » Allow for selection between Rail or Tab deployer
- Launch Services Program Level Dispenser and CubeSat Requirements Document will be the governing document. Any deviation or required waivers to the requirements must listed in the proposal with rationale for the waiver



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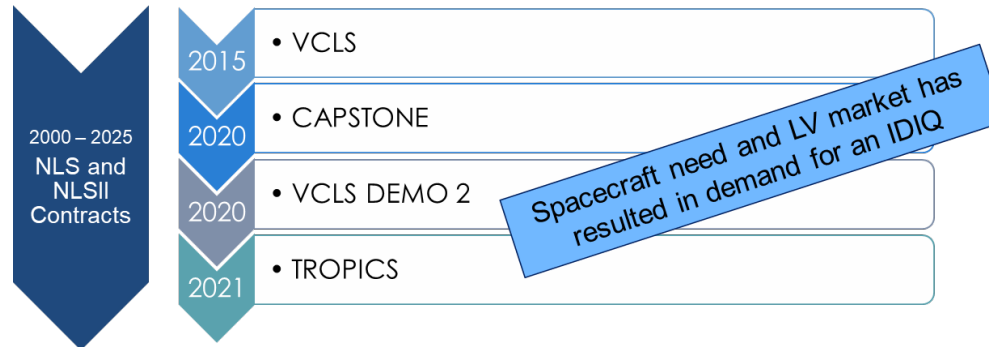
# ***VADR***

## **Venture-class Acquisition of Dedicated and Rideshare missions**



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# Background



## VADR IDIQ:

- FAA licensed commercial launch services
- Class D or more risk tolerant payloads; Very limited LSP mission assurance (NPD 8610.23 modified technical oversight approach)
- Multiple providers/launch vehicles
- Mission specific requirements
- Dedicated (full performance capacity of the launch vehicle for sole use), Primary Rideshare (allow option for provider to sell excess capacity) and Traditional Rideshare.
- Capability for CubeSats due to risk posture (e.g., UCLASS, TROPICS Pathfinder, Non-ISS)
- On-ramp capability
- The loss of these payloads will not be considered a NASA “Mishap” under NPR 8621.1. Launch vehicle mishap investigations will not be conducted as part of the VADR contract



# VADR Requirements



## Standard Launch Services (CLIN 1)

- **ATP is ~L-24 months (mission specific timeline will be determined at time of order)**
- **Integration Reviews (not chaired/conducted as ERBs)**
  - **Mission Specific Design Review**
  - **Mission Integration Readiness Review**
  - **Launch Processing Readiness Review**
  - **Launch Readiness Review**
- **No approvals of designs and no IV&V**
- **Launch services include payload separation system**
- **Launch services include payload processing facility**
- **Public affairs support**
- **Launch service capabilities (Attachment 05) for all common launch vehicle configs on contract**



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# VADR Contracts Awarded



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ABL Space Systems

Relativity Space, Inc.

Astra Space, Inc.

Rocket Lab USA, Inc.

Blue Origin Florida, LLC

Spaceflight, Inc.

L2 Solutions, LLC

Space Exploration Technologies Corp.

Northrop Grumman System Corp.

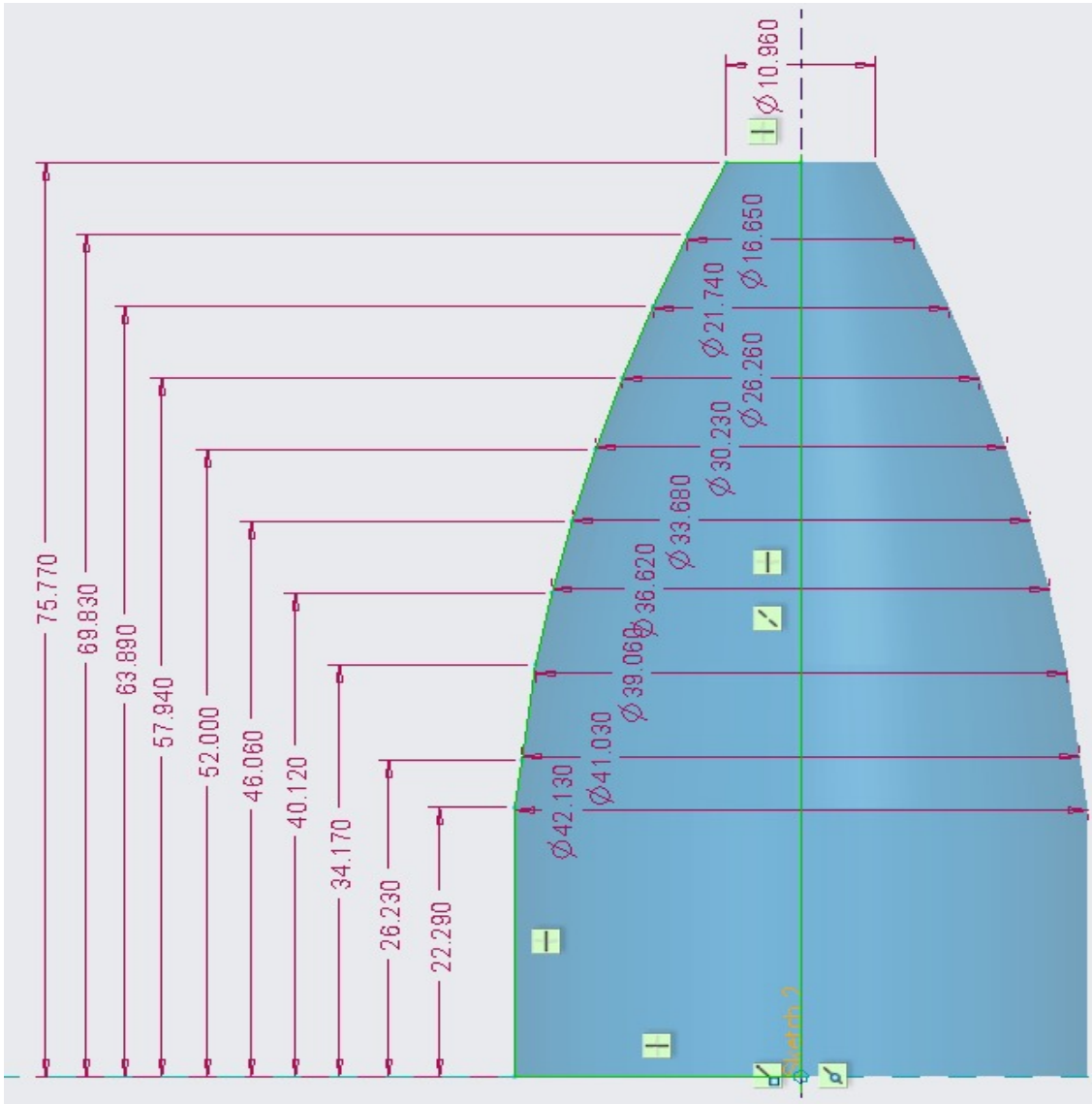
United Launch Services, LLC

Phantom Space Corp.

Virgin Orbit, LLC



# Commercial FAA-Licensed LS



- Encompassing Static Fairing Envelope (in.) available for launches
- S/C dimensions will be used to assess feasibility of fitting within this PLF static envelope, including any close approaches.

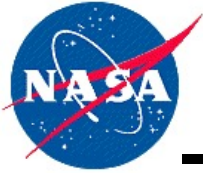


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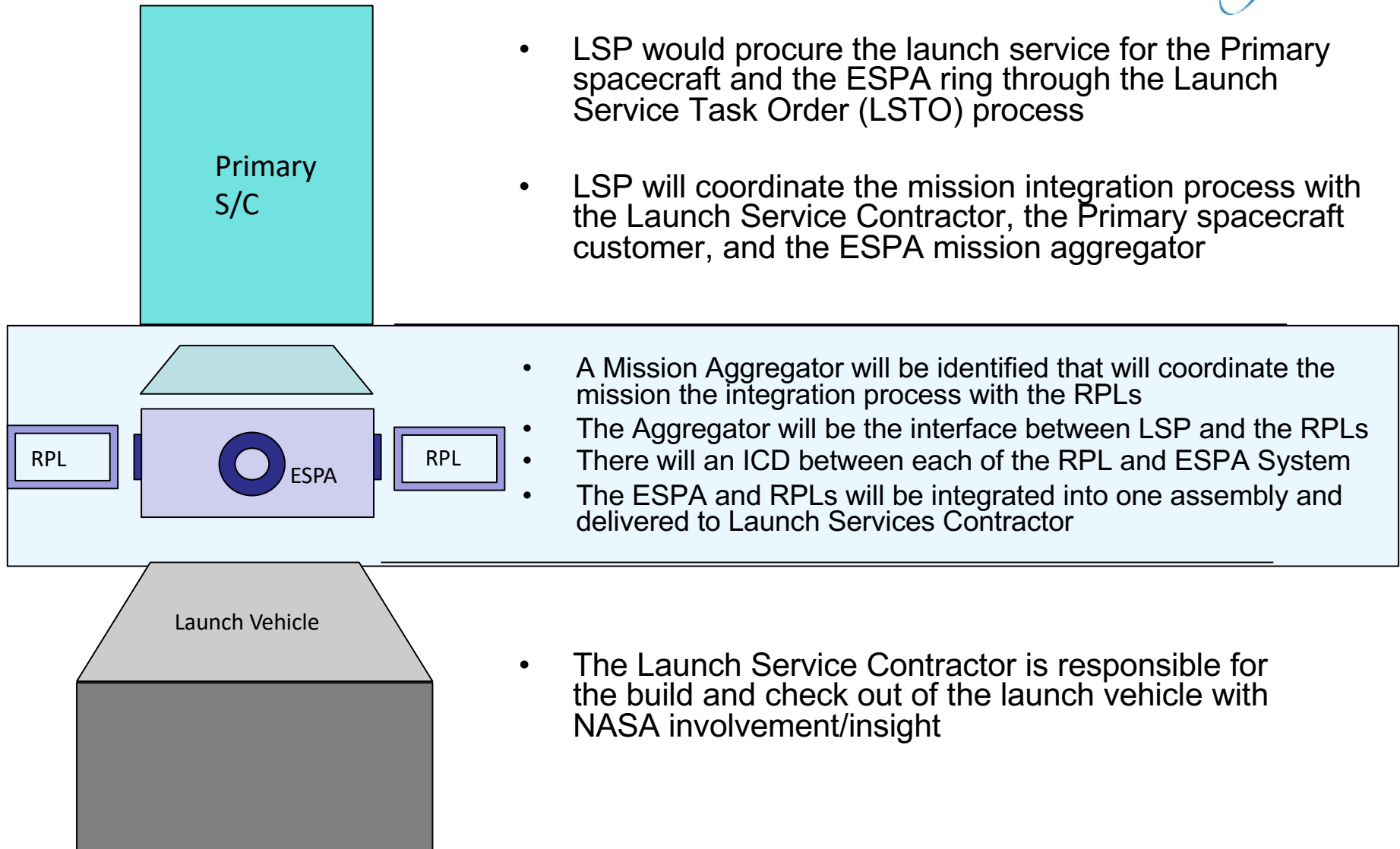


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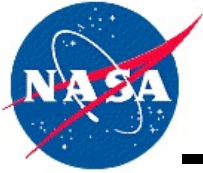
# Rideshare Access to Space



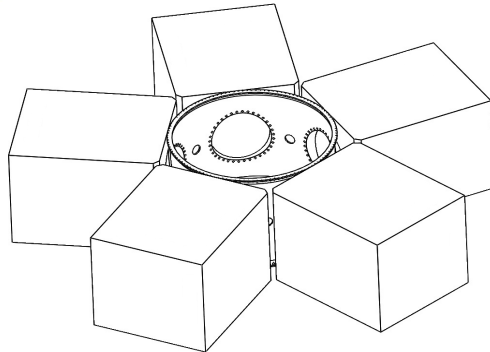
# ESPA Configuration



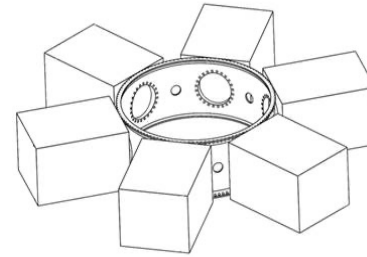




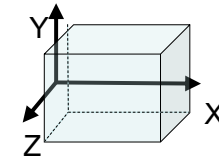
# ESPA Interfaces



**ESPA Grande**



**ESPA**



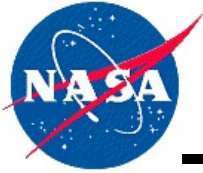
ESPA	Max RPL Mass	Allowable RPL Volume	RPL Interface
ESPA Grande 4 or 5 Port	465 kg	42"x46"x38" Y, Z, X	24" circular
ESPA 6 Port	220 kg	24"x28"x38" Y,Z,X	15" circular

**NASA will provide the ESPA Separation System as GFE:**

**RUAG PAS 381S (15") for ESPA**  
**RUAG PAS 610S (24") for ESPA Grande**  
**PSC MkII MLB (15" or 24")**  
 Other sizes of separation systems can be accommodated with an adapter

1. See [NASA Science Mission Directorate \(SMD\) Launch Vehicle Secondary Payload Adapter Rideshare Users Guide with Do No Harm](#) (updated 10/01/2021) found in the EVI-6 Library.

2. Rideshare Accommodation Worksheet is found in the EVI-6 Library.



# Accommodation Worksheets



- Requirement R-19 of the EVI-6 PEA states “Proposals for Instrument investigations that will be accommodated on a NASA-selected platform shall clearly state the proposed instrument mass, volume dimensions, power requirements, platform stabilization requirements, thermal requirements, observational geometry requirements, launch vibration constraints, electromagnetic interference / electromagnetic compatibility (EMI/EMC) requirements, data rate requirements, and all other requirements (or constraints or preferences) that the instrument places on the platform for accommodation, launch, deployment, and operations. An “EVI Instrument Accommodation Worksheet” is provided in the EVI-6 Library to aid proposers to provide these data. This table shall be provided in the experiment implementation section (Section E) of the proposal. This table will not be considered during the evaluation and does not count towards the proposal page limit.”
- Requirement R-20 of the EVI-6 PEA states “SmallSat proposals shall clearly state the proposed payload mass, volume dimensions, power and other requirements, using the “Rideshare Accommodation Worksheet” provided in the EVI-6 Library. This worksheet shall summarize information from other sections of the proposal, shall not provide new information, and shall be provided in the Investigation Implementation section (Section F) of the proposal. This rideshare accommodation worksheet will not be considered during the evaluation and does not count towards the proposal page limit.”



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# Summary



- It is the NASA 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 must be officially submitted to:

Garrett L Skrobot  
Mission Manager

NASA Launch Services Program Code VA-C  
Kennedy Space Center, FL 32899  
Phone: 321-266-4841  
Email: [garrett.l.skrobot@nasa.gov](mailto:garrett.l.skrobot@nasa.gov)

*NASA LSP is ready to respond to your mission specific questions.*

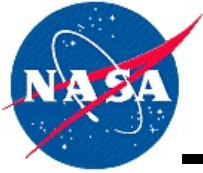


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# Back-Up Slides

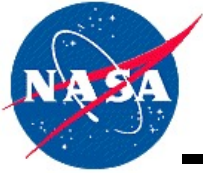


# RPL Do No Harm



All ESPA class Rideshare Payloads (RPL) will be subject to a Do-No-Harm (DNH) assessment process to ensure that they will not pose a threat to the mission success of the Primary spacecraft or Launch Vehicle (LV) – Some general DNH considerations include:

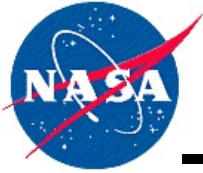
- RPL Design
  - Design should be done to Aerospace standards including appropriate safety factors for tested and untested hardware
  - Design must physically comply with the space allotted and remain constrained and sufficiently stiff to not make contact with launch vehicle or other spacecraft hardware during flight
  - Dynamic modes of the auxiliary payload must be sufficiently understood and communicated to ensure no detrimental dynamic loading onto the launch vehicle or primary spacecraft
  - RPL must maintain integrity and not separate prematurely under worst case predicted loads and environments (acoustic, shock, vibe, thermal, depressurization)



# RPL Do No Harm



- Flight Risks
  - Separation analysis must ensure no re-contact with the LV, Primary spacecraft, or other RPLs during RPL separation event(s)
  - RPL separation indications must be included in the LV telemetry stream
  - Mitigations are in place to ensure any potentially hazardous functions are redundantly inhibited until well after the RPL is clear of the LV, Primary spacecraft, or other RPLs
  - RPLs must not generate debris that may contact the LV, Primary spacecraft, or other RPLs
  - RPLs contamination sources must be understood and provided to the LV, Primary spacecraft, or other RPLs for impact assessment
  - RPLs must not generate environments (e.g. thermal, separation shock, etc.) which detrimentally impacts the qualification of the LV, Primary spacecraft, or other RPLs



# RPL Do No Harm



- Launch Schedule Support
  - RPL integration schedules must support launch vehicle/primary payload integration schedules
  - RPLs must not impact the launch date for the primary mission in the event that the RPL is not able to support launch date – This is typically accomplished by having a mass simulator available and ready to integrate
  - RPLs must support the full launch window defined by the primary spacecraft
- Personnel Safety
  - RPLs must comply with applicable OSHA, DOT AFSPCMAN 91-710
  - RPLs must be stable and safe without services (power, commodities) once integrated

*Please see the NASA Science Mission Directorate (SMD) Launch Vehicle Secondary Payload Adapter Rideshare Users Guide with Do No Harm (updated 10/01/2021) found in the EVI-6 Library.*