JOHN F. KENNEDY SPACE CENTER

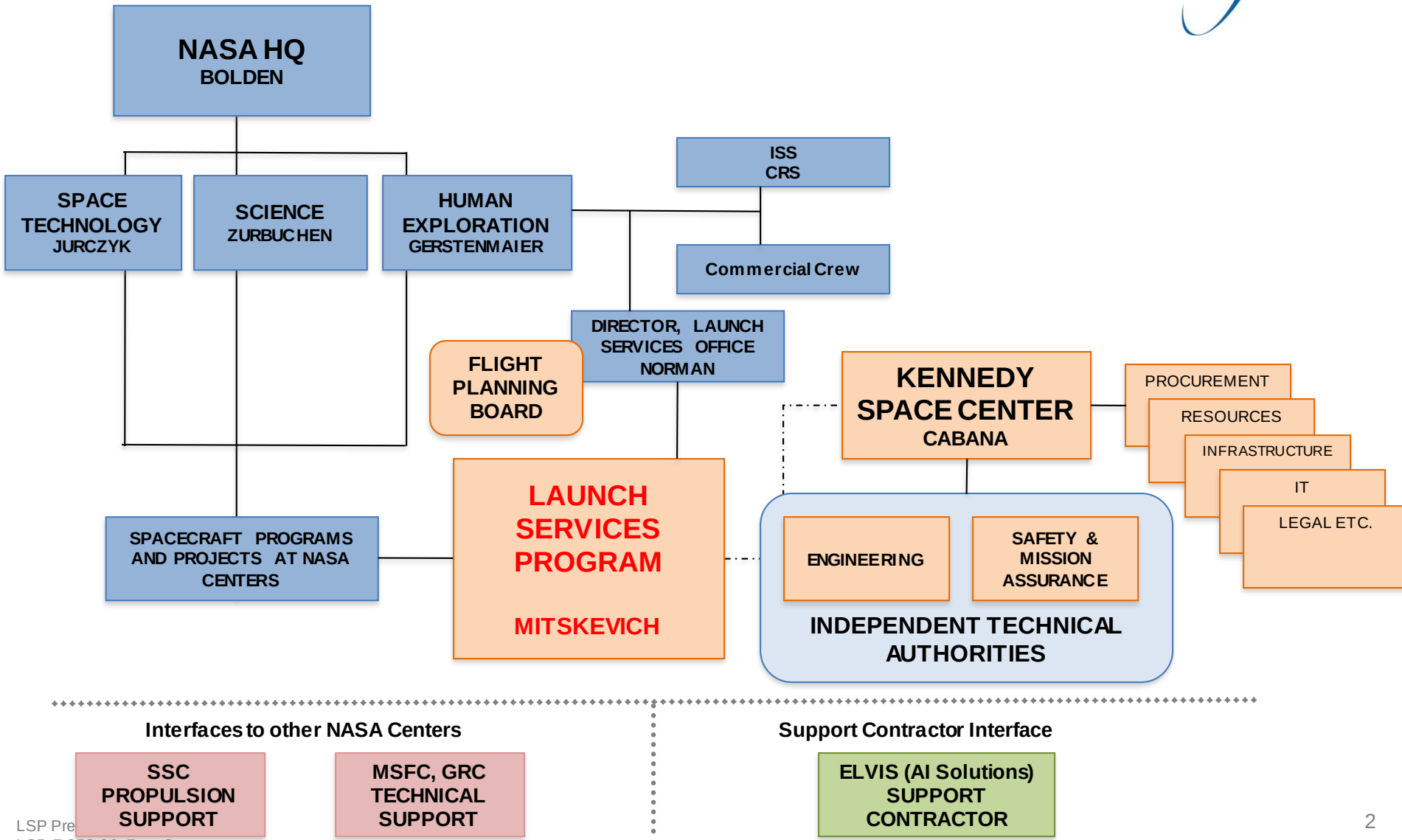
LAUNCH SERVICES PROGRAM

NASA
LAUNCH SERVICES PROGRAM

NEW FRONTIERS 2016 AO
PRE-PROPOSAL CONFERENCE
JANUARY 20, 2017

Mary K. Faller
Flight Projects Office

Launch Services Program Relationships (NASA/HEOMD/KSC)



LSP Organizational Structure

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LAUNCH SERVICES PROGRAM

LAUNCH SERVICES PROGRAM
Amanda Mitskevich
Chuck Dovale

Matrixed Organizations

SYSTEM INTEGRATION
Darren Bedell

Risk Mgmt/Tech Policy
Business Development

LAUNCH DIRECTOR
Omar Baez

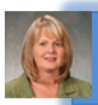
Launch Manifest
Coordination

FLIGHT PROJECTS
Albert Sierra

Mission Management
Pre-Phase A–E

PROGRAM BUSINESS
Bobbi Gnan

Contracts
Budgeting



PROGRAM PLANNING
Lisa Haber

Strategic Planning
Policy

LSP CHIEF ENGINEER
James Wood

S&MA
Rick Boutin

Technical Authority

PROCUREMENT
John Vondenhuevel

CHIEF FINANCIAL OFFICE
HQ McKinney

CHIEF COUNSEL
Joe Batey

Center Support

FLEET & SYSTEMS MGMT
Jenny Lyons/Denise Pham

Fleet
Integration Engineering
Field Offices

FLIGHT ANALYSIS
Mike Carney

Flight Dynamics
Flight Structures
Environments

INFRASTRUCTURE MGMT
Eric Anderson

Ground Systems
Launch Site
Comm & Telemetry

Launch Services Program

The Launch Services Program (LSP) provides:

- **Procurement and management of the launch service**
- **Technical insight/approval of the launch vehicle (LV) production/test**
  - **Mission Management and engineering support**
  - **Oversight (approval) of mission unique launch vehicle hardware/software development**
- **Launch campaign/countdown management – formal readiness reviews**
- **Risk management for launch service**
- **Downrange telemetry assets for launch vehicle data**

Launch Services Program

NASA Strategic Plan 2014

Strategic Goal 3:
Serve the American public and accomplish our Mission by effectively managing our people, technical capabilities, and infrastructure.

Objective 3.2:
Ensure the availability and continued advancement of strategic, technical, and programmatic capabilities to sustain NASA's Mission

Key Strategy:
Provide access to space

Lead Office: **HEOMD**
Contributing Program: **LSP**

Key Strategy "Provide access to space" citation:

"…certify and procure domestic commercial space transportation services for the launch of robotic science, communication, weather, and other civil sector missions"

"…provide robust, reliable, commercial and cost-effective launch services"

"…assured access to space through a competitive 'mixed Fleet' approach utilizing the breadth of U.S. industry's capabilities"

LSP Strategic Goals 2014

Goal 1: Maximize Mission Success

Goal 2: Assure Long-Term Launch Services

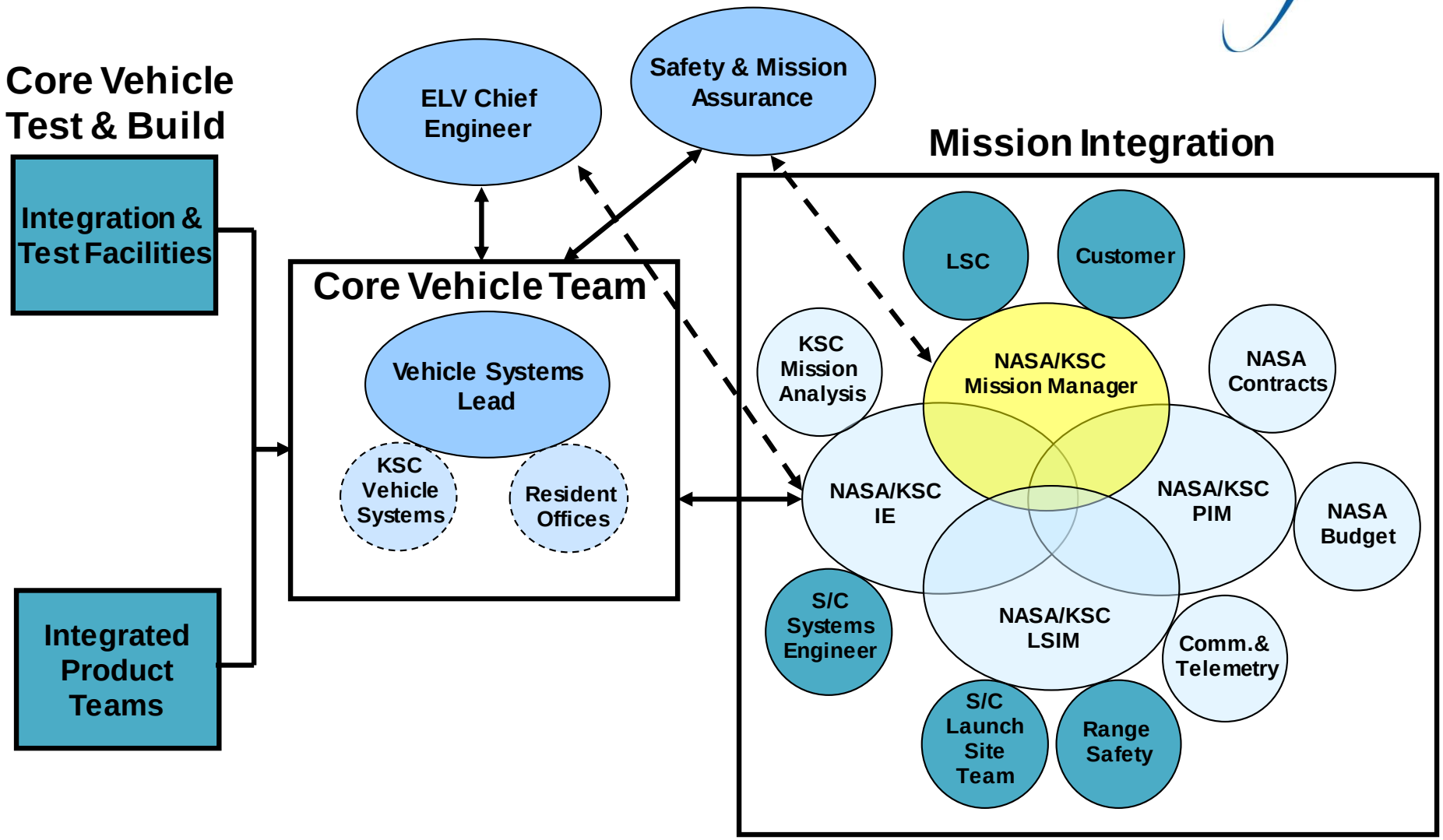
Goal 3: Promote Evolution of a U.S. Commercial Space Launch Market

Goal 4: Continually Enhance LSP's Core Capabilities

LSP Functional Structure

- 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 approval
- 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
- Interface with Safety and Mission Assurance
  - Safety
  - Quality

Technical Information flow into the MIT



NASA Provided Launch Services

- The NASA Launch Services (NLS) II Contract is LSP's primary method to acquire all classes of Category 2 and Category 3 commercial launch services for spacecraft (SC) customers
- Provides NASA with domestic launch services that are safe, successful, reliable, and affordable
- Provides services for both NASA-Owned and NASA-Sponsored payloads through multiple Indefinite Delivery Indefinite Quantity (IDIQ) Launch Service Task Order (LSTO) contracts with negotiated Not To Exceed (NTE) Prices
- Provides services on a Firm-Fixed-Price (FFP) basis
  - Incorporates best commercial practices to the maximum extent practical
  - Includes standard and non-standard services
  - Mission unique modifications
  - Special studies
- Allows LSP to turn on a task assignment or non-standard service at any time for analyses

NLS II Contracts Overview

- **Launch Services Risk Mitigation Policy for NASA-owned and/or NASA-sponsored Payloads/Missions can be found under NPD 8610.7. Document can be found at http://nodis3.gsfc.nasa.gov**
  - Risk Category 1: Low complexity and/or low cost payloads-Classified as Class D payloads pursuant to NPR 8705.4
  - Risk Category 2: Moderate complexity and/or moderate cost payloads-Classified as Class C payloads and, in some cases, Class B payloads, pursuant to NPR 8705.4
  - **Risk Category 3: Complex and/or high cost payloads-Classified as Class A payloads and, in some cases, Class B payloads, pursuant to NPR 8705.4**
- **NLS II Launch Service Costs**
  - **Acquisition process begins at approximately L-36 months**
  - **Authority to Proceed (ATP) concurrent with task order award at approximately L-30 months**
    - » **Cumulative payment of 10% due at L-30 (Nominal)**
    - » **Nominal mission integration begins**
  - **Costs not covered by the New Frontiers Program include items such as:**
    - » **Mission unique/non-standard services such as a custom payload adapters, auxiliary propulsion, extreme cleanliness/contamination sensitivities, launch services associated mission utilizing radioactive material (See Attachment 2 of the ELV Launch Services Information Summary document)**
    - » **Payload-caused launch delay costs**

NLS II Contracts Overview

- **Each Provider has their own unique launch delay table**
  - **Delay terms are identical for both parties (contractor/NASA)**
  - **No-fault launch delays**
    - » **Include: range constraints, floods, acts of God, strikes and other conditions**
    - » **No adjustment made to mission price**
    - » **No limit on number of days**
- **For the remaining delay cases grace days are based on sliding scale for both contractor and NASA delays**
  - **150 days of grace at ATP through L-24**
  - **Sliding down to 7 days of grace at L-10 days**

Launch Service Budget

- **The standard launch service includes:**
  - **Procurement and management (including risk management) of the launch service, technical insight/approval of the launch vehicle production/test and mission unique launch vehicle hardware/software development**
  - **Launch campaign/countdown management – formal readiness reviews**
  - **The launch vehicle, engineering, analysis, and minimum performance standards and services provided by the contract**
  - **Mission integration**
  - **Launch site payload processing facility and support, logistics, hazardous support**
  - **Range support and services, contractor engineering support, base support contracts**
  - **Down range telemetry support (launch vehicle only)**

Launch Service Budget (cont'd)

- **The standard launch service for this AO specifically includes:**
  - **Nominal allocation for non-standard/mission unique launch vehicle modifications/services – items typically necessary to customize the basic vehicle hardware to meet spacecraft driven requirements such as T-0 GN2 purge, ISO 14644-1 Class 7 integration environment and interleaved SC telemetry – mission unique reviews**
  - **Launch vehicle based on a intermediate high performance with a 4-m payload fairing for a no later than Dec 31 2025 launch**
  - **Payload fairing with approximately 2 access doors with thermal and/or acoustic blankets**
  - **Standard LV-provided payload separation system**
  - **Standard payload adapter**
  - **Standard test payload adapter availability**
  - **Spacecraft spin/de-spin capability for separation (if required)**
  - **Single-Spacecraft**
  - **Collision/contamination avoidance maneuver (CCAM) capability if needed**
  - **Electrical interface connectors (approximately 3 sets)**
- **Budget does not include launch delays**

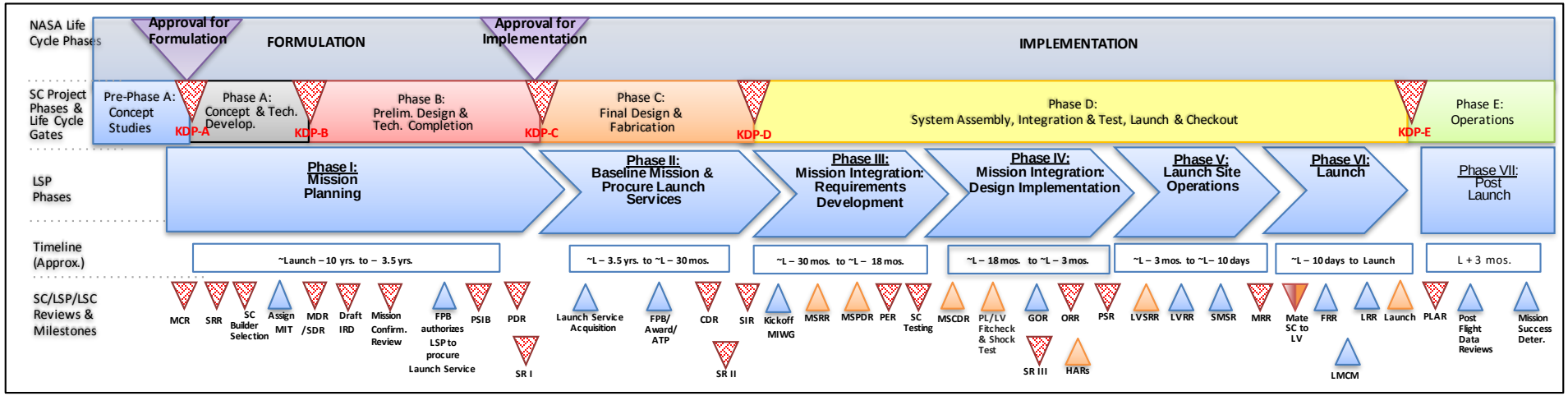
Launch Services Budget (cont'd)

- **Non Standard launch services are NOT covered under the LSP budget and cost must be included in the PI-managed mission cost:**
  - **Nuclear launch services utilizing a RHU/MMRTG**
  - **Enhanced contamination control, planetary protection, operational clean enclosures**
  - **Cameras on the LV**
  - **Extended mission integration periods (in excess of 33 months)**
  - **LV hardware modifications required to accommodate unique payload configuration**
  - **More capable launch vehicles or larger fairings as shown:**

Performance Class	4m	5m
Low	$0	$11M
Intermediate Low	$0	$23M
Intermediate High	$0	$33M
High	$22M	$62M

Launch Service Acquisition

- **The acquisition of the launch service will be a domestic expendable launch vehicle procured and managed by the NASA/Launch Services Program (LSP)**
- **The LSP will competitively select a launch service provider for these missions based on customer requirements and NASA Flight Planning Board (FPB) approval**



Spacecraft reviews shown in red.

Available Vehicles Under NLS II

- Most likely candidate vehicles for the New Frontiers AO that are available on the NLS II contract are
  - Atlas V
  - Falcon 9
  - Antares 232
- Assumption of a specific launch vehicle configuration as part of this AO proposal will not guarantee that the proposed LV configuration will be selected for award of a launch service competitive procurement
- Bidders must remain compatible with vehicles LSP uses the NLS II contract and not the launch vehicle providers users guides when determining LV configurations and performance
  - Proposers are advised to plan for compatibility with all that provide their performance requirements that are expected to be available through spacecraft Preliminary Design Review
  - Payload design should accommodate the limiting/enveloping launch characteristics and capabilities included in "ELV Launch Services Program Information Summary" document

Summary

- **It is the Launch Services 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:**

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Mission Manager
NASA Launch Services Program
Code VA-C
Kennedy Space Center, Fl. 32899
Phone: 321-867-8943
Email: mary.k.faller@nasa.gov

Back Up

Available Vehicles under NLS II

- **The Agency policy, NPD 8610.7, "Risk Mitigation Policy for NASA-Owned and/or NASA-Sponsored Payloads/Mission"**
  - **Requires one successful launch of vehicle configuration in order to bid for a proposal**
- **Launch Services Program initiates the procurement of a launch service under the NLS II contract via a Launch Services Task Order (LSTO)**

LSTO Process

- **HQ Flight Planning Board (FPB) notifies LSP of mission requirement**
  - **Launch Services Interface Requirements Document (LSIRD) has already been developed by SC customer & provided to HQ FPB and to LSP (LSP works with SC customer to develop LSIRD)**
- **Launch Services Program Manager notifies procurement officer of requirement and provides recommended technical personnel for LSTO evaluation team**
- **Procurement officer establishes LSTO evaluation team with designated contracting officer and lead tech evaluator**
  - **Note that the team includes up to 2 or 3 reps from the spacecraft project team**
- **LSTO evaluation team performs the following:**
  - **Develop tech requirements based on mission definition**
  - **Assures FAR guidelines are being followed**
  - **Determines and documents LSTO evaluation criteria**
  - **CO issues Request for Launch Services Proposal (RLSP) to multiple award contractors**

LSTO Process

- **LSTO evaluation team performs the following (cont'd):**
  - **Evaluate contractor proposals in accordance with LSTO procedures**
  - **Complete evaluation and brief to procurement officer, LSP Program Manager, FPB, sponsoring Program/Project on evaluation results**
  - **Verify status of Authority To Proceed (ATP)**
- **Launch Services Program Manager makes selection and coordinates with KSC Contracting Officer (CO)**
- **KSC CO awards LSTO for mission launch service**

Evaluation

- **Launch Service Technical Evaluation:**
  - **Overall Assessment: - Given the ground rules in the AO, is the proposed launch vehicle (LV) concept feasible for this application? (Yes or No)**
  - **Comments:**_____
    _____
    _____
- **LV Performance: Area of concern (Yes or No)**
  - **Proposed LV configuration:** _____
  - **Proposed Launch Date:** _____
  - **Launch Period (MM/DD/YYYY to MM/DD/YYYY):** _____/____/_____ **to** _____/____/_____
  - **Launch Window (On any given day of the launch period Minutes:Seconds):** _____ : _____ .

Evaluation

- **LV Performance: Area of concern (cont)**
  - **Orbit requirements: Apogee: _____ km Perigee: _____ km Inclination: _____deg**
  - **High Energy requirements: C^3: _____ km^2/sec^2 DLA: _____deg RLA: _____deg**
  - **Proposed LV Performance: _____**
  - **Mass (including reserves) Dry Mass: _____ kg Wet Mass: _____ kg**
  - **Dry Mass Margin: _____ kg _____ %**
  - **Wet Mass Margin _____ kg _____ %**
  - **Formulas:**
  - **Mass Margin kg = LV Performance – S/C Mass (including reserves)**
  - **Mass Margin % = [(Mass Margin kg) S/C Mass (including reserves)kg] X 100**
  - **LV Performance Comments/issues/concerns:**

Evaluation

- **Launch Service Cost Assessment: Area of concern (Yes or No)**
  - Is there additional funding for any mission unique modifications/services? (Yes or No)
- **LV Integration: Area of concern (Yes or No)**
  - Does the proposer have experience in LV integration? (Yes or No)
- **LV to Spacecraft Interface: Area of concern (Yes or No)**
  - Proposed Payload Fairing (PLF) _____
  - Spacecraft (S/C) Dimensions: Radial:_____ m Height _____ m
  - Any intrusions outside of the PLF usable *static* volume? (Yes or No)
  - **Mechanical Interface:**
    - » Standard Adapter: _____ Custom Adaptor: _____
  - **Electrical Interface:**
    - » Standard _____ Pin(s) Connector(s): (Yes or No)

Evaluation

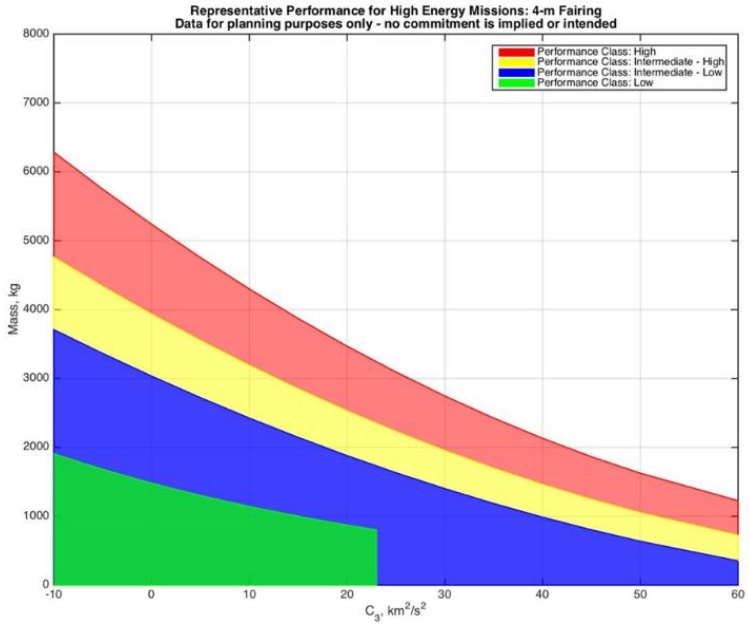
- **LV to Spacecraft Interface: Area of concern (Yes or No)**
- **Mission Unique requirements:**
  - **Instrument T-0 GN_2 Purge: (Yes or No)**
  - **T-0 S/C Battery Cooling: (Yes or No)**
  - **Planetary Protection Requirements: (Yes or No)**
  - **Contamination Control Requirements:**
    - » **PLF: (Yes or No)**
    - » **LV adapter: (Yes or No)**
  - **Cleanliness Level: _____ other: _____**
  - **Unique Facility Requirements: (Yes or No)**
    - » **Pad: _____**
    - » **S/C Processing Facility: _____**
  - **S/C Environmental Test Plans**
    - » **Environmental Test Plan/Flow described: (Yes or No)**
    - » **Test Levels provided: (Yes or No)**
    - » **Test Schedule provided: (Yes or No)**
    - » **Comments/issues/concerns: _____**

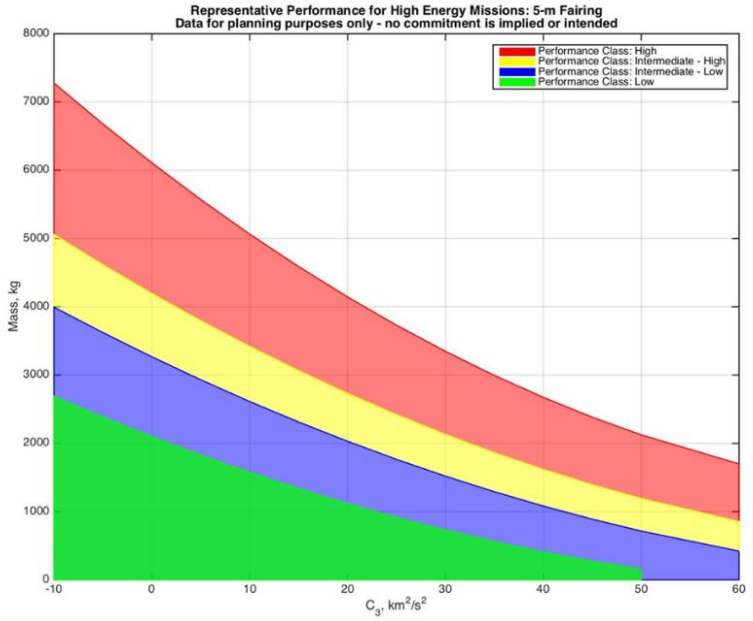
Evaluation

- **Spacecraft Schedule: Area of concern (Yes or No)**
  - **Adequate timing of:**
    - » **Launch Service Integration Start Time: (Yes or No)**
    - » **S/C Environmental Test Program: (Yes or No)**
    - » **Delivery of Verified S/C Model: (Yes or No)**
    - » **S/C ship date: (Yes or No)**
    - » **S/C to LV integrated Operations: (Yes or No)**
- **Missions with Radiological material Area of concern (Yes or No)**
  - **List the Radiological Sources:**

    _____
  - **Are unique facilities required to store/process the Radiological Sources? (Yes or No)**
  - **Any LV modifications required for additional safety or Launch approval? (Yes or No)**

Launch Services Characteristics/Capabilities

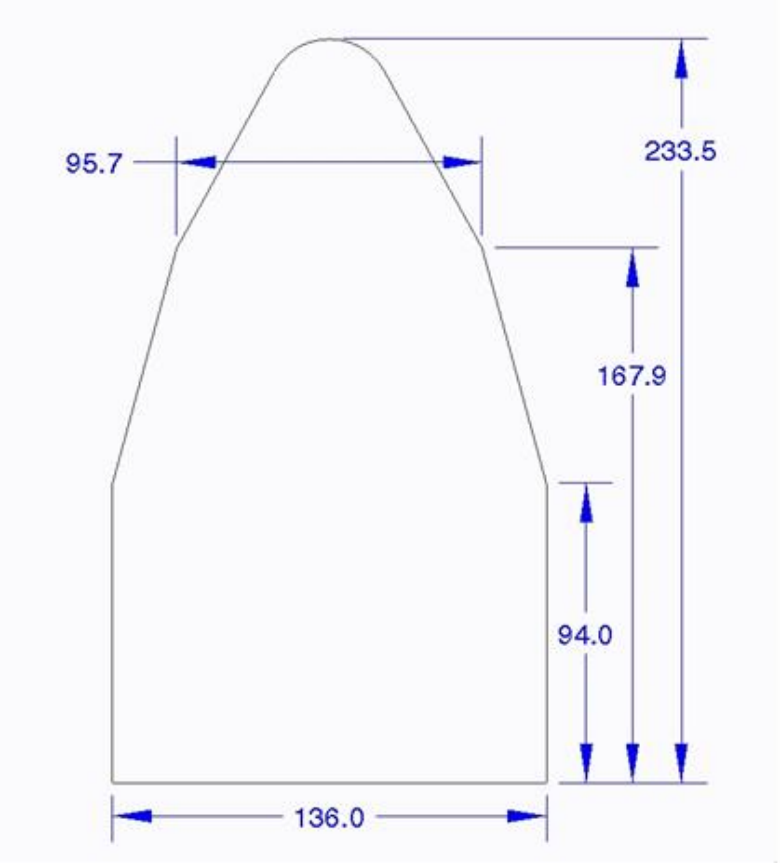




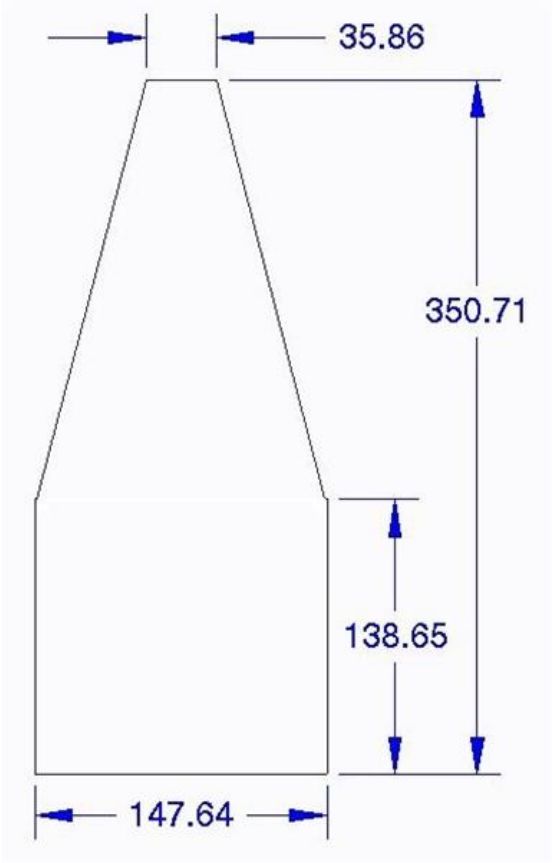
Appropriate fairing must be used for each performance class

Payload Fairings

(not to scale)



4m Static Payload Fairing Envelope (Use with Low Performance Class)



4m Static Payload Fairing Envelope (use with Intermediate-Low, Intermediate-High and High Performance Class)