HUMAN LANDING SYSTEM BAA

INDUSTRY FORUM

FEBRUARY 14, 2019

In the next decade,

humanity will return to the Moon for good.

Agenda

Schedule: 1:30 - 4:30 p.m. EST

Topics	Speakers	NASA Affiliation
Moon to Mars and Human Landing System (HLS) Remarks	Jim Bridenstine Bill Gerstenmaier	NASA Administrator Associate Administrator, Human Exploration and Operations Mission Directorate (HEOMD)
Introduction	Lindsay Aitchison	HLS Formulation Integration, HEOMD
Lunar Exploration Overview	Marshall Smith	Lunar Exploration System Development, HEOMD
HLS and the NextSTEP-2 Appendix E BAA	Greg Chavers Nantel Suzuki Mike DeKlotz Melinda Swenson	HLS Formulation Manager, HEOMD HLS Program Executive, HEOMD HLS Acquisition & Project Management Advisor, HEOMD HLS Procurement, MSFC
Industry Q&A		

Forum Purpose

- Provide an overview of NASA's Moon to Mars activities
- Provide background on NASA's Human Landing System (HLS) Objectives and Activities
- Provide an overview of NASA's NextSTEP-2 Broad Agency Announcement (BAA), Appendix E, released on February 7, 2019
  - Seeks proposals for 6-month Studies and Risk Reduction activities to enable rapid development and flight demonstrations of Human Landing System elements
  - Solicitation available at: https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=13ca9566b575d496988122e66efc8230
  - Additional information available at: https://www.nasa.gov/nextstep/humanlander
- Address questions from potential offerors

Forum Ground Rules

- This forum is being recorded for purposes of capturing questions and answers
- NASA will address questions during this forum to clarify the content of the Announcement. The posted Q&A log will represent NASA's official response.
- Virtual participants, please submit questions via **Webex Chat** or by email at

  hq-nextstep-baa@mail.nasa.gov
- Questions that require further assessment to address will be resolved as soon as possible after the forum, and the answers will be included in the Q&A log

Forum Ground Rules

- NASA will not provide evaluations, opinions, or recommendations regarding any suggested approaches or concepts
- The Announcement and written answers posted to the NextSTEP website take precedence over all verbal discussions, including this forum and presentation materials
- **Deadline for written technical questions is February 21, 2019, 5 pm EST – submit questions to hq-nextstep-baa@mail.nasa.gov**
- Following this forum, NASA will post an Industry Attendance list for partnering purposes. Send an email to hq-nextstep-baa@mail.nasa.gov by **February 15, 2019** if you do not want to be included on this list.

HLS Panel Members

GREG CHAVERS
HLS Formulation Manager

NANTEL SUZUKI
HLS Program Executive

MIKE DEKLOTZ
HLS Acquisition and Project Management Advisor

MELINDA SWENSON
HLS Procurement

LINDSAY AITCHISON
HLS Formulation Integration

Welcome

Marshall Smith

Lunar Exploration System Development
Human Exploration and Operations Mission Directorate
NASA Headquarters

HUMAN LANDING SYSTEM BAA Industry Forum

Why The Moon?

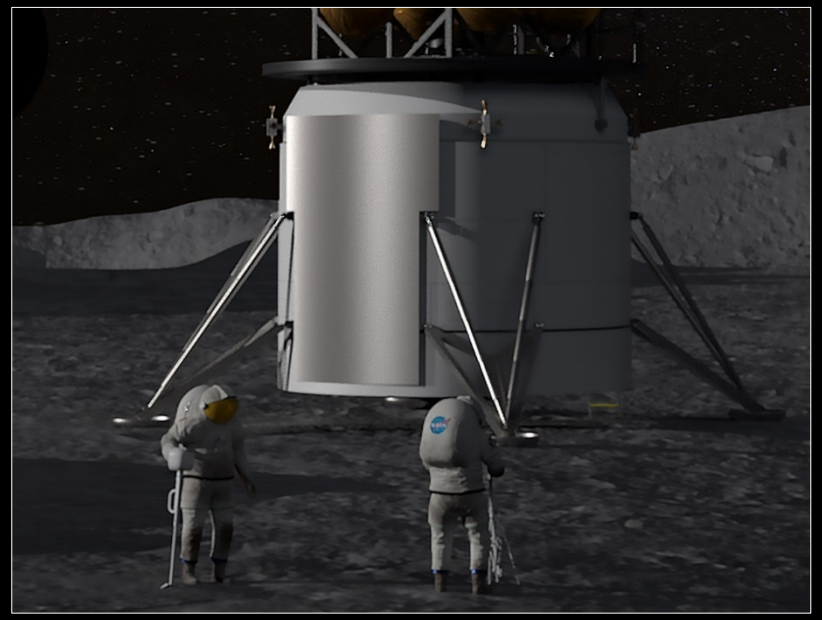
Because Humans Explore.

No human being has ventured beyond low-Earth orbit since 1972.
Right now, NASA is working to re-establish U.S. preeminence to, around, and on the Moon.

Space Policy Directive-1

"Lead an innovative and sustainable program of exploration with commercial and international partners to enable human expansion across the solar system and to bring back to Earth new knowledge and opportunities.

Beginning with missions beyond low-Earth orbit, **the United States will lead the return of humans to the Moon for long-term exploration and utilization**, followed by human missions to Mars and other destinations."

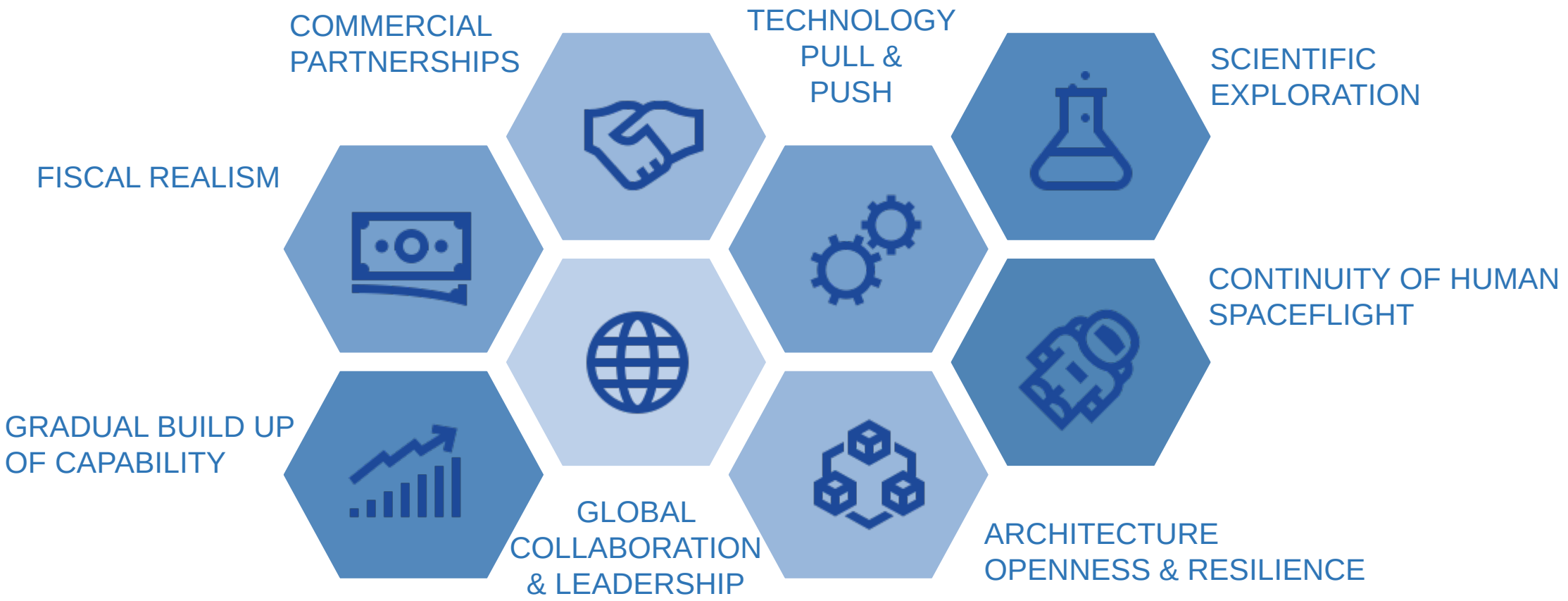


Lunar Surface in Preparation for Mars

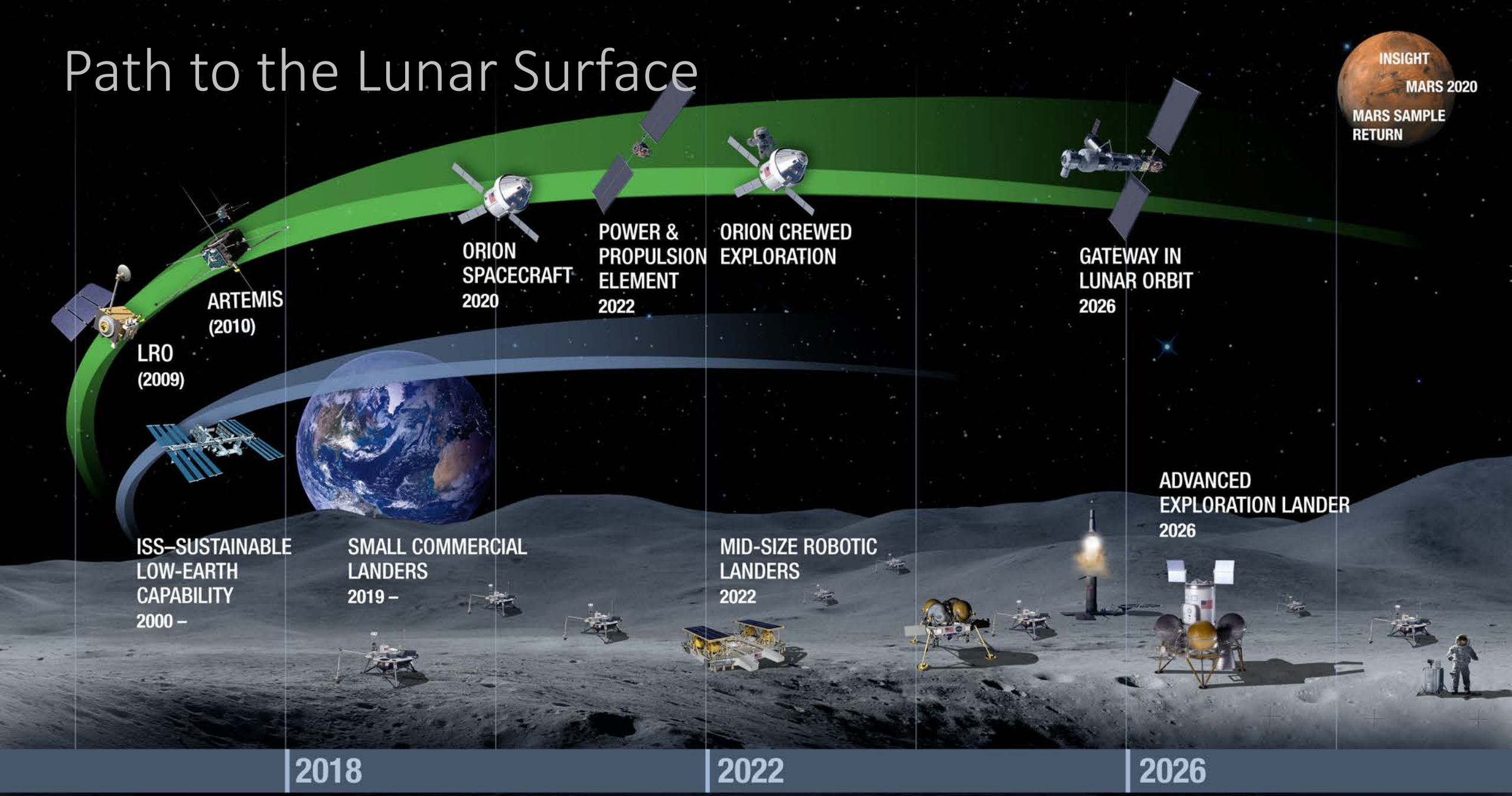
- **Transportation Capabilities**
  - Demonstrate ISRU
  - Demonstrate precision landing
  - Human-class ascent vehicle development and testing
  - Development of human-scale, pressurized surface mobility
- **Crew Health and Habitation Systems**
  - Short- and long-duration surface habitat refinement
  - Learning to recycle destination resources for fuel, water, oxygen, and building materials
  - Development of advanced surface suits
- **Surface Operations**
  - Teleoperation of surface assets from orbit
  - Sample return
  - Surface power technology demonstrations
  - Communications delay and autonomous operations
  - Establishing deep space logistics supply chains
  - Human surface science and exploration operations techniques

Capability maturation and system development ongoing within NASA and through international and commercial partnerships

Strategic Principles for Sustainable Exploration



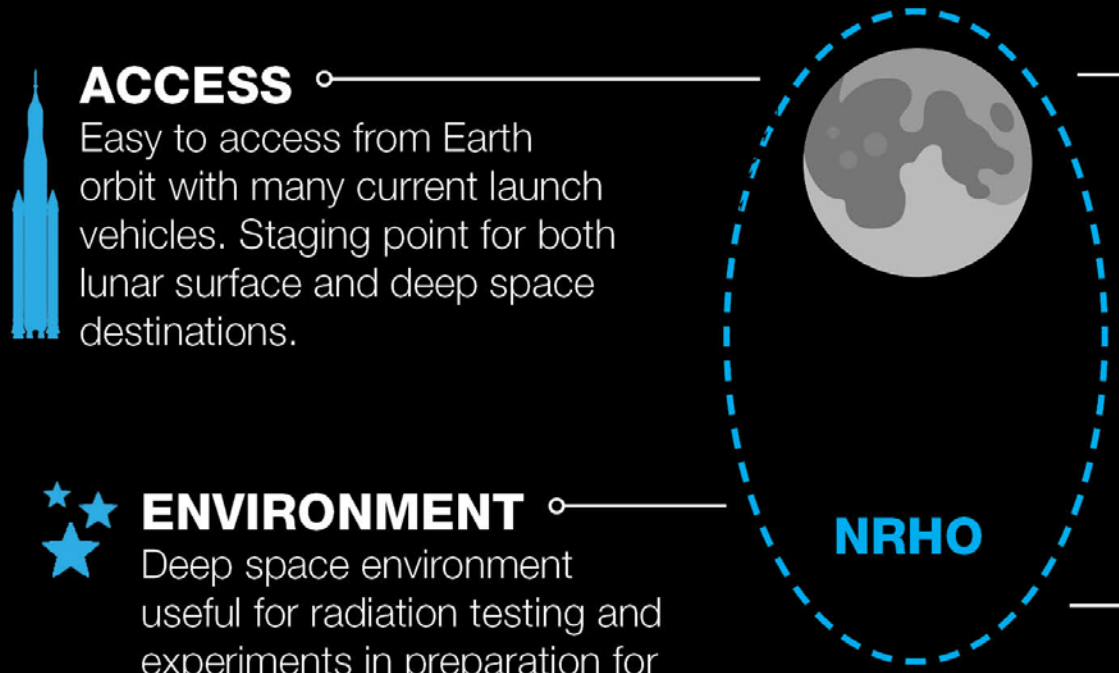
Path to the Lunar Surface



Gateway Objectives

- Enable human crewed missions, including surface missions
- Meet scientific requirements for lunar discovery and exploration
- Prove technologies that enable Lunar missions and feed forward to Mars and other deep space destinations

Gateway's Near-Rectilinear Halo Orbit (NRHO)



ACCESS
Easy to access from Earth orbit with many current launch vehicles. Staging point for both lunar surface and deep space destinations.

ENVIRONMENT
Deep space environment useful for radiation testing and experiments in preparation for missions to the lunar surface and Mars.

SCIENCE
Favorable vantage point for Earth, sun and deep space observations.

COMMUNICATIONS
Provides continuous view of Earth and communication relay for lunar farside.

SURFACE OPERATIONS
Supports surface telerobotics, including lunar farside. Provides a staging point for planetary sample return missions.

FULFILLING THE DREAM

In the next decade, humanity will return to the Moon for good.

Today marks an early step on this journey.
Our bold adventure is just beginning!

HLS Architecture and BAA Overview – N. Suzuki

NextSTEP

Next Space Technologies for Exploration Partnerships

HUMAN LANDING SYSTEM BAA Industry Forum

QUESTIONS? Email HQ-NextSTEP-BAA@mail.nasa.gov

Lunar Transportation Technology Development

SMD
Lunar Discovery and Exploration Program

Timeline governed by available budget and partner contributions

Small Landing Services

Mid-Size Science Landers

Science instruments and technologies demonstrated at increasing capability on each mission

STMD
Technology Development and Demonstrations

Prop — Deep Space Engine

Precision Landing — Sensors — Terrain Relative Nav Hazard Avoidance

Cryo Fluid Management

Survive the night, Recharging Station, Autonomy and Navigation

ISRU/Surface Power

HEOMD
Advanced Cislunar & Surface Capabilities

DESIGN & DEVELOPMENT

HUMAN-CLASS EXPLORATION LANDERS

Lunar CATALYST development ends 2019

HLS Descent Development

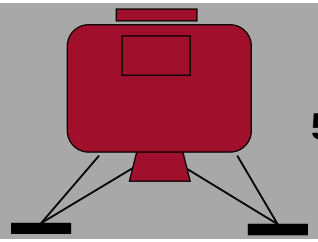
HLS Ascent and Transfer Vehicle Development

HLS Architecture Key Target Features

- Sizing for 4 crew lunar landings with an option of as few as 2 crew
- Support for lunar surface extra-vehicular activities (EVA)
- Global lunar surface access
- Reusability
  - Ascent and Transfer Vehicle Elements reusable, refueled in 2028
  - Descent Element evolvable to be reusable in future
- Accommodations for science missions
- Facilitates commercial and international participation
- Support for launching Elements on commercial launch vehicles
- Rendezvous with Gateway to transfer crew
- 7-day lunar sorties

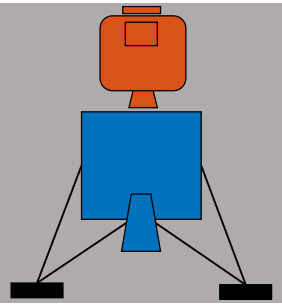
Key Takeaways from Initial Studies

To deliver humans to the Moon, several lander vehicle options were assessed



50+ mT

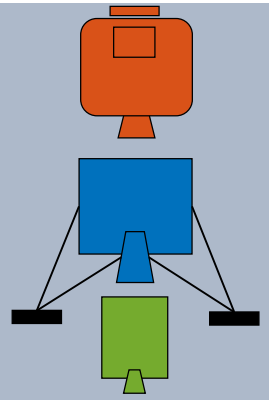
- **Single-stage human lander**
  - Does not fit on any launch vehicle, including SLS Block 1B Cargo



9-12 mT

32-38 mT

- **Two-stage options**
  - Ascent Module fits on commercial launch vehicles expected to be available
  - Descent Module does not fit on commercial launch vehicles
  - Small module commonality across habitable volumes



9-12 mT

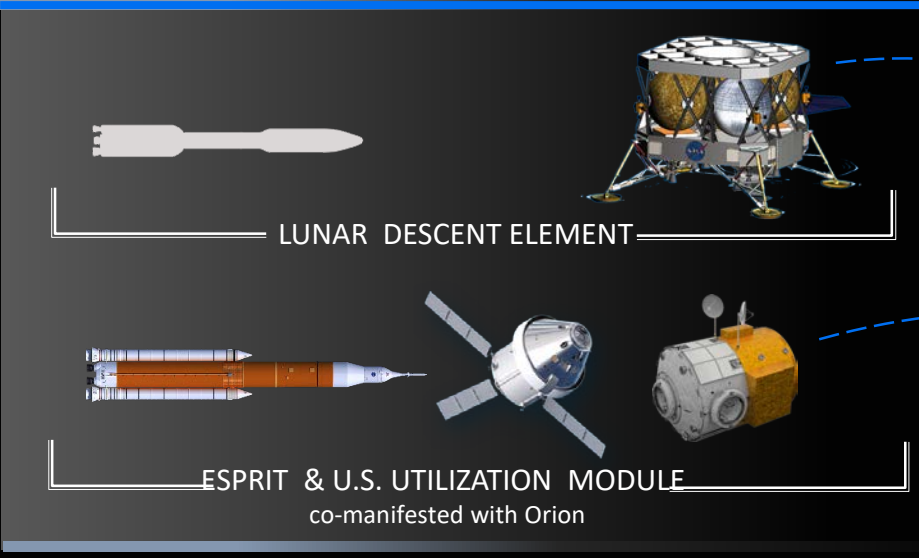
~15 mT

12-15 mT

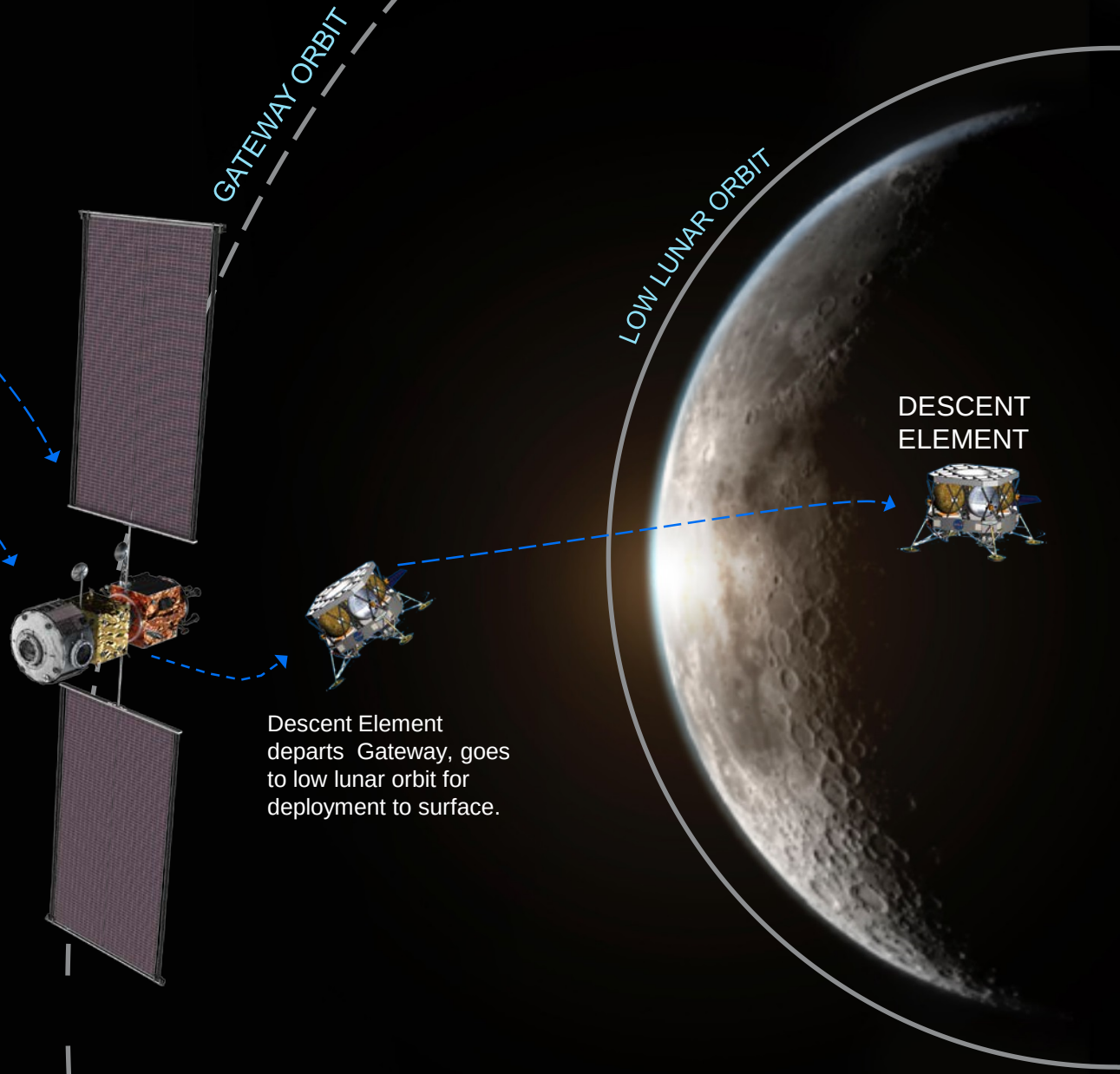
- **Three-stage options**
  - Fits on commercial launch vehicles expected to be available
  - Single elements potentially can be co-manifested payload on SLS
  - Allows increased partnering opportunities
  - Maximizes reusability and flexibility
  - Small module commonality across habitable volumes

Buildup of Notional Human Landing System Reference Architecture
(1 of 3)

2024



LUNAR DESCENT ELEMENT LAUNCHES TO GATEWAY ON COMMERCIAL ROCKET



Descent Element departs Gateway, goes to low lunar orbit for deployment to surface.

Buildup of Notional Human Landing System Reference Architecture

(2 of 3)

2026

LUNAR ASCENT ELEMENT
co-manifested with Orion

LUNAR DESCENT ELEMENT

TRANSFER VEHICLE ELEMENT

Crew goes to Gateway

Lander components aggregate at Gateway

GATEWAY ORBIT

LOW LUNAR ORBIT

Transfer Vehicle takes lander to low lunar orbit, Descent Element completes surface landing

END-TO-END HUMAN-CLASS TEST

Transfer Vehicle Element back to Gateway

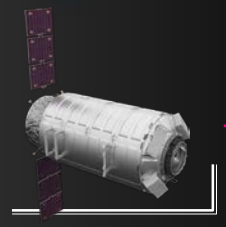
Ascent Element back to Gateway

ONE SLS LAUNCH, TWO COMMERCIAL LAUNCHES TO AGGREGATE AT GATEWAY

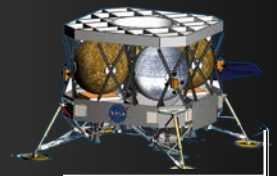
Buildup of Notional Human Landing System Reference Architecture
(3 of 3)

2028

4 CREW AND AIRLOCK



LUNAR ASCENT ELEMENT REFUEL



LUNAR DESCENT ELEMENT

TRANSFER VEHICLE ELEMENT REFUEL

Crew and Airlock go to Gateway

Logistics Resupply refuels Ascent Element at Gateway

Aggregate at Gateway

Logistics Resupply refuels Transfer Vehicle Element at Gateway

GATEWAY ORBIT

LOW LUNAR ORBIT

Transfer Vehicle Element takes lander to low lunar orbit, Descent Element completes surface landing

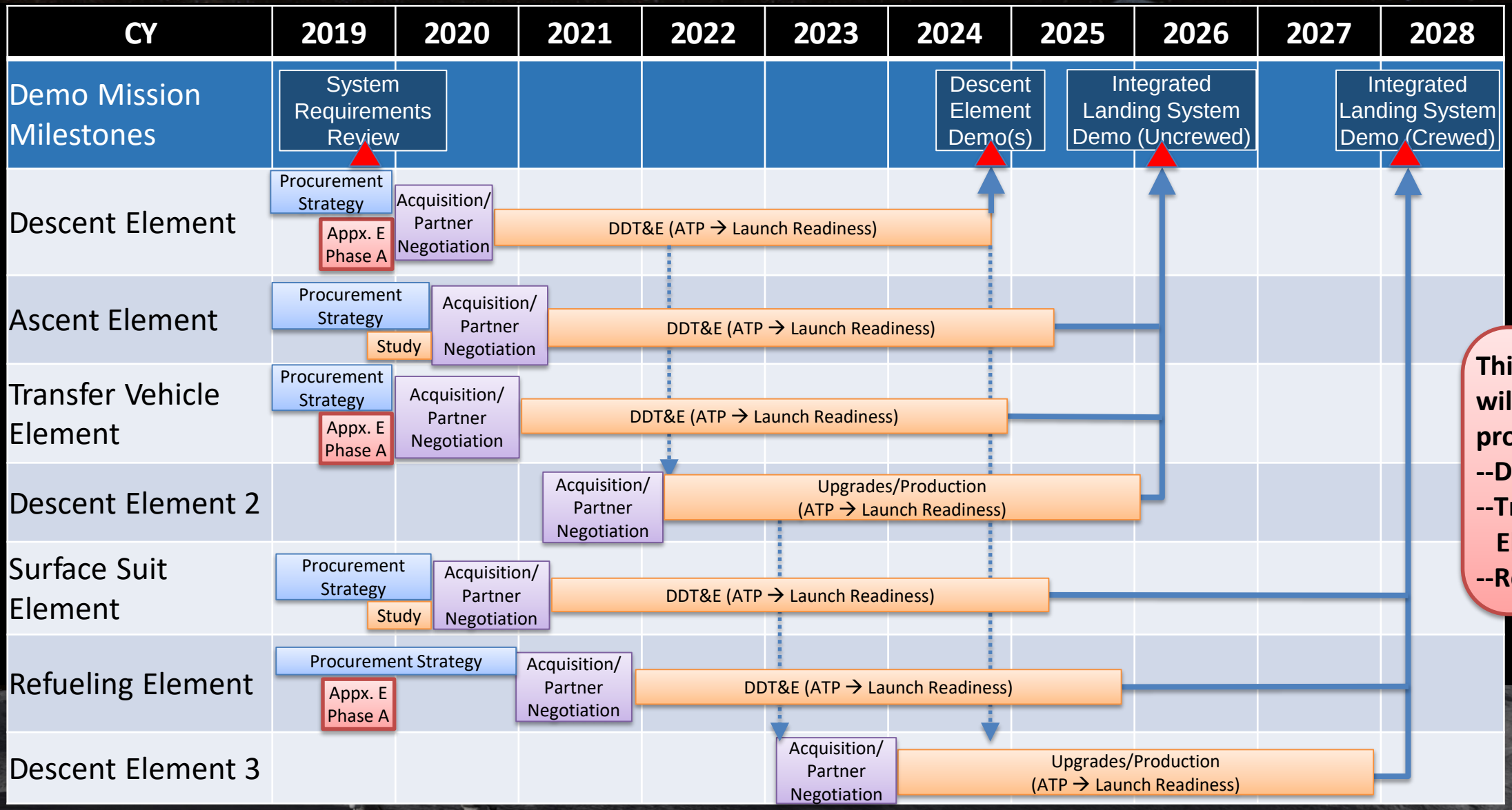
Transfer Vehicle Element back to Gateway

Ascent Element back to Gateway

HUMAN LUNAR SURFACE EXPLORATION

ONE SLS LAUNCH, THREE COMMERCIAL LAUNCHES TO AGGREGATE AT GATEWAY

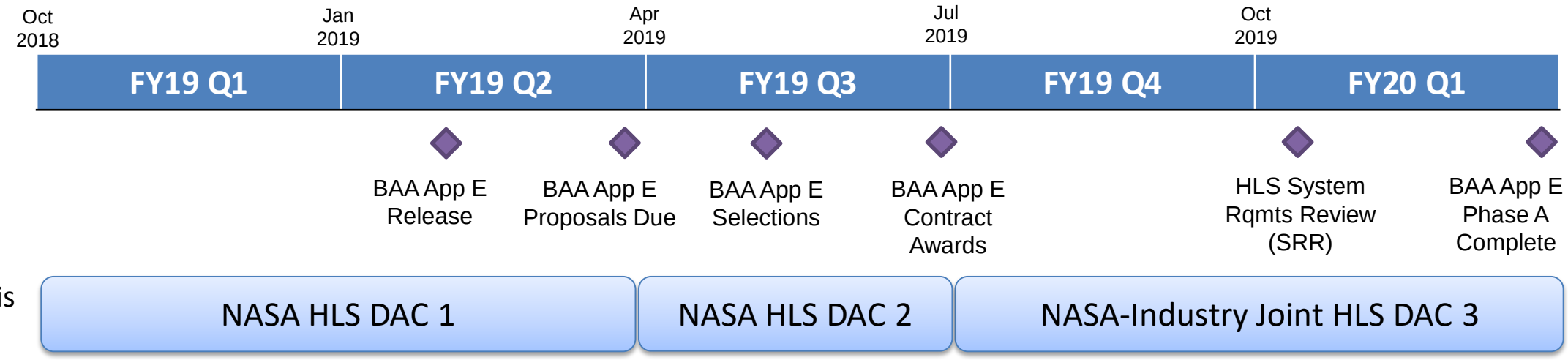
Notional Acquisition Timeline



Appx. E Phase A

This BAA (Appx. E) will request proposals only for:
--Descent Element
--Transfer Vehicle Element
--Refueling Element

HLS Design Analysis Cycle and BAA Schedule



Goals of Appendix E BAA

- **Refine** the architecture, functional allocation options, standards, and common interfaces required to enable the aggregate system to provide human landing capability
- **Inform** System, Element-level, and Inter-Element interface requirements
- **Understand** and refine Element designs, schedules, and costs
- **Identify** key technology maturation areas and implement technology maturation plans
- **Identify** any long-lead procurement items, as well as provide a plan for how offerors would acquire those items, including procurement during the 6-month period of performance of this Phase A effort

- BAA Scope: Descent, Transfer Vehicle, and Refueling Elements (funding emphasis on Descent Element)
- Ascent Element and Surface Suit: NASA plans internal effort to mature designs of Ascent and Surface Suit Elements before issuing potential external study and risk reduction efforts

Minimum and Goal Element Requirements

Descent Element Requirement	Preliminary Minimum	Preliminary Goal
Design stability	Minimal changes needed from 2024 design to support 2026, 2028 missions	Not applicable (N/A)
Payload mass to lunar surface	At least 9 metric tons (mT) from LLO (100km) to support 2026 and 2028 missions.	12 mT or greater.
Reusability (Full reusability: ability to be refueled and reused on a subsequent mission)	N/A	Evolvable to be refuelable to support eventual full reusability
Schedule	Credible launch readiness in 2024	Credible launch readiness in 2023
Launch Vehicle considerations	Design to fit within 6.3m dynamic envelope diameter Wet mass at launch less than 16mT	Design to fit within 4.6m dynamic envelope diameter Wet mass at launch less than 15mT
Landing zone	Global access	N/A
Landing precision	100m	50m
Propulsion system effective deep throttling (accomplished with single or multiple engines)	4:1	6:1

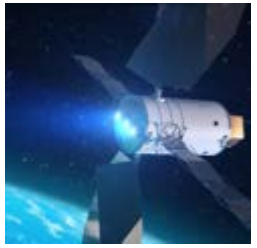
Minimum and Goal Element Requirements

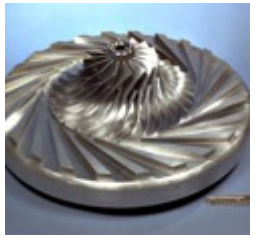
Transfer Vehicle Element Requirements	Preliminary Minimum	Preliminary Goal
Reusability (Full reusability: ability to be refueled and reused on a subsequent mission)	Evolvable to being fully reusable	Fully reusable
Number of reuses	N/A	10 uses
Mass transferred from Near Rectilinear Halo Orbit (NRHO) to 100km LLO (assuming ability to return to NRHO after transfer)	25mT	>25mT
Schedule	Credible launch readiness in 2026	Credible launch readiness in 2025
Launch Vehicle considerations	Design to fit within 6.3m dynamic envelope diameter Wet mass at launch less than 16mT	Design to fit within 4.6m dynamic envelope diameter Wet mass at launch less than 15mT
Propellant	Cryogenic or storable	Cryogenic

Minimum and Goal Element Requirements

Refueling Element Requirements	Preliminary Minimum	Preliminary Goal
Refueling capacity at NRHO	10 mT propellant	>10mT propellant
Propellant types	Cryogenic or storable	Cryogenic
Reusability	None	Some
Schedule	Credible launch readiness in 2028	Credible launch readiness in 2026 or earlier
Launch Vehicle considerations	Design to fit within 6.3m dynamic envelope diameter Wet mass at launch less than 16mT	Design to fit within 4.6m dynamic envelope diameter Wet mass at launch less than 15mT

Industry Partnerships in Pursuit of NASA Goals





- **NextSTEP solicits studies, concepts and technologies to demonstrate key capabilities on the International Space Station and for future human missions in deep space. Focus areas include:**
  - life support systems, advanced electric propulsion systems, small satellites, commercial lunar landers, in-space manufacturing, and in-situ resource utilization (ISRU) measurements and systems
- **Most NextSTEP efforts require some level of corporate contribution. For this Appendix, small businesses have different corporate contribution requirements.**
- **This corporate contribution model of public-private partnerships stimulates the economy and fosters a stronger industrial base and commercial space market.**

NextSTEP-2 Omnibus BAA

- **Umbrella BAA solicitation covering multiple areas of research by AES**
  - Original Release April 19, 2016: NNHZ16CQ001K
  - Effective through December 2020 as of Amendment #6
- **Specific Research and Development Opportunities announced periodically as Appendices**
- **Umbrella BAA document contains information relevant to all Appendix solicitations**
  - Information may be augmented by or superseded in Appendices
  - Provide the flexibility for a variety of contract vehicles
  - Eligibility requirements, proposal instructions, proposal review information

NextSTEP-2 Omnibus BAA

- **Appendices contain details specific to the research being sought**
  - Funding, expected number/type of awards (grant, CA, **contract**)
  - Proposal instructions where it may differ from the omnibus
- **Appendix E – Human Landing System Studies, Risk Reduction, Development, and Demonstration released February 7, 2019**

NextSTEP BAA HLS Phase A Award Overview

- **NASA is soliciting Phase A proposals for firm fixed price contracts for trade studies, long-lead items, and risk reduction prototypes for Descent Elements, Refueling Elements, and Transfer Vehicles of the Human Landing System**
  - Base study – All proposals are expected to include a Base Study that includes all Phase A scope with the exception of scope included under Long-Lead and Prototypes described below
  - Long-lead items – Proposals may include procurement of long-lead items
  - Risk reduction prototypes – Proposals may include risk reduction prototype development and testing

NextSTEP BAA HLS Phase A Award Overview

- Phase A Period of Performance: 6 months
- Funding: $30 - $40M to allocate (FY2019)
- Structure by Contract Line Item Number (CLIN) (total not to exceed $9M per proposal)
  - Base Study CLIN (expected to be < $1M, not to exceed $1.5M)
  - Long-Lead CLIN
  - Prototype CLIN
- Corporate contribution: at least 20% (10% for small business)
- Follow-on potential
  - Phase B for Design, Development, Test and Evaluation (DDT&E) of Descent Elements (other Elements will have separate DDT&E procurement)

Phase A Objectives and Expected Deliverables

BAA Phase A Objective	Expected in Proposal	Expected Proposed Study Deliverable(s)
Inform requirements, concept of operations, architecture	SOW Milestone(s) to provide comments	Comments
Inform interfaces	Approach to standards review, support of interface working groups	Report(s)
Mature designs	Capability concept	Updated design package
Technology maturation	Technology maturation plan, including proposed prototypes	1) Prototype documentation 2) Updated technology maturation plan for post-Study phase
Element Development Schedule thru flight	Rough schedule with assumptions	Refined preliminary schedule
Study SOW (includes schedule	Phase A SOW w/milestones	N/A (deliverables per SOW)
Element SOW thru flight	N/A	Draft SOW (expected only for Descent Element)
Element cost thru flight	N/A	Estimated Element cost with assumptions
Mature program technical approach	Element technical approach	Updated design package
Long-lead items	Long-lead plan, including proposed Phase A procurements	Updated long-lead items plan
NASA GFP/GFE/Subject Matter Expertise Plan	Phase A NASA GFP/GFE/Subject Matter Expertise Plan	Updated GFE plan (expected only for Descent Element)

Descent Element Follow-On Phases

- Following Phase A, NASA intends to make zero, one, or two awards for the Design Development Test and Evaluation (DDT&E) and planned 2024 flight demonstrations of Descent Elements from among the Phase A participants
  - Potential offerors that are interested in performing DDT&E and flight demonstration of their Descent Elements under contract at Phase B are strongly encouraged to and should propose Phase A Studies requested under this Appendix
  - Following Descent Element Phase A award, NASA intends to provide additional Phase B information, including applicable evaluation criteria
- Work related to the planned 2026 and 2028 missions may be awarded exclusively to one or more offerors from among Descent Element Phase A awardees
- NASA reserves the right to revisit and modify its Descent Element acquisition/partnering strategy at any time and will notify industry if and when it does so

BAA Details – M. DeKlotz

NextSTEP

Next Space Technologies for Exploration Partnerships

HUMAN LANDING SYSTEM BAA Industry Forum

QUESTIONS? Email HQ-NextSTEP-BAA@mail.nasa.gov

Eligible Participants

- This solicitation topic is open to non-Government U.S. institutions (companies, universities, nonprofit organizations)
- Foreign institutions, NASA civil servants, Jet Propulsion Laboratory (JPL) employees, national laboratories, and Federally Funded Research and development Centers (FFRDCs) shall not be proposed as a Prime Contractor on any effort associated with this announcement, but may participate as a team member
- Performance of Descent Element Phase B of this appendix will be subject to the eligibility and domestic sourcing requirements of both the Commercial Space Act of 1998 and the National Space Transportation Policy

Corporate Resources

- **Offerors must show a minimum of 20% of the overall effort corporate contribution (10% for a Small Business)** that is directly relevant to the proposed effort.
  - A minimum of half of corporate contribution must be invested coincident with the period of performance of this effort in the form of direct labor, travel, consumables, or other in-kind contributions.
  - No more than half of required minimum corporate contribution may be from foreign partners
  - Value of participation by federally funded participants and/or use of federal government facilities shall be added to the price to the government for determining whether the 20% required corporate contribution has been met.

CC: Corporate Contribution
RP: Requested Price to NASA (not including cost of NASA resources)
NR: NASA Resources (GFP/GFE/Subject Matter Expertise)
OE: Overall Effort
OE = CC + RP + NR (if applicable)
Minimum CC = 0.20 * OE

Government-Contributed Resources

- Offerors may include requests for access to Government resources, such as facilities, GFP/GFE, NASA subject matter expertise, or other Government services
  - Responsibility of offeror to determine availability of Government facilities or services
  - Government effort must be a discrete effort/SOW
- Center points-of-contact listed below and in BAA Appendix E, Attachment B

Center	Point-of-Contact
Ames Research Center	David Korsmeyer, 650-604-3114, david.korsmeyer@nasa.gov
Armstrong Flight Research Center	Charles Rogers, 661-276-7572, charles.rogers-1@nasa.gov
Glenn Research Center	Gary Ruff, 216-433-5697, gary.a.ruff@nasa.gov
Goddard Space Flight Center	Mark Lupisella, 301-286-2918, mark.l.lupisella@nasa.gov
Jet Propulsion Laboratory	Dave Eisenman, 818-354-4430, david.j.eisenman@jpl.nasa.gov
Johnson Space Center	Randy Lillard, 281-483-4629, randy.lillard-1@nasa.gov
Kennedy Space Center	Julius Edelmann, 321-861-7526, j.edelmann@nasa.gov
Langley Research Center	David Dress, 757-864-5126, david.a.dress@nasa.gov
Marshall Space Center	Jason Adam, 256-961-2317, jason.r.adam@nasa.gov
Stennis Space Center	Lauren Underwood, 228-688-2096, lauren.w.underwood@nasa.gov

Proposal Content (1 of 5)

- Title Page
- Executive Summary
  - No proprietary content (publicly releasable)
- Proof of Eligibility

Proposal Content (2 of 5)

Technical Proposal

- Capability Concept
  - Element concept description and how it functions (what role it serves in the Human Landing System)
  - How concept addresses objectives/requirements
  - Reusability, recyclability, extensibility
- Technical Approach
  - Overview of enveloping engineering approach
  - Detailed work plan and schedule including key project milestones (may refer to Draft SOW attachment)
  - Long-lead procurement plan
  - Technology maturation path
  - A brief summary of past relevant activities/tests
  - Plan for providing feedback on Concept of Operations, requirements
  - Plan for supporting interface working groups
  - Plan for NASA-contributed expertise and facilities (may refer to Requested government-contributed resources attachment)
  - Identification of key team members, their roles in the project, and plan to coordinate work across multiple departments/partners, if applicable (may refer to Resumes attachment)

Proposal Content (3 of 5)

Business Proposal

- Define customer/partnership model
- Capabilities: Evidence of existing capabilities for designing and developing space-qualified systems applicable to the Elements described in this Appendix
- Intellectual Property
  - Approach for data rights and inventions
  - Describe how approaches meet the objectives outlined under Omnibus BAA Section 2.7, Intellectual Property
  - Attachment E provides as a reference the standard FAR patent and data rights clauses used by NASA in contract awards. Provide any exceptions, with justification.

Proposal Content (4 of 5)

Price Proposal

- Firm fixed price, sample format set forth in Omnibus BAA Attachment A
- Include table with breakout and value of corporate resources
- Include table with breakout and value of government-contributed resources
- Structure by CLIN (total not to exceed $9M)
  - Base Study CLIN (expected to be < $1M, not to exceed $1.5M)
  - Long-Lead CLIN
  - Prototype CLIN
- Provide existing rate agreements, if any

Proposal Content (5 of 5)

- **Attachments:**
  - Draft Statement of Work
    - Proposed technical and payment milestones
    - Deliverables
  - Summary chart (template enclosed)
  - Resumes
  - Corporate Resources Documentation
  - Key Facilities and Equipment
  - Requested government-contributed resources

Proposal Evaluation Criteria (1 of 3)

- **Technical Merit, Relevance, and Price factors are equally important. Within the Technical Merit factor, Technical Approach is more important than Quality of Team.**
- **Relevance**
  - Address one of the specific HLS Elements
    - Offerors may submit proposals for one or more Elements, with a separate proposal submitted for each Element being proposed
    - Offerors may only submit one proposal per Element
    - Note that proposals not aligned with the Elements of the HLS as described in the BAA, while potentially valuable to NASA, are outside the scope of this BAA
  - Alignment with NASA's strategy to stimulate the U.S. space industry while leveraging those same commercial capabilities through this Partnership and future contracts to deliver mission capabilities

Proposal Evaluation Criteria (2 of 3)

- **Technical Merit – Technical Approach**
  - Address the preliminary minimum and goal requirements for proposed element
  - Robust design such that Elements used in earlier missions are expected to be robust enough to be used for later missions without significant design changes
  - Proposed technology maturity plan supports the schedule and objectives of three anticipated missions described in Attachment A
  - Risk-reduction prototype activities and long-lead procurement proposed to be accomplished during Phase A critical in supporting the schedule and objectives of the proposed Element
  - To what extent is the SOW – including key technical milestones and deliverables – specific, measurable, appropriate, realistic, and timely
  - Use of NASA GFE, GFP, and subject matter experts aligns with the objectives
  - Adequate plan to assess proposed design concept against applicable standards, as well as provide feedback on interfaces, requirements, concept of operations
  - Recognize significant potential risks and consider reasonable mitigation strategies

Proposal Evaluation Criteria (3 of 3)

- **Technical Merit – Quality of Team**
  - Proposed team posses sufficient technical knowledge and capabilities
  - Evidence of successful past performance for designing and developing space-qualified systems
  - Staffing levels adequate
  - Roles clearly defined, with clear and appropriate management structure
  - Facilities appropriate to complete the Phase A effort and potential follow-on development and manufacture of space-qualified systems

- **Price will be evaluated for reasonableness**

Schedule

- Pre-Solicitation Notice (Synopsis) Released: 12/13/18
- BAA Solicitation Released: 2/7/19
- Industry Forum (NASA HQ & Virtual): 2/14/19
- Inquiries / Notices of Intent (NOI) Due: 2/21/19
- Proposals Due: 3/25/19
- Awardee Selections: May 2019 (anticipated)
- Contract Awards: July 2019 (anticipated)

Q & A – L. Aitchison

NextSTEP

Next Space Technologies for Exploration Partnerships

HUMAN LANDING SYSTEM BAA Industry Forum

QUESTIONS? Email HQ-NextSTEP-BAA@mail.nasa.gov

Q & A Instructions

- Questions may be submitted as follows:
  - In-Person or Webex Chat questions during Q&A period of the forum
  - E-mail questions to: hq-nextstep-baa@mail.nasa.gov
- Please limit questions to clarifications of this BAA
- Questions that require further assessment to address will be resolved as soon as possible after the forum, and the answers will be posted to the NextSTEP website: **http://www.nasa.gov/nextstep/humanlander**
- Any published responses to questions posted at the NextSTEP website will supersede oral discussions during this forum

Thank You for Participating

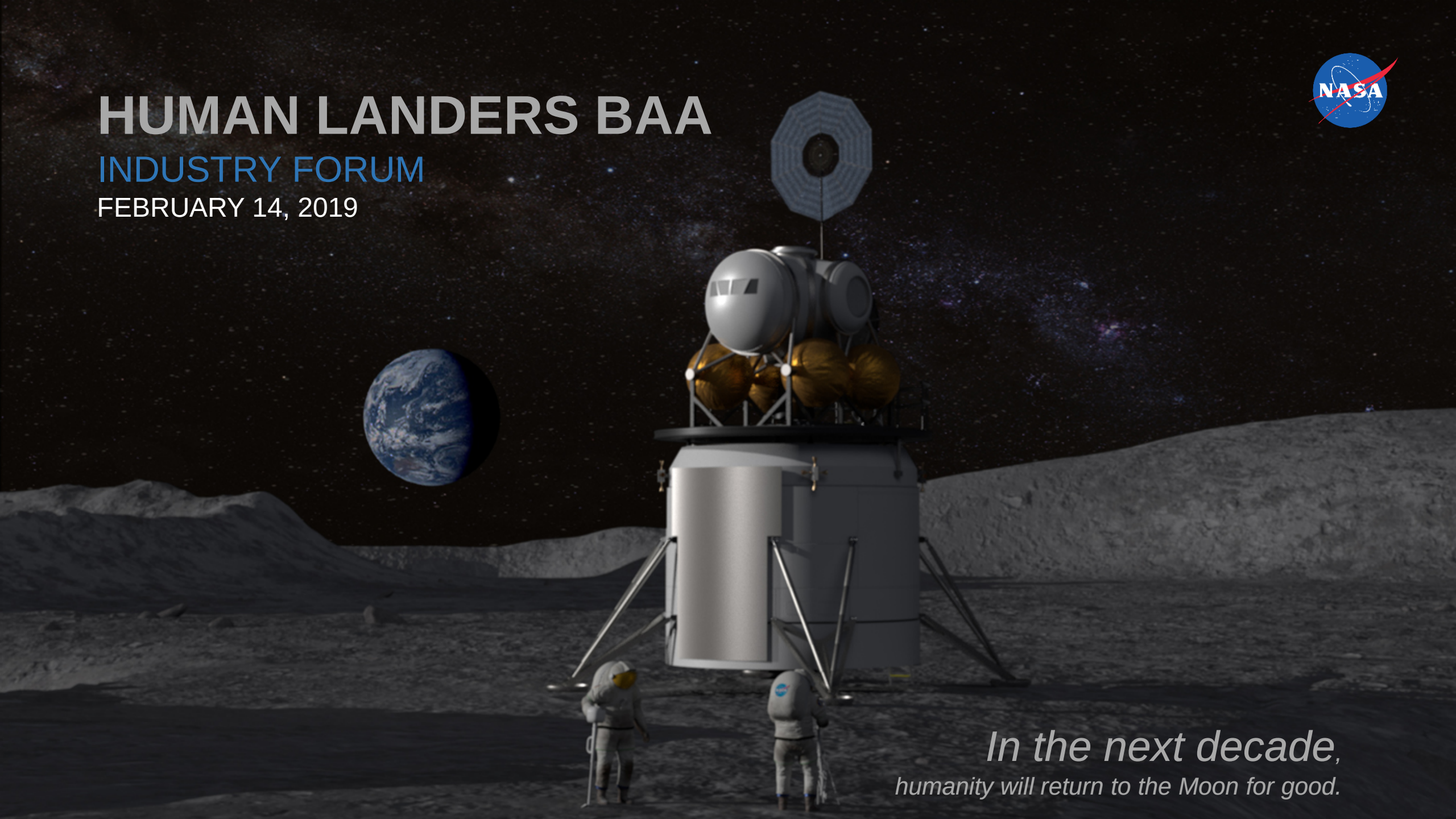
This presentation will be posted at:
http://www.nasa.gov/nextstep/humanlander

Please submit questions about no later than **February 21,** 2019, 5pm EDT to:
hq-nextstep-baa@mail.nasa.gov

HUMAN LANDERS BAA

INDUSTRY FORUM

FEBRUARY 14, 2019



In the next decade,

humanity will return to the Moon for good.