



INSPIRE ENGAGE EDUCATE EMPLOY
The Next Generation of Explorers

NASA ADVISORY COUNCIL STEM ENGAGEMENT COMMITTEE

AIMEE KENNEDY, PHD
NAC STEM ENGAGEMENT COMMITTEE CHAIR

FIFTH NATIONAL SPACE COUNCIL MEETING



VP Pence announces plans to **return US Astronauts** to the surface of the **Moon by 2024**, with report from NASA Administrator **Bridenstine**
3.26.2019

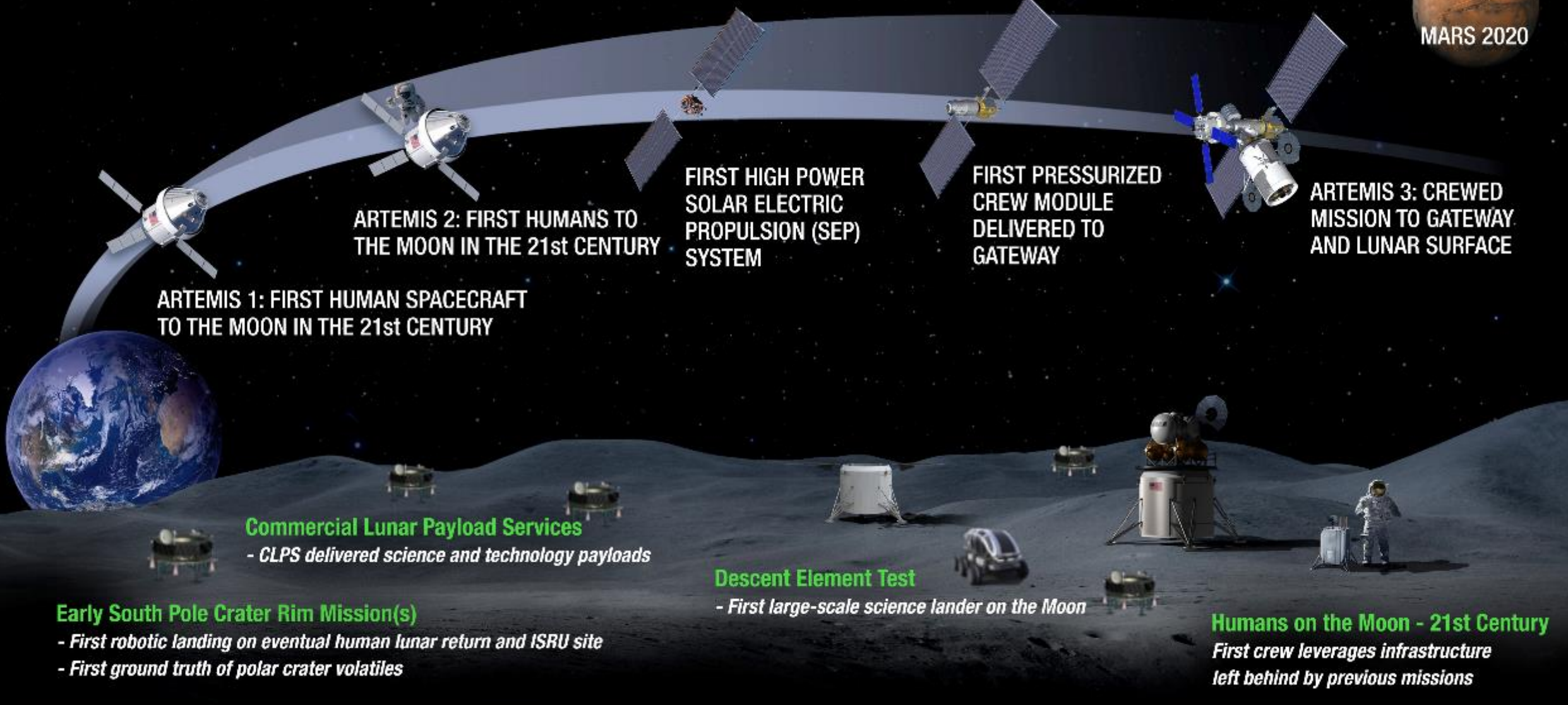
Expert Panel 1: Ready to Fly

- Les Lyles, retired U.S. Air Force general and former Vice Chief of Staff of the Air Force
- Eileen Collins, retired U.S. Air Force officer and former NASA astronaut
- Sandy Magnus, former NASA astronaut

Expert Panel 2: Ready to Explore

- Dan Dumbacher, American Institute of Aeronautics and Astronautics
- Jack Burns, University of Colorado at Boulder
- Wanda Sigur, independent consultant

ARTEMIS PHASE 1: TO THE LUNAR SURFACE BY 2024



ARTEMIS 1: FIRST HUMAN SPACECRAFT TO THE MOON IN THE 21st CENTURY

ARTEMIS 2: FIRST HUMANS TO THE MOON IN THE 21st CENTURY

FIRST HIGH POWER SOLAR ELECTRIC PROPULSION (SEP) SYSTEM

FIRST PRESSURIZED CREW MODULE DELIVERED TO GATEWAY

ARTEMIS 3: CREWED MISSION TO GATEWAY AND LUNAR SURFACE

Commercial Lunar Payload Services
- CLPS delivered science and technology payloads

Early South Pole Crater Rim Mission(s)
- First robotic landing on eventual human lunar return and ISRU site
- First ground truth of polar crater volatiles

Descent Element Test
- First large-scale science lander on the Moon

Humans on the Moon - 21st Century
First crew leverages infrastructure left behind by previous missions

LUNAR SOUTH POLE CRATER TARGET SITE

2019

2024

FINDING

Finding: The Office of STEM Engagement (OSTEM) brings a continuous improvement approach to its work and is making good progress on the work plans previously presented (i.e. BSA findings, NASA STEM Engagement strategy, Federal 5-year STEM plan).

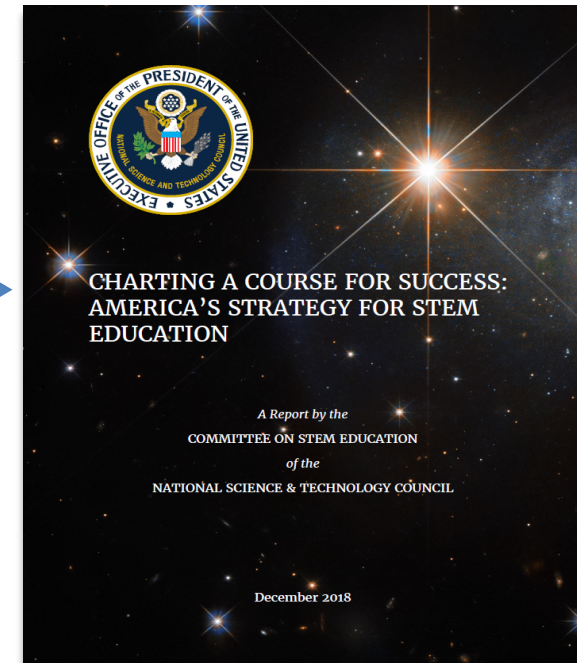
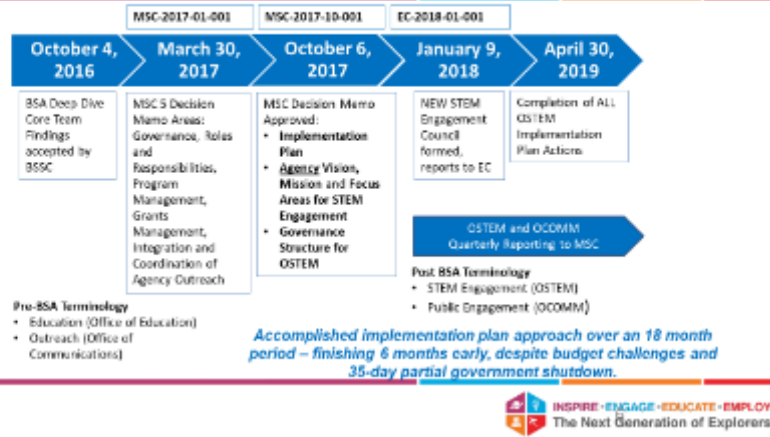
Major Reasons for the Finding:

- OSTEM continues to align their STEM engagement programs for maximum impact.
- OSTEM continues to leverage scalability of their reach through strategic partnerships.

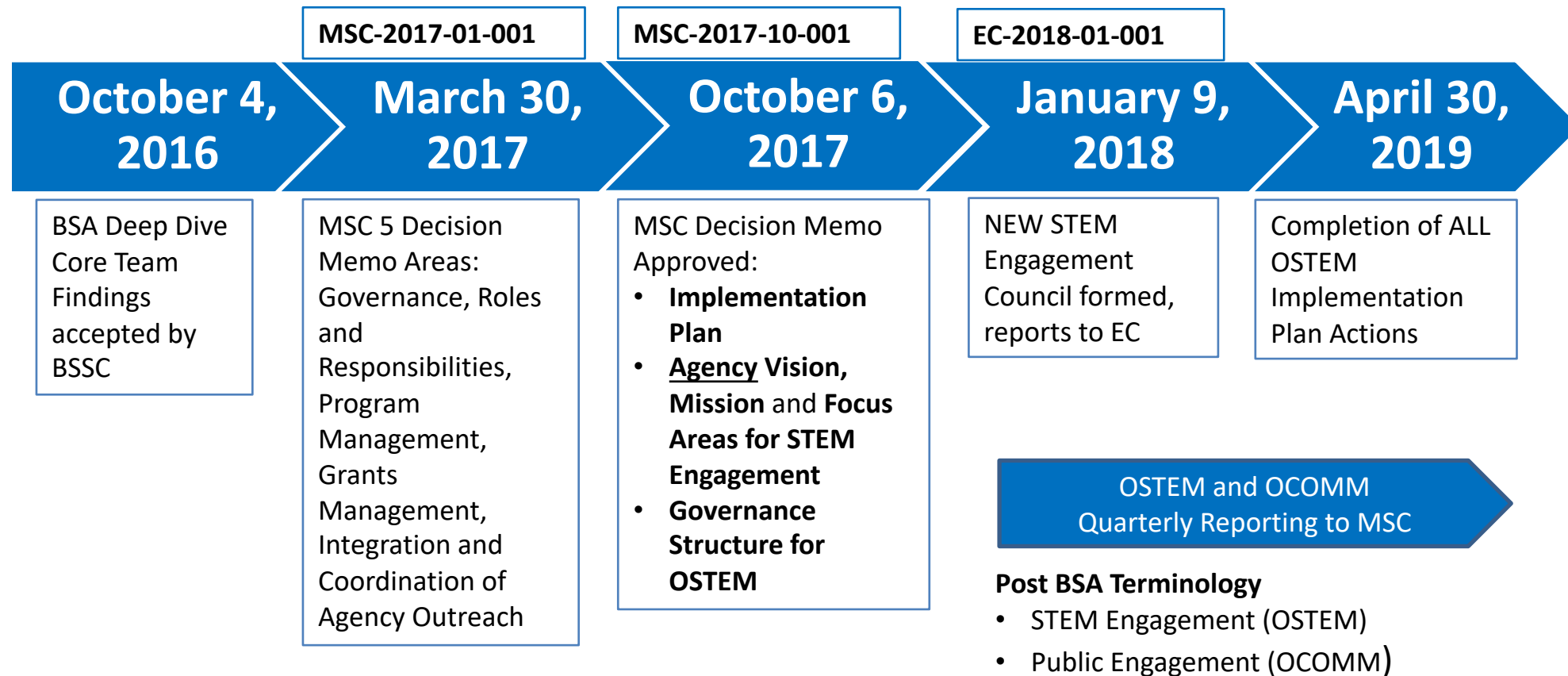


PROGRESS ON PLANS

STEM ENGAGEMENT BSA IMPLEMENTATION TIMELINE



STEM ENGAGEMENT BSA IMPLEMENTATION TIMELINE



Pre-BSA Terminology

- Education (Office of Education)
- Outreach (Office of Communications)

Accomplished implementation plan approach over an 18 month period – finishing 6 months early, despite budget challenges and 35-day partial government shutdown.



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STEM ENGAGEMENT TRANSFORMATION HIGHLIGHTS

Systemic

- ✓ STEM Engagement Council
- ✓ New STEM Engagement function and Office of STEM Engagement
- ✓ New agency Strategy for STEM Engagement
- ✓ New performance measurement and evaluation approach
- ✓ Integrated agency STEM Engagement Portfolio
- ✓ Annual agency STEM Engagement planning process
- ✓ New STEM Engagement NASA Policy Directive (in formal NODIS process)
- ✓ Capabilities-driven model with assignment of functional roles and responsibilities
 - ✓ Performance Measurement & Evaluation
 - ✓ Educational Platforms and Capabilities
 - ✓ Internships
- ✓ Enhanced infrastructure, tools & systems
 - ✓ New NASA Internship Portal
 - ✓ New NASA STEM Engagement Search Engine for students and educators
 - ✓ New enterprise performance measurement system under construction

Programmatic

- ✓ An integrated program management approach for appropriated program
- ✓ Significant changes to appropriated programs:
 - ✓ New Next Gen STEM project, replacing SEAP, incorporating significant changes to approach
 - ✓ Streamlined MUREP with more focused, strategic award initiatives
 - ✓ New multi-year solicitation for Space Grant with key changes
- ✓ Rigorous, systematic program and fiscal management practices
- ✓ Project management and grants management training requirements – in implementation



NEW ARCHITECTURE ENABLING STUDENT OPPORTUNITIES

NASA MISSION DIRECTORATE DRIVERS & REQUIREMENTS



Evidence-based strategies

Rigorous planning



Integrated operational model

FOCUS AREAS

Create unique opportunities for students to contribute to NASA's work.

Build a diverse future STEM workforce by engaging students in authentic learning experiences.

Strengthen public understanding by enabling powerful connections to NASA's mission and work.

Strategic, balanced portfolio

NASA-unique learning experiences



Student contributions to NASA's work in action

SCALABILITY TO MAGNIFY NASA'S REACH AND IMPACT

Graduate

Undergraduate

High School

Middle School

K-Elementary

BENEFICIARIES OF NASA'S STEM ENGAGEMENT PORTFOLIO

NASA STRATEGY FOR STEM ENGAGEMENT

The *NASA Strategy for Science, Technology, Engineering and Math (STEM) Engagement* serves as a roadmap to frame and guide the agency's work in STEM engagement over the next 3 years.

Beneficiaries of NASA's STEM Engagement Portfolio



Elementary



Middle School



High School

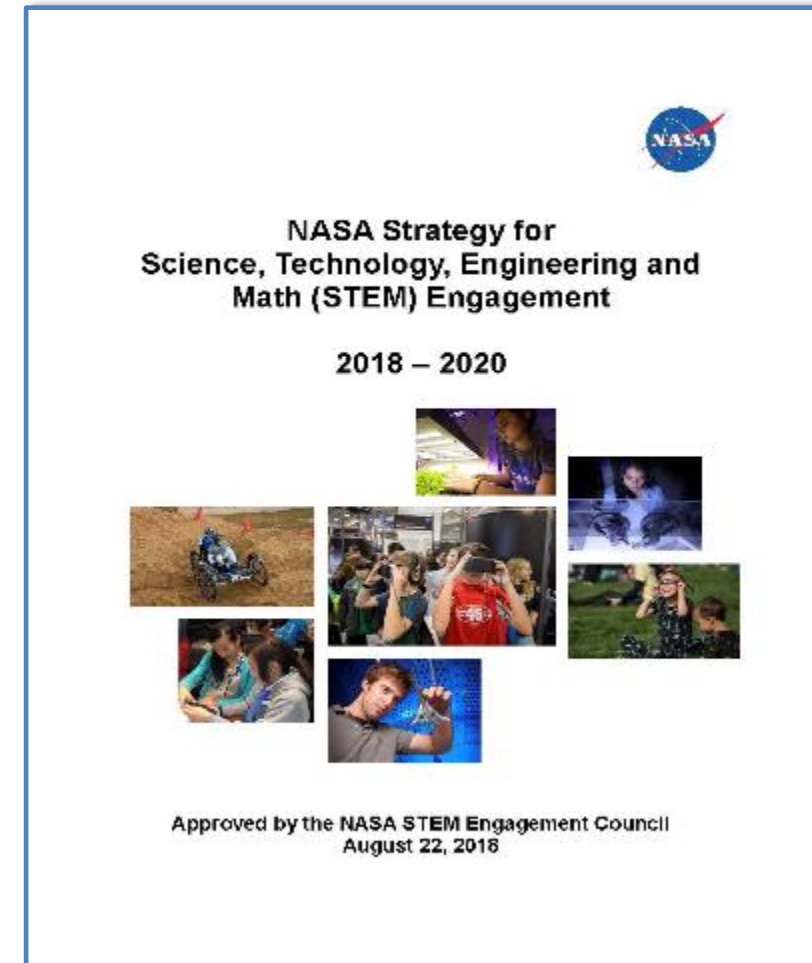


Undergraduate



Graduate

STEM engagement is comprised of a broad and diverse set of programs, projects, activities and products developed and implemented by HQ functional Offices, Mission Directorates and Centers.



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NASA STRATEGY FOR STEM ENGAGEMENT

FOCUS AREAS

Enable contributions to NASA's work

Build a diverse, skilled, future workforce

Strengthen STEM through connections to NASA



OBJECTIVES

- Mission-driven student contributions
- Building our pipeline
- Connecting with students



STRATEGIES

- Strategies toward achieving 8 objectives aligned with Vision focus areas



NASA Strategy for Science, Technology, Engineering and Math (STEM) Engagement

2018 – 2020

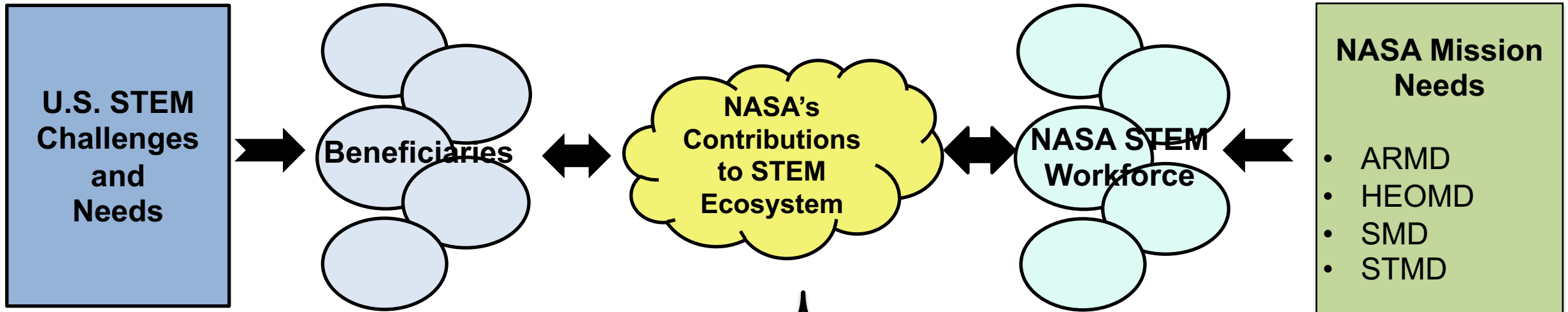


Approved by the NASA STEM Engagement Council
August 22, 2018



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NASA STEM ENGAGEMENT PORTFOLIO



- NASA Mission Needs**
- ARMD
 - HEOMD
 - SMD
 - STMD

STEM Engagement Portfolio



PARTNERSHIPS



APOLLO 50TH

The screenshot shows the 'Events and Exhibits' page on the Space STEM Forum website. The page is filtered for July 2019 and the Apollo Program. It lists several events, including 'Wings Over the Rockies Air and Space Museum', 'Armstrong Air & Space Museum', 'Columbia Memorial Space Center', 'Museum of Flight', 'Columbia Memorial Space Center', 'U.S. Space & Rocket Center', 'Children's Museum of Indianapolis', 'Saint Louis Science Center', and 'The Discovery Museum'. Each event entry includes a title, date, location, and a brief description.

Image	Organization	Title	Date	Location
	Wings Over the Rockies Air and Space Museum	Apollopalooza 2019	NA	Denver, Colorado
	Armstrong Air & Space Museum	Summer Moon Festival	NA	Wapakoneta, Ohio
	Columbia Memorial Space Center	Apollo 11 Splashdown Parade	NA	Downey, California
	Columbia Memorial Space Center	5k Moon Walk	NA	Downey, California
	Museum of Flight	National Moon Day and Night at a Museum	NA	Seattle, Washington
	Columbia Memorial Space Center	Recreating the Birthplace of Apollo	NA	Downey, California
	U.S. Space & Rocket Center	National Moon Day and Night at a Museum	NA	Huntsville, Alabama
	Children's Museum of Indianapolis	National Moon Day and Night at a Museum	NA	Indianapolis, Indiana
	Saint Louis Science Center	National Moon Day and Night at a Museum	NA	St. Louis, Missouri
	The Discovery Museum	National Moon Day and Night at a Museum	NA	Bridgeport, Connecticut

This screenshot shows a different view of the 'Events and Exhibits' page, displaying a list of events with columns for Title, Date, and Location. The events listed are:

Title	Date	Location
Cub Scout Out of this World STEM Nova	1-12-19	Wallops Island, Virginia
Astronomy Days 2019	NA	Raleigh, North Carolina
Apollo 11 Splashdown Parade	7-24-19	Downey, California
Apollopalooza 2019	7-13-19	Denver, Colorado
National Moon Day and Night at a Museum	7-20-19	Seattle, Washington
Facing Mars	NA	Des Moines, Iowa
Apollo 11 Mission Re-enactments	NA	Downey, California

- 60+ events catalogued from around the country
- Variety of partner organizations hosting the events

TEAM II SOLICITATION

Teams Engaging Affiliated
Museums and
Informal Institutions

2019

Solicitation

Underway

**Due Date: August
13, 2019**

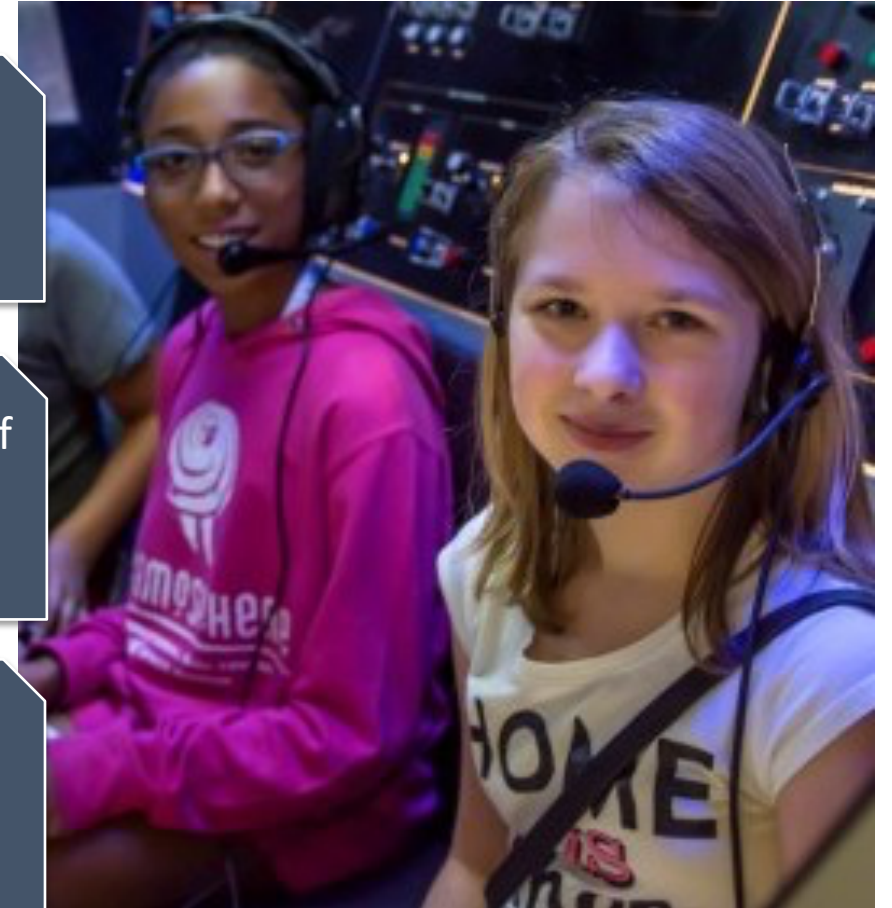
Theme:

Moon to Mars

Experiential-based educational
opportunities in informal settings
targeted at grades 4-8

Utilize networks with wide range of
organizations to enable broad
dissemination

Proposals directly tied to and
amplify the Moon to Mars theme



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PARTNERSHIP: TYNKER

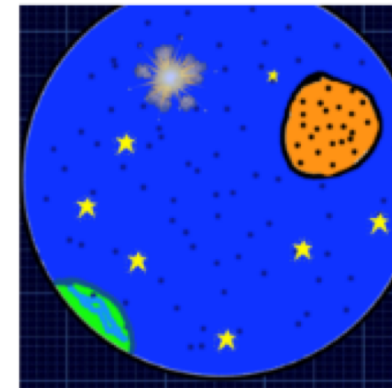
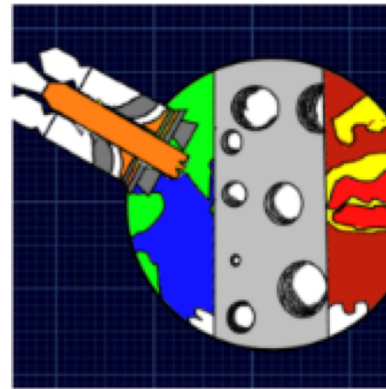


Series of coding challenges based on NASA space missions

- **Challenge 1:**
 - Deadline May 5th
 - >7,000 unique entries
 - Winners were announced May 20)
- **Challenge 2: September 2019**
- **Challenge 3: November 2019**



Forward to the Moon Design a Mission Patch Design Challenge Winners Announced



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ACTIVITY DEMONSTRATION VIDEOS

Senses of Sound



Sound Effects



Viewing Locations: SSSL Website, NASA Images, NASA Education YouTube, NASA Edge Website

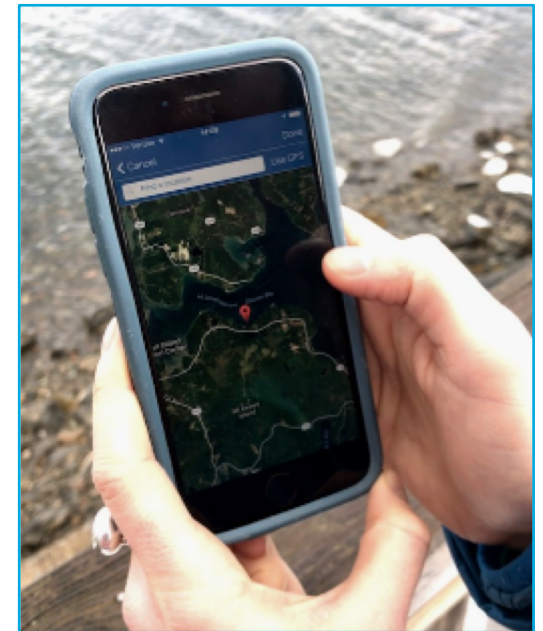
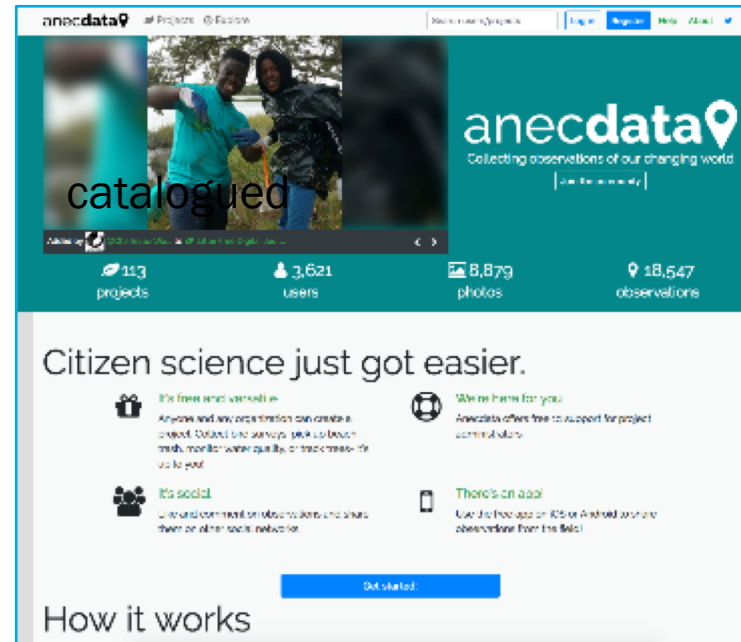
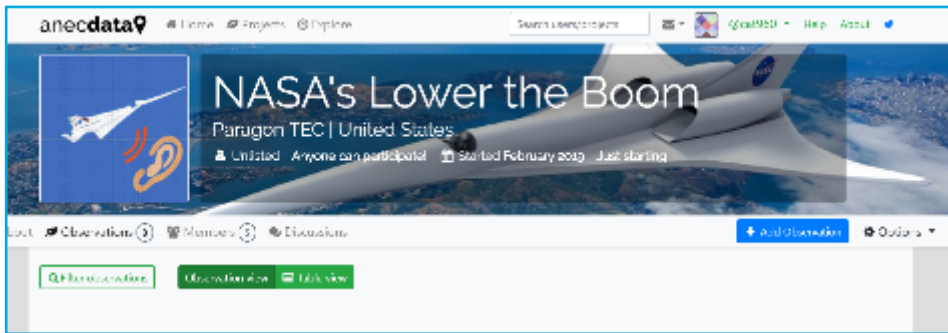


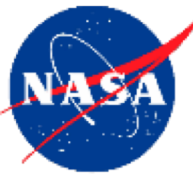
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NASA'S LOWER THE BOOM – CITIZEN SCIENCE ACTIVITY



AneCDATA Citizen Science Data Collection App





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THANK YOU!