

ASA

Space Exploration Committee

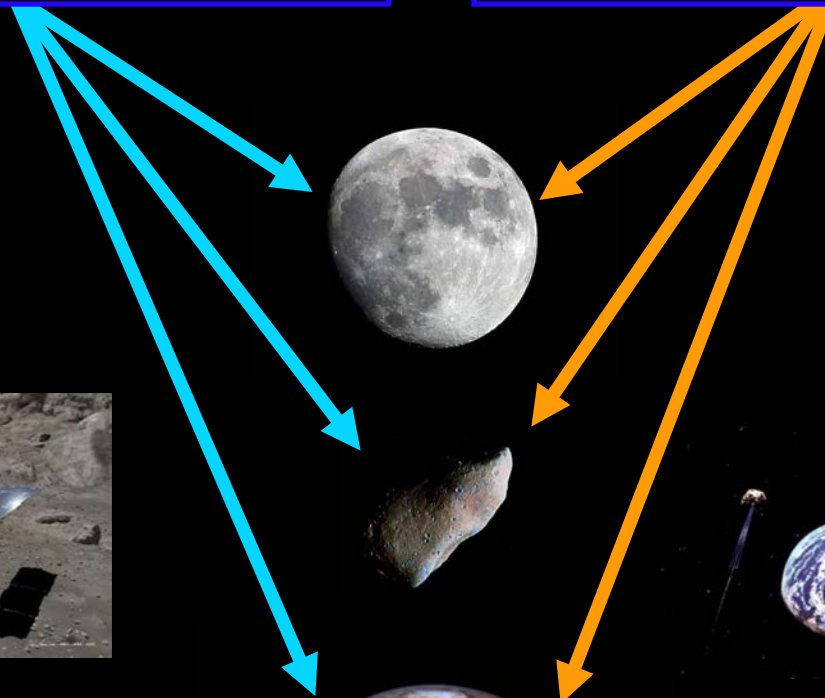
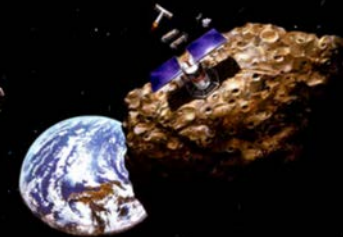
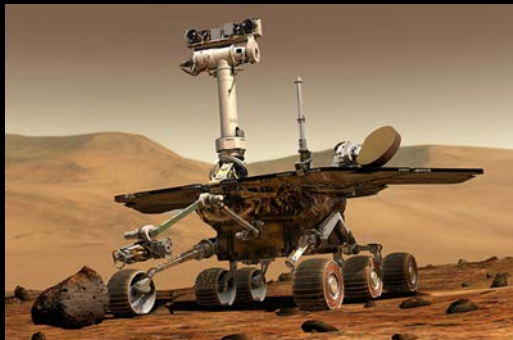


Reaching for the Stars!

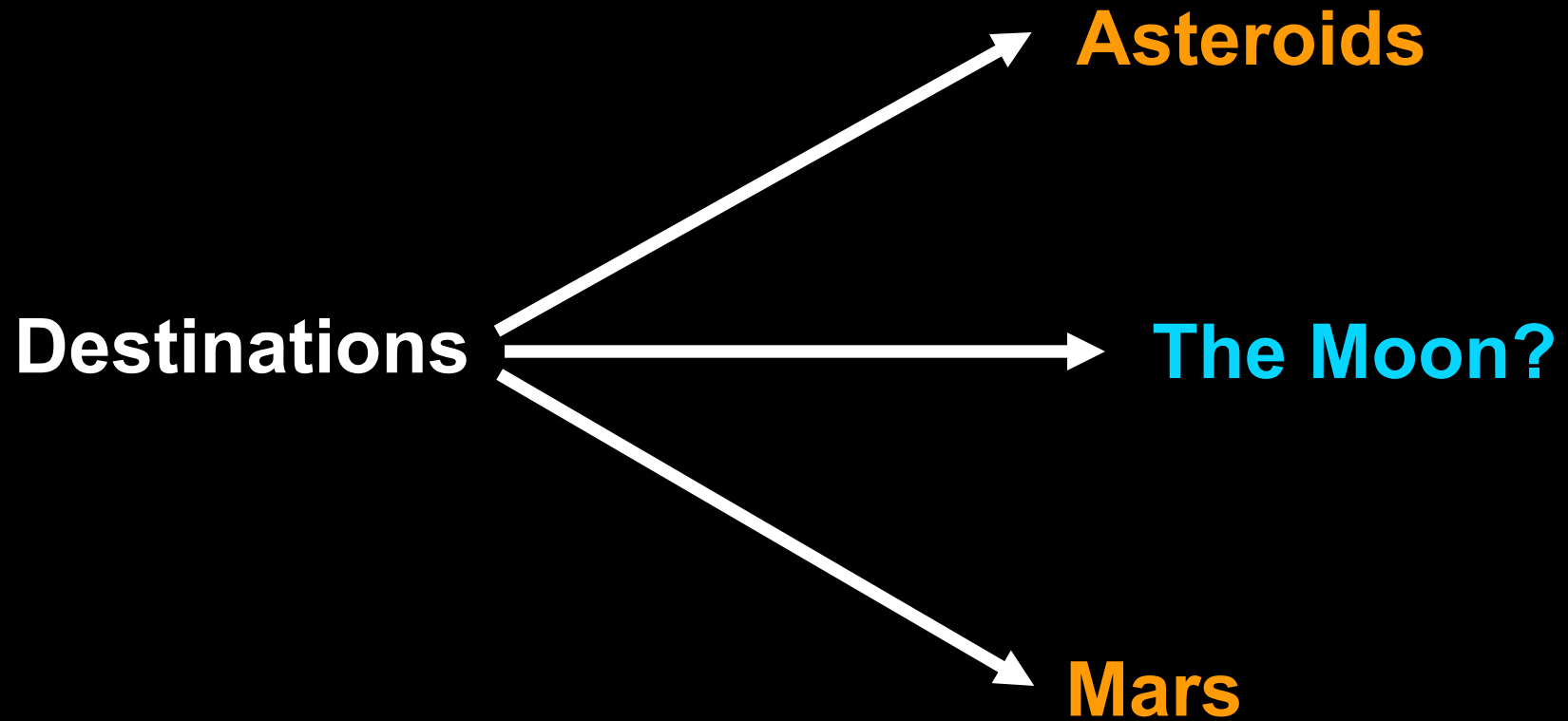
A Framework for Space Enterprise

**SPACE
RESEARCH/EXPLORATION**

**SPACE
DEVELOPMENT/UTILIZATION**



FUTURE SPACE EXPLORATION



Earth-Moon System as a Launchpad to the Solar System



Asteroids

and beyond!

Mars

Rationale for Lunar Exploration/Development/Utilization

- ★ More affordable/sustainable in near-term
- ★ Minimizes risks/Maximizes returns
- ★ Leverages existing technologies/capabilities
- ★ Enables deep space observation, T&E, education/training, commerce and launch
- ★ Aligns with international policies/priorities
(vital for collaboration that can reduce costs, enhance benefits and accelerate timetables)

Multinational Lunar Outpost



“The Next Giant Leap - With All Mankind”

THE MLO VISION

(Been there but haven't done this!)

A multinational R&D and education outpost on the Moon, developed through partnerships among public and private space agencies/institutions, universities, industry and non-profit organizations, to:

- (1) Enable innovation in space science, research, education, exploration, utilization and commerce.*
- (2) Facilitate development of a sustainable human presence beyond low-Earth orbit.*

Prototyped through terrestrial analogs in Hawaii and developed through a precursor robotic village on the lunar surface.

THE MLO VISION

(Been there but haven't done this!)

- ★ **Multinational in scope**
- ★ **Public-private partnerships**
- ★ **Massively participatory**

THE MLO VISION

(Been there but haven't done this!)



**Platform for Space Observation
(Earth, Sun, NEOs, Deep Space)**

**Space Utilization, Development
and Commerce**

**University/K-12 Education
and Professional Training**

**Launch Pad for
Deep Space Missions**

THE MLO ROADMAP

- Terrestrial prototype in Hawaii
- Expanding robotically to the Moon
- Reaping benefits as we go:
 - International R&D on Earth and the Moon
 - University/K-12/Public Education
 - Professional Training/Mentorships
 - Technology Innovation/Diversification
 - Commercial Spinoffs
- Leading to a sustainable robotic/human lunar outpost.
- Key Concepts: multinational; public-private partnerships; massively participatory.

3-Phase Buildout

*leading to a
sustainable human presence
on the Moon*

Terrestrial Prototype in Hawaii



Lunar Robotic Village



MLO on the Moon

50th
Anniversary
Of Apollo 11

TIMELINE

2017 2018 2019 2020 2021 2022 2023 2024 2025 2026

Concept

Funding

Terrestrial Infrastructure

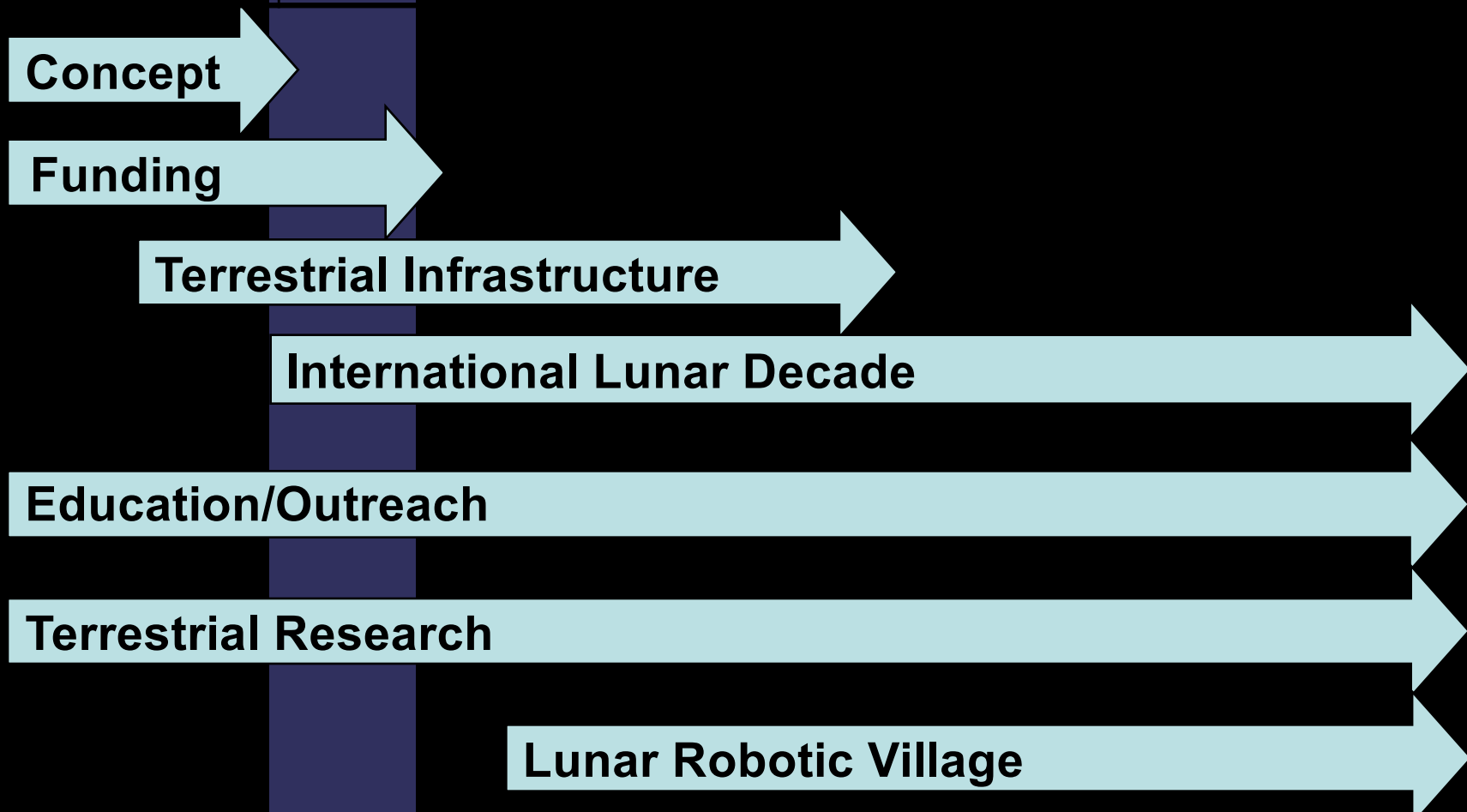
International Lunar Decade

Education/Outreach

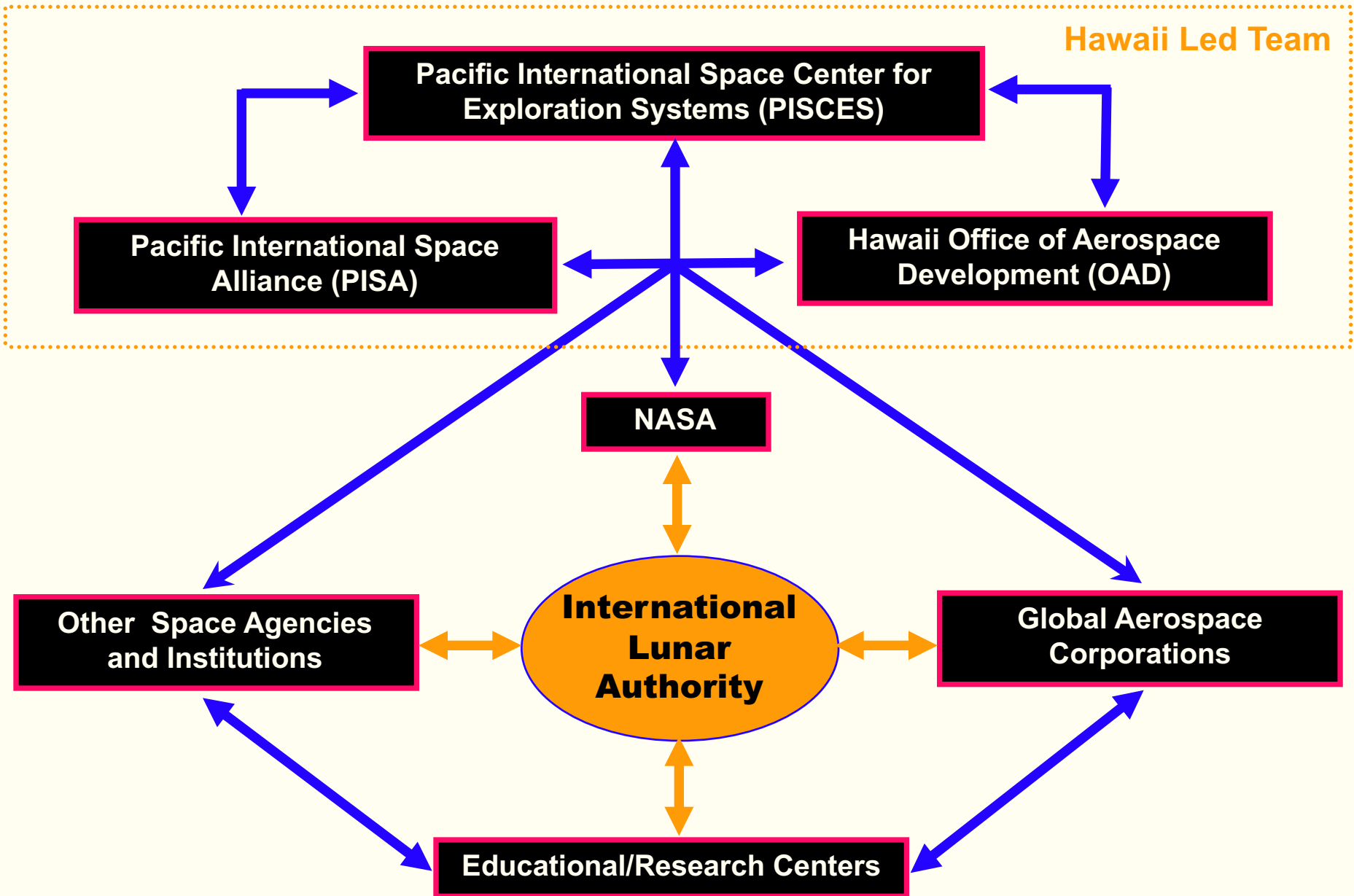
Terrestrial Research

Lunar Robotic Village

Humans
Return to
Moon?



Public-Private/International Partnerships



Builds upon Presidential Visions of Exploration

“We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win.”

***President John F. Kennedy
September 12, 1962***

“Fifty years after the creation of NASA, our goal is no longer just a destination to reach. Our goal is the capacity for people to work and learn and operate and live safely beyond the Earth for extended periods of time, ultimately in ways that are more sustainable and even indefinite. And in fulfilling this task, we will not only extend humanity’s reach in space - we will strengthen America’s leadership here on Earth.”

***President Barack Obama
April 15, 2010***

Supports goals of U.S. Space Policy & NASA Authorization Act

- Sustainable settlements beyond LEO
- Permanent human presence in space
- Public-Private Partnerships
- Multinational Alliances

“The long-term goal of the human spaceflight and exploration efforts of NASA shall be to expand permanent human presence beyond low-Earth orbit, and to do so, where practical, in a manner involving international partners.” (Sec. 202, NASA Authorization Act)

MAJOR BENEFITS

- **For NASA**

- ✓ **Will facilitate cost-effective implementation of Flexible Path.**
- ✓ **Could employ a variety of launch platforms.**
- ✓ **Will accelerate technology innovation and partnerships with industry.**
- ✓ **Will support/advance the agency's leadership in the exploration and development of space.**
- ✓ **Will keep the dream alive for extending a human presence beyond low-Earth orbit.**

MAJOR BENEFITS

- **For States**

- ✓ **Will expand opportunities for STEM education and professional training in aerospace.**
- ✓ **Will provide new R&D opportunities for local universities and industry.**
- ✓ **Will afford new jobs and revenue streams.**
- ✓ **Will promote State as a catalyst for public-private partnerships and multinational alliances.**
- ✓ **Will enhance State's role/recognition as a major contributor to and beneficiary of space enterprise.**

MAJOR BENEFITS

- **For our Nation and the World**
 - ✓ Will provide unsurpassed analog site, with test environments to incorporate high-fidelity lunar infrastructure (such as will be deployed on Moon).
 - ✓ Can be made “massively participatory” to enhance/expand STEM education, commercial development and multinational partnerships.
 - ✓ Will leverage assets from industry, international agencies, the State of Hawaii, Google Lunar X-Prize, Centennial Challenges.
 - ✓ Targeted to become the largest, peaceful, multinational space program in human history.
 - ✓ Will help align common space-faring interests with complementary resources/capabilities to help reduce the cost, enhance benefits and accelerate timetables for future space missions.