

National Aeronautics and
Space Administration



KISS Workshop

Revolutionizing Access to Martian Surface

**Short Course on Growth of Commercial
Space**



A vibrant space-themed background featuring a curved view of Earth at the bottom left, with the sun's glow on the horizon. Above Earth, the moon is visible, followed by Mars, Saturn with its rings, and Jupiter. The background is filled with stars and a colorful nebula in shades of blue, green, and yellow.

What does commercialization mean?

- Private enterprise involved in space related activities?
- Making a profit from space related activities?
- Private/public partnerships?
- Fixed price contracts?
- No government support? No government involvement?

A vibrant space-themed background featuring a curved view of Earth at the bottom left, transitioning into a deep blue space filled with stars, nebulae, and several celestial bodies including Saturn, Mars, and the Moon.

NASA's approach to commercialization

- Human Spaceflight
 - Mercury, Gemini, Apollo
 - Space Shuttle
 - International Space Station (ISS)
 - Orion, Space Launch System
 - Commercial Cargo to ISS
 - Commercial Crew to ISS
- Science Missions
 - Discovery class, New Frontier, Flagship missions
 - Launch Service Provider
 - Commercial Lunar Payload Services

A space-themed background featuring a curved view of Earth at the bottom left, with the Moon, Mars, and Saturn visible against a starry sky. The title 'Commercial Lunar Payload Services' is written in a light blue font at the top.

Commercial Lunar Payload Services

- Master contract awarded to vendors to safely integrate, accommodate, transport, and deliver NASA payloads using contractor-provided assets, including launch vehicles, lunar lander spacecraft, lunar surface systems, and associated resources
- NASA wants to be a marginal customer, one of many payload providers. NASA does not manage or direct these commercial missions
- Purposely chose a 'hands off', very light touch management approach to allow commercial market to guide development and drive the mission process
 - Not using NASA processes nor is NASA guiding development; we are accepting a much higher level of risk
 - In return, NASA hopes to get lower prices and faster pace

CLPS Accomplishments

- 27 months after initial award, CLPS has:
 - Awarded 8 task orders for deliveries to the Moon
 - Manifested almost 40 instruments and technology demonstrations
 - Scheduled Lunar landings in 2021, 2022, and 2023
 - Committed roughly \$550M for delivery services



Evolution of NASA's approach

From Dr. John Donahue (Harvard Kennedy School):

Contracting and partnership are really, really different

- When you have a contract with a private company, the government is in control—unless it's screwing up. The private company just does what it's paid to do.
 - When you have a partnership with a private company, control is shared. The government can influence the private company, but not control it.
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- NASA's approach towards commercialization today has more to do with establishing:
 - Who is responsible for development cost
 - Who is responsible for cost risk and schedule risk
 - Who is responsible for how systems are built

The background of the slide is a dark blue space scene. On the left side, there is a vertical strip showing a yellow planet with rings (Saturn), a reddish planet (Mars), and a grey cratered moon (the Moon). The bottom left corner shows a curved horizon of the Earth with blue oceans and white clouds. The rest of the background is filled with a starry field and a nebula with green and blue hues.

How does this apply to Mars?

- Fundamental to any form of commercialization is the need to identify customers who are willing to pay for services
- Launch services are clearly a well-established commercial industry
- Communications and Earth observation are well-established commercial industries
- There is evidence that a customer base could be emerging for activities in low earth orbit
- Not as clear what the customer base is for lunar activities but there is enough interest to spur investment support
- Commercial interest in Mars?

A vibrant space-themed background featuring a curved view of Earth at the bottom left, with a bright sun or star in the lower-left corner. Above Earth, the Moon is visible in a crescent phase. Further up, Mars is shown as a reddish sphere, and Saturn is depicted with its rings. The background is filled with a starry field and a blue and green nebula.

If there isn't a direct commercial market...

- Can our science interests on Mars take advantage of commercial development for other markets?
- Can NASA's choices for defining and developing Mars science missions be influenced by commercial capabilities developed for other markets?
- How would those feedback loops work?