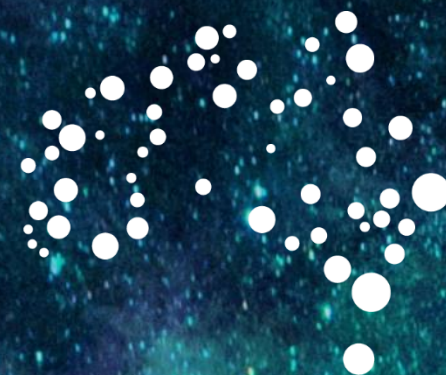




Australian Government



Australian
Space Agency

Australian Space Agency

Dr Megan Clark AC
Head, Australian Space Agency

30 September 2019

*The Australian Space Agency acknowledges the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture.
We pay our respects to their Elders past, present and emerging.*

Moon to Mars

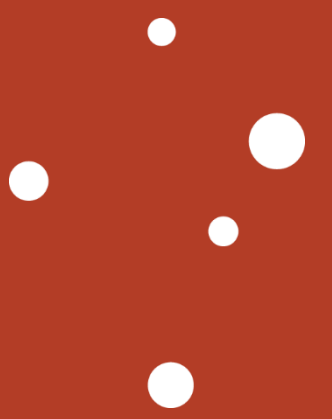
- \$150 million over five years
- Funding to commence from 2020-21
- Deliver key capabilities for missions through participation in the U.S.'s international space supply chains.

Investment focus

- Demonstrator and pilot projects which showcase investment-ready Australian capabilities
- Working with NASA to leverage Australia's key strengths
- Supporting access to international space supply chains

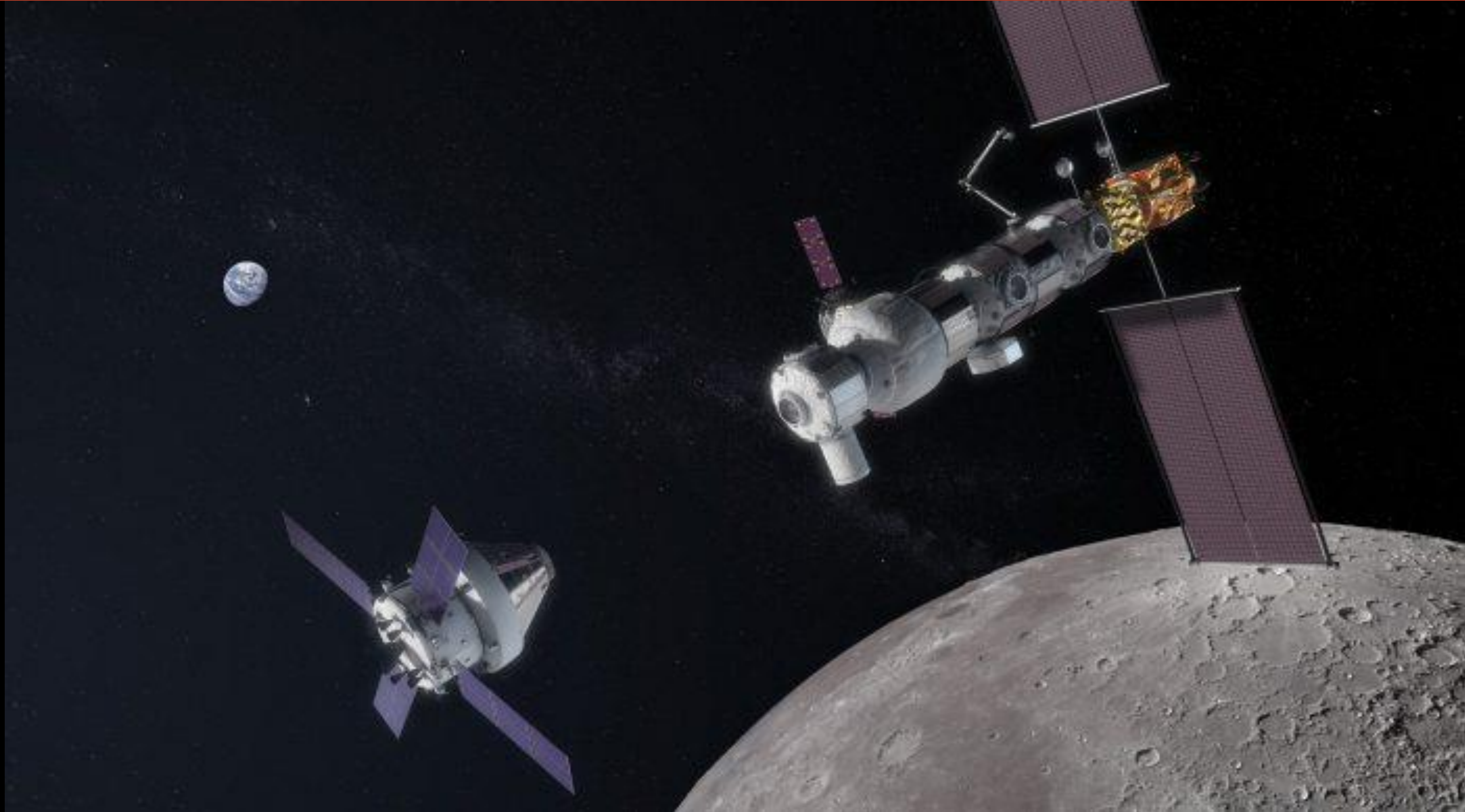


NASA working with Boeing to develop Space Launch System (SLS)



- You will be able to feel SLS' lift-off 3km away
- 95m high
- Can lift payloads with a mass of more than 26 tonnes

Orion will carry Artemis crew to Gateway



Artemis Phase 1: To The Lunar Surface by 2024

Artemis I: First human spacecraft to the Moon in the 21st century

Artemis II: First humans to orbit the Moon in the 21st century

Artemis Support Mission: First high-power Solar Electric Propulsion (SEP) system

Artemis Support Mission: First pressurized module delivered to Gateway

Artemis Support Mission: Human Landing System delivered to Gateway

Artemis III: Crewed mission to Gateway and lunar surface

Commercial Lunar Payload Services

- CLPS-delivered science and technology payloads

Early South Pole Mission(s)

- First robotic landing on eventual human lunar return and In-Situ Resource Utilization (ISRU) site
- First ground truth of polar crater volatiles

Large-Scale Cargo Lander

- Increased capabilities for science and technology payloads

Humans on the Moon - 21st Century

First crew leverages infrastructure left behind by previous missions

LUNAR SOUTH POLE TARGET SITE

2020

2024

Artemis Phase 2: Building Capabilities For Mars Missions



*Reusable human lander
elements refueled*

Artemis IV

Artemis V

Artemis VI

Artemis VII

Artemis Support Mission
*Lunar surface asset deployment
for longer surface expeditions*

CLPS opportunities

SUSTAINABLE LUNAR ORBIT STAGING CAPABILITY AND SURFACE EXPLORATION

MULTIPLE SCIENCE AND CARGO PAYLOADS

INTERNATIONAL PARTNERSHIP OPPORTUNITIES

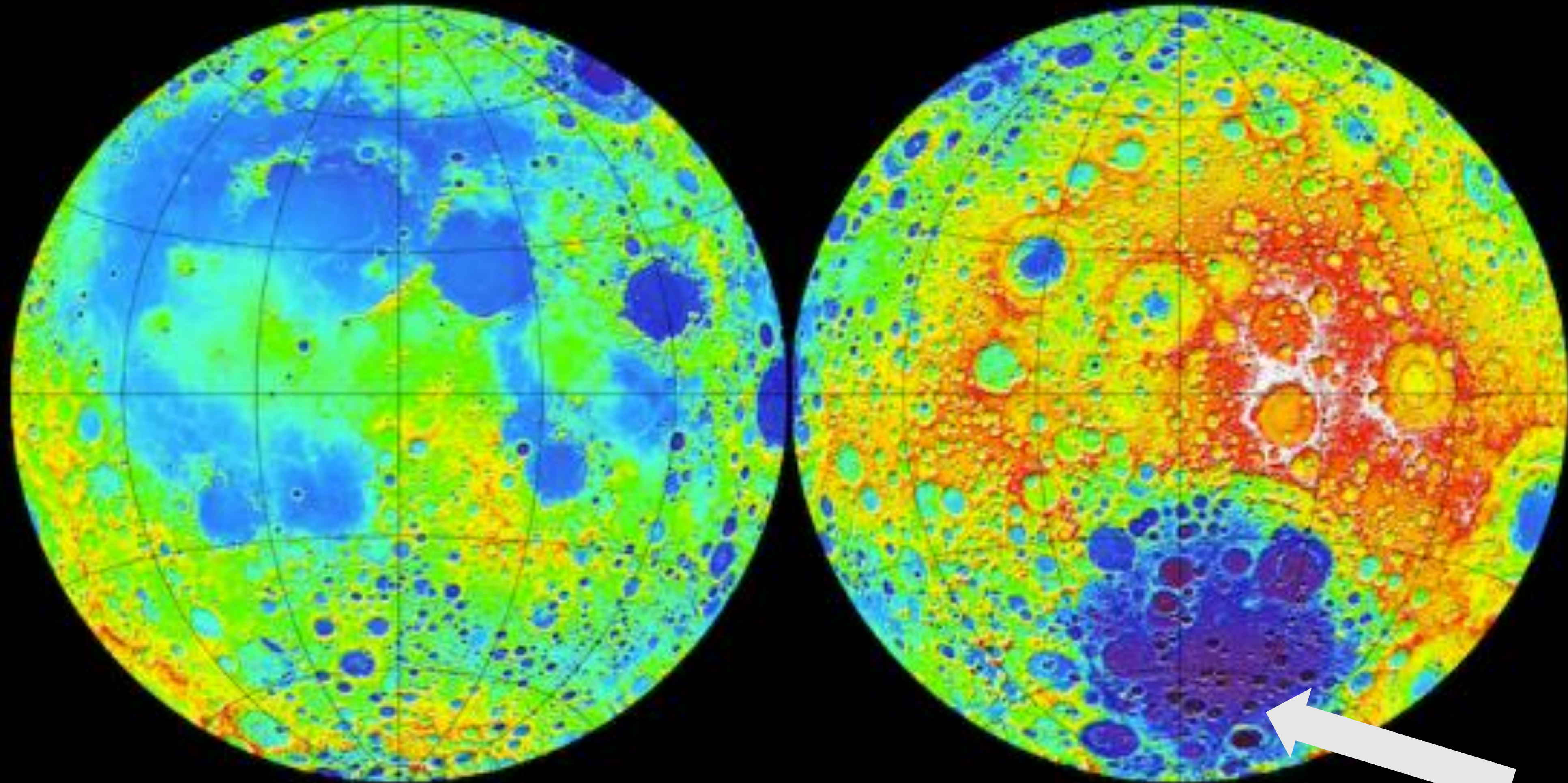
TECHNOLOGY AND OPERATIONS DEMONSTRATIONS FOR MARS

2025

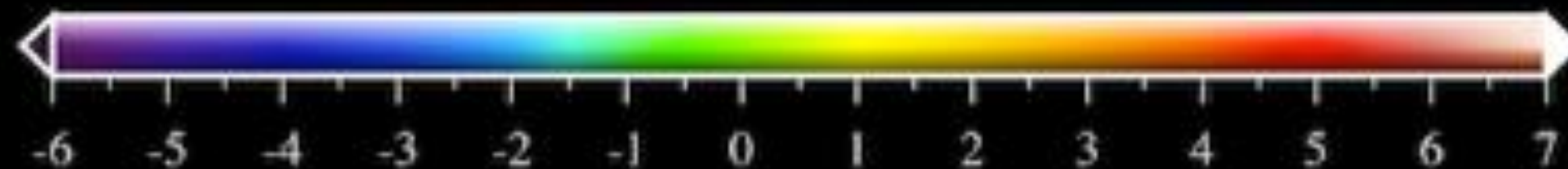
2029

Near side

Far side



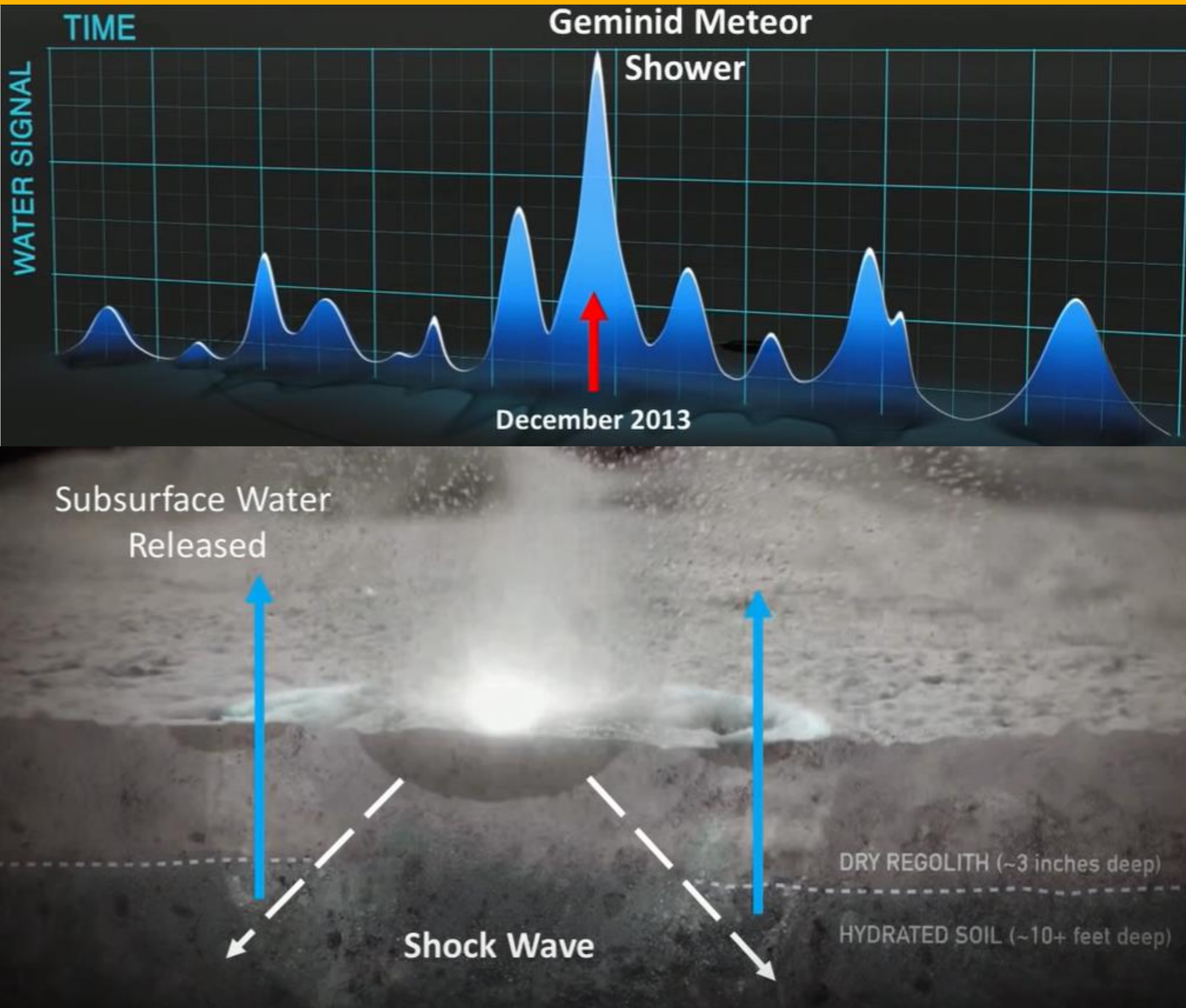
Topography (km)



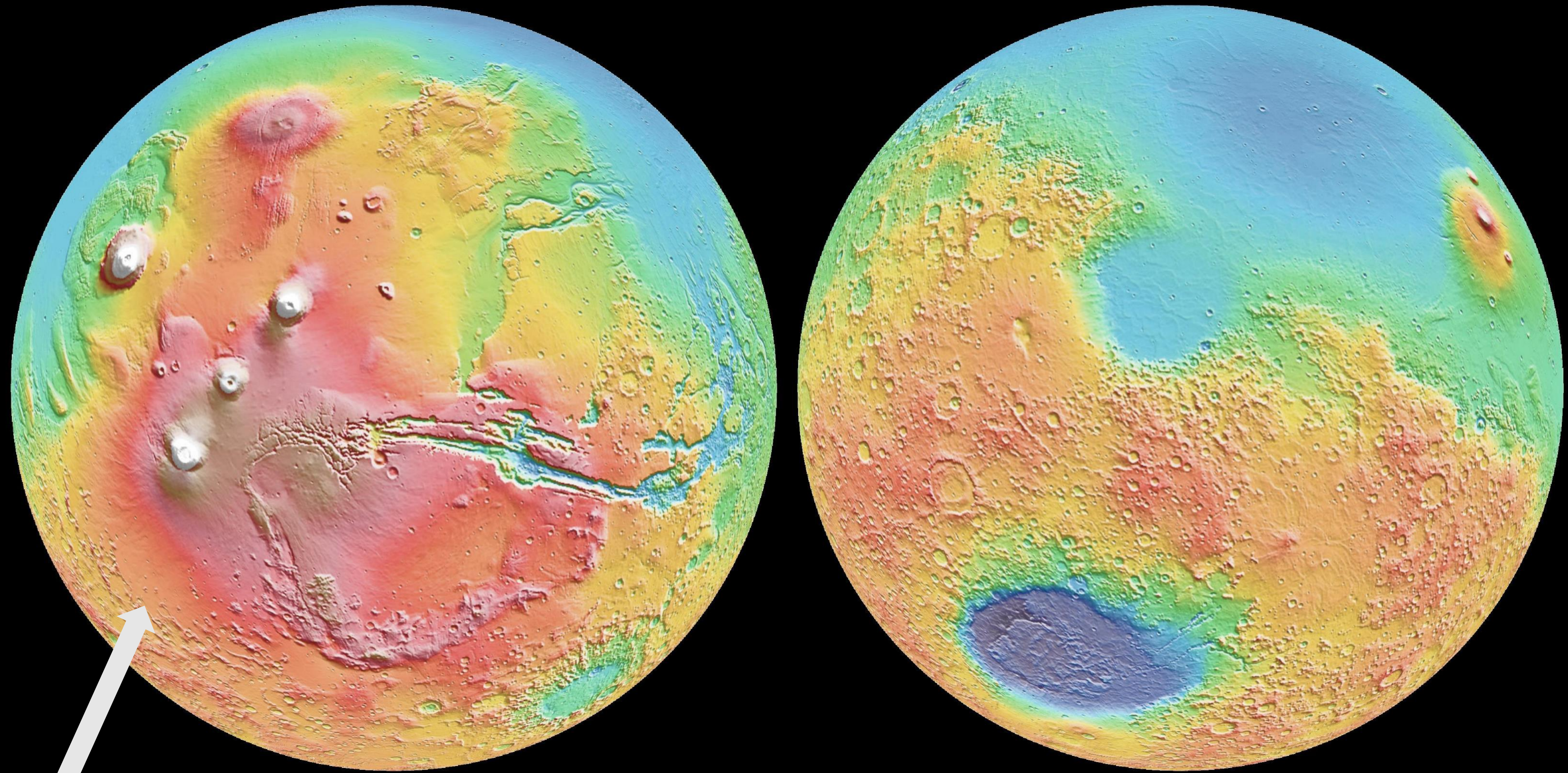
**South Pole -
Aitkin Basin**

Water released on the Moon by large micro meteors

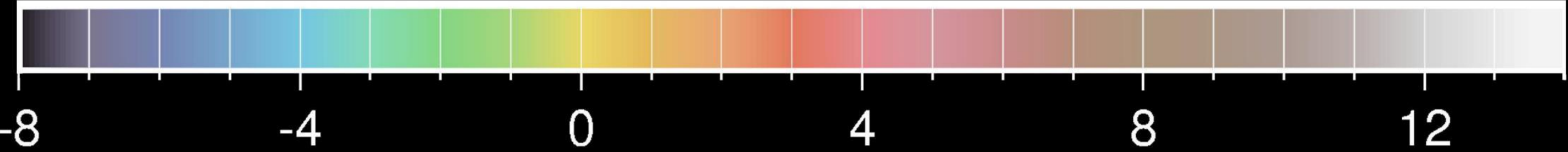
CREDIT: Jim Green The Future of Lunar Exploration-Jim Green, NASA June 2019



- Water is hiding in craters which are permanently shadowed
- Cold traps -175 C to -200 C
- LADEE Space craft, 2013-2014 measured Moon emitting water during meteor showers.
- Large micro-meteors release buried water



Sirenum Fossae



Altitude [km]



**A crater in the Sirenum Fossae
region of Mars showing
seasonal briny water flows from
sub-surface aquifers** CREDIT: MARS
RECONNAISSANCE ROVER, HIRISE INSTRUMENT NASA
/JPL / UNIVERSITY OF ARIZONA

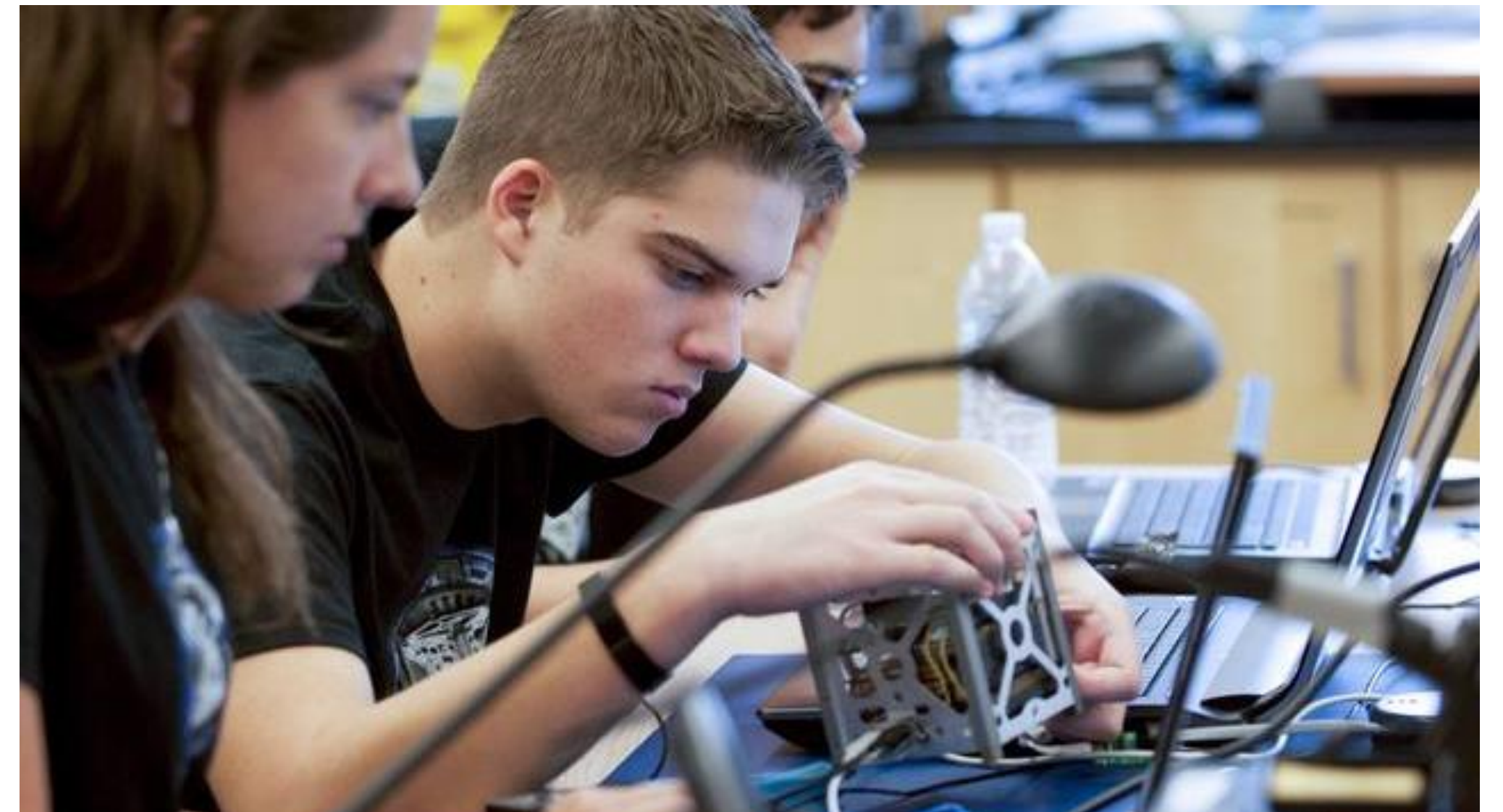
ESA Progress



- **Expansion of New Norcia deep space tracking station in WA; Operational contract to CSIRO.**
- **Next steps - Framework Agreement subject to ESA Council endorsement later in the year.**

UK Space Bridge

- Austrade, UK Department of International Trade, UK Space Agency and Australian Space Agency
- SmartSat CRC and UK Catapult programme as partners.
- Next step is a Framework Agreement





Australian Government



**Australian
Space Agency**

Questions?

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