Mars | MMX | MarsLandingStep1 | MLStep2 | MLStep3
--- | --- | --- | --- | ---
Moon | SLIM | Unmanned | LEAD program
--- | --- | --- | ---
Moon | LUPEX | Pressurized Manned Rover | Large Cargo Lander
--- | --- | --- | ---

*Commercial lunar exploration*

*Direct contribution to ARTEMIS, focus on polar region*
<table>
<thead>
<tr>
<th>Year</th>
<th>Mars Landing Steps</th>
</tr>
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<tbody>
<tr>
<td>2030</td>
<td>MMX, Mars Landing Step 1, ML Step 2, ML Step 3</td>
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<td>2040</td>
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**Moon**
- Unmanned SLIM LEAD program

*Commercial lunar exploration*
- Manned LUPEX, Pressurized Manned Rover, Large Cargo Lander

*Direct contribution to ARTEMIS, focus on polar region*
SLIM: small lander, pin-point landing, two-staged scheme for landing on a slope
LEAD

• Tech demo for **OK-sized** lunar exploration
• Driven by top science themes that receive clear merit of being on the surface of the Moon
  Radio astronomy
  Lunar seismometer network
  Sample return

• Precursor to frequent lunar exploration involving multiple assets provided by various parties including commercial sectors which will be deployed in **synergy with human exploration.**
Mars
MLStep1
MLStep2
MLStep3
Moon
SLIM
Unmanned
LEAD program
100-200kg rover
50kg rover
Thruster for landing
Thrust for landing
Commercial lunar exploration
Manned
LUPEX
Pressurized Manned Rover
Large Cargo Lander
Direct contribution to ARTEMIS, focus on polar region
JAXA Mars landing in three steps

**Step 1** ~2030
Demonstrate safe landing by an inflatable soft aeroshell

**Step 2** mid-2030
Size up of aeroshell
Demonstrate pin-point landing to the Martian surface

**Step 3** late-2030/early-2040
Mars Polar Rover

Feed to Deep space exploration

Feed from lunar exploration
LEAD

thruster

rover

OTV
In the Martian **tenuous** atmosphere, **heat shield**, **super-sonic** parachute and thruster

**Inflatable soft aeroshell**

*Hard shell is not needed as long as the mass to be delivered is not too high.*

Limited launcher capability, limited budget, interest in more frequent opportunities… Yes, we are interested in **light-weight access** to the Mars surface.
Take home

- Human exploration division at JAXA taking care of direct contribution to ARTEMIS.

- Scientist-engineer teaming-up under limited launcher capability and budget: JAXA/ISAS’s way

- We are interested in light-weight access to the Mars surface.

- LEAD program to develop OK-sized assets for surface exploration of the Moon, with Mars as the final target in mind.