



# **CHANG'E-5 AND TIANWEN-1**

**Lunar Exploration and Space Engineering Center, CNSA**

**April 19, 2021**

# Mission planned prior to 2020

CLEP

Orbiting



Landing



Sample Return

Chang'E-1  
2007.10



Chang'E-2  
2010.10



Chang'E-4  
2018.12



Chang'E-5  
2020.11



Chang'E-3 2013.12



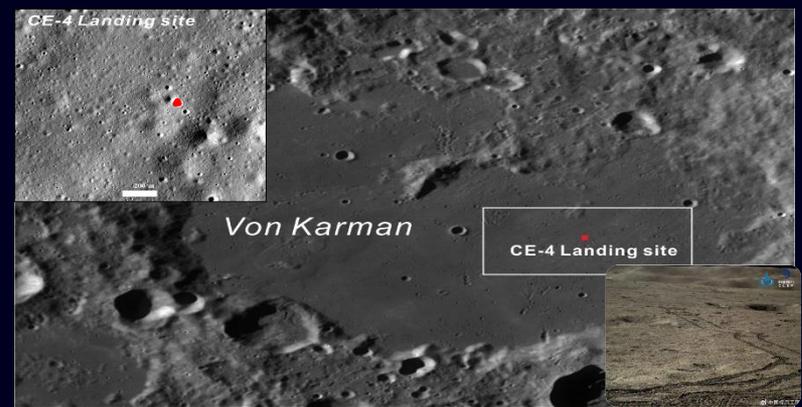
T1 Reentry Test 2014.10



# Well-accomplished Missions

## Chang'E-4

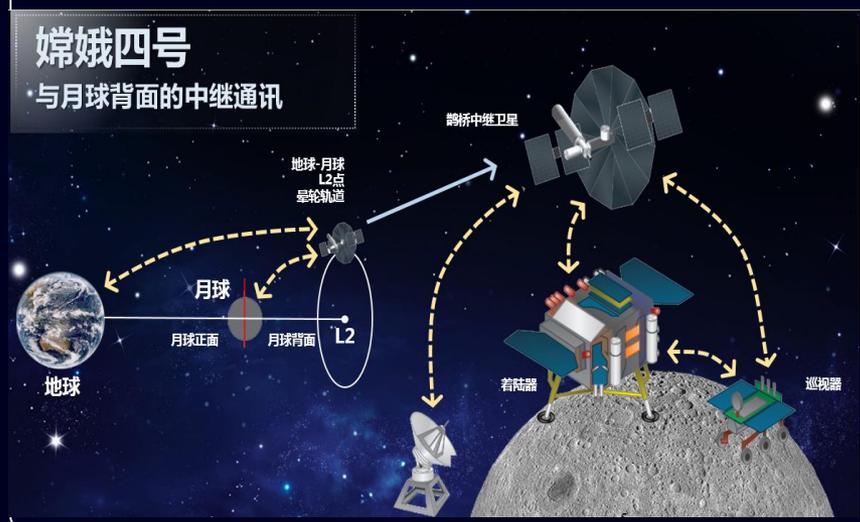
2018.05.21 Relay satellite.  
2018.12.08 Probe.  
2019.01.03  
Landing first-ever on the far side



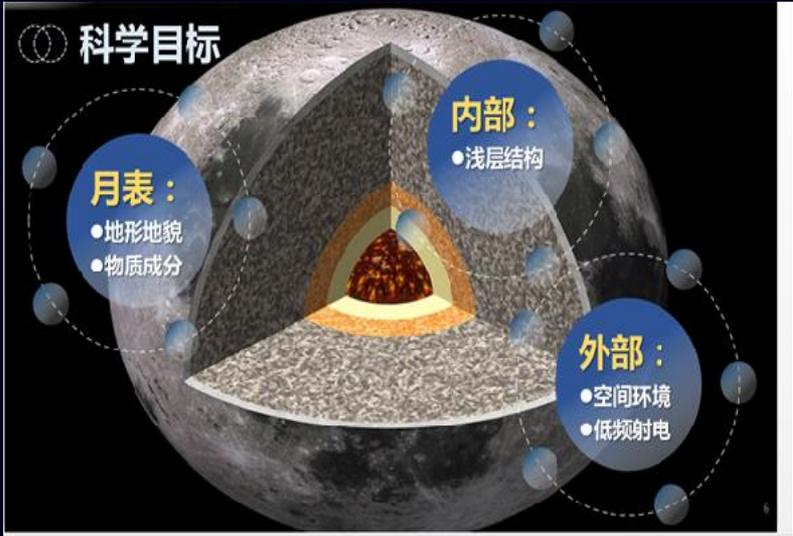
177.6°E, 45.457°S, -5935M

### 嫦娥四号

与月球背面的中继通讯



### 科学目标

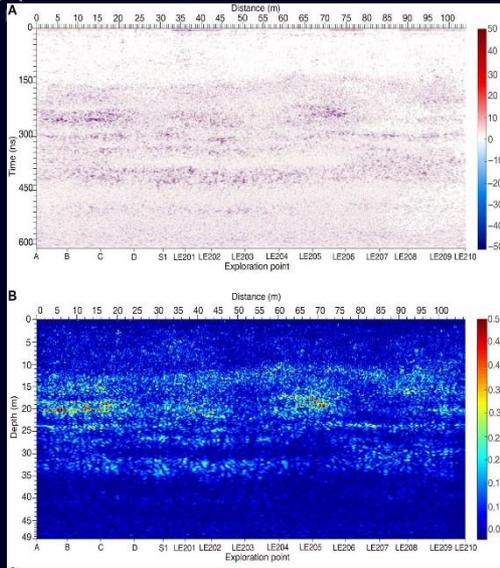


# Well-accomplished Missions

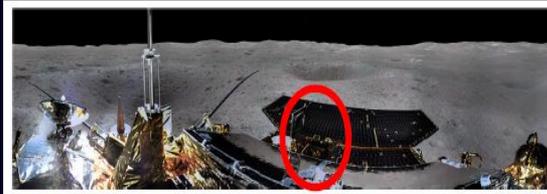
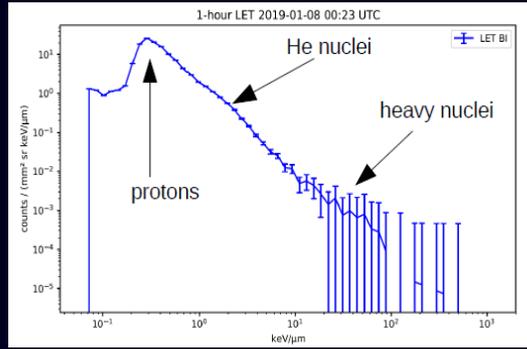
## Piggyback 4 cooperative payloads on CE-4



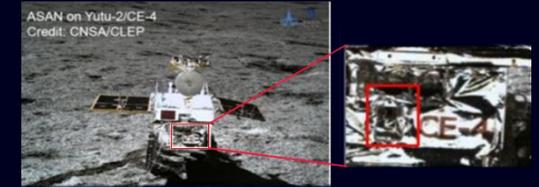
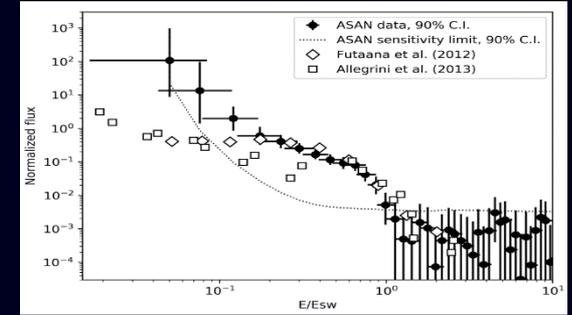
# Moon subsurface data at a depth of 40m



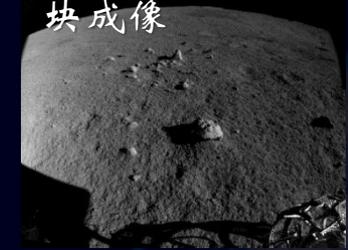
# Moon surface particle radiation dose rate



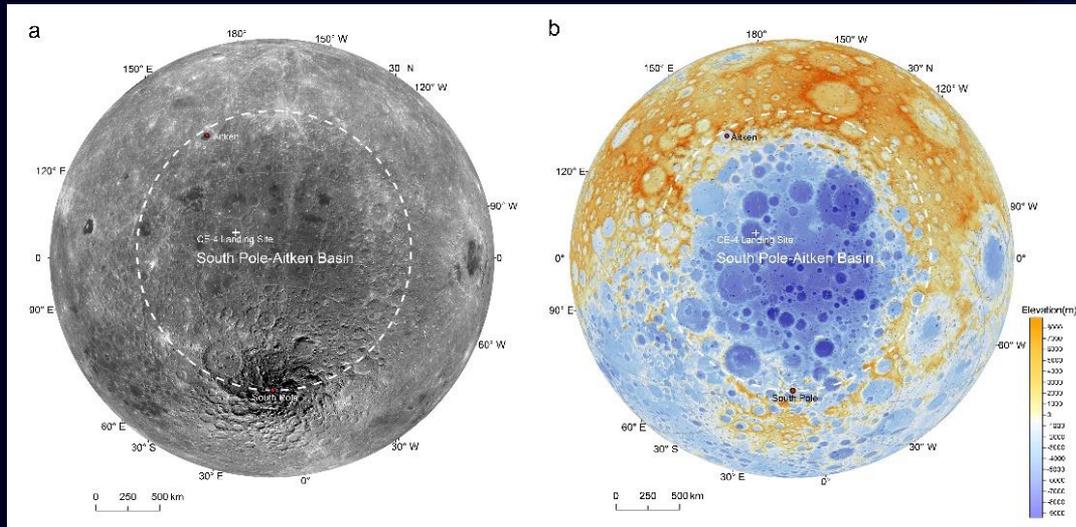
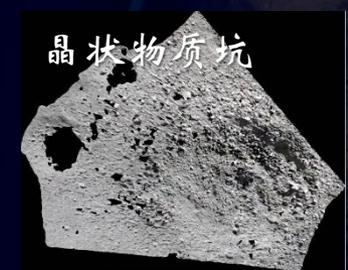
# Energy spectrum distribution map of moon surface neutral atoms



避障相机对石块成像



晶状物质坑

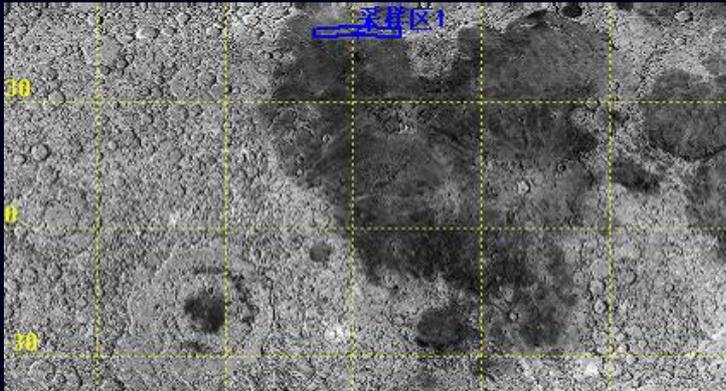


Initial spectroscopic identification of lunar far-side mantle-derived materials

# Well-accomplished Missions

## Chang'E-5

- Launched on Nov.24, 2020.  
Obtained 1731g samples.



Carry out research on lunar samples and deepen the study of the formation and evolution history of the moon.

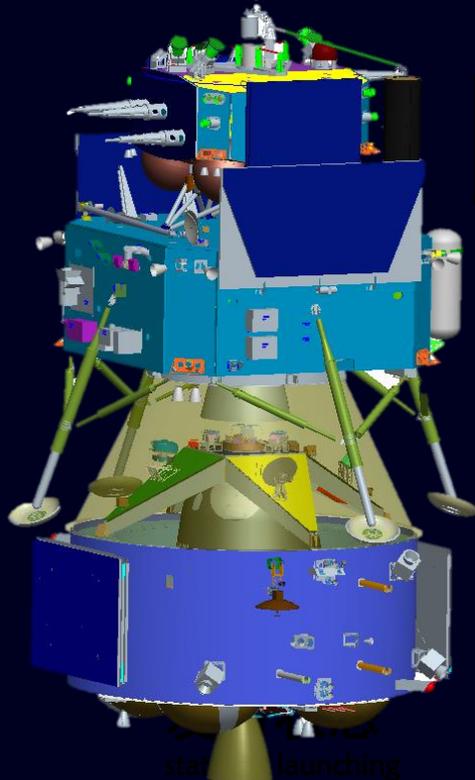


Lunar samples

# Well-accomplished Missions

## Chang'E-5

- **The probe** The probe, which consists of the orbiter, lander, ascender, and return vehicle, finished earth-moon transfer, orbit the moon, soft landing on the moon, lunar sampling and scientific exploration, lifting off from the moon, rendezvous and docking in lunar orbit, returning the earth with samples, etc.



Ascender

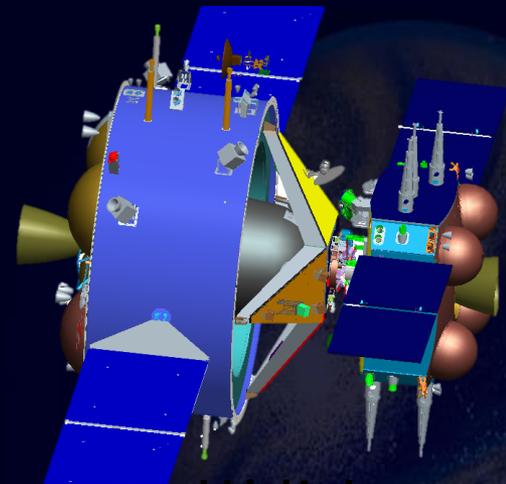
Lander

Lander

Return capsule

Lander

Orbiter



对接状态

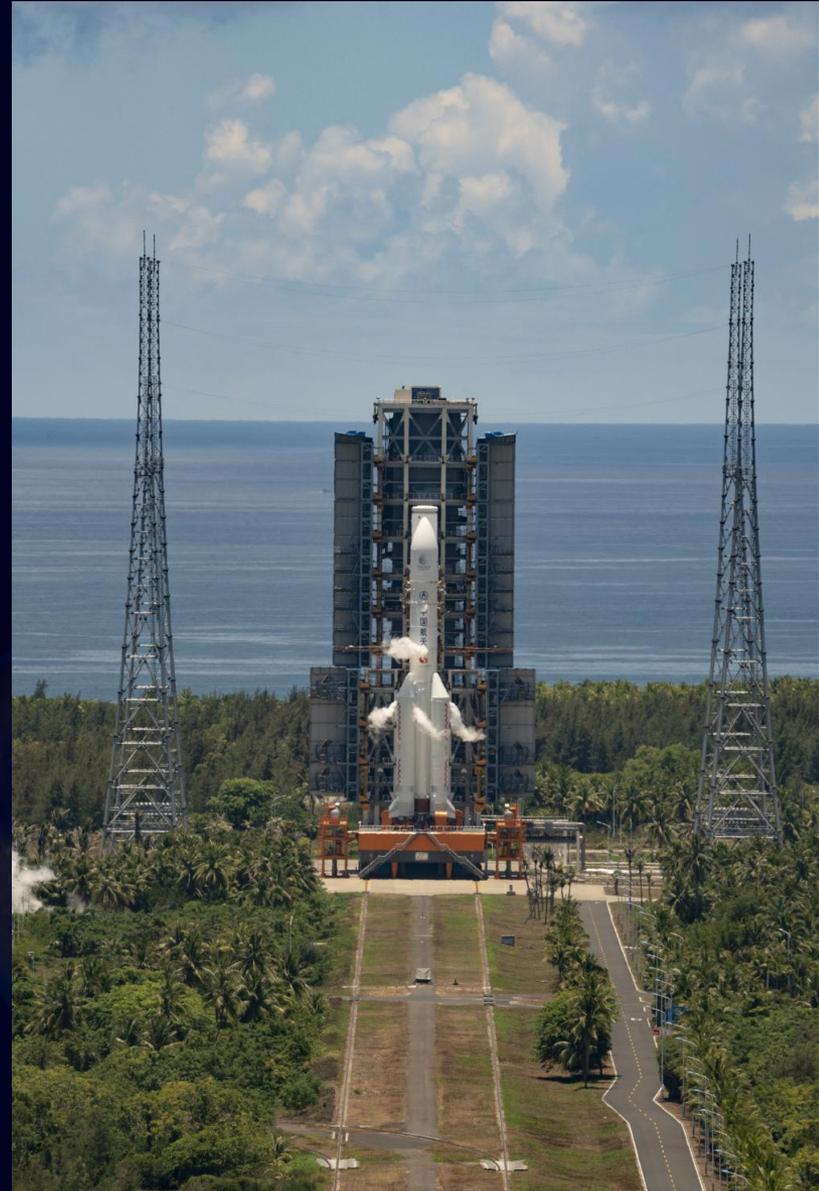
Status of RVD

# Well-accomplished Missions

## Chang'E-5

### □ The launching site

- Long March 5 carrier rocket sent the probe to the earth-moon transfer orbit, with a perigee of 200 kilometers and apogee of 400000 kilometer.
- CZ-5 Rocket: 56.97 meters long, with a takeoff mass of 867t and a takeoff thrust of 1068t.
- The launching site is Wenchang Spacecraft Launch Site.



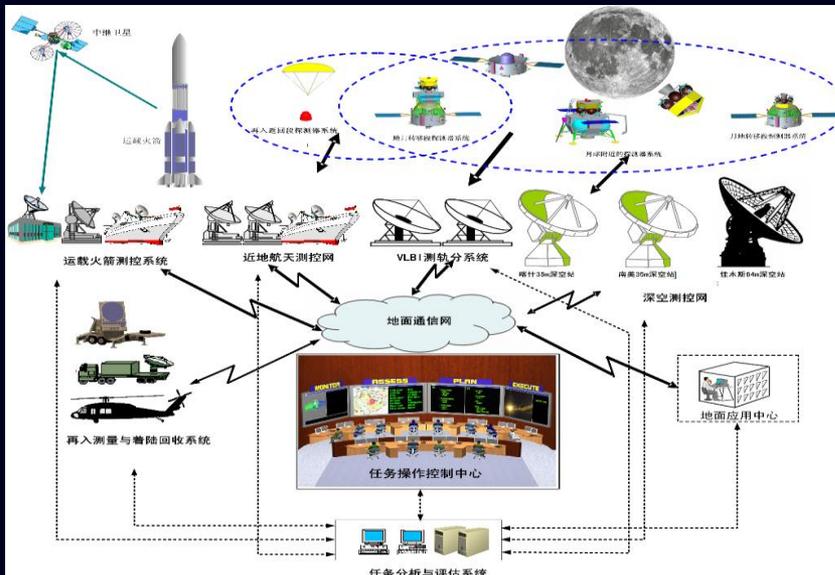
# Well-accomplished Missions

## Chang'E-5

### TT&C

Tracking the carrier rocket and the probe. Re-entering measurement, search and recovering of the return vehicle.

Tracking equipment like the 35-meter deep space Tracking Telemetry & Control Station in South America and the 18-meter Tracking Telemetry & Control station in Namibia are newly built.



# Well-accomplished Missions

## Chang'E-5

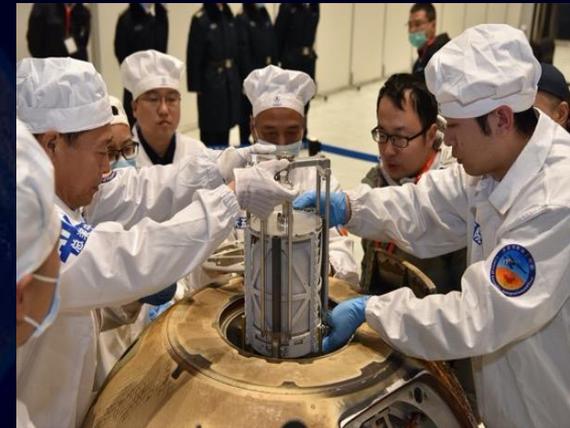
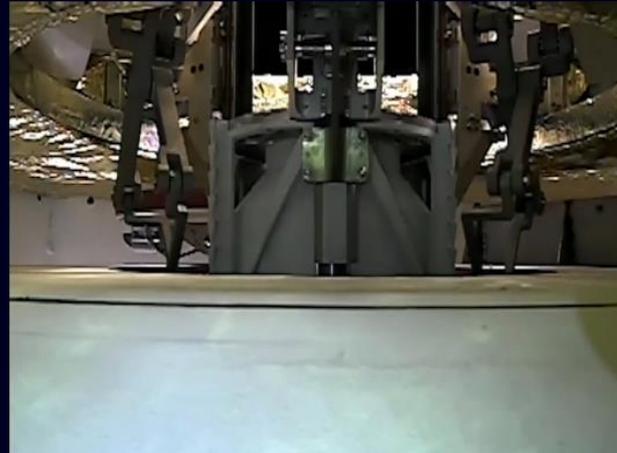
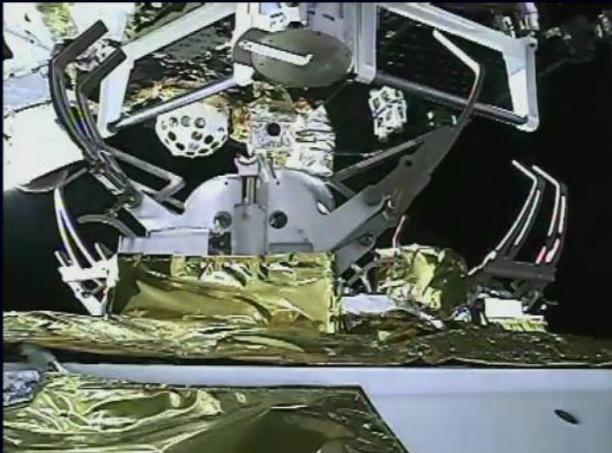
### □ Ground application system

- Storage, preparation and distribution of the lunar sample.
- Receipt, management, and interpretation of the scientific tracking data. Application and research related to lunar sample and scientific statistics.
- A 40-meter data receiving station in Miyun District, Beijing and a lab for lunar sample are newly built.



# Well-accomplished Missions

## Chang'e-5



Clips of Chang'e-5 Sampling Mission

# Well-accomplished Missions

## Chang'E-5



**Lunar Sample 001 at national museum**



**China National Space Administration**

[Index](#) >> [Government Affairs](#) >> [Policies and Announcement](#) >> [Content](#)

**Notice of China National Space Administration on the Distribution of Procedures for Requesting Lunar Samples**

Date : 2021-01-18

To all units concerned:

The Procedures for Requesting Lunar Samples is approved and adopted. Official versions are effective immediately.

China National Space Administration

December 17, 2020

**Procedures for requesting lunar samples released by CNSA**

# Well-accomplished Missions

## Chang'E-5



角砾岩



玄武岩



玻璃

月球与深空探测科学数据与样品发布系统

试用, 若有问题请联系 68378007, 68379139, 技术支持: 68373633转840

科学数据 月球样品... 成果应用

样品申请

	<p>样品编号: CESC0100YJFM001</p> <p>样品特征: 为月球表面获得的钕取样, 样品细粒粉末状。</p>	<p>数量 (个): 1</p> <p>重量 (毫克): 5000</p> <p>样品粒度 (微米): &lt;0.005mm</p> <p>取样位置 (段/节): --</p> <p>已借出数量 (份): 0</p>	<p>申请</p> <p>详情</p>
	<p>样品编号: CESC0800YJFM00104GP</p> <p>样品特征: 取自CESC0800瓶中的月壤粉末样品 (含21865个颗粒)</p>	<p>数量 (个): 1</p> <p>重量 (毫克): 20</p> <p>样品粒度 (微米): &lt;1mm</p> <p>取样位置 (段/节): --</p> <p>已借出数量 (份): 0</p>	<p>申请</p> <p>详情</p>
	<p>样品编号: CESC0800YJFM00103GP</p> <p>样品特征: 取自CESC0800瓶中的月壤粉末样品 (含26053个颗粒)</p>	<p>数量 (个): 1</p> <p>重量 (毫克): 20</p> <p>样品粒度 (微米): &lt;1mm</p> <p>取样位置 (段/节): --</p> <p>已借出数量 (份): 0</p>	<p>申请</p> <p>详情</p>
	<p>样品编号: CESC0000YJYX03501GP</p> <p>样品特征: 2个玄武岩颗粒和1个角砾岩颗粒, 玄武岩的粒度粗细有差异</p>	<p>数量 (个): 3</p> <p>重量 (毫克): 52</p> <p>样品粒度 (微米): 1.5~4mm</p> <p>取样位置 (段/节): --</p> <p>已借出数量 (份): 0</p>	<p>申请</p> <p>详情</p>
	<p>样品编号: CESC0300YJFM002GP</p> <p>样品特征: 取自CESC0300瓶中的月壤粉末样品 (含180847个颗粒)</p>	<p>数量 (个): 1</p> <p>重量 (毫克): 15</p> <p>样品粒度 (微米): &lt;2mm</p> <p>取样位置 (段/节): --</p> <p>已借出数量 (份): 0</p>	<p>申请</p> <p>详情</p>

上一页 1 2 3 4 下一页 返回

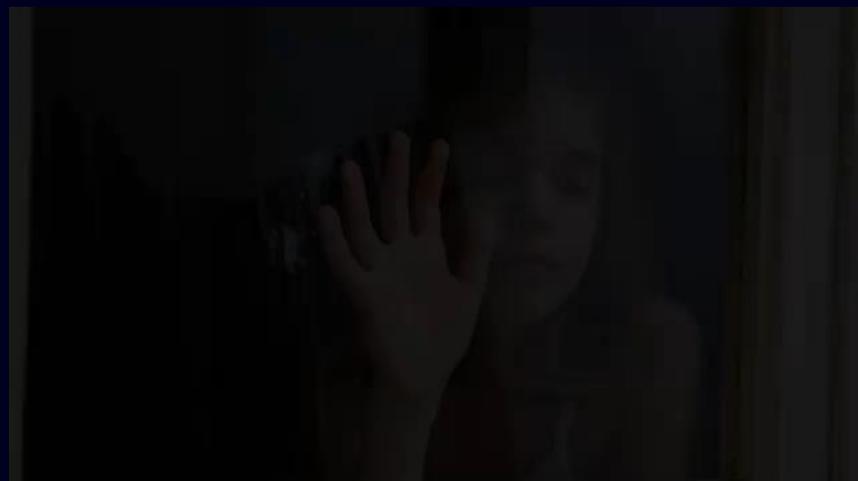
Copyright 2018. 版权所有 航天科技工程中心



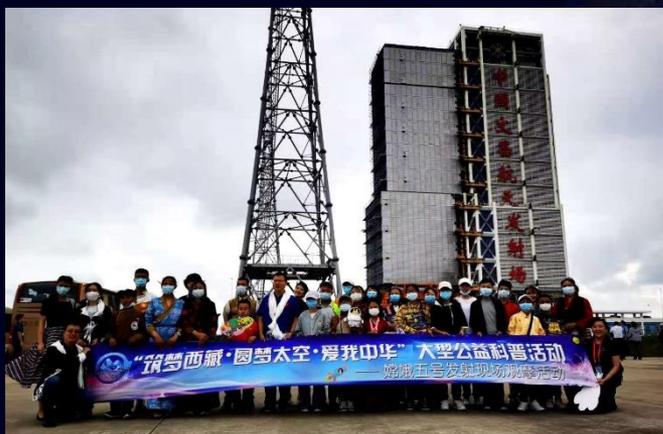
# Passengers" onboard the mission



30 kinds of seeds



Song Starlight



Kids from Chinese Tibet watching the launch



Mascots of 2022 Beijing Winter Olympic games

# Being Implemented Mission

## Mars Mission TIANWEN-1

Orbiting & Landing & Roving  
ALL-IN-ONE !

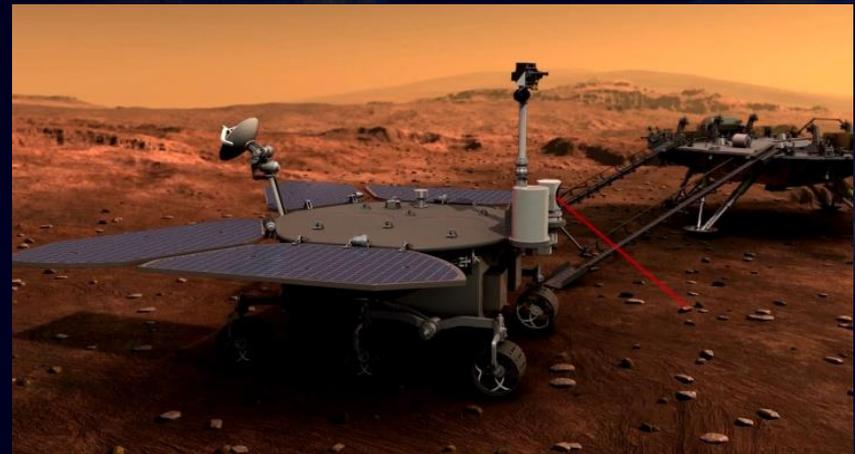
Launched in 7.23 , 2020.

Engineering Obj.

Martian orbiting and roving.

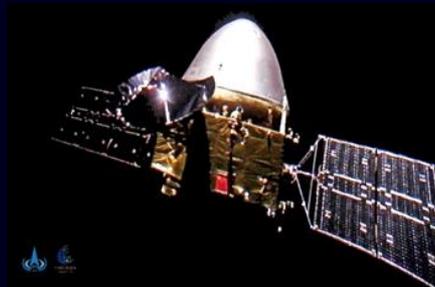
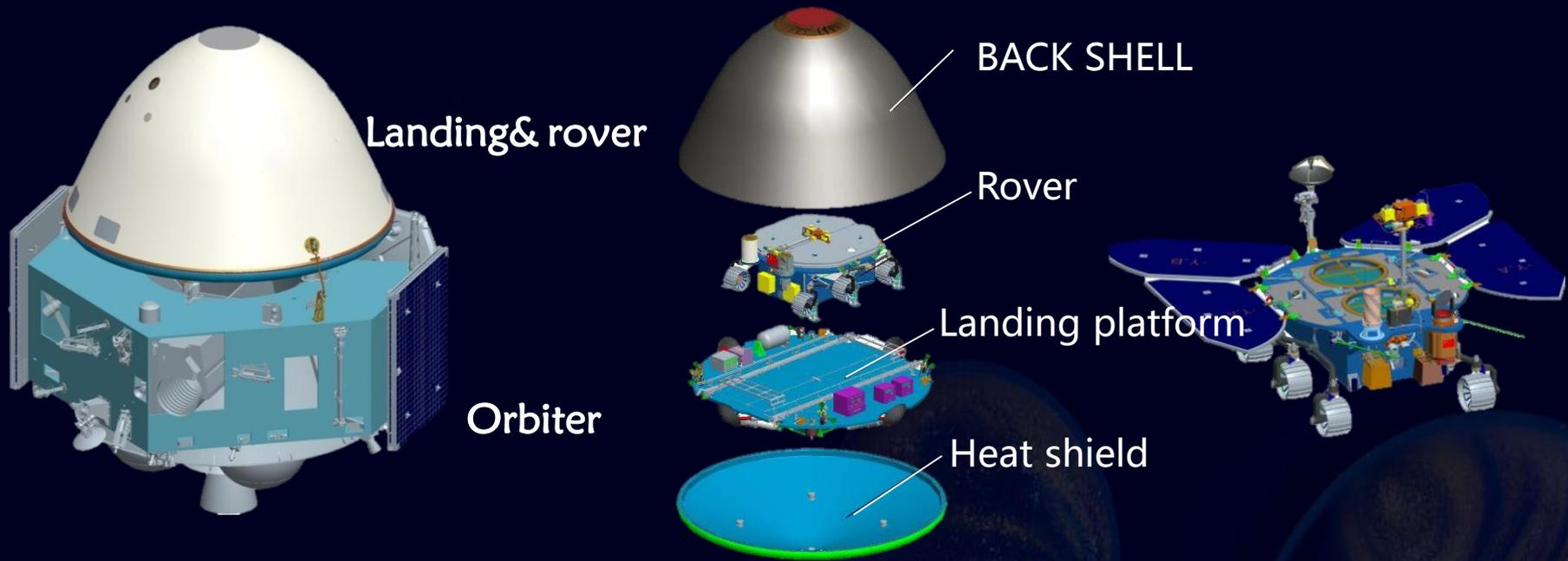
Scientific obj.

Scientific detection of Martian surface morphology, soil characteristics, material composition, water ice, atmosphere, ionosphere, magnetic field, etc.



# Being Implemented Mission

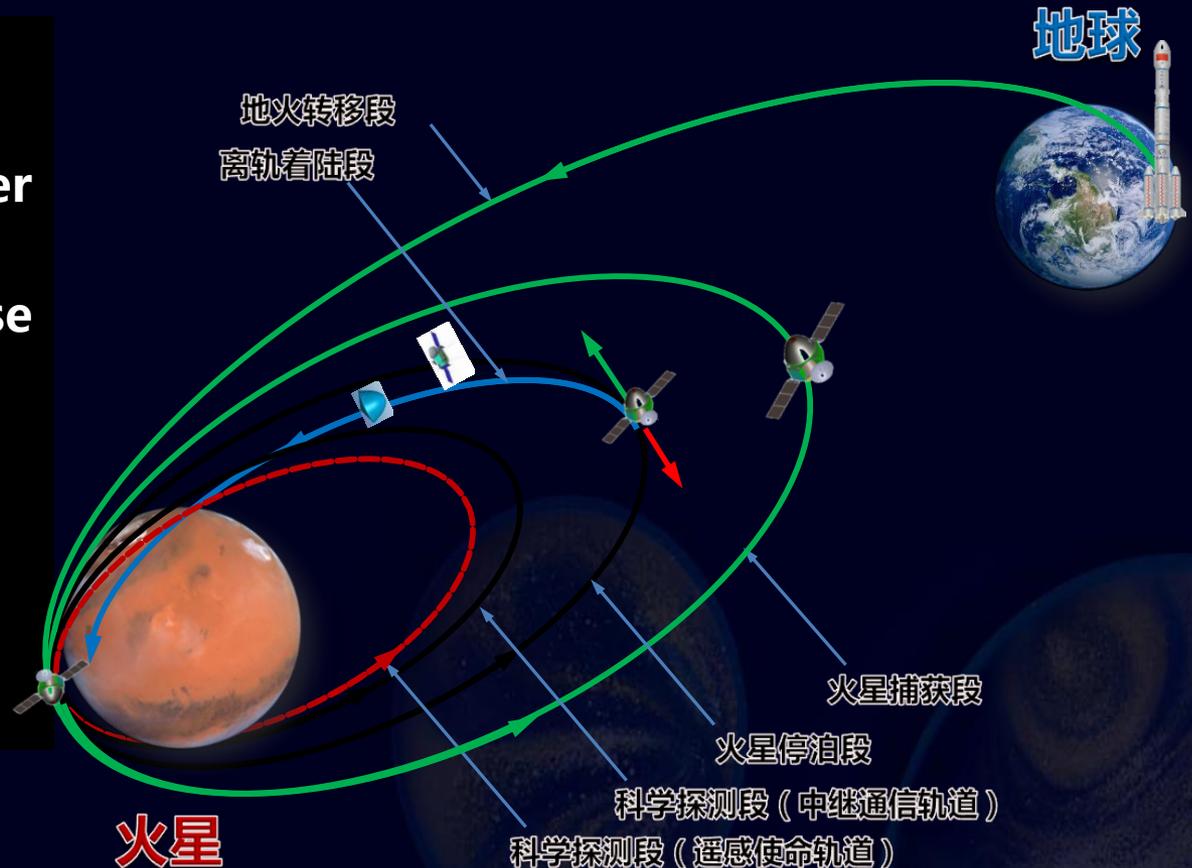
## Mars Mission TIANWEN-1



# Being Implemented Mission

## Mars Mission TIANWEN-1

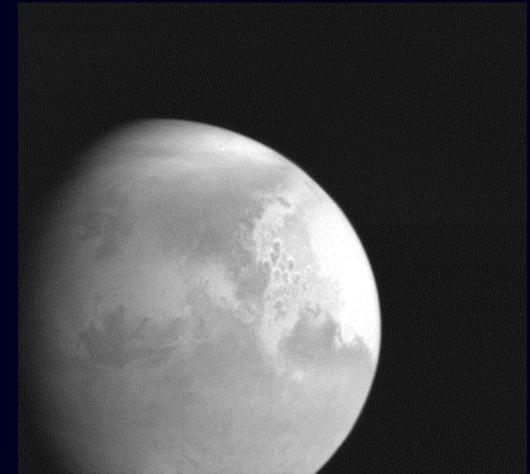
- ① 2020.7.23  
Launching phase
- ② Earth-Mars transfer phase
- ③ Mars capture phase
- ④ Mars parking phase
- ⑤ Deorbit and landing phase
- ⑥ Scientific exploration phase



# Being Implemented Mission

## Mars Mission TIANWEN-1

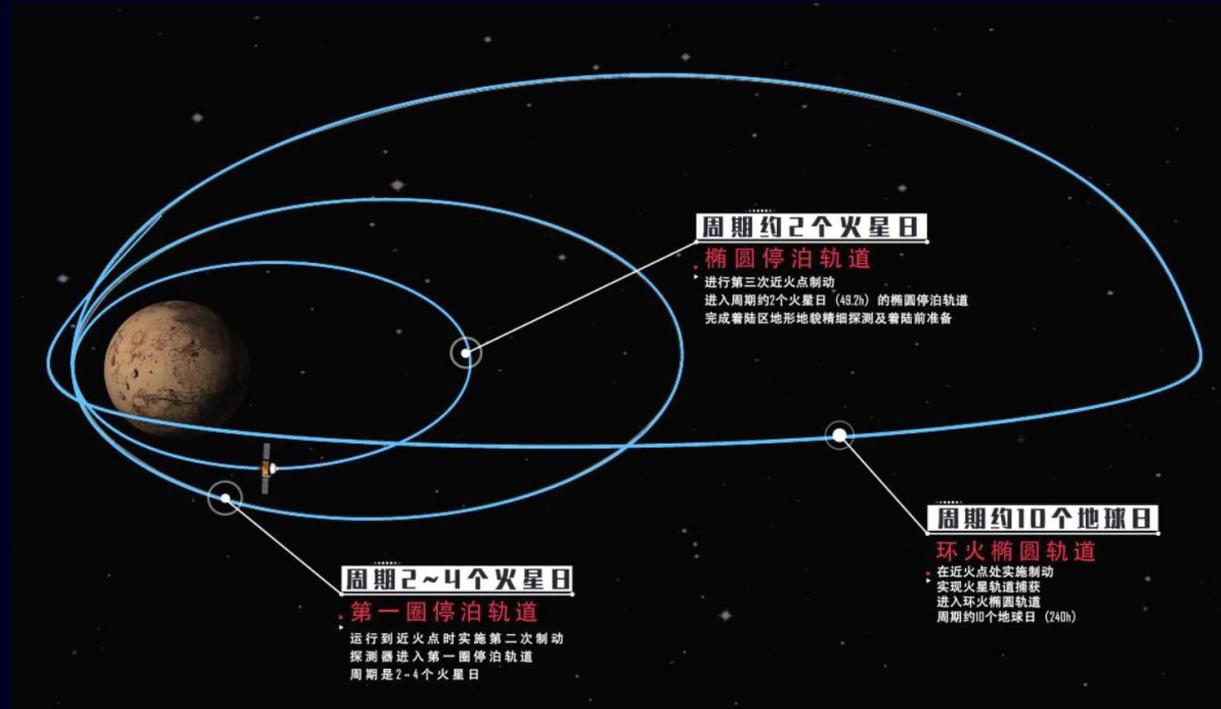
- Transfer phase took 6.5month.
- In Jan. Tianwen-1 took a picture of Mars at a distance of 2 million kilometers.
- On Feb.10th, Tianwen-1 carried out 1st orbit insertion.



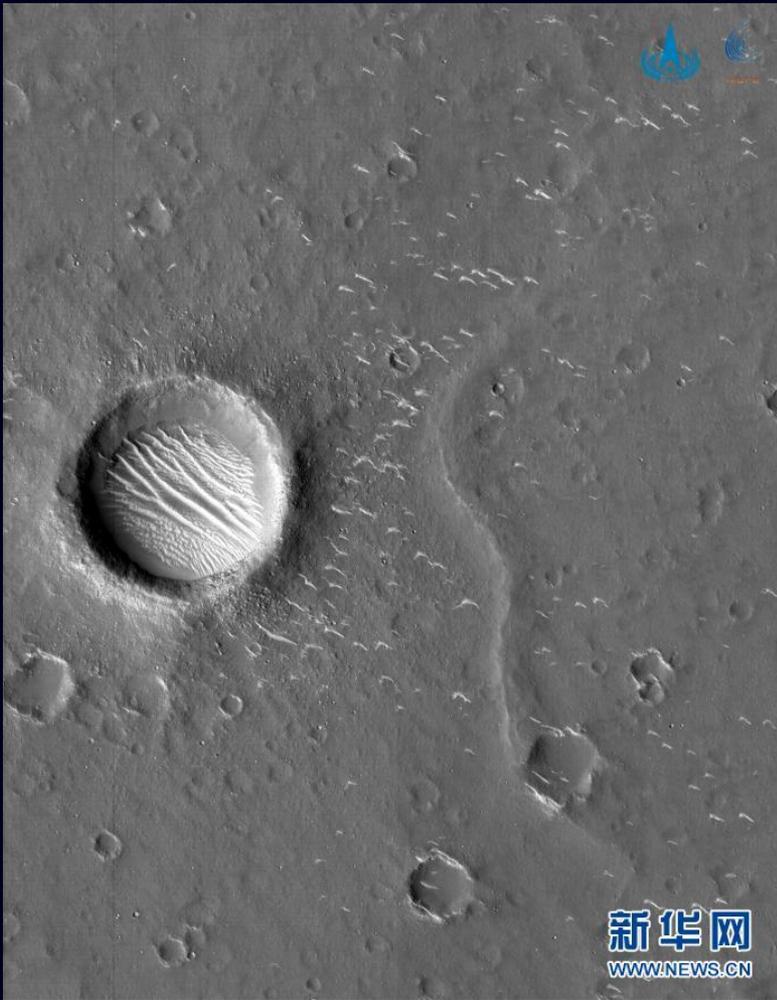
# Being Implemented Mission

## Mars Mission TIANWEN-1

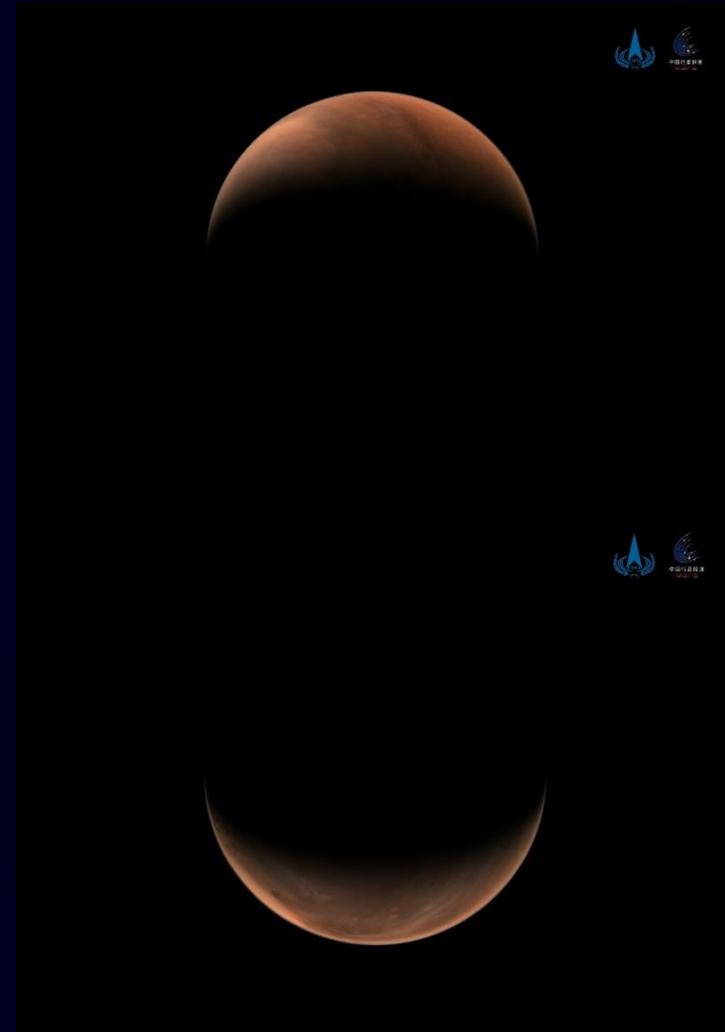
- On Feb.24, Tianwen-1 took the 3<sup>rd</sup> orbit insertion entering 280km×59000km parking orbit with a period of 2 Mars days.



# Being Implemented Mission



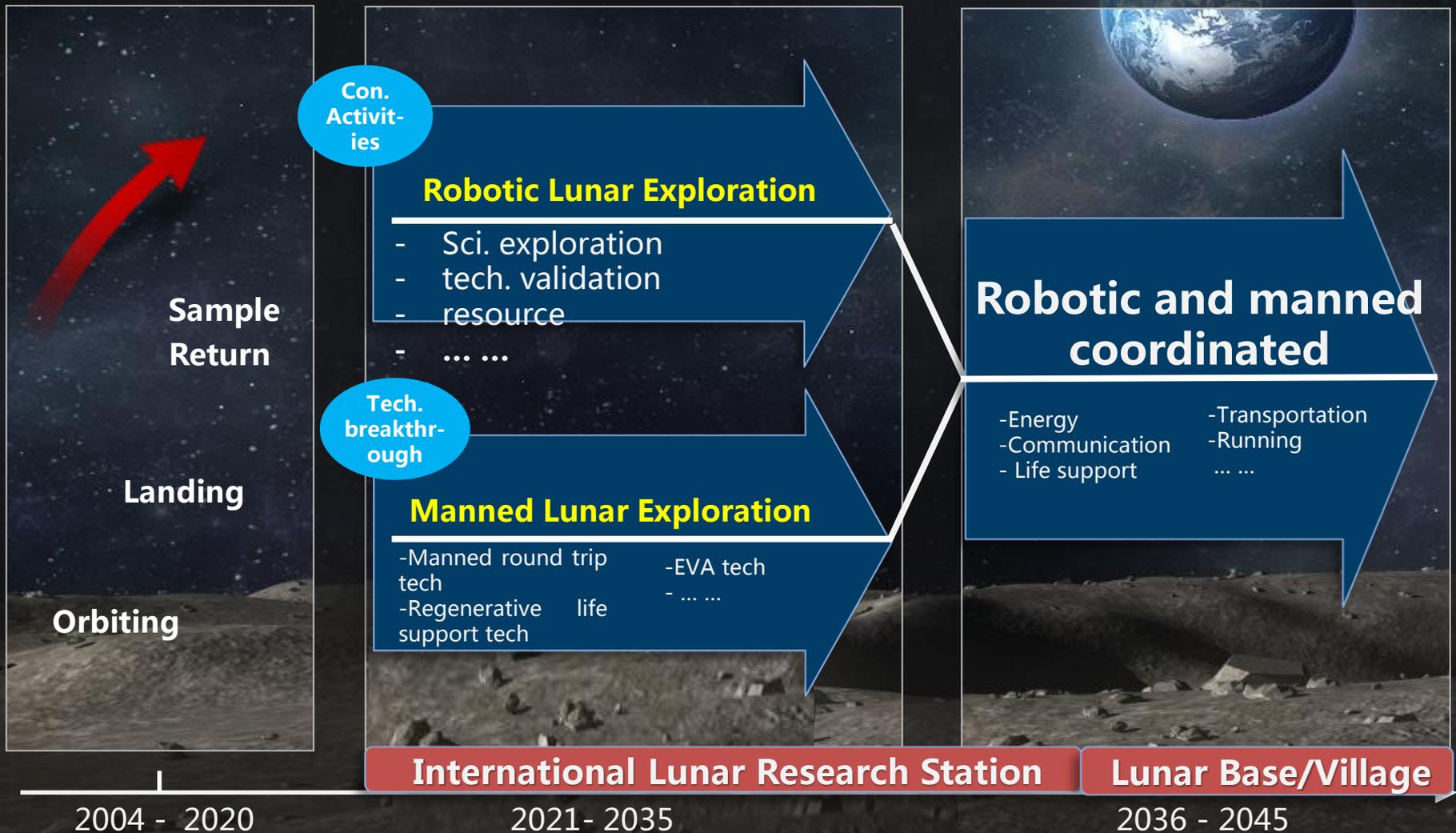
TIANWEN-1 's high definition pic. of Mars



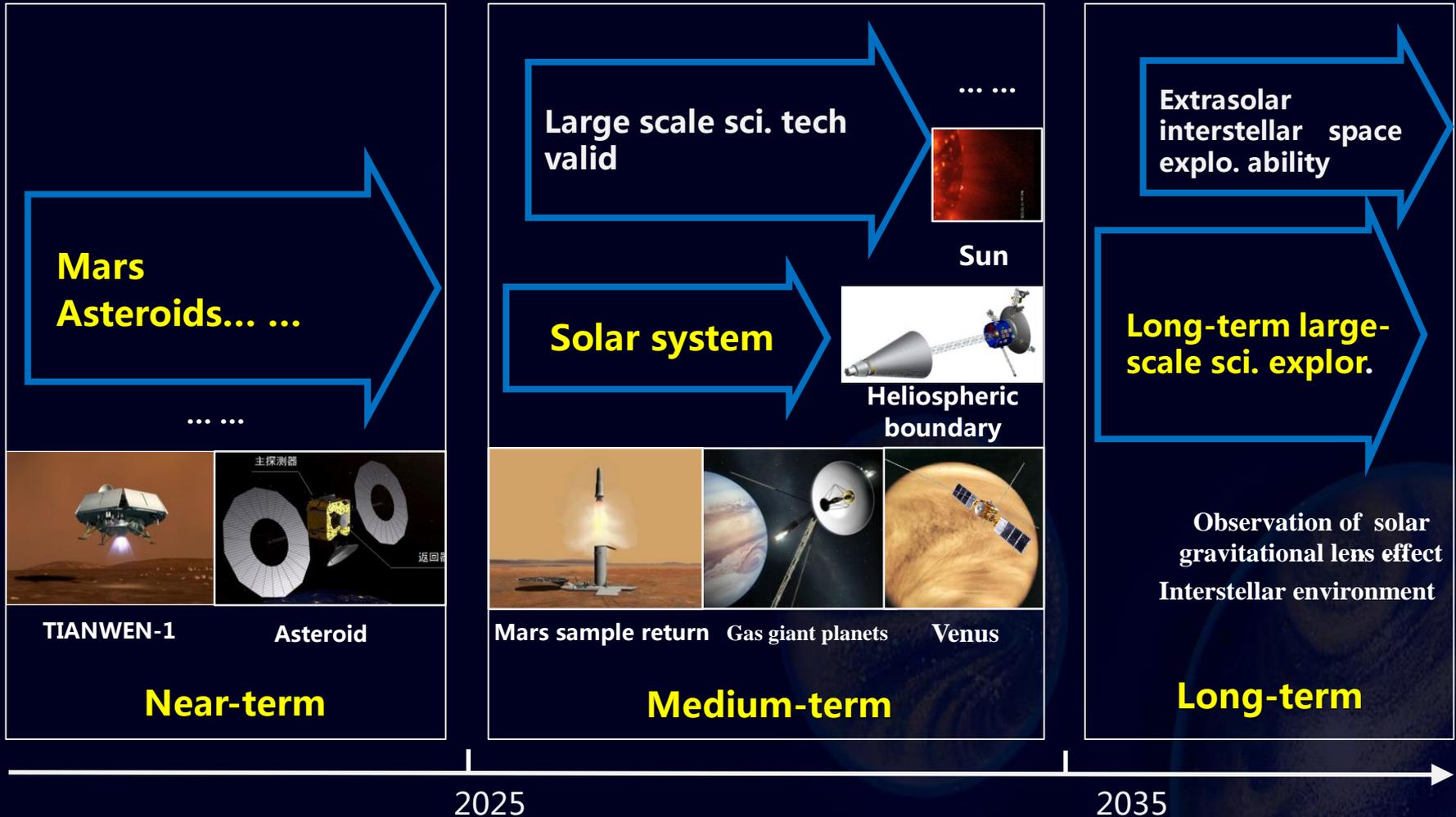
The stunning view of the Red Planet's northern hemisphere and southern hemisphere in mid March.

# Future Lunar Exploration Planning

## Multiple Exploration Approaches



# Deep space exploration plan



# THERE IS NO END FOR SPACE EXPLORATION PURSUING DREAMS, DARING TO EXPLORE, WIN-WIN COOPERATION



## 联合国与中国国家航天局关于在中国月球和深空探测中开展合作的协定 Agreement between the United Nations and the China National Space Administration Concerning Cooperation on China's Lunar and Deep Space Exploration

