



# International Lunar Research Station

**Guide for Partnership**

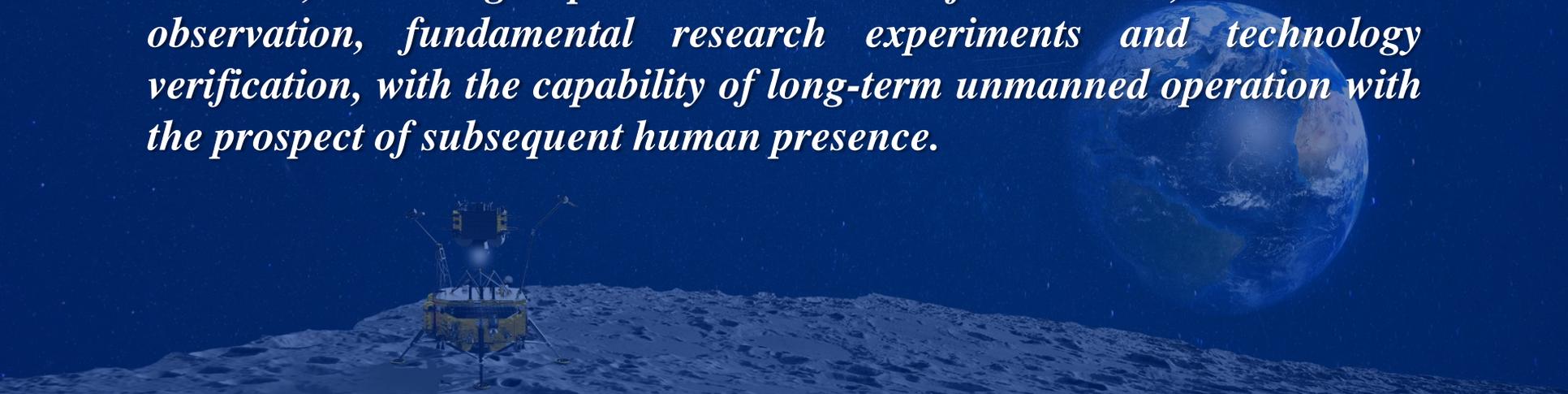
(V1.0)

**August 2021**



## Definition of ILRS

*The International Lunar Research Station (ILRS) means a set of complex research facilities to be constructed with the possible involvement of international partners on the surface and/or in the orbit of the Moon. It is designed for multi-purpose scientific research activities, including exploration and use of the Moon, moon-based observation, fundamental research experiments and technology verification, with the capability of long-term unmanned operation with the prospect of subsequent human presence.*



## Milestones of ILRS

**March 9, 2021**

**China and Russia signed MoU Regarding Cooperation for the Construction of the International Lunar Research Stations**

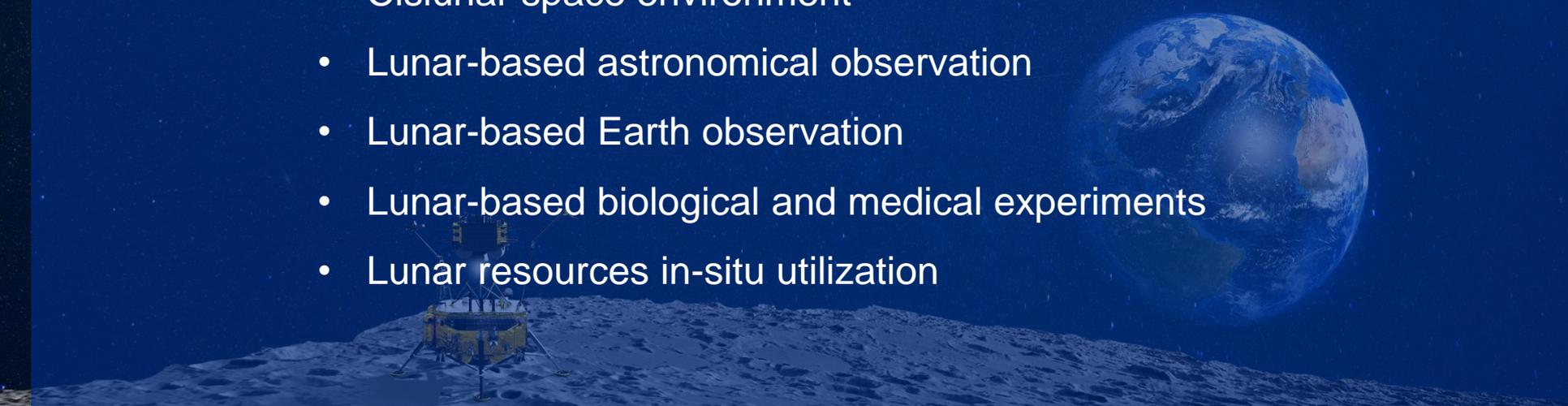
**April 23, 2021**

**Issued the "Joint Statement of the China National Space Administration and the State Space Corporation "Roscosmos" Regarding Cooperation for the Construction of the International Lunar Research Stations" at the side event of STSC 2021**

**June 16, 2021**

**Jointly released the "Roadmap of ILRS (V1.0)" and "Guide for Partnership of ILRS (V1.0)" at the GLEX 2021**

## Scientific Objectives

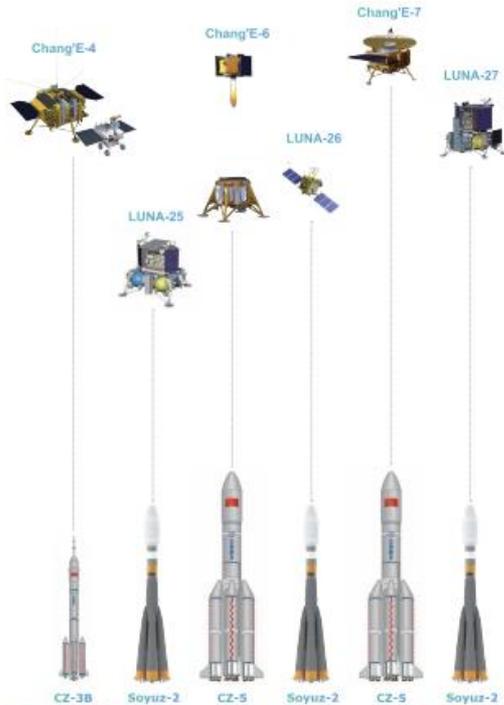
- Lunar topography, geomorphology and geological structure
  - Lunar physics and internal structure
  - Lunar chemistry (materials and geochronology)
  - Cislunar space environment
  - Lunar-based astronomical observation
  - Lunar-based Earth observation
  - Lunar-based biological and medical experiments
  - Lunar resources in-situ utilization
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# ILRS Guide for Partnership



## ILRS Development Phases and Mission Profile

The construction of ILRS is carried out in three phases:  
Reconnaissance, Construction, Utilization.

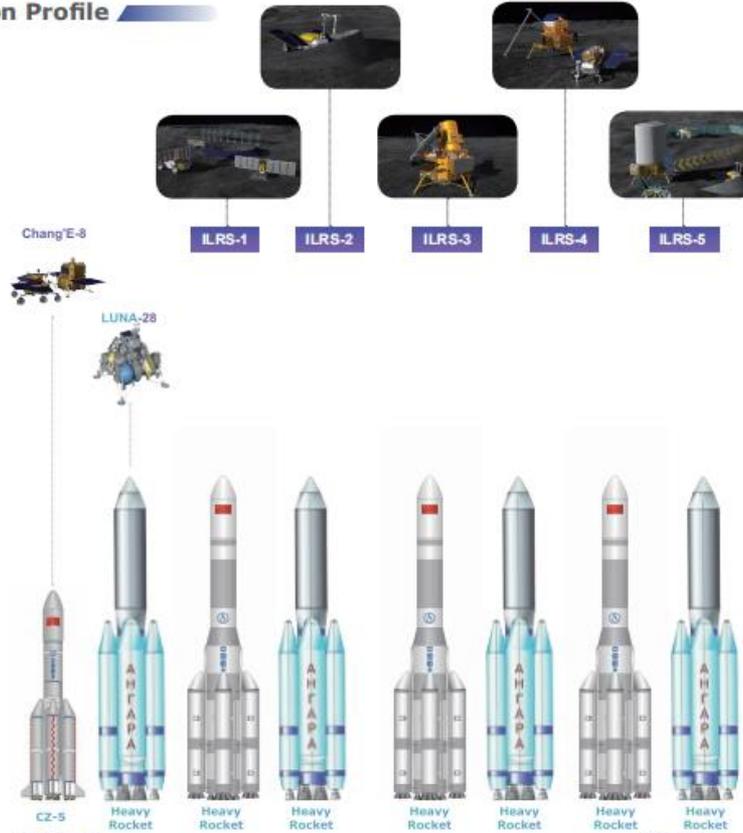


**R** 2021  
Reconnaissance

**Objectives:**

- Lunar reconnaissance with the missions, already planned.
- ILRS design and selection of ILRS site (sites).
- Technology verification for secure high-precision soft Landing.

**Missions planned:**  
Chinese CE-4, CE-6, CE-7  
Russian LUNA-25, LUNA-26, LUNA-27  
Potential missions of other partners.



**C** 2030  
Construction

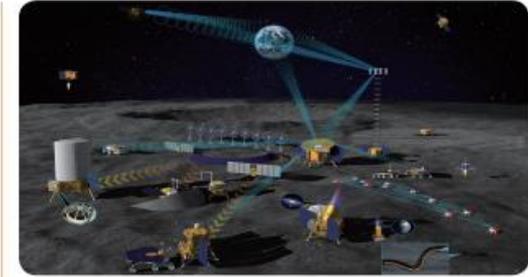
**Objectives:**

- Technology verification for the command center of ILRS.
- Lunar sample return.
- Massive-cargo delivery and secure high-precision soft Landing.
- Start of joint operations.

**Missions planned:**  
Chinese CE-8,  
Russian LUNA-28.  
Potential missions of other partners.

**Objectives:** Comprehensive establishment of ILRS to complete the in-orbit and surface facilities for energy, communication, transportation services as well as for research, exploration, and verification of in-situ utilization of resources, other potential common technologies.

**Missions planned:**  
ILRS-1, ILRS-2, ILRS-3, ILRS-4, ILRS-5, etc.



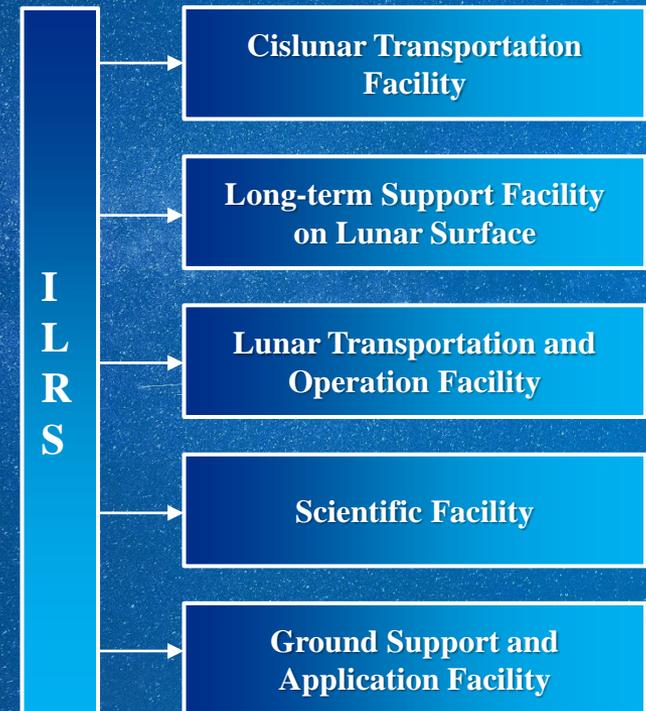
**U** 2035  
Utilization

**Objectives:** Lunar research and exploration, technology verification, supporting human lunar landing with the completed ILRS. Expanding and maintaining modules as needed.

## Facilities Description

On a top level ILRS consists of Cislunar Transportation Facility, Long-term Support Facility on Lunar Surface, Lunar Transportation and Operation Facility, Scientific Facility, Ground Support and Application Facility, etc.

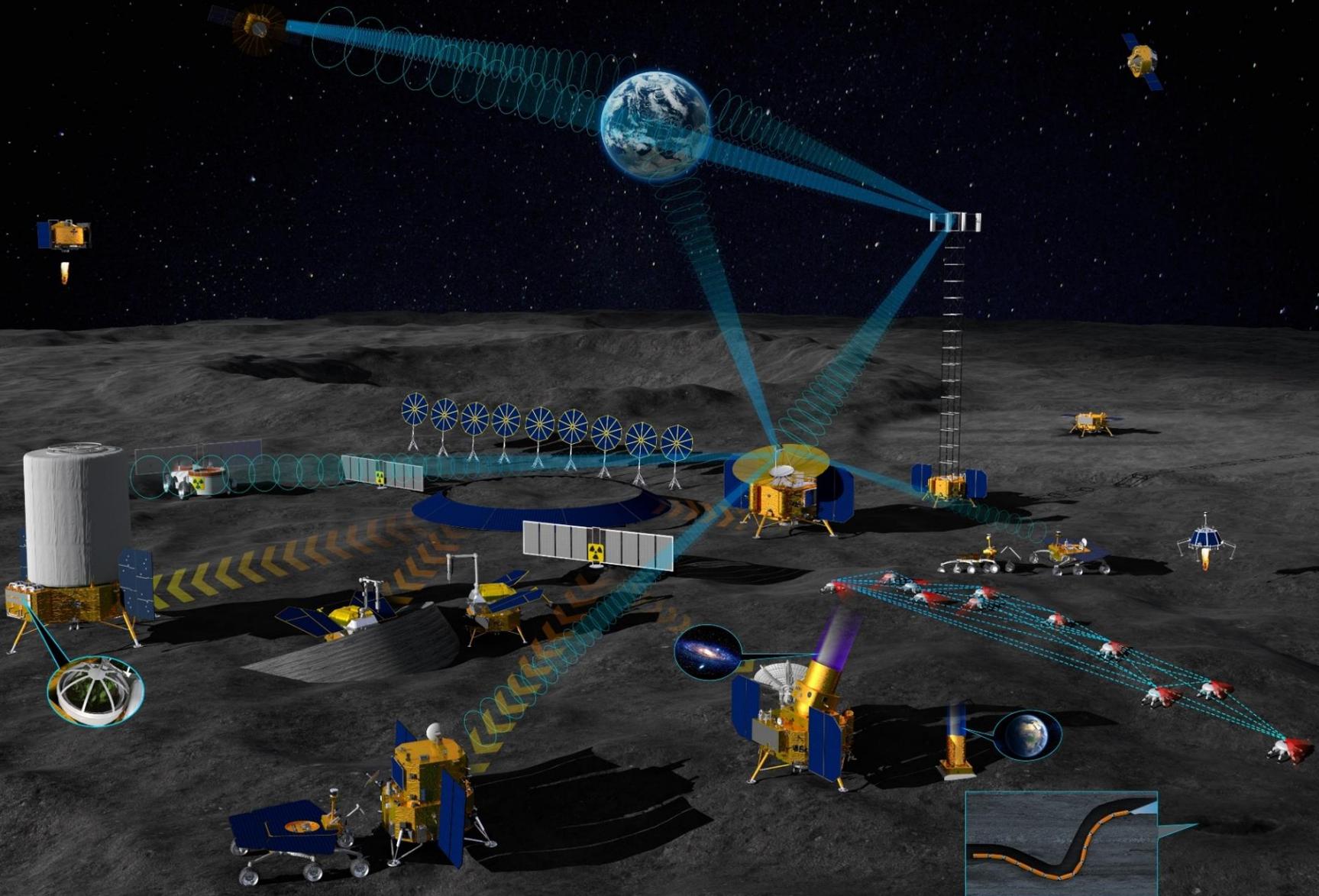
- **Cislunar Transportation Facility** will support cislunar round-trip transfer between the Earth and the Moon, lunar orbiting, soft landing, ascending on lunar surface, and re-entry to the Earth.
- **Long-term Support Facility on Lunar Surface** will support command center, global TT&C net, energy supply, **operation** management, etc., and various support modules if needed.
- **Lunar Transportation and Operation Facility** will support various modules to move or hop on the lunar surface, lava tube exploration, for cargo transportation and operation for the long-term support system and scientific facilities system, such as excavation and sampling.
- **Lunar Scientific Facility** will support **lunar scientific exploration**, technology verification, etc.
- **Ground Support and Application Facility** will support launch, operation, research, etc.



# ILRS Guide for Partnership



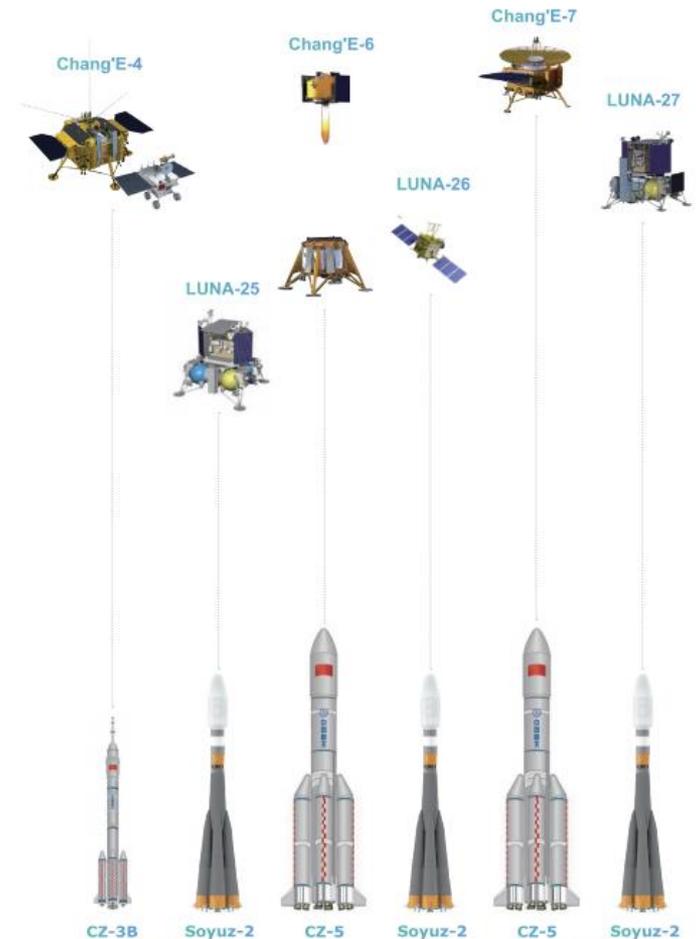
## Conceptual Design of ILRS



## ILRS Roadmap

### Phase I (Reconnaissance) 2021-2025

- **Objectives:**
  - Lunar reconnaissance with the planned missions.
  - ILRS design and selection of ILRS site(s).
  - Technology verification for secure high-precision soft landing.
- **Missions planned:**
  - Chinese CE-4, CE-6, CE-7
  - Russian LUNA-25, LUNA-26, LUNA-27
  - Potential missions of other partners.



## ILRS Roadmap

### Phase II (Construction) 2026~2035

#### ● Stage 1 (2026-2030)

##### ● Objectives:

- Technology verification for the command center of ILRS.
- Lunar sample return.
- Massive-cargo delivery and secure high-precision soft landing.
- Start of joint operations.

##### ● Missions planned:

- Chinese CE-8. Russian LUNA-28.
- Potential missions of other partners.

#### ● Stage 2 (2031-2035)

##### ● Objectives:

- Comprehensive establishment of ILRS to complete the in-orbit and surface facilities for energy, communication, transportation services as well as for research, exploration, **scientific experiment** and verification of in-situ utilization of resources and other potential common technology.

##### ● Missions planned:

- ILRS-1, ILRS-2, ILRS-3, ILRS-4, ILRS-5, etc.

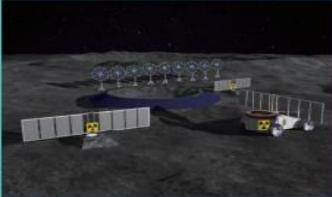


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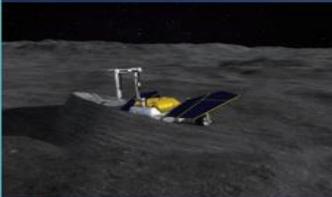
## The set of ILRS missions

2031



### ILRS-1 mission

Establishment of command center, basic energy and telecommunication facilities, to satisfy the needs of lunar infrastructure, lunar autonomous operations and long-term research and exploration.



### ILRS-2 mission

Establishment of lunar research and exploration facilities, such as lunar physics, geological profiling, lava tube exploration, lunar sample collection.



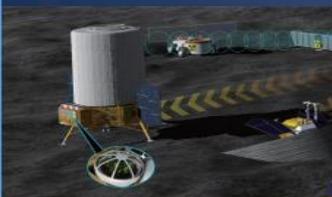
### ILRS-3 mission

Establishment of lunar in-situ resource utilization technology verification facilities.



### ILRS-4 mission

Verification of the general technologies for following explorations such as lunar biomedical experiment, distributed sample collection and return.



### ILRS-5 mission

Establishment of lunar-based astronomy and earth observation capabilities.

2035

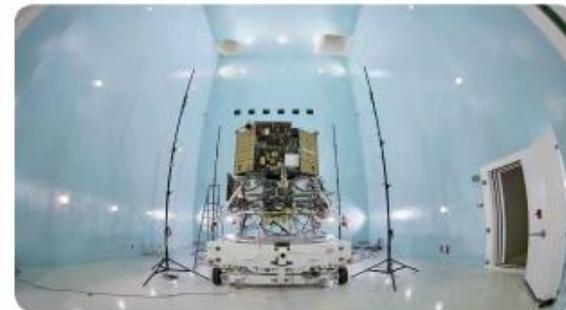
## ILRS Roadmap

### Phase III (Utilization) after 2036

- **Objectives:**

Lunar **scientific** research, exploration and **experiment**, technology verification, supporting human lunar landing with the completed ILRS.

Expanding and maintaining modules **as** needed.



## ● Cooperation Domains

- Strategy development and coordination related to the Moon exploration and use, defining of areas of cooperation and planning including development of the road-map with regard to the exploration and use of the Moon.
- Joint substantiation of scientific and engineering objectives of ILRS, including configuration and development road-map of ILRS.
- Joint development of the legal documents regulating relations, including the involvement in cooperation of third parties, in the framework of creation of ILRS.
- Review of existing standards in the field of launch vehicle and spacecraft technology development and potential definition of future standards that may be used during the creation of ILRS.
- Coordination of conceptual and preliminary design, modeling, test and validation of ILRS and its component parts.
- Coordination of scientific and technical research, development and creation including the assembly integration testing of ILRS.
- Collaboration on launching of the component parts of ILRS, coordination of its operation, management, including ground station support and other activities.
- Scientific and technical data analysis and sharing in the framework of ILRS in accordance with the legislation of the participants for export control.

## Cooperation Classification

Based on ILRS's general architecture, functions and roadmap, international partners can choose any form of cooperation categorized with A, B, C, D, E listed as follows.

- **Category A. Space Mission Cooperation**  
Partners will systematically contribute in the development of general architecture, scientific objectives, road-map of ILRS, and **participate in the construction of ILRS in mission level.**

## Cooperation Classification

Based on ILRS' s general architecture, functions and roadmap, international partners can choose any form of cooperation categorized with A, B, C, D, E listed as follows.

- **Category B. Space System Cooperation**
  - Partners will develop in cooperation with China and/or Russia at least one or several space systems based on the ILRS general architecture and **planned roadmap missions** .
  - System cooperation can be divided into three sub-categories:
    - **Sub-Category B1**: Partners will develop at least one system of ILRS, **such as independent energy module, rover, robot.....**
    - **Sub-Category B2**: Partners will participate in the missions led by CNSA, such as CE-4, CE-6, CE-7, CE-8. In this occasion, CNSA is responsible for discussing the cooperation with participants.
    - **Sub-Category B3**: Partners will participate in the missions led by ROSCOSMOS, such as LUNA-25, LUNA-26, LUNA-27 and LUNA-28. In this occasion, ROSCOSMOS is responsible for discussing the cooperation with participants.

## Cooperation Classification

Based on ILRS' s general architecture, functions and roadmap, international partners can choose any form of cooperation categorized with A, B, C, D, E listed as follows.

- **Category C. Subsystem Cooperation**
  - Partners will develop at least one or sets of space subsystems based on the defined space missions and space systems of ILRS. For example, **scientific** payloads **subsystem**, **navigation** **subsystem**, **communications** **subsystem**,.....can be developed by one partner or jointly developed by more partners.
  - The responsible party of the space system is in a position to discuss the cooperation with the partners.

## Cooperation Classification

Based on ILRS' s general architecture, functions and roadmap, international partners can choose any form of cooperation categorized with A, B, C, D, E listed as follows.

- **Category D. Equipment Cooperation**
  - Partners will supply one or sets of equipment according to defined space missions or subsystems of ILRS, **such as one or sets of scientific instruments for payload subsystem, components of navigation or communications subsystem, robot arms.....**
  - The responsible party of the space subsystem is in a position to discuss the cooperation with the partners.

## Cooperation Classification

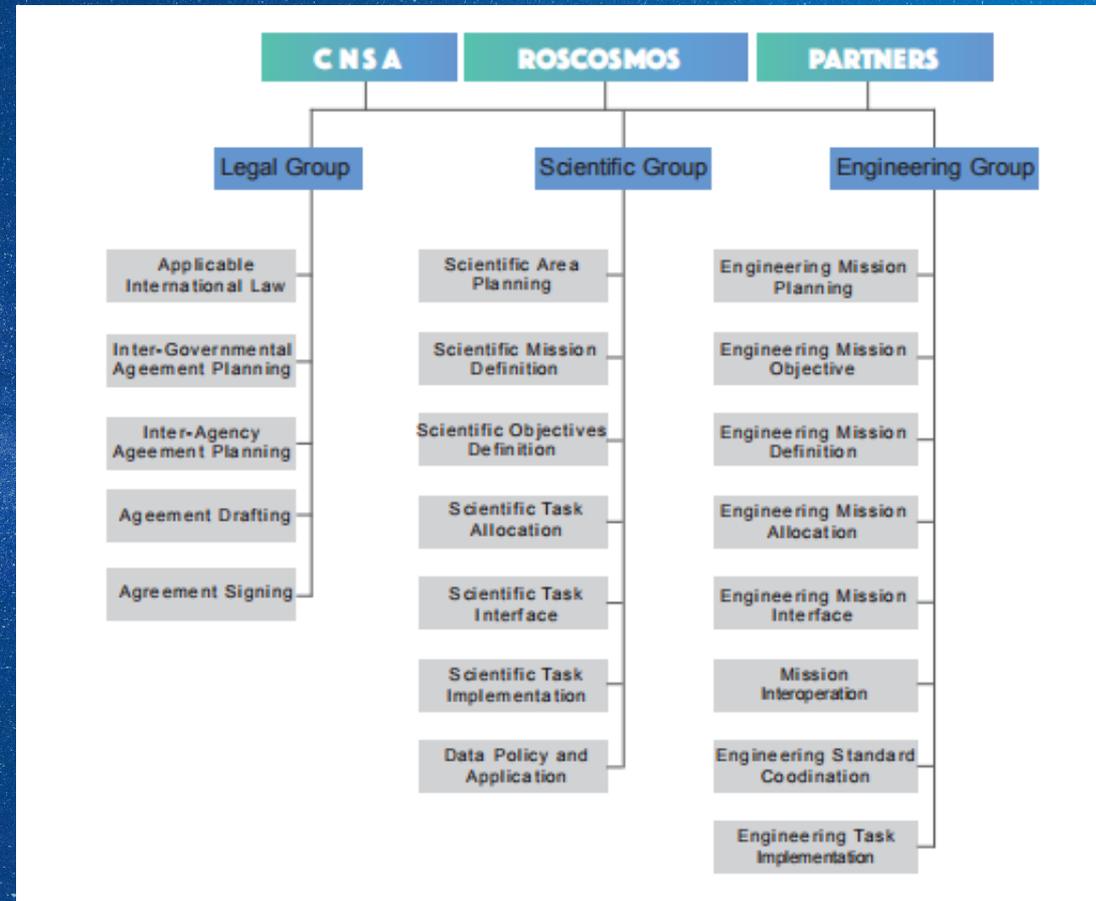
Based on ILRS' s general architecture, functions and roadmap, international partners can choose any form of cooperation categorized with A, B, C, D, E listed as follows.

- **Category E. Ground and Application Cooperation**

Partners will cooperate on ground segment, in-orbit operation and maintenance, construction of the joint data center, data analysis and applications.

## Cooperation Organization

- The inter-agency JWG of ILRS was established. Currently, The JWG consists of space agencies from China and Russia, under which the subgroups for legal affairs, science and engineering are operative as per their each functions.
- Based on the mechanism, the future organization is as shown.



## Opportunities for CNSA Missions

Mission	CE-4	CE-6	CE-7	CE-8
<b>Cat. A</b>	Closed	Closed	Mission coordination*	Mission coordination
<b>Cat. B</b>	Closed	Closed	Piggyback of probe system	Piggyback of probe system
<b>Cat. C</b>	Closed	Closed	Joint development	Joint development
<b>Cat. D</b>	Closed	Piggyback of scientific instrument	Piggyback of scientific instrument	Piggyback of scientific instrument
<b>Cat. E</b>	Data analysis & sharing	Data analysis & sharing	Data analysis & sharing	Data analysis & sharing

\*CE-7 and LUNA-26 cooperate on mission level.

## Opportunities for ROSCOSMOS Missions

Mission	LUNA-25	LUNA-26	LUNA-27	LUNA-28
<b>Cat. A</b>	Closed	Closed*	Closed	Mission coordination
<b>Cat. B</b>	Closed	Closed	Closed	Piggyback of probe system
<b>Cat. C</b>	Closed	Closed	Closed	Joint development
<b>Cat. D</b>	Closed	Closed	Piggyback of scientific instrument	Piggyback of scientific instrument
<b>Cat. E</b>	Data analysis & sharing	Data analysis & sharing	Data analysis & sharing	Data analysis & sharing

\*CE-7 and LUNA-26 cooperate on mission level.

## Opportunities for Future Missions by China, Russia and Partners

Mission	ILRS-1	ILRS-2	ILRS-3	ILRS-4	ILRS-5
<b>Cat. A</b>	Mission coordination and/or joint development				
<b>Cat. B</b>	System cooperation and/or joint development				
<b>Cat. C</b>	Joint development				
<b>Cat. D</b>	Joint development				
<b>Cat. E</b>	Data analysis & sharing				

## Contacts for Missions

Missions	Contacts
CE-4, CE-6, CE-7, CE-8	Ms. Jiang Hui, Division Director, Department of International Cooperation, CNSA Tel.: +8610 88581203, E-mail: <a href="mailto:jiangh@cnsa.gov.cn">jiangh@cnsa.gov.cn</a>
LUNA-25, LUNA-26, LUNA-27, LUNA-28	Ms. Marina Kuzmina, Division Director, Department of International Cooperation, ROSCOSMOS Tel.: +7495 6319000 ext. 3314, E-mail: <a href="mailto:Kuzmina.MA@Roscosmos.ru">Kuzmina.MA@Roscosmos.ru</a>
ILRS-1, ILRS-2, ILRS-3, ILRS-4, ILRS-5	Ms. Marina Kuzmina, Division Director, Department of International Cooperation, ROSCOSMOS Tel.: +7495 6319000 ext. 3314, E-mail: <a href="mailto:Kuzmina.MA@Roscosmos.ru">Kuzmina.MA@Roscosmos.ru</a> and Ms. Jiang Hui, Division Director, Department of International Cooperation, CNSA Tel.: +8610 88581203, E-mail: <a href="mailto:jiangh@cnsa.gov.cn">jiangh@cnsa.gov.cn</a>



**Thanks for your attention!**

