China Human Space Program
For the Advancement of Space Exploration for All Human

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01 Near-Earth Orbit
**CSS Construction**

**Key Technology Verification**

- **Long March 5-B**
  - **2020.05.05**
  - The maiden flight of CSS construction, largest Chinese carrier rocket so far

- **Core Module**
  - **2021.04.29**
  - Marked the start of the construction of the CSS

- **Tianzhou-2**
  - **2021.05.29**
  - First mission of the cargo transportation subsystem

- **Shenzhou-12**
  - **2021.06.17**
  - First human flight mission of the CSS

- **Tianzhou-3**
  - **2021.09.20**
  - Second mission of the cargo transportation subsystem

- **Shenzhou-13**
  - **2021.10.16**
  - Second human flight mission of the CSS
CSS Construction

Assembly Phase

- **2022.05.10**
  - Unveiled the in-orbit assembly of the CSS

- **2022.06.05**
  - First human mission of the assembly phase

- **2022.07.24**
  - Transposed to form the "L" configuration

- **2022.10.31**
  - Transposed to form the "T" configuration

- **2022.11.12**
  - 4th mission of the cargo transportation subsystem

- **2022.11.29**
  - Marked the ending of the CSS construction
Since 1998, CMS has selected 49 astronauts (44 active) in 4 batches.

China has successfully completed 11 human space missions, 18 astronauts in total head count 29 people/times went into space, setting a record for the longest continuous flight of Chinese astronauts in orbit for 183 days.

Yang Liwei is the first Chinese flown astronaut.

JING Haipeng is the record keeper of flight missions (4 times).

LIU Yang is the first Chinese female astronaut entering space.
15 EVA in total: Shenzhou-18 crew completed the installation of space debris protection equipment and inspection of exposed equipments of the CSS, which took about 8.5 hours, setting a new record for the single EVA of Chinese astronauts.
CSS Operation Phase

Ground Centers
- CSS Operation Management Center
- CSS Flight Control Center
- Astronaut Support Center
- Payload Operation & Application Center
- CSS Support Center

Experiment Module II (EM2)
- 29 standard payload adapters

Experiment Module I (EM1)
- 1 large payload attach point
- 1 extended experiment platform
- 22 standard payload adapters

Core Module (CM)
- 1 payload attach point

TZ Cargo Spaceship
- 3 times every 2 years

SZ Manned Spaceship
- 2 times per year, 3 crew member each
Cold Atom Experiment Rack (CAER)

High-precision Time-Frequency Rack (HTFR)

Fundamental physics in microgravity
  - Cold Atom Experiment Rack (CAER)
  - High-precision Time-Frequency Rack (HTFR)

High Micro-gravity Level Rack (HMGR) & Medical Sample Analysis

Varying-Gravity Experiment Rack (VGER)

Science Glove-box and Refrigerator Rack (SGRR)

Online Maintenance and adjustment Operation Rack (OMOR)

Ecology Science Experiment Rack (ESER)

Biotechnology Experiment Rack (BER)

Microgravity fluid physics & combustion
  - Fluids Physics Experiment Rack (FPER)
  - Two-phase System Experiment Rack (TSER)
  - Combustion Experiment Rack (CER)

Material science in space
  - Material Furnace Experiment Rack (MFER)
    - Electrostatic Levitation Rack (ELR)

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CSS Operation

Space Life Science and Human Research

Space Astronomy and Earth Science

Microgravity Physics

Space New Tech and Utilization

Utilization Mission Planning
Over 130 scientific research and utilization projects conducted in orbit, 280+ papers in international journals, including the preparation of multi-component eutectic alloys, research on the growth of new materials in space, and studies on the directed differentiation of human bone cells.
**CSS Operation**

**Upgrades**

- **CSS Expansion**
  - From T shape to cross shape

- **Reusable Rocket & Spaceship**
  - Enhance transportation capabilities

- **Develop low-cost Cargo Spaceship**
  - New vehicle and commercial flight participation for higher flexibility

- **Deploy CSST**
  - High space resolution for deep space observation
02

Lunar Orbit
Human Lunar Exploration

3 step development of MLE

- Demonstration phase
  - Demonstration of key technological solutions
    - 2020—2022

- Research & development phase
  - Carry out systematic and continuous human lunar exploration
  - To explore, develop and utilize Earth-moon space resources
    - 2023—2030

- Implementation phase
  - Human mission to the moon by 2030
    - 2030~

Background

China's deep space exploration and human lunar exploration development strategy

2018.10
Human Lunar Exploration

Preliminary Plan

1. Launch Manned Spaceship
2. Transfer to lunar orbit
3. Circumlunar docking
4. Detach and descend of the lander
5. Lunar activity
6. Take-off and ascent
7. Ascent docking
8. Transfer to earth orbit

circling the moon

landing
detach
powered lowering
desend to orbit
braking at perilune
International Cooperation
## Partnership Overview

<table>
<thead>
<tr>
<th>Cooperation Plan</th>
<th>Cooperation is being implemented in CSS with UNOOSA and ESA, and international mega science program such as the CSST is also in plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperation Network</td>
<td>Agency</td>
</tr>
<tr>
<td>International Organization</td>
<td>More than 10 international organizations, including the United Nations Office for Outer Space Affairs, the International Astronautical Federation, and the International Academy of Astronautics, APSCO, etc.</td>
</tr>
</tbody>
</table>
Cooperation Projects

- 10 undergoing cooperative projects for the first round, 158 labs from 95 organizations of 23 countries are involved the cooperation
- Chinese and European scientists have jointly carried out dozens of space and ground experiments using ISS and CSS, parabolic flights and sounding rockets under the cooperation between CMSA and ESA.
Cooperation Projects

7 projects from 12 countries will be launched on board the China Space Station

Europe 50%
Asia 25%
America 16%
Africa 8%

7 projects from 12 countries will be launched on board the China Space Station.
**Upcoming Cooperation**

**Scientific Research**
The CSS will become an open space science activity platform for scientists around the world to jointly explore and utilize space resources.

**Flight Opportunity**
Can carry active/passive targets inside/outside the cabin and release small satellites, and can retrieve certain payload, sample and other items when the manned spacecraft returns.

**Astronaut Training**
Can select and train astronauts for other countries and participate in the flight missions of CSS.

**Science Popularization Education**
Carry out educational activities such as personnel exchange and teaching, micro-satellite training and in-orbit release, or actively use unique resources such as astronauts in orbit of the space station to carry out various forms of science popularization activities.
China is carrying out Human Lunar Exploration mission. Subsequently, lunar scientific research and development will be carried out, and lunar scientific research experimental stations will be built. In this regard, we hope to actively carry out exchanges with other countries and seek cooperation opportunities.

- Provide a new platform for scientific exploration
- Make full use of the space station and unmanned lunar exploration
- Innovative lunar exploration model
- Adhere to openness and cooperation
China Human Space Program will continue to adhere to the principles of "mutual respect, equality and mutual benefit, transparency and openness", share the achievements of the utilization of CSS and Human Lunar Exploration mission, and jointly promote the development of space technology in the world.

To make more positive contributions to the peaceful use of space for the benefit of all mankind.
THANK YOU

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