**Tiangong** ([Chinese](https://en.wikipedia.org/wiki/Chinese_language): 天宫; [pinyin](https://en.wikipedia.org/wiki/Pinyin): *Tiāngōng*; lit. 'Heavenly Palace'),[[5]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-sfn-20210429-5)[[6]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-xinhua202104-6) officially the ***Tiangong* space station**[[7]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-cmse201311-7) ([Chinese](https://en.wikipedia.org/wiki/Simplified_Chinese_characters): 天宫空间站; [pinyin](https://en.wikipedia.org/wiki/Pinyin): *Tiāngōng kōngjiānzhàn*), is a permanently crewed [space station](https://en.wikipedia.org/wiki/Space_station) constructed by [China](https://en.wikipedia.org/wiki/China) and operated by [China Manned Space Agency](https://en.wikipedia.org/wiki/China_Manned_Space_Agency).[[8]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-crew-8) Tiangong is a modular design, with modules docked together while in [low Earth orbit](https://en.wikipedia.org/wiki/Low_Earth_orbit), between 340 and 450 km (210 and 280 mi) above the surface. It is China's first long-term space station, part of the [Tiangong program](https://en.wikipedia.org/wiki/Tiangong_program) and the core of the "Third Step" of the [China Manned Space Program](https://en.wikipedia.org/wiki/China_Manned_Space_Program); it has a pressurised volume of 340 m3 (12,000 cu ft), slightly over one third the size of the [International Space Station](https://en.wikipedia.org/wiki/International_Space_Station). The space station aims to provide opportunities for space-based experiments and a platform for building capacity for scientific and technological innovation.[[9]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-ChinaPower_CSIS-9)

The construction of the station is based on the experience gained from its precursors, [Tiangong-1](https://en.wikipedia.org/wiki/Tiangong-1) and [Tiangong-2](https://en.wikipedia.org/wiki/Tiangong-2).[[10]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-nsf20210301-10)[[11]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-cmse-20131031-11)[[12]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-copuos2016tech20E-12) The first module, the [*Tianhe*](https://en.wikipedia.org/wiki/Tianhe_core_module) ("Harmony of the Heavens") core module, was launched on 29 April 2021.[[5]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-sfn-20210429-5)[[6]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-xinhua202104-6) This was followed by multiple crewed and uncrewed missions and the addition of two [laboratory cabin modules](https://en.wikipedia.org/wiki/Laboratory_Cabin_Module). The first, [*Wentian*](https://en.wikipedia.org/wiki/Wentian_module) ("Quest for the Heavens"), launched on 24 July 2022; the second, [*Mengtian*](https://en.wikipedia.org/wiki/Mengtian_module) ("Dreaming of the Heavens"), launched on 31 October 2022.[[10]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-nsf20210301-10)

**Nomenclature**

The names used in the space program, previously all chosen from the revolutionary history of the People's Republic, have been replaced with mystical-religious ones. Thus, the space capsule [Divine Vessel](https://en.wikipedia.org/wiki/Shenzhou_program) (神舟; *Shénzhōu*),[[13]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-13) spaceplane [*Divine Dragon*](https://en.wikipedia.org/wiki/China%27s_spaceplane_program) (神龙; *Shénlóng*),[[14]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-14) land-based high-power laser *Divine Light* (神光; *Shénguāng*),[[15]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-15) and supercomputer *Divine Might* (神威; *Shénwēi*).[[16]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-16)

These poetic[[17]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-guardian.co.uk-17) names continue as the [first](https://en.wikipedia.org/wiki/Chang%27e_1), [second](https://en.wikipedia.org/wiki/Chang%27e_2), [third](https://en.wikipedia.org/wiki/Chang%27e_3), [fourth](https://en.wikipedia.org/wiki/Chang%27e_4), [fifth](https://en.wikipedia.org/wiki/Chang%27e_5) and future probes of the [Chinese Lunar Exploration Program](https://en.wikipedia.org/wiki/Chinese_Lunar_Exploration_Program) are called [Chang'e](https://en.wikipedia.org/wiki/Chang%27e) – after the Moon goddess. The name "Tiangong" means "heavenly palace". Across China, the launch of Tiangong-1 was reported to have inspired a variety of feelings, including love poetry. The rendezvous of the space vehicles has been compared to the reunion of [the cowherd and the weaver girl](https://en.wikipedia.org/wiki/The_Weaver_Girl_and_the_Cowherd).[[18]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-18)

Wang Wenbao, director of the [China Manned Space Agency](https://en.wikipedia.org/wiki/China_Manned_Space_Agency) (CMSA), told a news conference in 2011:

"Considering past achievements and the bright future, we feel the manned space programme should have a more vivid symbol, and that the future space station should carry a resounding and encouraging name. We now feel that the public should be involved in the names and symbols, as this major project will enhance national prestige and strengthen the national sense of cohesion and pride."[[17]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-guardian.co.uk-17)[[19]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-theregister.co.uk-19)[[20]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-20)

On 31 October 2013, CMSA announced the new names for the whole space station program:[[11]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-cmse-20131031-11)

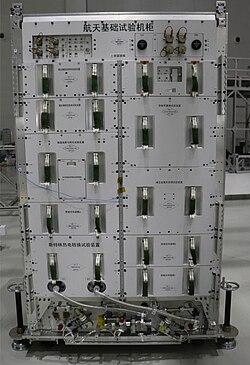
* The precursor space labs would be called [Tiangong](https://en.wikipedia.org/wiki/Tiangong_program) (天宫; *Tiān Gōng*; 'Sky Palace'), code **TG**. [Tiangong-1](https://en.wikipedia.org/wiki/Tiangong-1) and [Tiangong-2](https://en.wikipedia.org/wiki/Tiangong-2) were launched respectively in 2011 and 2016.
* The large modular space station would be called **Tiangong** as well, without number.[[7]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-cmse201311-7)
* The [cargo transport spacecraft](https://en.wikipedia.org/wiki/Tianzhou_(spacecraft)) would be called **Tianzhou** (天舟; *Tiān Zhōu*; 'Heavenly Ship'), code **TZ**. The first [Tianzhou mission](https://en.wikipedia.org/wiki/Tianzhou-1) successfully launched and deorbited in 2017. The first mission to the space station, [Tianzhou 2](https://en.wikipedia.org/wiki/Tianzhou_2), flew on 29 May 2021. Subsequently, [Tianzhou 3](https://en.wikipedia.org/wiki/Tianzhou_3), [Tianzhou 4](https://en.wikipedia.org/wiki/Tianzhou_4) and [Tianzhou 5](https://en.wikipedia.org/wiki/Tianzhou_5) were launched respectively on 20 September 2021, 9 May 2022 and 12 November 2022.
* The Modular Space Station [Core Module](https://en.wikipedia.org/wiki/Core_Cabin_Module) would be called ***Tianhe*** (天和; *Tiān Hé*; 'Harmony of the Heavens'), code **TH**.[[21]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-xinhuanet.com-21) [*Tianhe*](https://en.wikipedia.org/wiki/Tianhe_(space_station_module)) was successfully launched on 29 April 2021.[[22]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-sn-20191101-22)[[23]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-ld20210421-23)[[24]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-24)
* The Modular Space Station [Experiment Module I](https://en.wikipedia.org/wiki/Laboratory_Cabin_Module) would be called ***Wentian*** (问天; *Wèn Tiān*; 'Quest for the Heavens[[25]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-Chinadaily201804-25)'), code **WT**.[[21]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-xinhuanet.com-21) [*Wentian*](https://en.wikipedia.org/wiki/Wentian_module) was successfully launched on 24 July 2022.[[22]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-sn-20191101-22)[[26]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-26)
* The Modular Space Station [Experiment Module II](https://en.wikipedia.org/wiki/Laboratory_Cabin_Module) would be called ***Mengtian*** (梦天; *Mèng Tiān*; 'Dreaming of the Heavens[[25]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-Chinadaily201804-25)'), code **MT**.[[21]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-xinhuanet.com-21) [*Mengtian*](https://en.wikipedia.org/wiki/Mengtian_module) was successfully launched on 31 October 2022.[[22]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-sn-20191101-22)[[27]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-nsf_mengtian-27)
* The separate [space telescope module](https://en.wikipedia.org/wiki/Xuntian) would be called **Xuntian** (巡天; *Xún Tiān*; 'Touring the Heavens'), code **XT** (telescope), receiving the previously intended name for the Experiment Module II. Launch is planned for 2026.[[28]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-28)

**Purpose and mission**

According to CMSA, which operates the space station, the purpose and mission of Tiangong is to develop and gain experience in [spacecraft rendezvous](https://en.wikipedia.org/wiki/Space_rendezvous) technology, permanent human operations in orbit, long-term autonomous spaceflight of the space station, regenerative life support technology and autonomous cargo and fuel supply technology. It will also serve the platform for the next-generation orbit transportation vehicles, scientific and practical applications at large-scale in orbit, and technology for future [deep space exploration](https://en.wikipedia.org/wiki/Deep_space_exploration).[[29]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-29)[[30]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-30)[[31]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-31)

CMSA also encourages commercial activities led by the private sector and hopes their involvement could bring cost-effective aerospace innovations.[[32]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-32) [Space tourism](https://en.wikipedia.org/wiki/Space_tourism) at the space station is also considered.[[33]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-33)

**Scientific research**

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Basic space experiment cabinet of Tiangong space station

The space station will have 23 experimental racks in an enclosed, pressurised environment. There will also be platforms for exposed experiments; 22 and 30 on the Wentian and Mengtian laboratory modules, respectively.[[34]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-34) Over 1,000 experiments are tentatively approved by CMSA,[[35]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-nature_un-35) and scheduled to be conducted on the space station.[[36]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-nature_experiments-36)

[Agriculture in microgravity](https://en.wikipedia.org/wiki/Space_farming) was explored with cultivation of [rice](https://en.wikipedia.org/wiki/Rice) and [*Arabidopsis thaliana*](https://en.wikipedia.org/wiki/Arabidopsis_thaliana) as sustainable food sources for long-term spaceflight.[[37]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-37)

The programmed experiment equipment racks for the three modules as of June 2016 were:[[12]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-copuos2016tech20E-12)

* Space life sciences and biotechnology
  + Ecology Science Experiment Rack (ESER)
  + Biotechnology Experiment Rack (BER)
  + Science Glove-box and Refrigerator Rack (SGRR)
* Microgravity fluid physics and 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)
  + Container-less Material Experiment Rack (CMER)
* Fundamental Physics in Microgravity
  + Cold Atom Experiment Rack (CAER)
  + High-precision Time-Frequency Rack (HTFR)
* Multipurpose Facilities
  + High Micro-gravity Level Rack (HMGR)
  + Varying-Gravity Experiment Rack (VGER)
  + Modularized Experiment Rack (RACK)

**Education and cultural outreach**

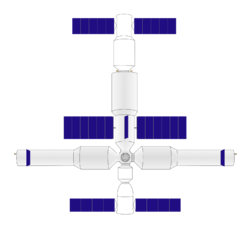
The space station features space lectures and [popular science](https://en.wikipedia.org/wiki/Popular_science) experiments to educate, motivate and inspire the younger Chinese generation and world audience in science and technology. Each lecture is concluded with a question-and-answer session with school children's questions from classrooms across China.[[38]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-38) The first and second Tiangong space lesson was conducted in December 2021 and March 2022, as a part of the [Shenzhou 13](https://en.wikipedia.org/wiki/Shenzhou_13) mission.[[39]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-39)[[40]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-40) This tradition continued with the [Shenzhou 14](https://en.wikipedia.org/wiki/Shenzhou_14).[[41]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-41)

The CSSARC is the Amateur Radio payload for the Chinese Space Station, proposed by the Chinese Radio Amateurs Club (CRAC), Aerospace System Engineering Research Institute of Shanghai (ASES) and [Harbin Institute of Technology](https://en.wikipedia.org/wiki/Harbin_Institute_of_Technology) (HIT). The payload will provide resources for radio amateurs worldwide to contact onboard astronauts or communicate with each other, aim to inspire students to take interests and careers in science, technology, engineering, and math, and encourage more people to get interested in [amateur radio](https://en.wikipedia.org/wiki/Amateur_radio).[[42]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-42)[[43]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-43)

The first phase of the payload is capable of providing the following functions utilising the VHF/UHF amateur radio band:

* V/V or U/U crew voice
* V/U or U/V FM repeater
* V/V or U/U 1k2 AFSK [digipeater](https://en.wikipedia.org/wiki/Digipeater)
* V/V or U/U SSTV or digital image

**Structure**

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T-shaped early concept of the Chinese large modular space station

The space station is a third-generation modular [space station](https://en.wikipedia.org/wiki/Space_station). First-generation space stations, such as early [*Salyut*](https://en.wikipedia.org/wiki/Salyut), [*Almaz*](https://en.wikipedia.org/wiki/Almaz), and [*Skylab*](https://en.wikipedia.org/wiki/Skylab), were single-piece stations and not designed for resupply. Second generation *Salyut* 6 and 7, and *Tiangong* 1 and 2 stations, are designed for mid-mission resupply. Third-generation stations, such as [*Mir*](https://en.wikipedia.org/wiki/Mir) and the [International Space Station](https://en.wikipedia.org/wiki/International_Space_Station), are modular space stations, assembled in orbit from pieces launched separately. Modular design can greatly improve reliability, reduce costs, shorten development cycles, and meet diversified task requirements.[[10]](https://en.wikipedia.org/wiki/Tiangong_space_station#cite_note-nsf20210301-10)