



**Calling Taikong:
A Strategy Report and Study of China's Future Space Science Missions.**

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This small book carries a lot of weight if followed and realized.

China, having spent \$0.11 billion US \$ in 2015, counts itself as fifth strongest funding nation to the global 2015 space science budget (behind Nasa, ESA, JAXA and Russia, only India ranking behind China). China targets for an increase to \$0.42 billion US \$ per year in 2026-2030 (1/12 of Nasa's budget in FY 2015).

China's planned and described science program covering the years 2016-2030 is ambitious and well aligned with the known programs of Nasa, ESA, JAXA and Russia – which is no surprise because scientists from those agencies and associated institutions were invited to reviewed China's science long-term program and delivered inputs [Preface of the book].

That information carries two good news: the global harmonization of space science will include China as well as the funding effort.

The author and study team leader Ji Wu summarized the results of the strategy report, which outlines the plans and activities of Chinese National Space Science Center – Chinese Academy of Sciences (NASSC-CAS) from 2016-2030 for Springer's Science Policy Reports.

The dedication, with the words of the author Ji Wu is: "Taikong, in Chinese, means vast space above the ground. It is far, deep and yet mysterious. Before we get a response from it, the first attempt is to call it, knocking the door of Taikong. This is exactly what China is doing. We are newcomers. We are questioning it and now knocking the door, calling Taikong...."

The report is very well organized starting with the current space science activities in China, deriving the relevant follow-up questions to be responded to by establishing the strategic goals and programs through 2030. The required technologies are defined and a glimpse beyond 2030 is provided in the "conclusions"-chapter at the end of the book.

The most important missions to be continued or established within the discussed time period (2016-2030) of the Chinese Strategic Priority Program (SPP) are:

HXMT Hard X-ray Modulation Telescope

QUESS Quantum Experiment at space scale, quantum communications, quantum entanglement, quantum teleportation, long distance high speed quantum key distribution.

DAMPE: Dark Matter Particle Explorer

SJ 10 (Shijian 10), a recoverable satellite based on the Chinese developed FSW-type reentry vehicle, which is used to expose 215 kilograms of seeds of plants and fungus to the space environment. The payload is planned to be recovered after several weeks. [1]

KUAFU: The space weather chain program to focus on the key coupling processes in the solar-terrestrial space and its impacts on the global weather change.

Intensive Study of Future Space Science Missions

Advanced Research of Space Science Missions and Payloads

Highlights of the Planetary Program include Chang'e 4&5 missions (sample return from Moon) and a first Mars mission (Mars-1) in the 2018-2020 time frame, the Mars-2, a first Asteroid mission and 1st & 2nd lunar research missions in the 2020-2025 timeframe; the 3rd lunar research station and the 1st Jupiter system mission are planned in the 2025-2030 timeframe.

After the unplanned de-orbiting of the China's first space station Tiangong-1 (1st April 2018), the long-term plans and science goals of China's human spaceflight are of particular interest: As for microgravity science, research would be carried out mainly on the long duration space experimentation platform, the Chinese space station, in close coordination with special-requirement-oriented-scientific experiment satellites sounding rockets, parabolic aircraft, and drop tower facilities, etc., to continually conduct space experiments on microgravity fluid physics, space materials and microgravity combustion. These are fundamental and instructive to the applications in space thermal management, space propulsion, life support system, fire safety, exploitation of space resources, and construction on the planet surface etc. So, it can be assumed that another space station will be established by China's space agency or in cooperation with other agencies employing their Taikong-1, Shenzhou-series spacecraft and LM-2F launcher experience.

In appreciation of the author Ji Wu, the following text is quoted from the book: "As an interdisciplinary frontier, nurturing major scientific and technological breakthroughs, and being closely related to human's survival and development, space science is honored as a "jewel" in the crown of space exploration. It is an important natural science frontier, playing a vital role in driving space technology. World space powers think highly of space science significance in exploring the unknown, technological innovation, and national security as well as social and economic interests."

As reviewer of the book I wholeheartedly support Ji Wu's closing remark: "Meanwhile, more and more world-class scientists are getting involved into China's space science programs, and they will play an increasingly important role in the future."

Let's continue in this global spirit not only for China's space science programs, but also in the fields of technology development, communications, operations and finally exploitations – the door seems to be wide open!

April 2018, Joachim J. Kehr Editor SpaceOps News for the Journal of Space Operations & Communicator

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Reference

[1] Gunter's Space Page, http://space.skyrocket.de/doc_sdat/sj-10.htm