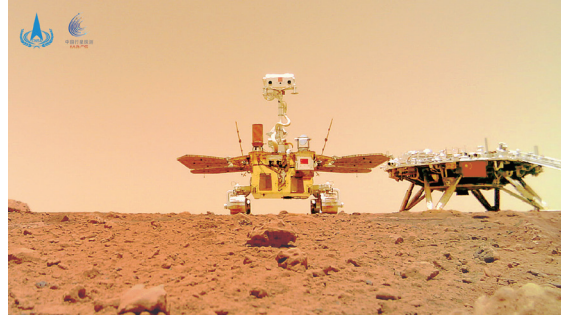




In This Issue

Special | Glory Moments of Science from 2021

China's Mars probe, *Tianwen-1*, hit the headlines on the eve of Chinese New Year when it braked to enter the gravity field of Mars on February 10, 2021 and further caught the eye of many in May of the same year – its lander softly touched down on the Martian terrains, and later sent a rover to conduct *in situ* observations and measurements on the Red Planet. Unsurprisingly, this ground-breaking mission ranked first in China's "Annual Top 10 Science Advances" of 2021, which was announced on February 28 this year by the High Technology Research and Development

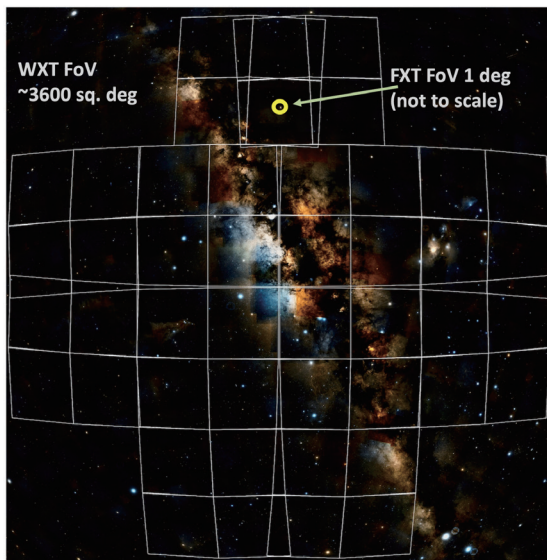


(Image: CNSA)

Center (HTRDC) of the Chinese Ministry of Science and Technology. Ranked high in the list are also several other space missions, including the launches and maneuvers of *Tianhe*, the core module of China's space station, and the two manned spaceships, the *Shenzhou-12* and *Shenzhou-13*. Their flights, and particularly the two spaceships' successful dockings onto *Tianhe*, ranked second in the list, and the results from the analysis of lunar samples returned by *Chang'e-5* ranked fourth, mirroring a bumper year for aerospace advances of China.

Scintillating in the list are also some acclaimed advances in other areas, including the first successful attempt to artificially synthesize starch from carbon dioxide without aid from photosynthesis of chloroplast. For a playback of these glory moments of 2021, please turn to page 5.

InFocus | First Light from "Lobster-eye"



(Image: EP Team)

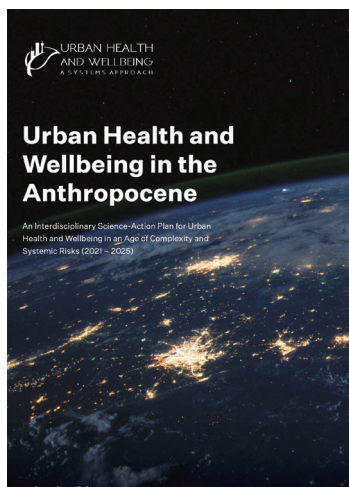
Expected to fly by the end of 2023, the Einstein Probe (EP) satellite will work in the soft X-ray band to observe transients and pursue open questions in time-domain astronomy. It will carry an X-ray focusing imaging telescope of an unprecedentedly wide field of view (FoV) for all-sky surveys – the future telescope will boast an unprecedentedly wide FoV up to 3,600 square degrees, at least 1,000 times bigger than the largest FoV of existing in-orbit X-ray focusing imagers.

This will greatly improve the efficiency of all-sky X-ray surveying and monitoring, as the instrument can cover a much wider area of the celestial sky with just a one-shot observation. It is highly challenging to build such a wide-field X-ray focusing imager, however – this might explain the long absence of such instruments in astronomical observations since the first pick-up of X-ray signals 60 years ago from the depths of the cosmos. Thanks to a state-of-the-art optics inspired by lobster

eyes (and hence named “lobster-eye micro-pore optics”), such a powerful instrument is coming true, but only after highly accurate technological development and strict calibration.

According to Dr. ZHANG Chen, Principal Investigator of the WXT mirror assembly, this telescope is the most complicated instrument they have ever developed. How does the team secure its accuracy and stability? Turn to page 16 to read Dr. ZHANG’s story.

Perspective | Urban Health and Wellbeing in the Anthropocene: A less anthropocentric and more eco-centric science action plan



(Image: UHWB)

To highlight the impact of human activity on our home planet’s environment, especially its climate and ecosystems, scientists give the Holocene Epoch, the current geological time we are living in, a nickname – the Anthropocene, literally reflecting the anthropogenic factors into the term. This mirrors their concerns for the rising of inter-connected and closely coupled challenges in a complicated world, and the need for a better understanding of urban health and wellbeing. All these entail a systems approach to learning and concerted efforts in response.

Against this background, the programme Urban Health and Wellbeing (UHWB) has been established at the Institute of Urban Environment of the Chinese Academy of Sciences co-sponsored by the International Science Council (ISC) and the International Society for Urban Health (ISUH), and started its global operations in October 2014. Seeing cities as microcosms of civilizations in the interconnected complex system, the UGWB Scientific Committee proposed the goals and corresponding actions needed to

address the challenges rising from the complicated world, aiming at guiding urban health related decision making and initiatives in urban circumstances across the world. UGWB published their proposal entitled *Urban Health and Wellbeing in the Anthropocene: An interdisciplinary Science-Action Plan for Urban Health and Wellbeing in an Age of Complexity and Systemic Risks (2021-2025)* in November 2021, as a global science programme.

BCAS has the honour to present an article by the Executive Director of UHWB and the Chair of UHWB Scientific Committee to briefly introduce the context, challenges, opportunities, goals and proposed actions of the new science plan. For detail, please turn to page 21.

Perspective | Science as a Public Good: Shared views and missions

The International Science Council published a position paper in October 2021 to set out the implications of its vision of “science as a global public good”. This position paper strongly echoes the value made clear in a statement entitled *Towards Excellence in Science* presented by the Chinese Academy of Sciences in 2014 and published in *BCAS* in the same year. In the statement, CAS defined its position about the value of science as a quest for truth, and the mission and responsibility of scientific enterprise in the service for society and humanity, and in the pursuit for human wellbeing. Also, the statement calls for strengthened self-governance and self-regulation in scientists to uphold the reliability of the scientific method and aspire to high standards of honesty and integrity.



(Image: ISC)

Noticing how the two declarations strongly resonate and complement with each other, Prof. Geoffrey Boulton OBE FRS FRSE, author of the ISC position paper, sent the text to *BCAS* on behalf of ISC, together with a preface highlighting the shared values of the two, and invited *BCAS* to re-publish the ISC position paper. Inspired and encouraged by the shared values of the scientific community, we hereby join ISC to reiterate the value, mission and responsibility of science as a public good, and the importance of individual and collective efforts by scientists and the scientific community to realize its social value in a fractured world, at a time when the humanity is facing unprecedented challenges.

For detail, please refer to page 27.

Carbon Policy | A Synthesis of Energy Policies from Finland and China

Finland and China tied a future-oriented partnership in 2017 for energy transition out of shared interests, recognizing the significant differences in size, culture, and political as well as economic systems between the two sides. The Sino-Finnish cooperation might make a good example of mutually beneficial partnership where the parties complement each other in terms of know-how and resources. In the column Carbon Policy for this issue, Dr. GUO Wen and her collaborators report the main findings from their policy study on energy transition in the two countries, in the hope of identifying potential policy initiatives for expanding Sino-Finnish cooperation towards green growth.

Please refer to page 40 for detail.