Voyage to Build China's Cruise Dream

Dialogue

By LONG Yun & BI Weizi

The docks of Shanghai are a long way from the Adriatic Sea. But that is exactly where Marco Rovati, a Croatian cruise ship expert with 30 years of European experience, chose to drop anchor.

"Coming to China to oversee the construction of China's homegrown cruise ships was the most correct decision in my life," he told *Science and Technology Daily.*

Decision forged by determination

What attracted him away from a successful European career? Not money but potential and sincerity. For decades, China had aspired to the "jewel in the crown of the shipbuilding industry," the large cruise ship. But unlike other nations, "China didn't just have dreams. It acted," Rovati said.

When CSSC Cruise Technology Development Co., Ltd. (CCTD) invited him to participate in the Adora Magic City project, he witnessed a "firm determination" unseen in most European shipyards. Nearly 6,000 researchers from more than 40 domestic units were mobilized to tackle the core technologies bottlenecks.

"This kind of national-level attention and industrial potential is unmatched in many European countries where the cruise ship industry was in a stagnant state at that time," he explained.

Croatia has a rich maritime tradition and Rovati had to adapt his management style to China's unique working culture. He noted that unlike the relatively independent work mode in Europe, Chinese teams emphasize "close collaboration and efficient execution."

Instead of simply imposing international standards, he integrated his experience with local realities, establishing a multi-level, distributed dynamic management system to break down the colossal project into manageable modules.

Marco Rovati. (COURTESY PHOTO)

Witnessing 'Chinese speed'

A large cruise ship consists of over 25 million parts. For Rovati, the single biggest challenge regarding the Adora Magic City was the integration of thousands of systems, particularly addressing three world-class technical difficulties: vibration and noise reduction, weight control, and safe return-to-port capability.

In the joint technical team he guided international standards while Chinese engineers tackled key bottlenecks. Through day- and- night labor, they achieved seamless integration.

What truly stunned the veteran expert was "Chinese speed." Rovati gave a specific, quantifiable example.

The second domestic ship, the Adora Flora City, is larger than its predecessor, the Adora Magic City. Its atrium is 17.4 meters longer, requiring higher structural strength. Yet its total construction cycle has been shortened by eight months.

"According to the international conventional construction cycle, the construction period of the second ship should be similar to (the first ship's) or even longer," Rovati said. Instead, the ship is now 85 percent complete, with delivery expected by the end of 2026.

He pointed to the prefabricated cabin process as the key: The Chinese team optimized international methods, prefabricating over 1,100 cabins as independent units in a factory before integrating them into the hull. During a critical period, the team completed a task scheduled for three months in just one month.

"This kind of efficiency, which combines diligence, professionalism, and team collaboration, is the true 'Chinese speed' in my eyes," he said.

Mission beyond ships

Rovati's mission is not only to oversee the construction of two ships. It is to build capability. He said his proudest achievement was watching the Chinese on-site supervision team on the Adora Flora City achieve independent technical review for the first time.

Today, an 18-member supervision team is independently solving technical problems, from structural optimization to system debugging. "Their growth means that China has initially established an independent technical supervision system for large cruise ships," he said.

What principles is he trying to pass on? Three things: respect for details, courage to innovate, and adherence to responsibility.

For the first, it should be borne in mind that on a ship with 25 million parts, a one-millimeter deviation in thin steel plate welding can affect the entire weight balance.

On innovation, he said while learning from abroad is vital, the Chinese team's optimization of prefabricated cabin technology and digital twins is the real victory.

Finally, he reminds his young colleagues that a cruise ship carries thousands of lives. "This is not just a job, but a commitment to safety and trust."

A second home

With the Adora Magic City already serving over one million tourists and achieving a passenger satisfaction rate of over 95 percent, Rovati is ambitious for the next decade. He predicts China will evolve from an "industry latecomer" to a "core force" and "leader" in the global cruise industry.

He cited the massive domestic market potential, expecting annual throughput to exceed five million passenger trips in the 14th Five-Year Plan period (2021-2025), making China the world's second-largest cruise market.

Personally for him, China is no longer just a workplace. He calls it his "second home." "I have witnessed the great changes in China's cruise industry from 'zero' to ranking among the world's cruise shipbuilding countries," Rovati said. "I have also formed deep friendships with Chinese colleagues."

What keeps him motivated? The rapid development and growth of his team. Every time he sees the steady progress of the Adora Flora City or a young member make a breakthrough, he feels his efforts are worthwhile.

"I hope to continue to stay here, act as a bridge for Sino-foreign technical cooperation and talent exchange, and witness China's cruise ships sail as a shining business card of China's high-end manufacturing industry."

HAO Xueying and HUI Shengyao from CCTD also contributed to this article.

First Ascendable Pagoda in the World

Traditional Eastern Wisdom

By BI Weizi

The Yongning Temple Pagoda is an iconic landmark in Luoyang, Henan province in central China, originally constructed in the first year of the Xiping era (516 CE) during the Northern Wei Dynasty. It was a site where the Emperor and the Empress Dowager performed Buddhist rites.

Modeled after the Cakri Stupa, the preeminent stupa of the Western Regions, the Yongning Temple Pagoda rose to a height of 49 *zhang* (approximately 136.71 meters). When combined with its spire, its total height reached 153.31 meters. It was the tallest wooden high-rise structure in ancient history, rivaling the so-called "Seven Wonders of the World" compiled by the Western world.

The Yongning Temple complex was designed with the pagoda at its center, surrounded by the monks' quarters arranged in a concentric ring. It was the first Buddhist temple in China to adopt a fully Sinicized architectural style.

The pagoda featured a gateway on each of its four sides. The southern gate was a three-storied structure connected by three elevated walkways. Standing 20 *zhang* above the ground, it bore a structural resemblance to the Duanmen (Front Gate) of the Imperial Palace.

Its surface was decorated with swirling cloud motifs and painted celestial spirits featuring intricate patterns of colorful brocade and azure latticework of dazzling brilliance. The arched doorways were flanked by statues of four Vajra guardians and four lions, lavishly embellished with gold and silver, and adorned with pearls and jade, creating a spectacle of solemn grandeur and resplendence unparalleled in the world at that time.

Green Huai trees were planted outside each of the four gates, and a moat of clear water encircled the entire complex. This environment, with the Yongning Temple nestled amongst water and trees, effectively screened the complex from the dust and grime kicked up by passing traffic.

Unlike early pagodas in the ancient world, which were typically inaccessible to visitors, the Yongning Temple Pagoda ingeniously fused the ancient Indian stupa tradition with the Chinese architectural style of multi-storied pavilions. This resulted in the creation of the world's first ascendable pagoda — a monumental technological breakthrough in architecture that held profound significance as a pivotal link between past traditions and future developments.

GIA, EAI and Humanoid Robots?

Science Outreach

By Staff Reporters

At the 2026 Beijing E-Town Humanoid Robot Half Marathon, which finished on April 19, over 70 robots took part, and they all won hearts in different ways. Some impressed with raw speed and technical skill; some won with their cuteness. Even those that were clumsy and stumbled through the course made the spectators cheer even louder.

These developments have brought concepts such as general-purpose intelligent agent (GIA), embodied artificial intelligence (EAI) and humanoid robots into the spotlight. But what exactly is the difference between them?

GIAs have an omnicompetent AI brain capable of independently identifying and solving problems.

It is an intelligent agent able to perceive, think, make decisions, learn, execute tasks and collaborate independently, while also understanding human emotions and adhering to ethical and moral principles — much like a human. Tongtong is a practical example of GIA.

However, Tongtong currently exists solely in the digital realm of screens and cannot physically interact with the real world. EAI is the key to breaking down this screen barrier. It refers to AI that possesses a physical body. Rather than being a mere "paper strategist" trapped within a screen and offering advice solely through speech, it is a "doer" that can truly step into the real world.

A humanoid robot is an advanced form of intelligent robot with a human-like physical appearance that is better adapted to human environments.

While these three terms are often used interchangeably, their core areas of focus are distinct: GIA focuses on solving a wide range of problems just like a human (scope of capability); EAI focuses on interacting with the world through a physical body (cognitive modality); and humanoid robots focus on resembling humans physically (form).

Tech+Culture

Modern Astronomy Shaped by Ancient China's Cosmic Legacy

By Staff Reporters

Ancient Chinese astronomy was rooted in classical tradition yet continuously refined through observation over thousands of years — a development that evolved through inheritance and innovation. Key practices included gnomon shadow measurements, geodetic surveys conducted by Yi Xing (683-727 CE), a Buddhist monk and astronomer, and Guo Shoujing (1231-1316 CE), an astronomer of the Yuan Dynasty. Detailed records of celestial phenomena were also well maintained.

From observing the sky to issuing the calendar

Observing the stars served a primary purpose — to "grant the seasons," or shoushi. An early Chinese text recounts Emperor Yao instructing his astronomers:"A solar year has 366 days. Use the intercalary month to fix the four seasons and complete the year." This describes the lunisolar calendar. The astronomer and historian Chen Zungui (1901-1991) considered this to be the earliest documented lunisolar calendar in China. It established the basic structure of Chinese calendars for centuries, using the lunar synodic month as the month and the solar tropical year as the year.

However, as observational data accumulated, older calendars eventually fell out of sync with actual celestial phenomena. This affected farming and rituals, meaning calendars had to be constantly revised.

In 104 BCE, Emperor Wu of Han (reigned 141 – 87 BCE) ordered a calendar reform. Astronomers redetermined the synodic month and calculated the tropical year as 365.25016 days.

In the Tang Dynasty (618-907 CE), Yi Xing remeasured shadow lengths across the country and developed new mathematical methods for his calendar, completed in 728 CE. In the Yuan Dynasty (1271-1368 CE), Guo Shoujing determined the tropical year to be 365.2425 days for his calendar, introduced in 1281 CE. This value was remarkably close to modern measurements.

By the Qing Dynasty (1644-1912 CE), a new calendar adopted in 1645 CE, incorporated Western astronomical theories but did not abandon the lunisolar structure. It improved accuracy within the existing framework.

From gnomon shadow to geodetic survey

An ancient Chinese text describes how astronomers placed an eight-chi gnomon, approximately 1.8 meters tall, vertically on the ground. At noon on the summer solstice, if the shadow measured exactly one chi and five cun, approximately 0.35 meters, that location was considered the center of the earth.

Another early text, compiled roughly between the 4th and 1st centuries BCE, used mathematical methods such as the Pythagorean theorem to calculate cosmic distances. It proposed that the distance between heaven and earth was 80,000 li, approximately 40,000 kilometers.

As territory expanded, astronomers found that shadow length changes did not conform to the simple linear formula assumed in that text. In the Sui Dynasty (581-618 CE), the scholar Liu Zhuo (c. 544-610 CE) requested a nationwide geodetic survey to verify the formula, but his request was not granted.

Yi Xing later completed such a survey. In 724 CE, he and his colleague, an astronomer of the Tang court, measured the North Star's altitude and solstice shadows at multiple locations from north to south. They concluded that the old formula was wrong.

During the Yuan Dynasty, Guo Shoujing improved the gnomon by designing a high gnomon, approximately 12 meters tall. He also invented an auxiliary device to reduce measurement errors caused by the blurring of shadows. This high gnomon can still be seen today at the Dengfeng Observatory in Henan province, located a short distance from an older gnomon platform.

Modern relevance of ancient astronomy

Ancient Chinese observational records offer valuable insights for modern astrophysics. The astronomer and historian Xi Zezong (1927-2008), an academician of the Chinese Academy of Sciences, examined ancient records of "guest stars," or kexing, which were supernovae, in the 1950s. He compiled a catalog of ancient novae, which helped Chinese and international astronomers confirm that the Crab Nebula in Taurus originated from a supernova explosion in 1054 CE, which was recorded in Chinese texts as the "Tian Guan guest star."

Unlike ancient Greek astronomers, who were mostly private philosophers, the chief astronomer in ancient China, known as the Grand Astrologer, held a ministerial-level position. This institutional support enabled large-scale observations. However, nationwide surveys such as Yi Xing's were only possible when the state was powerful enough to fund them. During the Tang Dynasty, Emperor Xuanzong (reigned 712-756 CE) generously supported Yi Xing's work. The resulting calendar assisted the emperor to govern more effectively, ultimately benefiting both their respective fields.

Modern astronomy still depends on strong national support. China's Chang'e lunar missions and the Tianwen Mars exploration program are recent examples. The experience of ancient Chinese rulers who supported large-scale astronomical research may still offer valuable lessons today.

Ancient Chinese astronomy engaged uniquely with classical tradition. That path began with the lunisolar calendar and gnomon shadow measurements, giving Chinese astronomy a strong classical and humanistic character. Through tool innovation and methodological breakthroughs, ancient scholars continuously revised the relationship between heaven, earth, and humanity.

The starry sky near the Lenghu astronomical observatory in Lenghu town, Mangnai city of Haixi Mongolian and Tibetan autonomous prefecture of northwest China's Qinghai province. (PHOTO: XINHUA)