

CENTRE FOR JOINT WARFARE STUDIES



CENJOWS

CHINESE ADVANCES IN SPACE LAUNCH VEHICLES

1. **China Gains New Flexible Launch Capabilities with First Sea Launch**¹. On 5th June 2019, China successfully launched a Long March 11 solid rocket from the yellow sea launch platform acquiring flexible launch capabilities. In this a 20.8-meter-long, 2-meter-diameter and 58-metric-ton four-stage rocket lifted off with seven satellites and successfully placed these into 600-kilometer altitude orbits.
2. The satellites included Bufeng-1A and B, designed by the China Academy of Space Technology to monitor ocean wind fields and improve typhoon monitoring, Xiaoxiang-1-04, a small satellite developed by Changsha-based private firm Spacety, an experimental communications satellite, Tianqi-3, developed by Guodian Gaoke, and two 'Tianxiang' Ka-band communications test satellites for the China Electronic Technology Group.
3. **Rapid Response, Risk Reduction.** The Sea launch capabilities could help mitigate safety risks to its civilian population which otherwise exists with on land launches. In China's case, three of China's four national launch centers are located deep inland, meaning rocket stages fall to ground rather than the seas, and often threaten populated areas. Evacuations of areas within rocket stage drop zones also raise the economic costs of launch.
4. Further innovations and technologies such as vertical takeoff, vertical landing and parafoils are being developed by China's main space contractor to reduce risk, while emerging private companies may also eventually offer solutions.

¹ <https://spacenews.com/china-gains-new-flexible-launch-capabilities-with-first-sea-launch/>

5. The sea launch of Long March 11 demonstrated the ability to hit any orbit without being constrained to a set geographic area.” Sea launches also allow low-inclination launches, with the greater rotational speed of the Earth near the equator meaning lower fuel requirements or higher payload capability.

6. The mobility factor enables quick and somewhat stealthy launches, which is of special interest to governments’ strategic interests and to the defense sector. This will speed up the response capability for commercial industry which is otherwise dependent on the on land launch infrastructure.

7. The launch was the seventh for the Long March 11, the only solid propellant rocket of the series, and the 306th Long March launch overall. It was the tenth launch in 2019 for China, which is planning more than 30 launches this year.



Liftoff of the Long March 11 from a mobile platform in the Yellow Sea, June 5, 2019. Credit: China Academy of Launch Vehicle Technology (CALT).

8. CHINA'S PRIVATE REUSABLE ROCKET TO BE LAUNCHED IN 2021²

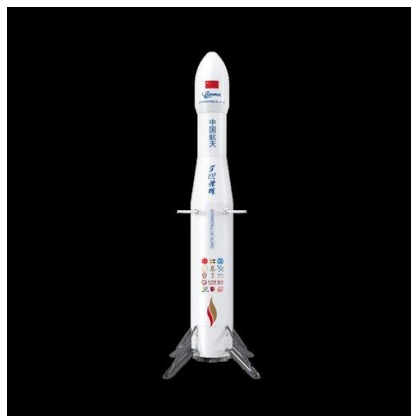


Photo shows the model of the Hyperbola-2, a reusable rocket developed by a private Chinese company.

² Source: Xinhua Published: 2019/10/22 10:07:33

9. A Chinese reusable carrier rocket that uses liquid oxygen-methane propellants made its first public appearance Friday at the ongoing 2019 Zhongguancun Forum in Beijing.

10. The rocket named the Hyperbola-2, will be launched for the first time in 2021. It may make up for China's lack of reusable liquid-propellant rockets. The Hyperbola-2 was developed by a Beijing-based private rocket developer i-Space. Its primary stage can be reused, reducing more than 70 percent of the rocket production cost, according to Dong Yanmin, the company's vice president of technology. U.S. private company Space X is the first to develop this capability. China is set to follow the suit. The reusable stages allow economical launches of the satellites.