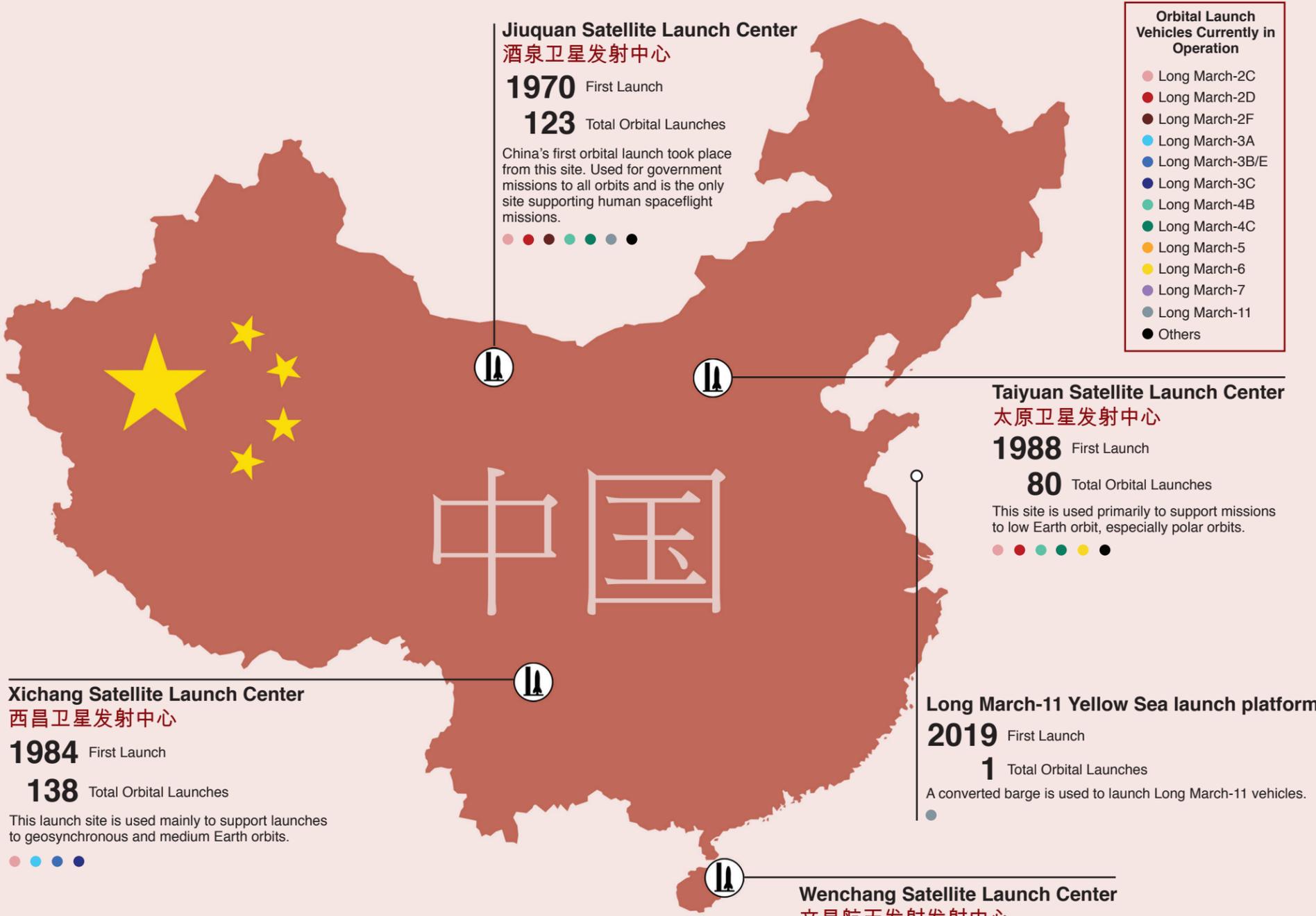
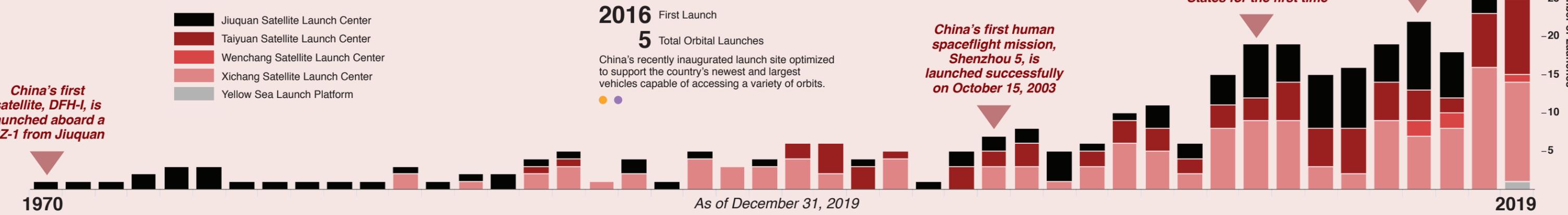
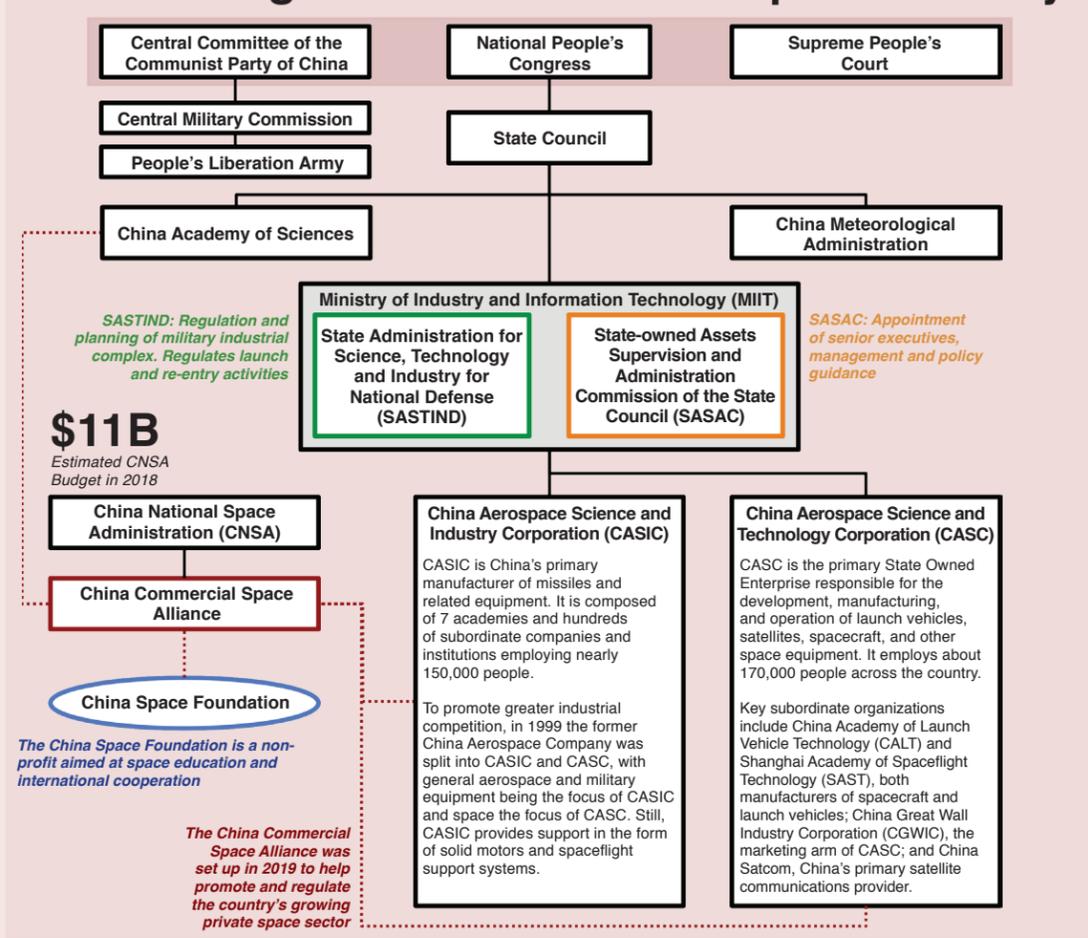


China's Orbital Launch Activity

This graphic provides foundational data on China's orbital launch sites and launch vehicles, as well as on the general structure of China's state-managed space industry.



General Organization of China's Space Industry



China's Orbital Launch Vehicles by Capacity Class

Includes operational vehicles and vehicles with a high probably of entering operations during the next 2 years. Partial failures counted as failures in reliability calculation.

Medium to Intermediate Vehicles 3,000 to 10,000 kg to LEO

Heavy Vehicles 10,000 kg+ to LEO

Small Vehicles Less than 3,000 kg to LEO



OS-M
 Provider: OneSpace
 Manufacturer: OneSpace
 Launch Site: Jiuquan
 LEO: 205 kg (OS-M1)
 Estimated Price/kg: Undisclosed

- Attempted first orbital launch of OS-M1 in March 2019, but failed
- Composed of decommissioned solid motors from retired missiles
- Launched from a mobile platform
- Other variants planned



Hyperbola
 Provider: iSpace Technology
 Manufacturer: iSpace Technology
 Launch Site: Wenchang
 LEO: 300 kg (Hyperbola 1)
 Estimated Price/kg: Undisclosed

- In July 2019, iSpace became China's first private company to successfully launch a satellite into orbit using the Hyperbola 1
- Launched from a mobile platform
- Other variants planned



New Line 1
 Provider: LinkSpace
 Manufacturer: LinkSpace
 Launch Sites: Mangnai, Qinghai
 SSO: 200 kg
 Estimated Price/kg: \$18,000

- Reusable
- First launch anticipated in 2020
- Other variants planned
- LinkSpace has raised ~\$20M



Kuaizhou 1A
 Provider: ExPace
 Manufacturer: CASIC
 Launch Site: Jiuquan, Taiyuan
 LEO: 300 kg
 Estimated Price/kg: \$50,000

- CASIC developed this variant from the Kuaizhou 1, which is no longer in service
- 7 launches, 100% reliability
- CASIC also developing Kuaizhou 11, 21, and 31 with LEO capacities of 1,500 kg, 20,000 kg, and 70,000 kg, respectively
- Launched from a mobile platform
- ExPace marketing arm for CASIC



Jie Long 1
 Provider: Chinارocket Co. Ltd.
 Manufacturer: CALT
 Launch Site: Jiuquan
 LEO: 250 kg est.
 Estimated Price/kg: \$30,000

- Launched for the first time in August 2019, successfully carried 3 satellites into orbit
- Launched from a mobile platform
- Other variants planned



Long March 2C
 Provider: CASC
 Manufacturer: CALT
 Launch Sites: Jiuquan, Taiyuan, Xichang
 LEO: 3,850 kg
 Estimated Price/kg: \$8,000

- Derived from the DF-5 ICBM
- First launched in 1982
- 51 launches, 98% reliability
- Used primarily for LEO and polar missions
- Marketed commercially by China Great Wall Industry Corporation



Long March 2D
 Provider: CASC
 Manufacturer: SAST
 Launch Sites: Jiuquan, Taiyuan
 LEO: 3,500 kg
 Estimated Price/kg: \$8,500

- Derived from the Long March 4, a vehicle system manufactured by SAST for polar missions
- Introduced in 1992
- 44 launches, 100% reliability
- Used primarily for LEO and polar missions
- Marketed commercially by China Great Wall Industry Corporation



Ceres 1
 Provider: Galactic Energy
 Manufacturer: Galactic Energy
 Launch Site: Jiuquan
 LEO: 350 kg
 Estimated Price/kg: \$14,000

- First launch planned in 2020
- Also developing Pallas vehicle (4,000 to LEO), first launch in 2022
- Company has raised \$43M (2020) and expects to launch Ceres 1 for first time in 2020



Zhuque 1
 Provider: LandSpace
 Manufacturer: LandSpace
 Launch Site: Jiuquan
 LEO: 300 kg
 Estimated Price/kg: Undisclosed

- Launched for the first time in 2018, but failed to reach orbit
- After manufacturer of solid motors terminated contract with LandSpace, company moving on to Zhuque 2 (4,000 kg to LEO)
- LandSpace has raised ~\$161M in investment



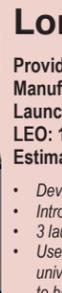
Kaituoze 2
 Provider: ExPace
 Manufacturer: CASIC
 Launch Site: Jiuquan
 LEO: 350 kg
 Estimated Price/kg: Undisclosed

- CASIC developed this variant from the Kaituoze 1 introduced in 2002 (only flew twice)
- Launched once successfully in 2017
- Kaituoze 2A, with a LEO capacity of 2,000 kg, under development
- ExPace is the marketing arm for CASIC



Long March 2F
 Provider: CNSA
 Manufacturer: CALT
 Launch Site: Jiuquan
 LEO: 8,400 kg
 Estimated Price/kg: N/A

- Only used to support human spaceflight missions
- Introduced in 1999
- 13 launches, 100% reliability
- Launched China's first astronaut into orbit aboard Shenzhou 5 in October 2003
- Overall, vehicle has put 11 Shenzhou and 2 Tiangong space station modules into orbit
- CNSA intends to replace vehicle with the Long March 7
- Not offered as a commercial option



Long March 6
 Provider: CASC
 Manufacturer: SAST
 Launch Site: Taiyuan
 LEO: 1,080 kg
 Estimated Price/kg: Undisclosed

- Developed jointly by CALT and SAST
- Introduced in 2015
- 3 launches, 100% reliability
- Used primarily for government and university missions and does not appear to be offered commercially



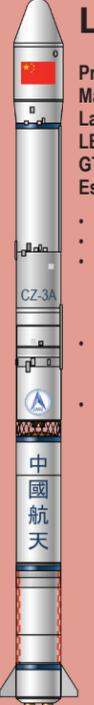
Long March 11
 Provider: CASC
 Manufacturer: CALT
 Launch Sites: Jiuquan, Yellow Sea platform, Xichang
 LEO: 530 kg
 Estimated Price/kg: \$10,000

- Vehicle introduced in 2015
- 8 launches, 100% reliability
- Launched from mobile land- and sea-based platforms



Long March 4B
 Provider: CASC
 Manufacturer: SAST
 Launch Sites: Jiuquan, Taiyuan
 LEO: 4,200 kg
 GTO: 1,500 kg
 Estimated Price/kg: \$15,400

- Derived from the retired Long March 4A
- Introduced in 1999
- 37 launches, 97% reliability
- Used primarily to support polar missions
- Though used mainly for Chinese government missions, it has launched several commercial satellites
- Marketed commercially by China Great Wall Industry Corporation



Long March 3A
 Provider: CASC
 Manufacturer: CALT
 Launch Site: Xichang
 LEO: 8,500 kg
 GTO: 2,600 kg
 Estimated Price/kg: \$8,200

- Introduced in 1994
- 27 launches, 100% reliability
- Used exclusively to support Chinese government programs, especially the BeiDou navigation satellite constellation
- It has also been used to deploy relatively small GEO satellites for Chinasat
- Marketed commercially by China Great Wall Industry Corporation, but to date has not been used to launch non-Chinese spacecraft



Long March 4C
 Provider: CASC
 Manufacturer: SAST
 Launch Sites: Jiuquan, Taiyuan
 LEO: 4,200 kg
 GTO: 1,500 kg
 Estimated Price/kg: \$15,400

- Derived from the Long March 4B, featuring a restartable upper stage
- Introduced in 2007
- 26 launches, 92% reliability
- Used to support polar missions
- The 4C variant differs from the 4B in that the former features a restartable second stage and a payload fairing with larger volume
- Marketed commercially by China Great Wall Industry Corporation



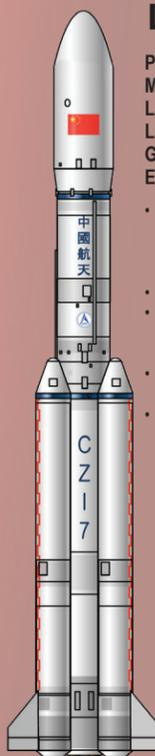
Long March 8
 Provider: CASC
 Manufacturer: CALT
 Launch Site: Wenchang
 LEO: Undisclosed
 SSO: 4,500 kg
 GTO: 2,500 kg
 Estimated Price/kg: Undisclosed

- First launch planned for 2020
- Features a combination of Long March 7 first stage and boosters with a second stage derived from the Long March 3B
- Reusable first stage and boosters, using landing struts similar to those used on SpaceX Falcon 9



Long March 3B/E
 Provider: CASC
 Manufacturer: CALT
 Launch Site: Xichang
 GTO: 5,500 kg
 Estimated Price/kg: \$5,300

- Derived from the retired Long March 3A
- Introduced in 1996
- 64 launches, 95% reliability
- The E version features enhanced 3B first stage and boosters
- Used mainly for GEO missions, but has been used to launch some BeiDou satellites in highly elliptical and medium Earth orbits
- CNSA's Chang'e 4 lander and rover was delivered to the Moon's far side in 2018
- Marketed commercially by China Great Wall Industry Corporation



Long March 7
 Provider: CASC
 Manufacturer: CALT
 Launch Site: Wenchang
 LEO: 13,500 kg
 GTO: 5,500 kg (7A)
 Estimated Price/kg: Undisclosed

- Introduced in 2016, inaugurating China's newest launch site on Hainan Island, Wenchang Spacecraft Launch Site
- 2 launches, 100% reliability
- Will replace the Long March 2F as primary vehicle for Shenzhou human spaceflight missions
- A second variant, the Long March 7A, feature a third stage
- Marketed commercially by China Great Wall Industry Corporation



Long March 3C
 Provider: CASC
 Manufacturer: CALT
 Launch Site: Xichang
 GTO: 3,800 kg
 Estimated Price/kg: \$5,300

- Derived from Long March 3B
- Introduced in 2008
- 17 launches, 100% reliability
- Used mainly for GEO missions, but has been used to launch several CNSA tracking and data relay satellites, some BeiDou satellites, and two probes to the Moon (Chang'e)
- Marketed commercially by China Great Wall Industry Corporation



Long March 5
 Provider: CASC
 Manufacturer: CALT
 Launch Site: Wenchang
 LEO: 25,000 kg (5B)
 GTO: 14,000 kg
 TLI: 8,200 kg
 Estimated Price/kg: Undisclosed

- Introduced in 2016
- China's most powerful launch vehicle
- 3 launches, 67% reliability
- Resumed operational status in December 2019 following July 2017 failure
- At least two variants expected, both with similar capacities but differ in terms of velocity
- Used to support deployment of space station modules, next generation human spacecraft, and interplanetary probes

-  Exclusive or routine smallsat deployment
-  Satellite deployment
-  Human spaceflight



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