

A Long March rocket is shown launching vertically from a landscape of white, fluffy clouds. The rocket is white with black and red accents, and a bright orange and yellow flame is visible at its base. The background is a bright, hazy sky with a sun-like glow. A large, semi-transparent white triangle is overlaid on the scene, pointing downwards.

**THE LONG MARCH LAUNCH SERVICES-YOUR RELIABLE  
PARTNER TO SUSTAINABLE EXPLORATION IN SPACE**

**LONG MARCH**

**C G W I C**

**YOUR RELIABLE PARTNER TO SPACE**

# Contents

- 1. The Development of Long March Launch Vehicle**
2. CGWIC's Commercial Launch Services

## China Aerospace Science and Technology Corporation

3 academies for system integration + 5 academies for sub-systems development

China Academy of Launch Vehicle technology  
(CALT)

China Academy of Space Technology  
(CAST)

Shanghai Academy of Space Flight Technology  
(SAST)

China Great Wall Industry Corporation  
(CGWIC)

Launch Vehicle  
for GTO/LTO/SSO/LEO Mission

Manned Spaceship / Chinese Space Station  
Satellite for Communication/Remote Sensing/  
Navigation

Satellite for Meteorological/Remote Sensing  
Launch Vehicle for SSO/LEO Mission

CGWIC 1 100% owned subsidiary of China Aerospace Science and Technology Corp. (CASC)

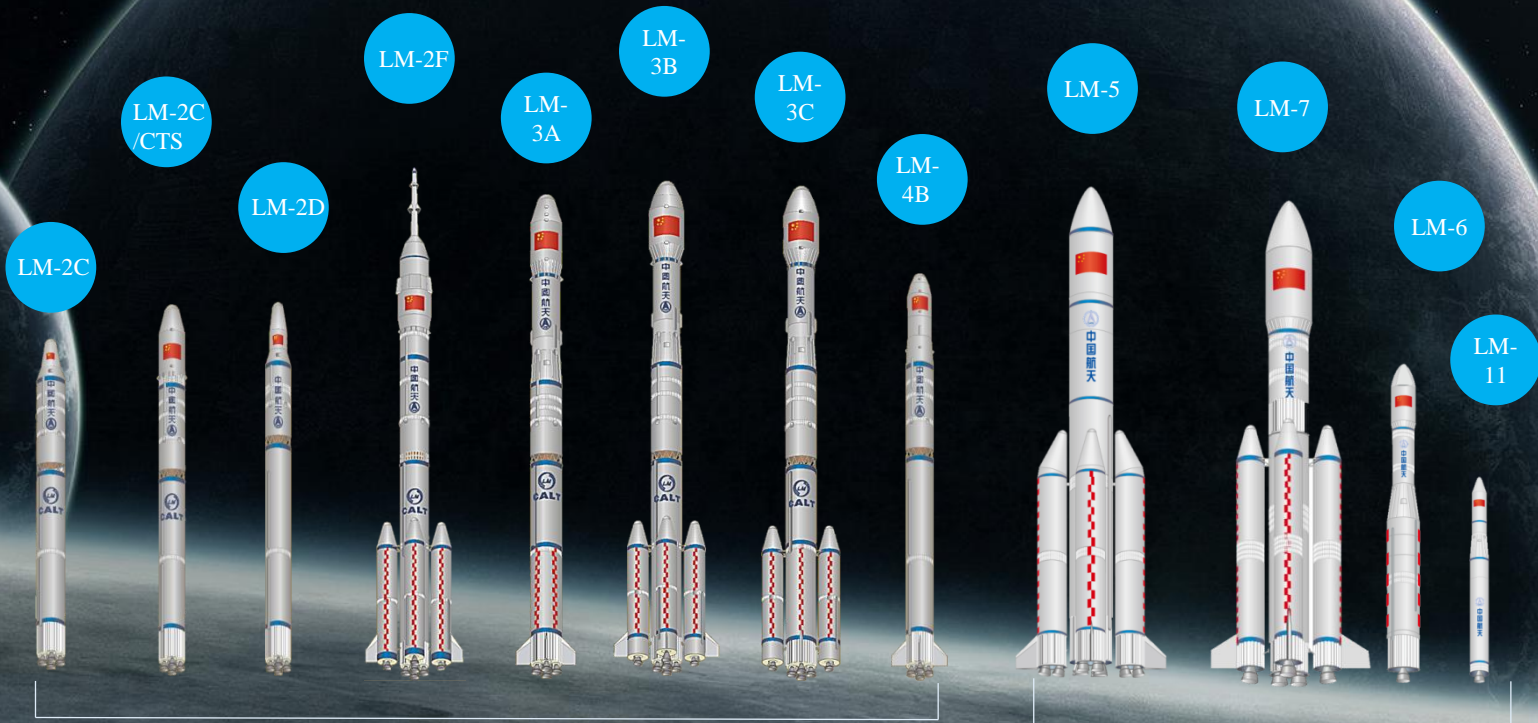
2 The gateway of China's space industry to the world

# From 1970-2019:

- ◆ On April 24<sup>th</sup>, 1970, China launched its first man-made satellite, Dongfanghong-1.
- ◆ As of today, China has developed the Long March (LM) launch vehicle with high reliability and strong capability, which include the LM-2C/D, LM-2F, LM-3A, LM-4B series and New Generation launch vehicles including LM-5/6/7/11 etc.

# 新一代运载火箭

LM-11、LM-6、LM-7、LM-5



New Generation



**For the future  
Environmental friendly  
New Generation launch  
vehicle are under planning  
and development.**



**LM-6A:**  
first flight planned in 2020;



**LM-7A**  
5.5 ton~7 ton for GTO orbit



**LM-8**  
5 ton for 700km SSO; first  
flight planned in 2020



**LM-9**  
50 ton~140 ton for LEO

◆ **Reusable launch vehicle technology.**

## Meet All Kinds of Customers Requirements

- 9 series Long March LV in services and some kinds of LVs are under development can send the payloads with different configurations to different orbit

## High Reliability:

- As of today, Long March family has conducted **301** flights:
  - ✓ The overall success rate: 95.68%;
  - ✓ The successful rate for the LV in services: 97.49%

## High Speed Development:

- The 1<sup>st</sup> 100 Long March launches: 37 years (1970.4.24-2007.6.01);
- The 2<sup>nd</sup> 100 Long March launches: 7 years (2007.07.05-2014.12.07);
- The 3<sup>rd</sup> 100 Long March launches: 4 years (2014.12.11-2019.03.10)



# Four Launch Centers and Sea Launch assure the customers schedule arrangements

▶ LM-2C

▶ LM-2D

▶ LM-4B/C

▶ LM-3A/B/C

▶ LM-5

▶ LM-7

The newly built fourth launch site, Wenchang Spacecraft Launch Center (WSLC, 19 degrees north latitude ), located in the Hainan Island, is used for the new generation of Long March launch vehicles.





# LONG MARCH-11M (Sea Launch)

LM-11M (sea launch based) shares the same flight vehicle hardware with LM-11 that is launched from inland launch sites of China. The differences between the two types are mainly the way of launching.

The standard launch capacity of LM-11M:

- 620kg for 500km Equatorial Earth Orbit;
- 430kg for 500km SSO.

LM-11M is capable for the low inclination orbit launch mission in particular.



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# CGWIC Overview

Your Reliable Partner to Success

## Launch Services

- Launch Vehicle Design & Development
- Manufacture, Assembly & Testing
- Mission Analyses
- LV Interface Coordination
- Flight Safety Engineering

## Satellite and Ground Facilities Manufacture

- Spacecraft Design Development, Manufacture, AIT
- Satellite Control Facilities
- KHTT
- Technical Support for Launch & In-Orbit Delivery

## Satellite TT&C

- Launch Site Technical Interface Coordination TT&C
- Ground station
- Launch Safety
- Planning & Organization

## Project Financing

- Business Loan
- The Preferential Export Buyer's Credit
- Chinese Government Concessional Loan

## Project Insurance

- Pre-launch insurance arrangement
- Launch plus 1 year in-orbit insurance arrangement services

## Technical Training

- Operation Training
- On-site Training
- Academic Training

## Consulting Services

- Frequency and slot consolation
- Insurance support and consultation
- Project Feasibility study

**65** International Commercial Launches Conducted

**17** Piggyback mission completed

**16** Satellite In-Orbit Delivery Contracts Signed

**13** Satellite IOD Program Launched and Delivered

**7 Apr. 1990**  
1st commercial launch



**14 May 2007**  
1st launch of Chinese communication satellite for international customer



**26 Oct. 1985**

Announcement to provide international launch services

**29 Sep. 2012**  
1st launch of Chinese Remote Sensing Satellite for international customer



**From 2016**

Provide Launch Services to Chinese Domestic Customers

*26 Satellite made in US  
8 Satellite made in Europe*

# CGWIC' s Launch Services in 2018

Conducted 11 flight missions and sent 36 satellites successfully into the designed orbit

- ✓ 2 IOD;
- ✓ 2 Dedicated International Launch Services;
- ✓ 6 Piggyback Launch Services:
  - ✓ both for international and domestic customers;
  - ✓ 32 piggyback satellites into the orbit and 1 payload on Change' mission

# The past successful cooperation



The recent international piggy back launch since 2016

Launcher	Date	Payload	Country	Orbit	Customer
LM-4B	20160530	ÑuSat-1 / ÑuSat-2	Argentina	SSO	
LM-2D	20160819	Cat-2	Spain	SSO	
LM-4B	20170615	ÑuSat-3	Argentina	SSO	
LM-11	20180119	KIPP	Canada	SSO	
LM-2D	20180202	ÑuSat-4 / ÑuSat-5	Argentina	SSO	
		GOMX-4A / GOMX-4B	Denmark		
LM-2C	20181029	BSUSat-1	Belarus	SSO	



# Why Long March



- ✓ 60+ years of step by step development, 301 flights;
- ✓ 9 series flight proven Long March LV and some new LV underdevelopment;
- ✓ High Reliability based rigorous and constantly enhanced QA system;
- ✓ LV batch production and Four Launch Centers assure customers launch schedule arrangement



## Why CGWIC

- ✓ more than thirty years experiences in the international launch services market;
- ✓ Cost-effective solution;
- ✓ Oriented to the Customer, One stop services
- ✓ Compliance with the regulations and strong government support;
- ✓ Familiar with financial, insurance, legal background, logistic support, etc.

**CGWIC**

**We Acknowledge**

**RISK**

**Financing**

**Legal Affairs**

**logistics**

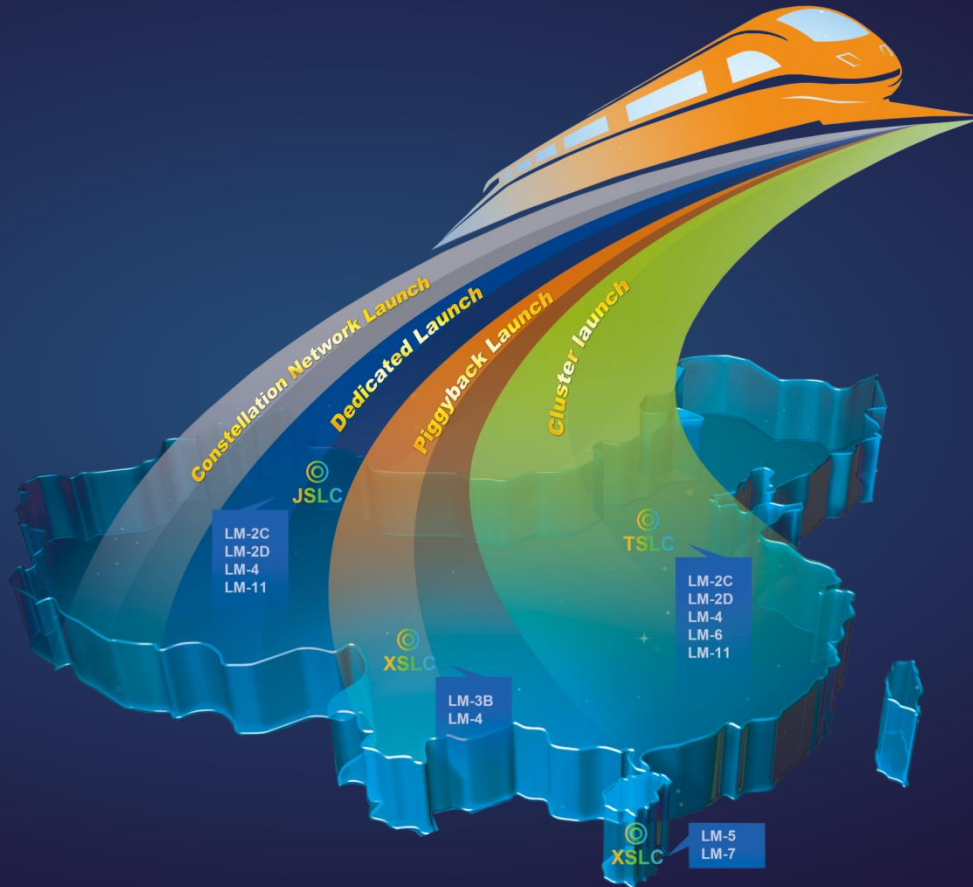


# Sustainable Long March Launch Services

- ✓ Competitive Launch Services Price for the dedicated launch
- ✓ Cost-effective price for the piggyback launch services
- ✓ For the launch services mission, a general debris mitigation plan is addressed and it's mandatory requirement:
  - Satellite: De-orbit at the end of life;
  - The orbital end stage launch vehicle: depletion and venting;
- ✓ For each satellite:
  - government approvals or third party insurance arrangement;
  - Frequency Coordination Result and the radio station license



# Long March Express



In order for better meeting the launch requirements, including small satellites and LEO constellation, CGWIC with the support of CALT & SAST, develop and provide the customized “**Long March Express**” launch services solution, including:

- ✓ **the Dedicated Launch**
- ✓ **the Piggyback Launch**
- ✓ **the Cluster Launch**

based on its Long March launch vehicles, and upper stages & CubeSat deplorers.

**For Dedicated Launch:  
Different LV with Various Launch Capability and fairing Meet the Requirement**

LV	LM-2C/CTS	LM-2D	LM-3B	LM-4B LM-4C	LM-5	LM-6	LM-7	LM-11
<b>Stages</b>	3	2	3	3	2	3	2	4
<b>Orbit</b>	LEO/SSO	LEO/SSO	GTO	SSO	LEO/GTO	LEO/SSO	LEO/SSO	LEO/SSO
<b>Capability</b>	3.85t/1.9t (600km)	1.2t (700km)	5.5t	2.5t/3t	25t/14t	1t (700km)	13.5t/5.5t (700km)	0.7t/0.38t (700km)
<b>Fairing Diameter</b>	3.35m 4.2m	3.35m 3.8m	4.0m 4.2m	3.35m 3.8m	5.2m	2.6m	4.0m 4.2m	1.6m 2.0m

# Smart Dragon-1

Length : 19.5m

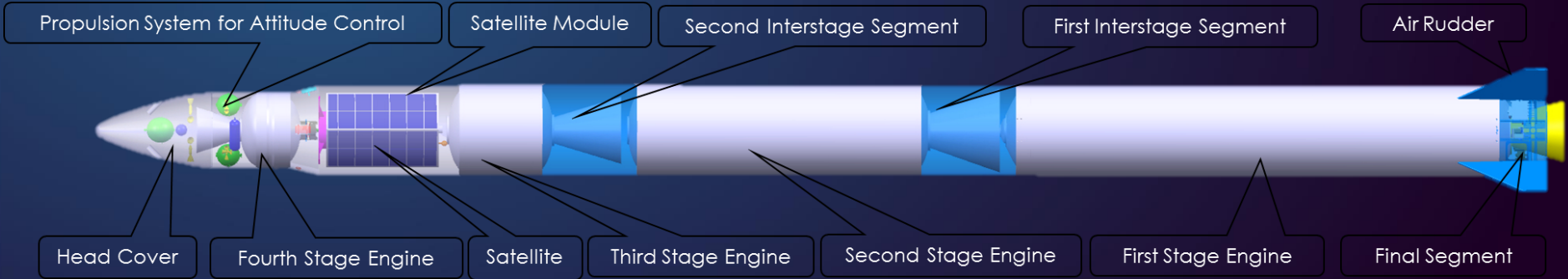
Diameter : 1.2m

Takeoff Mass : 23100kg

Takeoff Thrust : 544kN

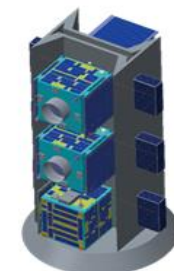
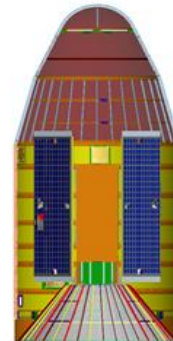
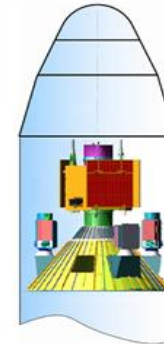
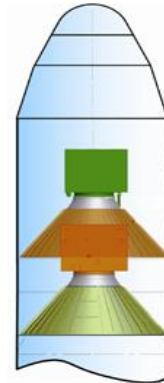
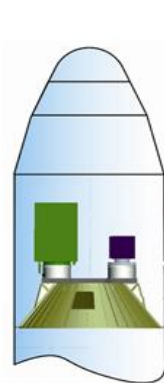
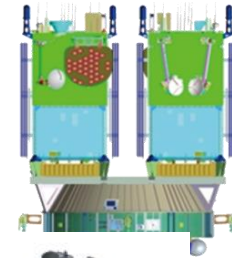
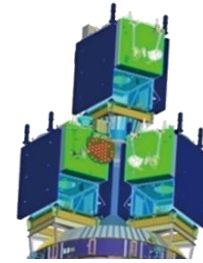
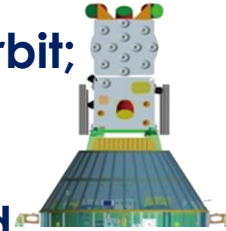
150kg/500km SSO

Smart Dragon-1 (SD-1) solid launch vehicle is newly developed by CALT based on the mature technology and planned for its maiden flight in Q2 2019.



## For Piggyback Launch:

- Launch opportunities for different orbit;
- The affordable price;
- Flight Proven POD for CubeSat;
- The diversified and flexible payload layout within the fairing



# Piggyback Launch Opportunities

No.	Slot	Orbit(km)	LTDN	Margin(kg)	Fairing/ Envelop
<b>SSO</b>					
1	<b>LM-6 SSO opportunities for piggyback payloads in 2020</b>				2.6m / TBD
2	2020	LEO	TBD	2000	3.35m or 4.2m
3	2020	655	TBD	100	
4	2020	688	14:00	100	
5	2020	688	TBD	100	
6	2020	747	10:30	200	
7	2021.01	500	6:00	500	
8	2021.03	500	6:00	500	
9	2021.12	782	10:30	300	
10	2021	500	14:11	300	
11	2021	700	8:00	200	
12	2021	700	14:00	200	
13	After 2021	500	10:30	300	
<b>LEO</b>					
14	2021	635(29°)	-	700	3.35m / TBD
15	2022	650(29°)	-	600	
<b>GTO</b>					

# Proposed LM-6 Cluster Launch in 1<sup>st</sup> Q 2020



CHINA GREAT WALL INDUSTRY CORPORATION

## LONG MARCH-6



- ▶ LM-6 is a 3 stage cryogenic liquid New generation Launch;
- ▶ By using “three horizon” test-launch mode, LM-6 can accomplish the quick-launch, mainly for SSO and LEO mission.
- ▶ LM-6 supports a variety of launch types including the single, multiple-satellites launch and constellation networking etc.
- ▶ September 20<sup>th</sup> , 2015, the first flight of LM-6 launch vehicle was conducted successfully, sending twenty satellites into the designed orbit.
- ▶ Two flights have been performed successfully

# Proposed LM-6 Cluster Launch in 1st Q 2020

 CHINA GREAT WALL INDUSTRY CORPORATION

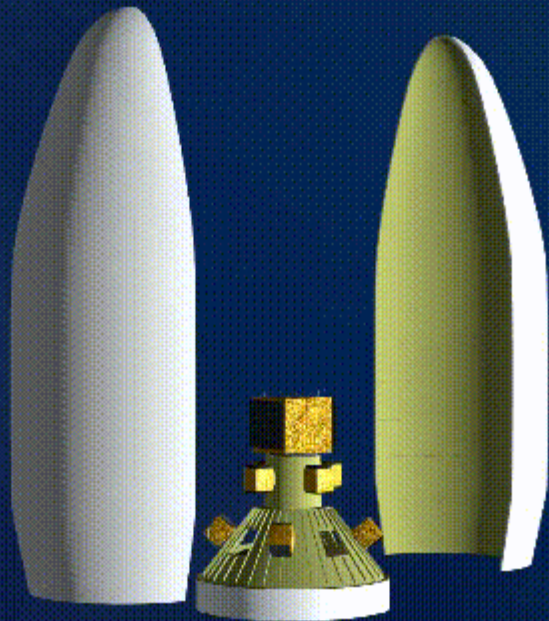
## LONG MARCH-6

01

02

03

04



### The main specifications :

- ✓ overall length 29m with 103t lift-off mass
- ✓ the 1<sup>st</sup> stage is 3.35m diameter, and the 2<sup>nd</sup> & 3<sup>rd</sup> stage is 2.25m diameter
- ✓ two typical mechanical interfaces:  $\Phi 660$  and  $\Phi 937$  or customized interface
- ✓ 1000kg for 700km SSO.

### Proposed LM-6 Cluster Launch

- ✓ Target Launch Date: 1st Q of 2020;
- ✓ Orbit: Follow the customer requirement;
- ✓ Price Principle: to occupy all the launch capability to reduce the price for each customer.



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谢谢!

תודה  
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**Thank You** Tak  
感謝您 Obrigado Teşekkür Ederiz  
Σας ευχαριστούμε 감사합니다  
Bedankt Дěkujeme vám  
ありがとうございます  
Tack

