



中国航天科技集团公司

China Aerospace Science and Technology Corporation

Europe-China Cooperation in Space

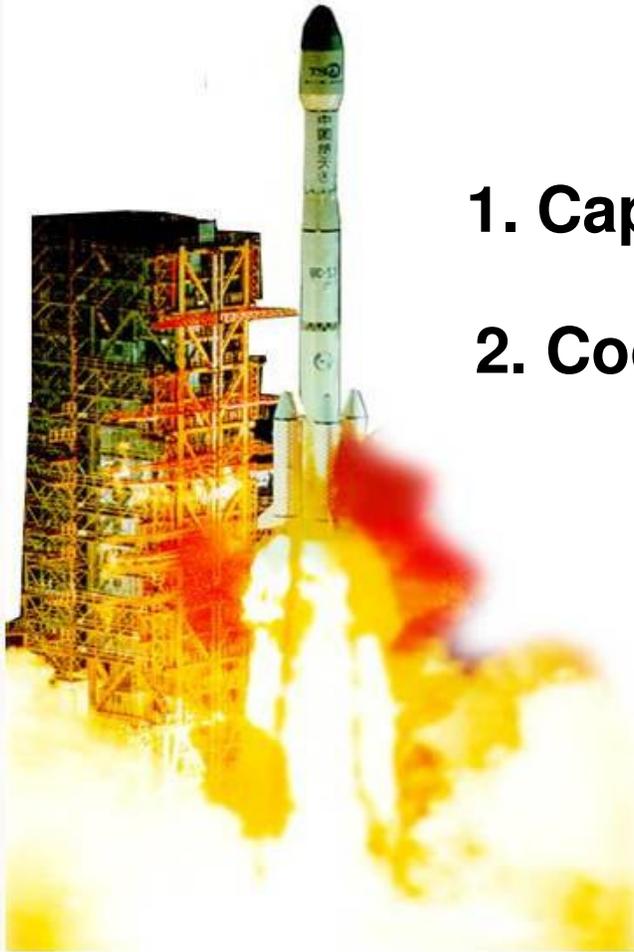
Gongling Sun

June 20, 2012, Brussels



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1. Capability and Future Development



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Launch Vehicles



Spacecrafts



Satellite Service Operation



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Long March Family of Launch Vehicles



- 12 Types of Long March Launchers Developed since 1970
- **Success Rate: over 98.9%** *(from 2001 to 2011 out of 91 launches)*
- **Launch Capability:**

5,500 kg (GTO) 2,800 kg (SSO) 9,500 kg (LEO)



LM-1	LM-2	LM-3	LM-4B	LM-2E	LM-2D	LM-3A	LM-3B	LM-2C/SD	LM-2F	LM-4C	LM-3C
1970	1975	1984	1988	1990	1992	1994	1996	1997	1999	2007	2008
LEO	LEO	GTO	SSO	LEO	SSO	SSO	SSO	LEO	SSO	SSO	SSO

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International Launch Service

- First commercial launch: April 1990, Asiasat-1 (Hughes 376)
- By the end of 2011, 39 commercial launches
e.g. W3C for Eutelsat on Oct. 07, 2011
- Customers:





Spacecrafts



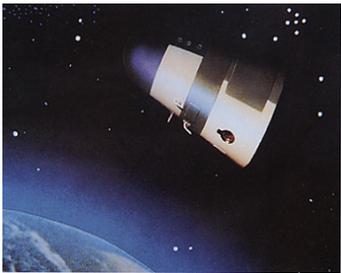
Telecom



Remote Sensing



Meteorological



Recoverable



Navigation



Science Exploration



Manned Spaceship



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Satellite Launched in 2012

#	Date	Satellite	Application	Launch Site	Comments
1	Jan 09	ZY-3	Remote Sensing	TY	
2	Jan 13	FY-2F	Meteorology	XC	
3	Feb 25	Beidou-G5	Navigation	XC	
4	March 31	ApStar-7	Telecom	XC	
5	April 30	Beidou M3, M4	Navigation	XC	
6	May 6	TH-1B	Remote Sensing	JQ	
7	May 14	YG-14, TT-1	Remote Sensing	TY	
8	May 25	ChinaSat-2A	Telecom	XC	
9	May 29	YG-15	Remote Sensing	TY	
10	June 16	SZ-9	Manned Space	JY	



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Satellite Operation Services

CASC, the sole telecommunication satellite operator in the mainland, China



– **Chinasatcom**

- Subsidiary of CASC
- 12 satellites in orbit (1 Lockheed Martin, 1 Boeing, 2 Loral, 5 TAS)



– **APT**

- CASC holds 4/7 shares of APT



LM-5 Launch Vehicle

To develop a new generation of launch vehicles, and start services in 2014

LM-5

- Non-toxic and environmentally friendly
- High reliability
- Low cost
- LEO: 10-25t, GTO: 6 -14t



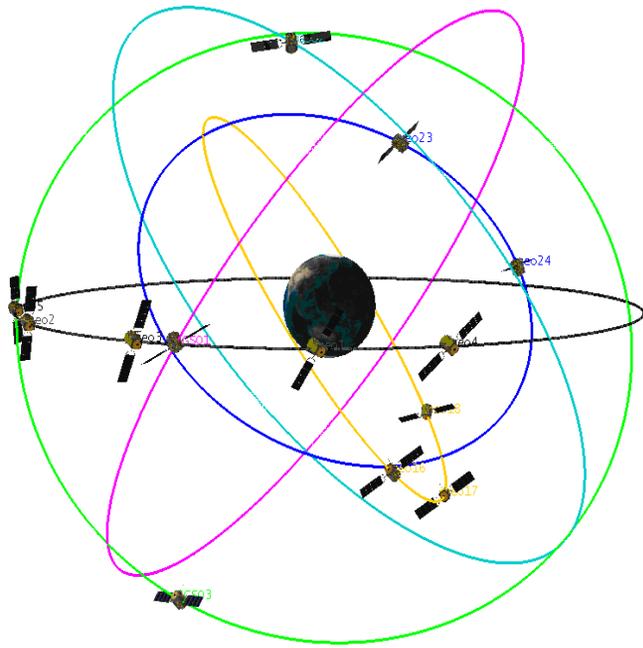
120t LOX/Kerosene engine



50t LOX/LH2 engine



Compass-2 Navigation System



COMPASS

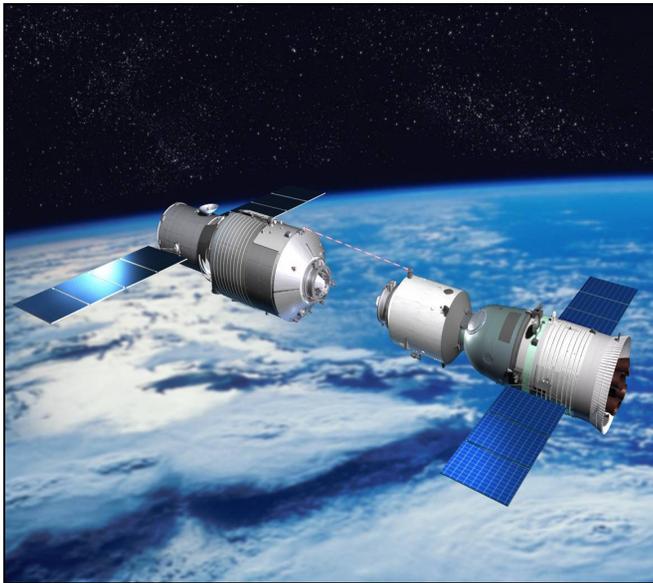
COMPASS Program for Navigation

- To build up a 15-satellite regional navigation and positioning system by 2012. (13 satellites in orbit now)
- To further expand it into a global satellite navigation and positioning system comprising 37 satellites in different orbits by 2020.



Manned Space Program

- Deploy space lab. before 2016, TG-2 and TG-3
- Launch space station by 2020



Space Rendezvous & Docking

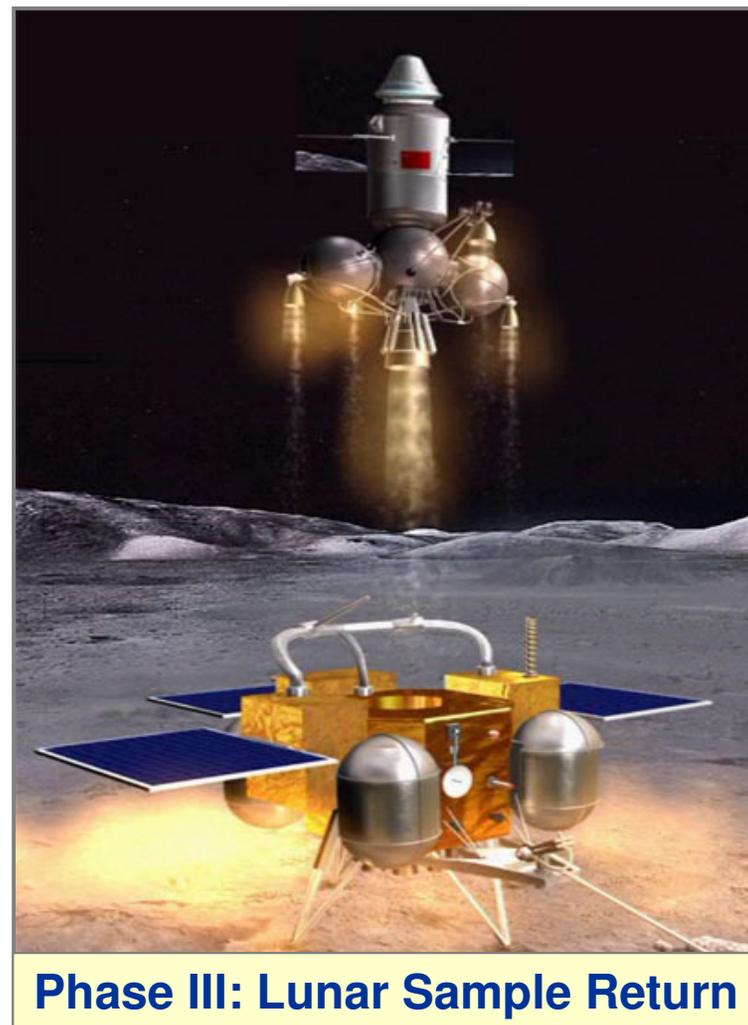


Space Lab.

Lunar Exploration Program

Implement Phases II and III of the Lunar Exploration Program:

- To launch a lunar rover to realize lunar soft landing
- To achieve lunar sample back to the Earth





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2. Cooperation between Europe and China



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Launch Service

No.	Payload/SC	Customer	Launch Date	Comment
1	Micro-gravity Test Instrument	MartraMaconi, France	5 Aug. 1987	Piggyback
2	Micro-gravity Test Instrument	Intospace ,Germany	5 Aug. 1988	Piggyback
3	Freja	SSC, Sweden	6 Oct. 1992	Piggyback
4	Livebox	ESA/DLR	1 Nov. 2011	Piggyback
5	W3C	Eutelsat	07 Oct. 2011	Dedicated



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Space Explortion

- Two satellites of the CNSA/ESA Double Star mission;
- Launched on 29 December 2003 and 25 July 2004, respectively;
- Study closely the interaction between the solar wind and the Earth's magnetic field.





Space Explortion

- European Space Tracking (ESTRACK) provided tracking support to Chang'E-1 and Chang'E-2 with 3 tracking stations.
- China shared lunar exploration data with ESA.





Telecommunication Satellites

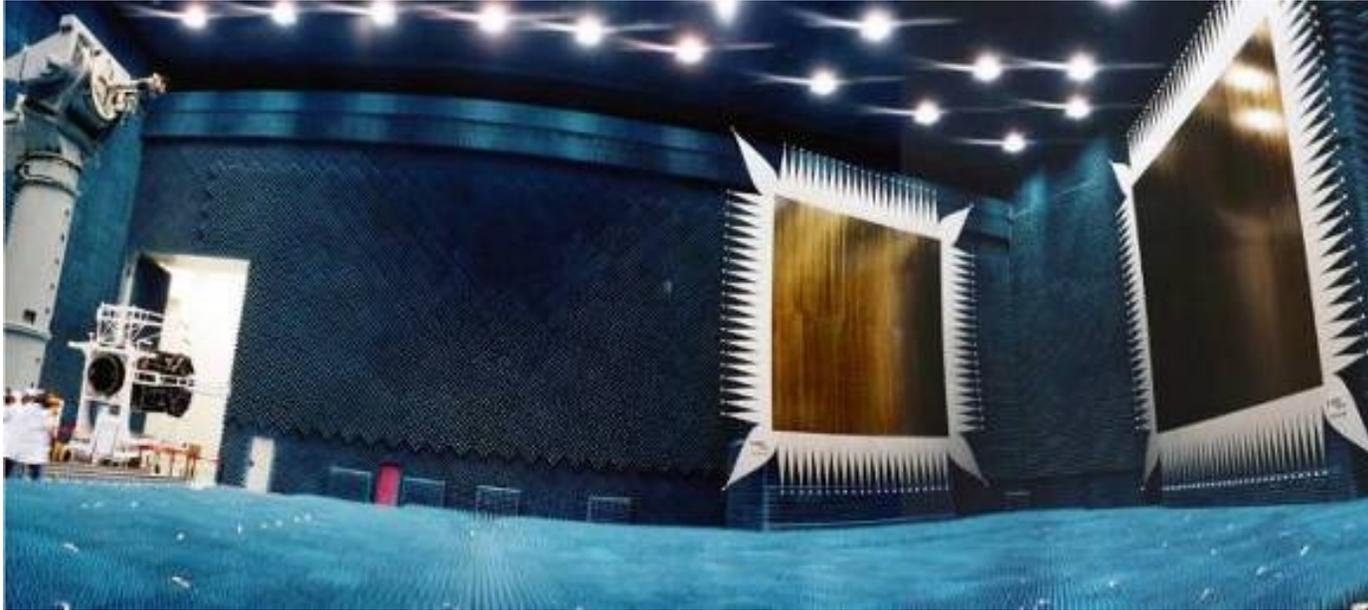
■ Joint Design

- DFH-3 bus development in collaboration with DASA since 1987

■ Satellite Purchase

- SinoSat-1 built by Aérospatiale and Launched on July 18, 1998
- ChinaSat-6B manufactured by TAS and Launched on July 5, 2007
- ChinaSat-9 manufactured by TAS and Launched on June 9, 2008
- ChinaSat-10 manufactured by TAS and Launched on June 21, 2011
- Apstar-7 manufactured by TAS and launched on March 31, 2012





120/100 Compensated Compact Range

- A joint project in collaboration with Astrium
- The largest compensated compact range in the world
- Used for telecommunication satellite system, payload and antenna RF performance test
- Follow-on projects: Xi'an, Tianjin

Ground Facility



- Diameter: 10m
- Height: 13.5m
- Pressure: 10^{-6} Topp

**Thermal Vacuum Environment Simulation Chamber
(Exported to Russia in July 2011)**



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Thanks for Attending!

For more information, please visit our website at

<http://www.spacechina.com/english>



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