



# The SVOM mission

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NAOC, Beijing

XIOPM, Xi'an

CEA-Irfu, Saclay

APC, Paris

LAM, Marseille

CPPM Marseille

GEPI meudon

MPE, Garching

IHEP, Beijing

SECM, Shanghai

IRAP, Toulouse

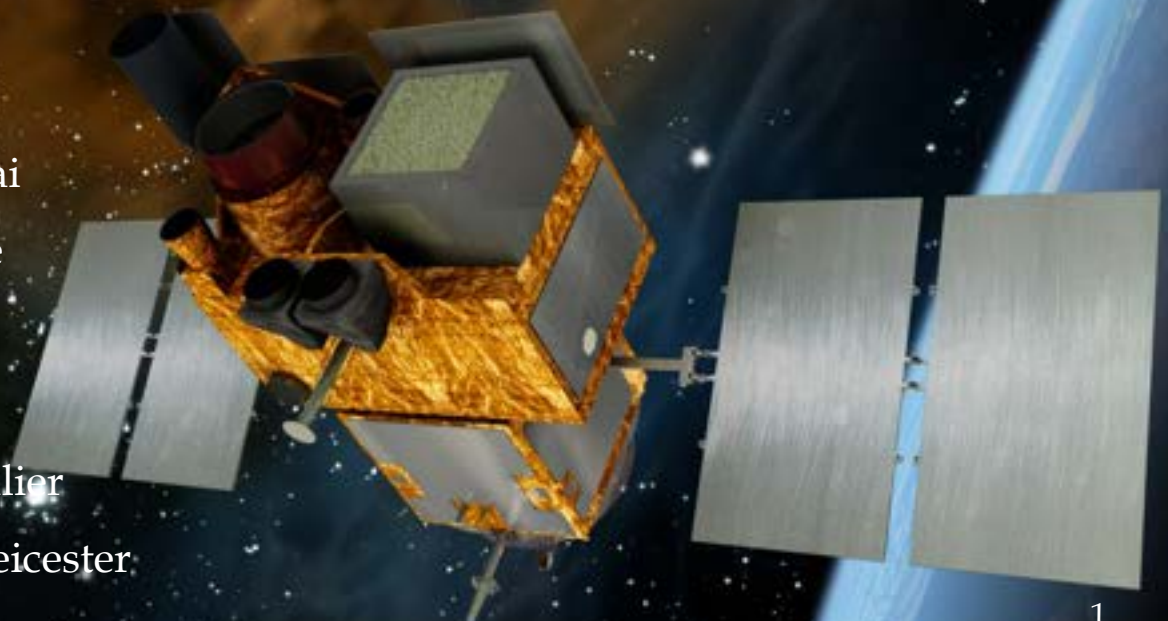
IAP, Paris

LAL Orsay

LUPM Montpellier

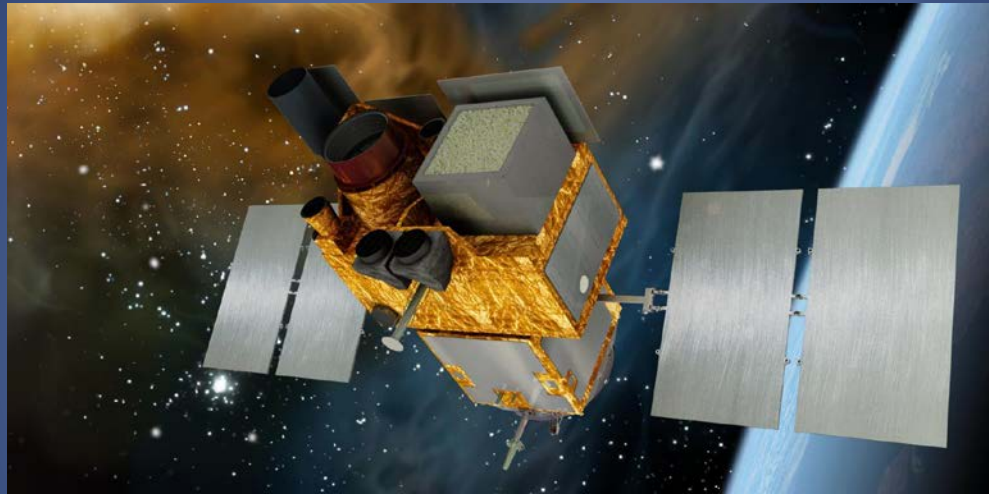
University of Leicester

CNES, Toulouse



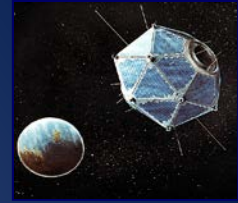
# SVOM in context

- **SVOM** = **S**pace-based multiband astronomical **V**ariable **O**bjects **M**onitor

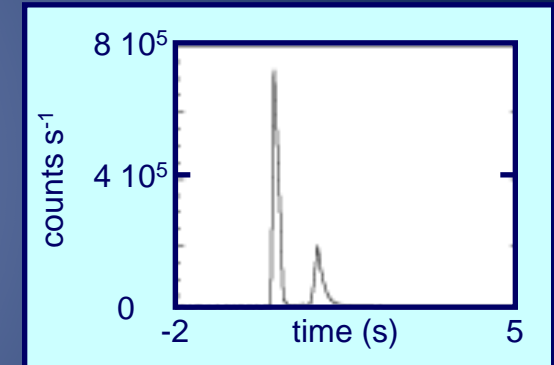
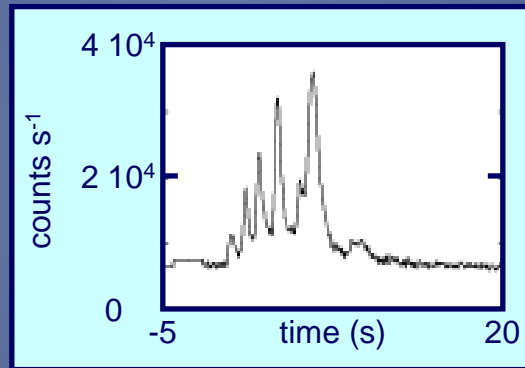
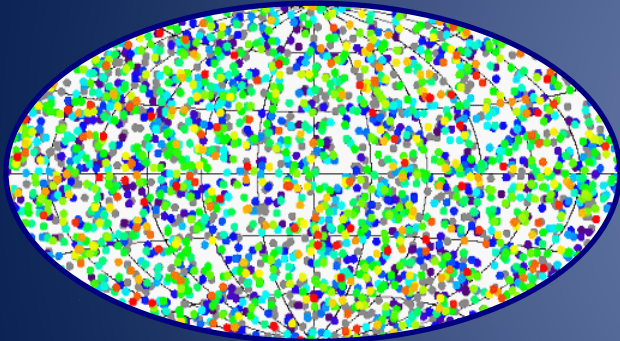


- SVOM is a **Chinese-French** space mission dedicated to the detection and study of **Gamma Ray Bursts** and their use for astrophysics and cosmology.
- SVOM is planned to be launched early in the next decade (**2021**), for a 3 year nominal mission.

# The Gamma-ray Burst



- Discovered in the 70s
- Gamma ray flashes isotropically distributed in the sky, with a duration of few tenths of second to a few tens of second



- Some of them are the most distant celestial body (~13 Gyr)
- The most energetic events in the universe since the Big Bang
- Now, from one to five detectable per day





# Scientific rationale of the SVOM mission

## *GRB phenomenon*

- Diversity and unity of GRBs

## *GRB physics*

- Acceleration and nature of the relativistic jet
- Radiation processes
- The early afterglow and the reverse shock

## *GRB progenitors*

- The GRB-supernova connection
- Short GRB progenitors

## • *Cosmology*

- Cosmological lighthouses (absorption systems)
- Host galaxies
- Tracing star formation
- Re-ionization of the universe
- Cosmological parameters

## • *Fundamental Physics*

- Origin of High-Energy Cosmic Rays
- Probing Lorentz invariance
- Short GRBs and gravitational waves

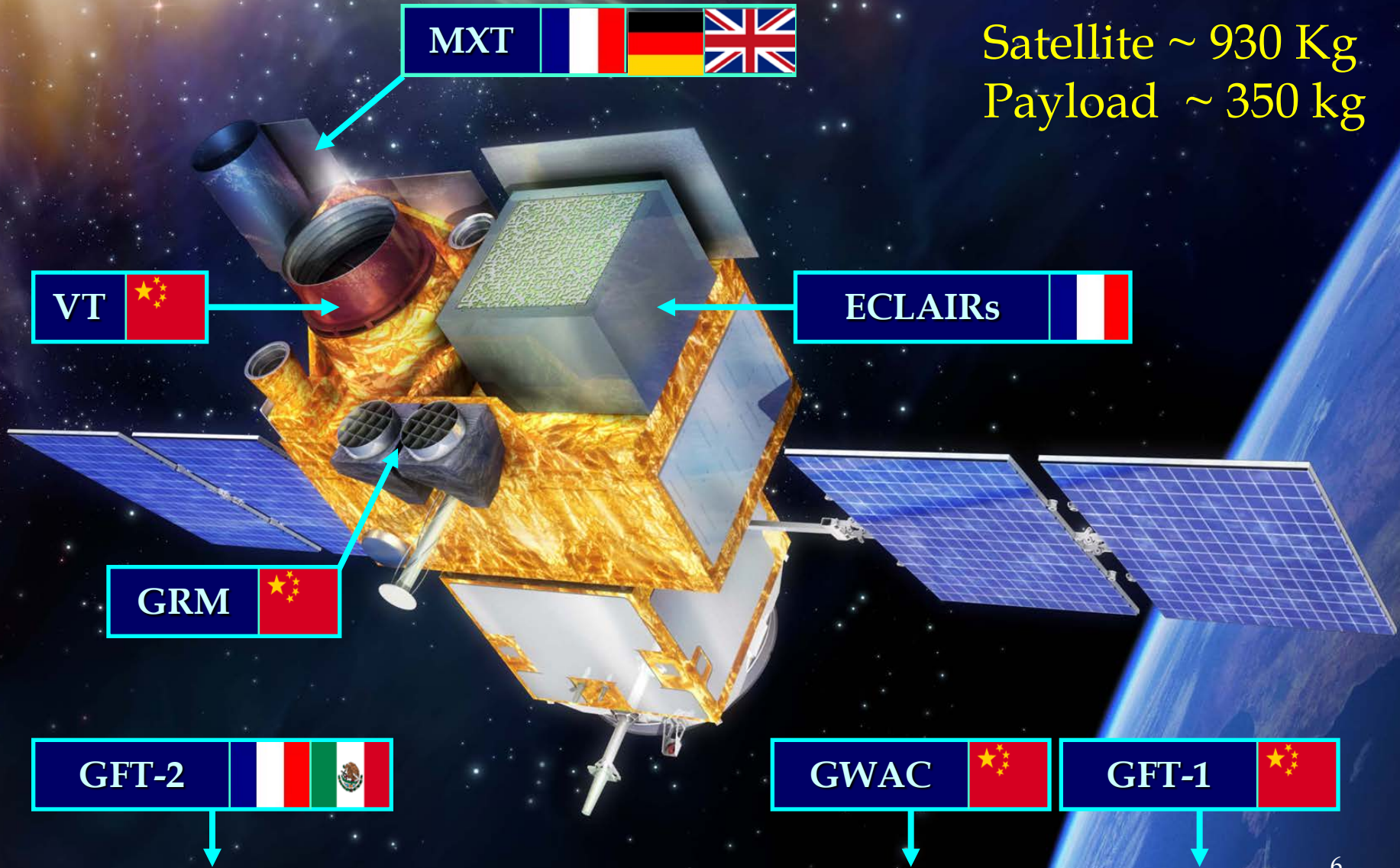


# SVOM in context at the beginning of the next decade

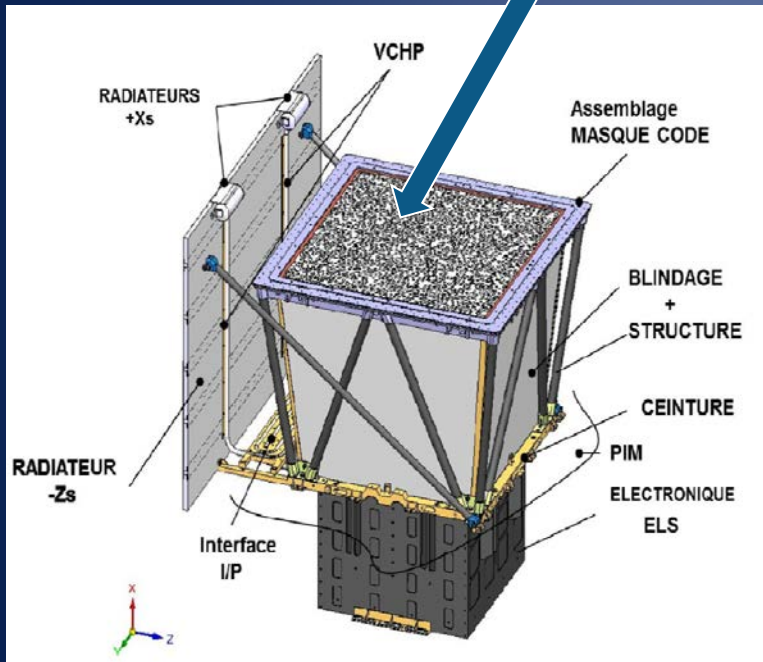
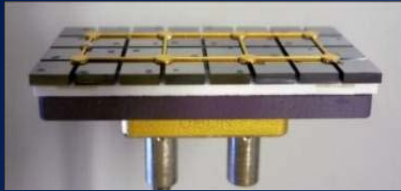
- SVOM is mini-satellite class mission ( $< 1000\text{kg}$ )
- SVOM will provide  $\sim 80$  GRB/yr. It will explore the area of **soft GRBs and X-ray Flashes** (above 4 keV), and the **prompt optical emission** with a good sensitivity.
- We aim at **measuring the redshift of  $>50\%$  of SVOM GRBs**
- We expect to detect  $\sim 5$  GRBs/yr at redshift  $z > 5$
- SVOM will operate in the era of **advanced GW detectors**, providing the opportunity to search for correlations between GW and GRBs.
- SVOM GRBs will benefit from **follow-up with a new generation of astronomical instruments**: JWST, SKA, CTA, LSST, etc.

# SVOM scientific instrument arrangement

Satellite ~ 930 Kg  
Payload ~ 350 kg







## Main characteristics

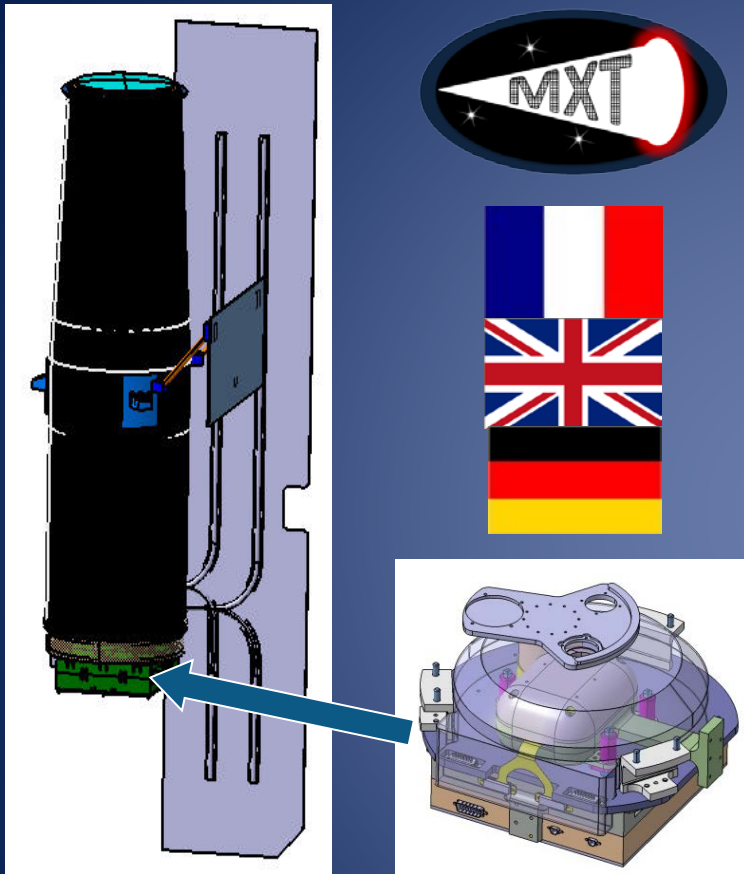
Coded mask telescope  
 Wide FOV : 2 Sr  
 6400 CdTe - 1024 cm<sup>2</sup>  
 4 keV – 150 keV

## Anticipated performances

Loc. accuracy < 16 arcmin  
 4 arcmin for bright bursts  
 80 GRBs / year

IRFU develops the Scientific Processing Unit in charge of the computation, in real time, of the position of the GRB.

# In space : MXT – The Multi-channel X-ray Telescope



## Main characteristics

MCP “Lobster eyes” X-ray optic  
FOV  $\sim 1 \text{ deg}^2$   
256 x 256 PN CCD  
0.2 keV – 10 keV

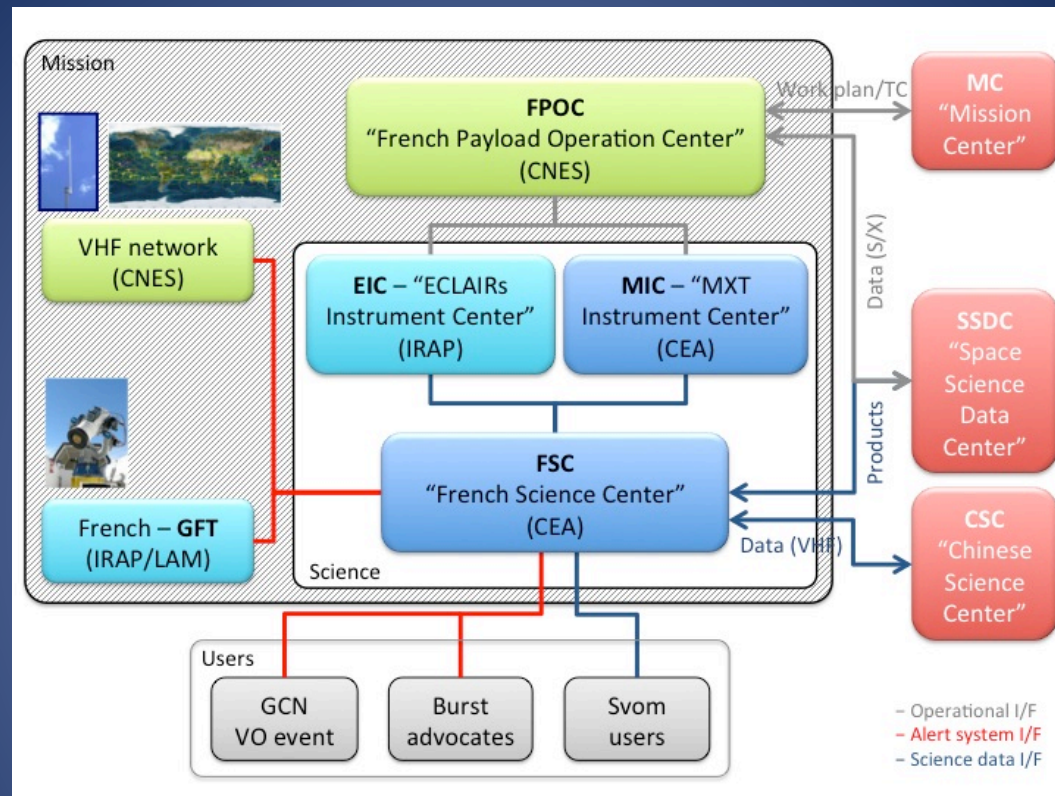
## Anticipated performances

$\sim 50 \text{ cm}^2$  at 1 keV  
Loc. accuracy  $< 1 \text{ arcmin}$   
20 arcsec for bright GRB  
 $\sim 70 \text{ GRBs/yr}$

Irfu develops the X-ray camera at the focal plane of the MXT.



# On ground : the Scientific Ground Segment



Irfu develops the French Science Center in the middle of the Scientific ground segment in charge to distribute the scientific data in quasi real time (T0+ 1 mn).

## Scientific responsibility :

- Scientific responsibility of the mission for the French side : PI B. Cordier
- Scientific responsibility of the ground segment : I-PI A. Claret
- Scientific responsibility of the X-Ray telescope MXT: I-PI D. Götz

	Activity	FTE (2015-2020)
Science	Coordination, GRBs, Cosmology, X-ray sources, AGNs	32
ECLAIRs	Development of the UGTS	26
MXT	Development of the X-ray camera	29
Scientific Center	Development of the FSC and MIC	24
<b>TOTAL</b>		<b>111</b>

- SVOM is the inheritor of Swift.
- SVOM, like Swift, will be a highly versatile astronomy satellite, with built-in multi-wavelength capabilities, autonomous repointing and dedicated ground follow-up.
- SVOM will have a broad science return thanks to its unique instrumental combination of 3 wide-field instruments: ECLAIRs, GRM, GWAC, and 3 narrow-field instruments: MXT, VT, GFTs.
- IRFU is strongly involved in the SVOM mission both scientifically and technically. This involvement should contribute to the success of the SVOM mission that we hope comparable with that of the Swift mission.



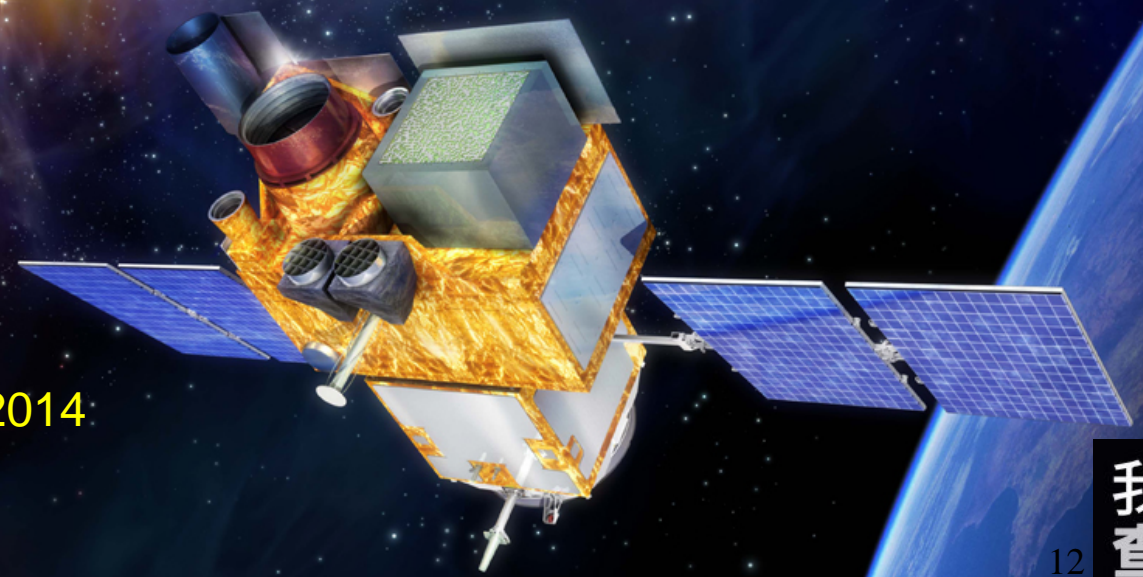


# GO SVOM !

- NAOC, Beijing
- IHEP, Beijing
- XIOPM, Xi'an
- SECM, Shanghai
- CEA-Irfu, Saclay
- IRAP, Toulouse
- APC, Paris
- IAP, Paris
- LAM, Marseille
- Obs Strasbourg
- LPAG Grenoble
- LUPM Montpellier
- LAL Orsay
- GEPI Meudon
- LPC2E Orléans
- University of Leicester
- MPE, Garching
- CNES, Toulouse

launch 2021

Phase B kick-off September 2014



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