

# **Info day of Space Activities (other than GMES) in the 7FP: Space Foundation areas and Opportunities for Spanish participation**

CDTI 16 May 2007

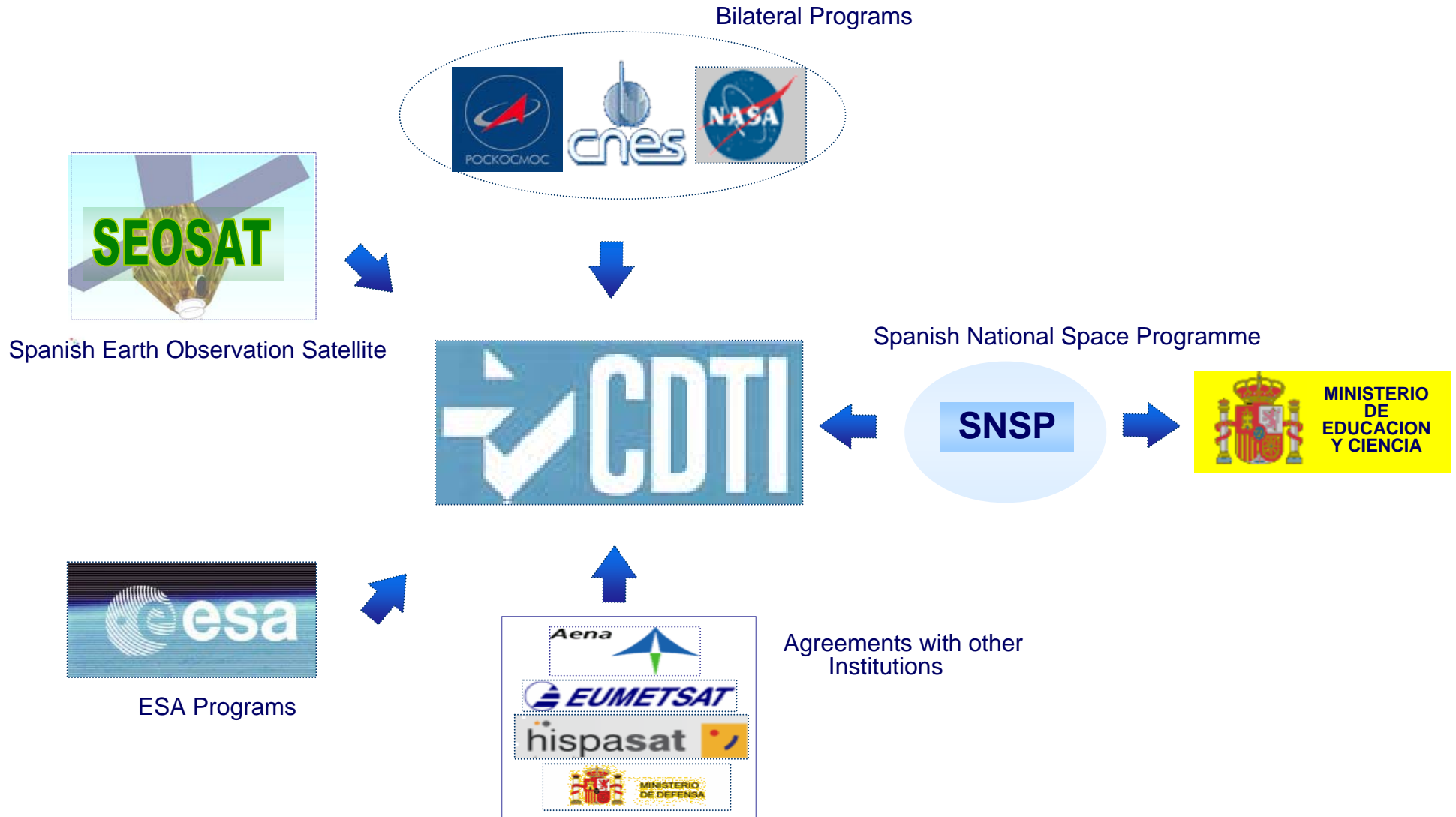


# CONTENT

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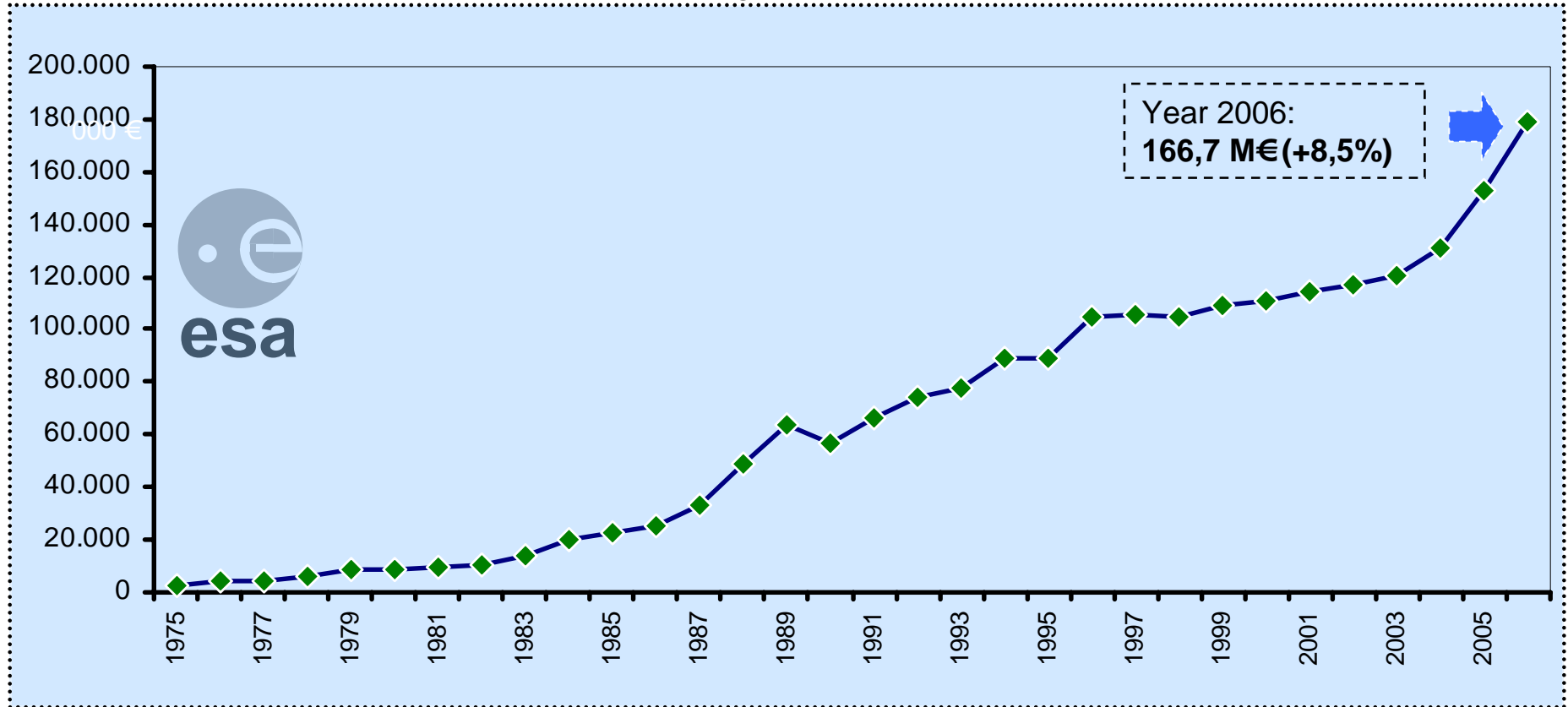
- CDTI / Space Programmes Managed by CDTI
- Pillars of European Launcher Strategy
- Spanish participation in Launcher Programmes
- Pillars of the Scientific Programme Strategy
- 7th Framework Programme / Space Foundation Areas

# CDTI / Space Programmes Managed by CDTI



# CDTI (II) / Spain in ESA

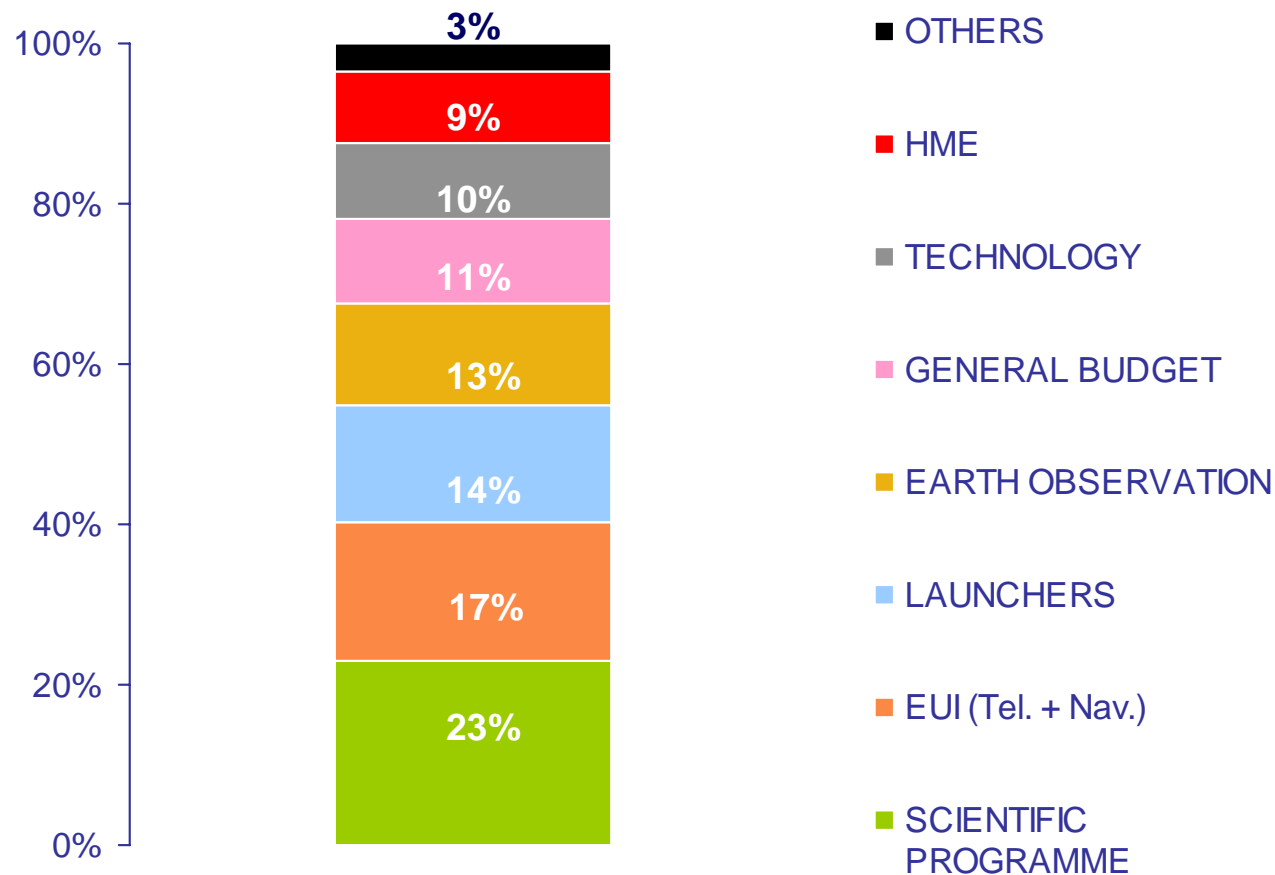
Spanish financial contribution to ESA  
(Figures in 'k€)



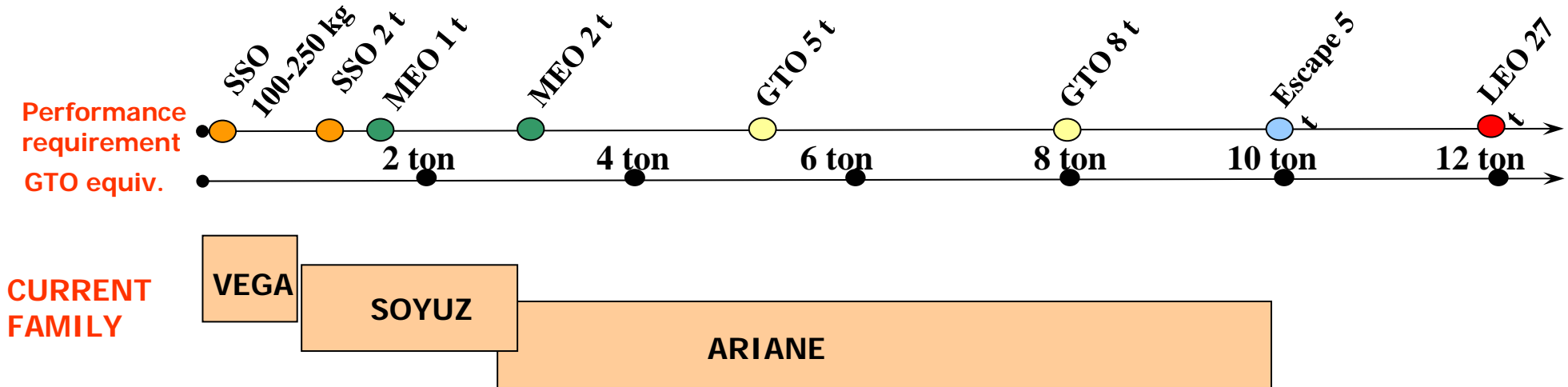
Spain is ESA's fifth largest contributor to ESA with 6.5%

# CDTI (III) / Spain in ESA: Activities

**Distribution of Spanish industrial participation in ESA activities**  
(year 2006)



# Pillars of European Launcher Strategy (I)/ European Launches



# Pillars of European Launcher Strategy (II) / Ariane-5

## Ariane 5: a launcher for the new century

Ariane 5 designed from the outset to meet the needs of the future launch market:

- Increased GTO mission payload lift capability
- Cost-effective dual launch
- More economic
- Launched from Europe's Spaceport (CSG) in French Guiana

Spanish Industrial Participation: VEB, ISS, ACU's, EPS, SE, System Studies, Vulcan-2 Tubes, Cone 3936, Flight Software....



EPS



ACUS



ISS



Cone3936



SE



VEB

# Pillars of European Launcher Strategy (III) / VEGA

## The European Small launcher program VEGA

- Low Earth Orbit, Polar, Sun Synchronous Orbit 1500 kg in 700 km Polar orbit
- Launch from Europe's spaceport (CSG) in French Guiana
- Three solid stages P80, Zefiro 23, Zefiro 9
- A liquid upper module (Avum) to improve the accuracy, to reach transfer orbit, to circularize the orbit, to perform the de-orbiting
- Qualification flight by 2007

Spanish Industrial Participation: AVUM, MFU (Electrical Integration), Interstage, ACU, Ground Control systems and Control Center, Flight Software, Dual payload and 1+multiple payload structures, TT&C Antena, System Studies...





# Pillars of European Launcher Strategy (IV) / CSG

## Europe's Spaceport: *the Guyana Space Centre*

### Location:

- French Guyana, South America.

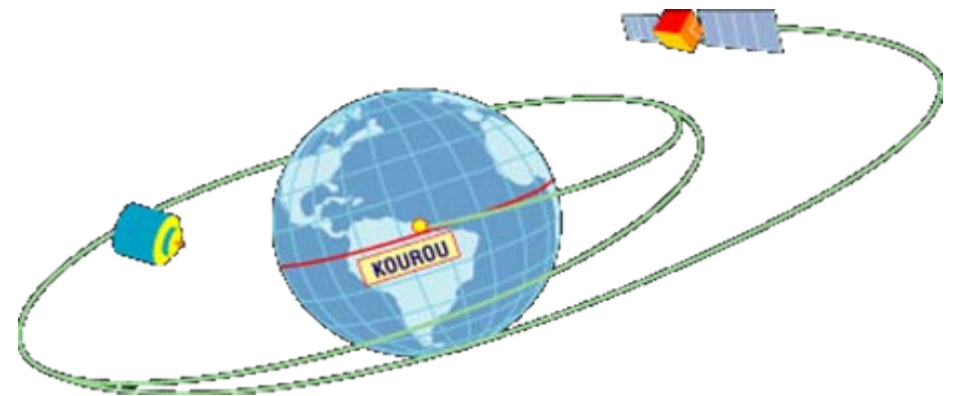
### Sites:

- ELA - Ariane 5
- SLV - Vega (2007)
- SLC – Soyuz (2008)

### Advantages:

- Payload mass gain for geostationary satellites because of proximity to the equator
- Launch to polar and geostationary orbits without over fly of populated areas.

Spanish Industrial participation: (CPI) Planing & coordination, Telecom & synchronization, Information systems, Trajectory Monitoring and Meteo, Telemetry & tracking and telecomand and remote control



# Pillars of European Launcher Strategy (V) / Soyuz at CSG

## Soyuz at CSG

LEO (Low Earth Orbit), Polar, SSO (Sun Synchrono's Orbit) orbits (4.5 – 4.9 t)

GTO ( Geostasionary Transfert orbit)  
orbit from Kourou (2.7 – 3.1 t)

Launch from Europe's spaceporrt (CSG) in  
French Guiana as from 2008

Exclusive commercialisation by Arianespace

Launch service range complementary to  
Ariane 5 and Vega

Spanish Industrial participation: Servitudes  
Control Centre, Interfaces with CSG



# Spanish participation in Launcher Programmes (I)

## Top level priorities and objectives

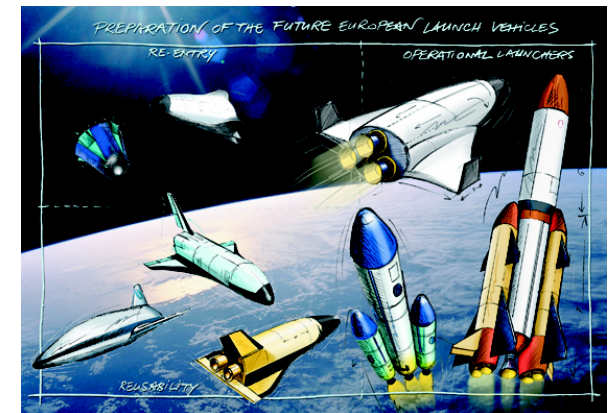
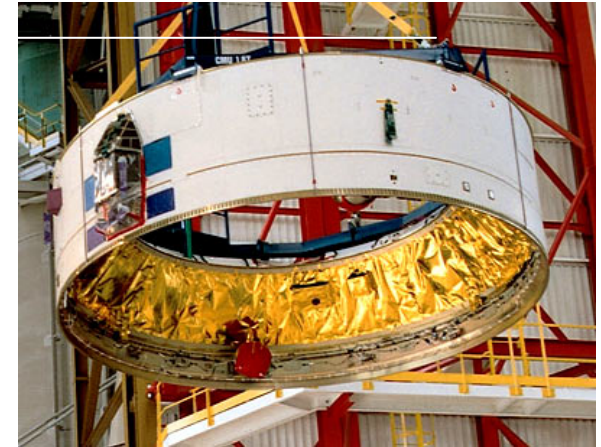
- **Guarantee the European independent access to space for the implementation of the European Space Policy based on European developments**
- **Ensure a strong and sustainable European system in the commercial market by a complementary launcher family**
- **Maintain the industrial and technology capabilities and exploring new opportunities for the Spanish Industry in production with higher level of responsibility and recurrence**
- **Promote a strong role of ESA in launchers for the development of new programmes, and the International cooperation to complement the European capabilities**



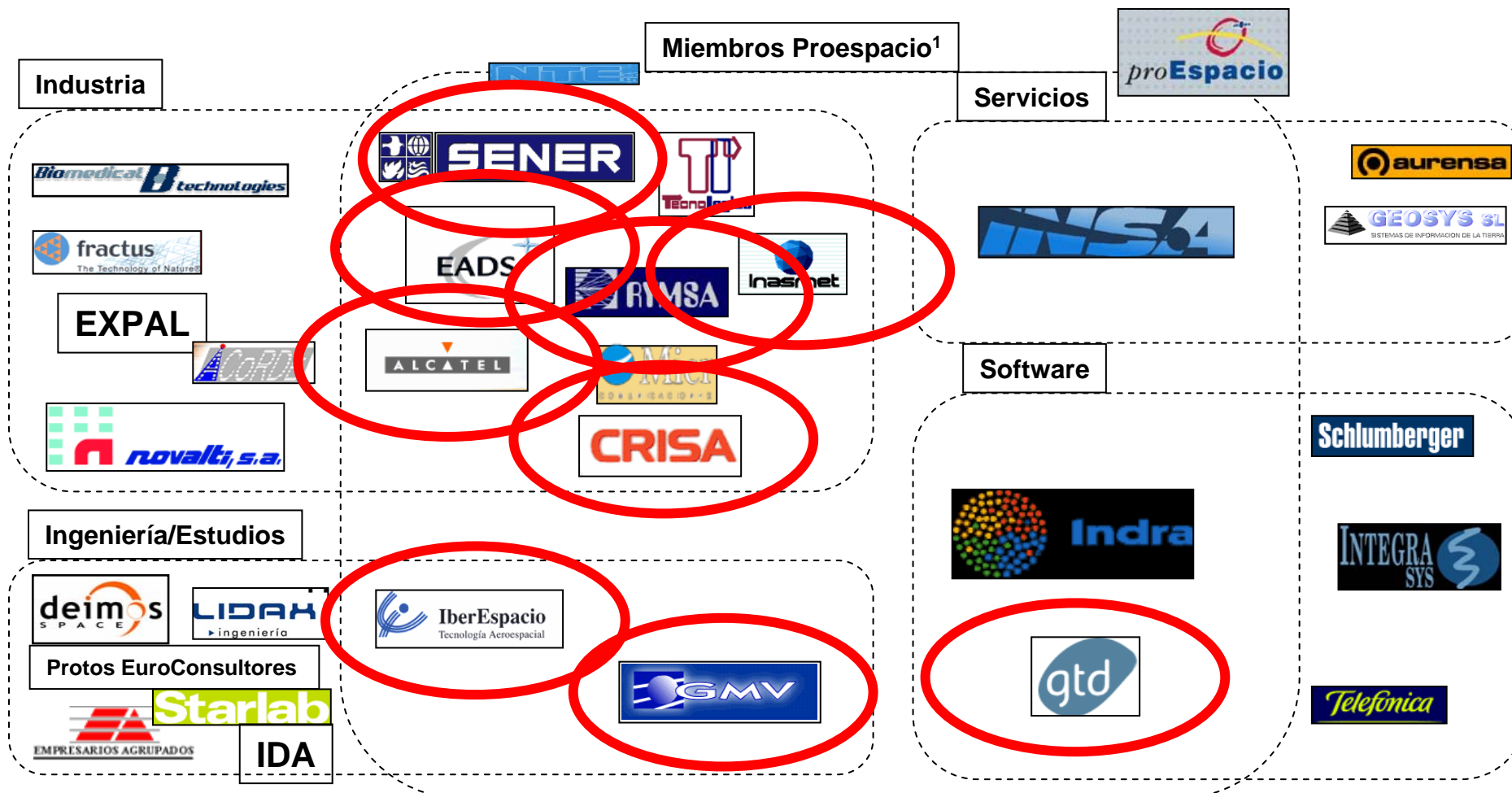
# Spanish participation in Launcher Programmes (II)

## Spanish participation by programmes

- **ARIANE-5:** 3% in production activities: Carbon fiber structures, sequential electronics, onboard software, system studies and propulsion studies.
- **VEGA:** 7% in production: Carbon fiber structures, MFU integration and onboard electronics, flight software, ground segment control.
- **Soyuz at CSG** 3,5 % in the construction of the Soyuz ground segment at CSG
- **FLPP:** 4 % in new technologies and demonstrators activities for the preparation of the future launchers
- **CSG:** 5% in ground segment maintenance and investment of the CSG Space Port



# Spanish participation in Launcher Programmes (III)



<sup>1</sup>No se incluye en este gráfico a Hispasat, dado que es un operador de satélite



# PILLARS OF THE SCIENTIFIC PROGRAMME STRATEGY (I)

The Scientific Programme and the Basic Activities constitute the mandatory ESA programmes



## Characteristics:

- Stability
- Long term planning
- Participation of the European Scientific community in the definition of the content of the programme

## Funding

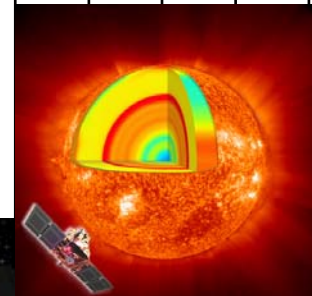
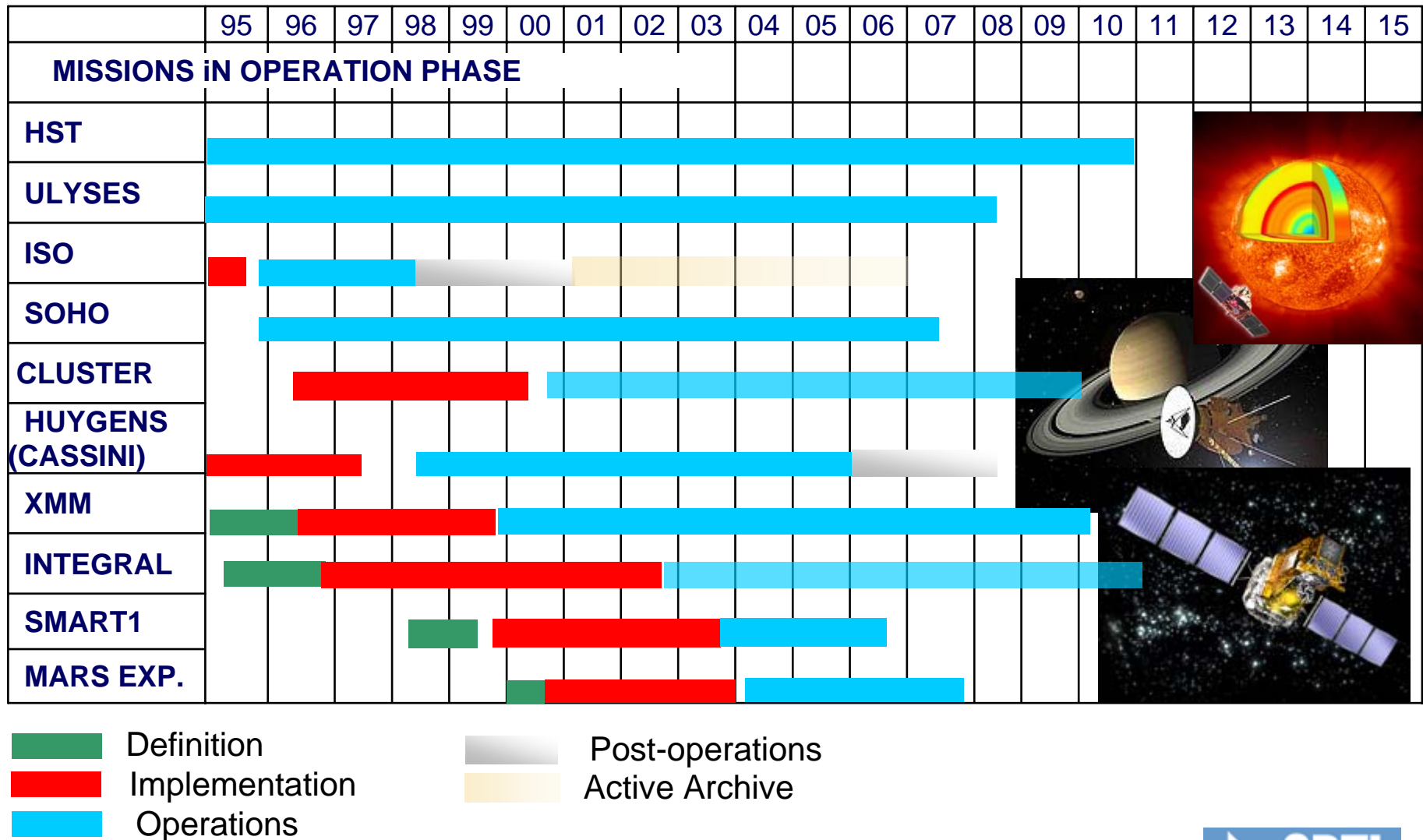
- Member States contribution (GNP). In Spain through CDTI (MITyC)
- The scientific instrumentation of the payload is funded on a national basis. In Spain it is done through the PNE (MEC)



The programme is developed through a set of missions included in a general framework known as **COSMIC VISION**

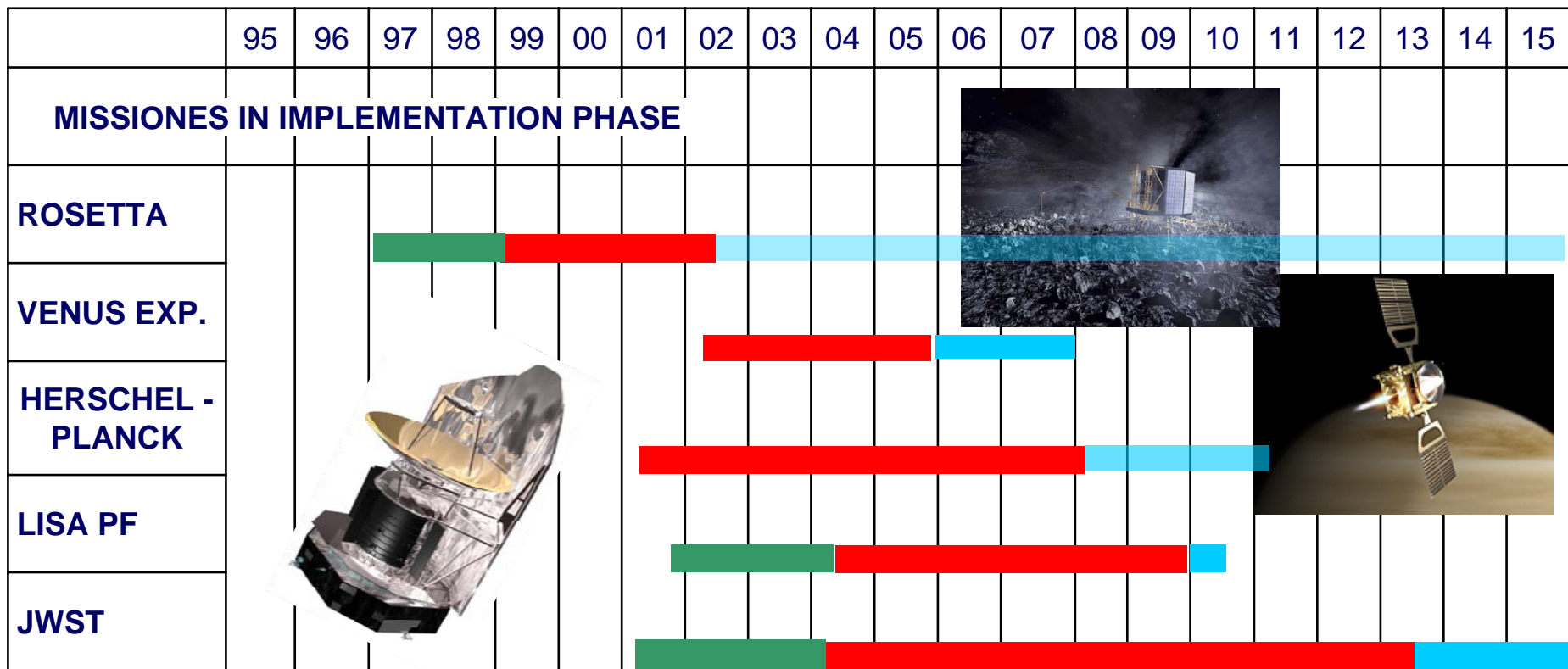
# PILLARS OF THE SCIENTIFIC PROGRAMME STRATEGY (II)

## MISSIONS IN OPERATION PHASE



# PILLARS OF THE SCIENTIFIC PROGRAMME STRATEGY (III)

## MISSIONS IN IMPLEMENTATION PHASE



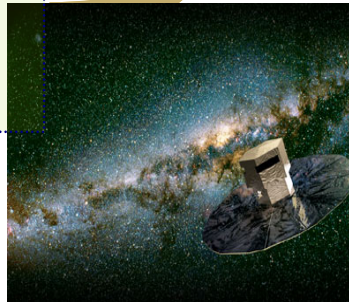


# PILLARS OF THE SCIENTIFIC PROGRAMME STRATEGY (IV)

## FUTURE MISSIONS

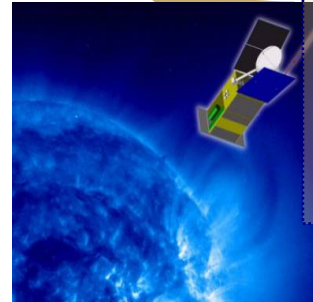
### GAIA

- Performance of a map of the visible stars in the Milky Way.
- Payload funded by ESA
- Launch foreseen in 2012



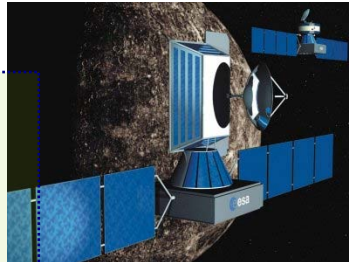
### SOLAR ORBITER

- Study of the Sun from a close position.
- Co-rotation with the Sun
- Launch foreseen in 2015 or 2017.



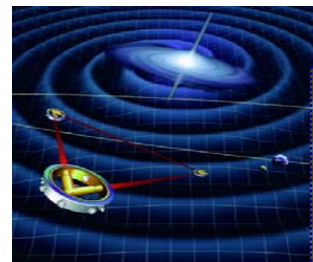
### BEPI COLOMBO

- Exploration of Mercury
- In cooperation with JAXA.
- 11 instruments
- Launch foreseen in 2013



### LISA

- Detection and observation of gravitational waves.
- In cooperation with NASA.
- Launch foreseen in 2017



# 7th Framework Programme (I)

## 7th FP Space Foundation Areas / General

- The objective of the FP7 space work programme is to support a European Space Policy focusing on applications such as GMES (Global Monitoring for Environment and Security), with benefits for citizens, but also other space foundation areas for the competitiveness of the European space industry. This will contribute to fulfill the overall objectives of the European Space Policy, complementing efforts of Member States and of other key players, including the European Space Agency.
- Call identifier: FP7-SPACE-2007-1 / Activity 9.2  
Strengthening of Space foundations
- Date of publication: 22 December 2006
- Deadline: 19 June 2007, at 17:00, Brussels local time
- Indicative budget: 28 million € from 2007 budget

# 7th Framework Programme (II)

## 7th FP Space Foundation Areas / Space Science

- **The work programme on space sciences is open to international cooperation and activities should focus on upstream research for preparing European space science missions, on downstream research aiming at the optimal scientific exploitation of their data and for the improvement of the public awareness by:**
  - Developing tools to archive, access and process data obtained from different sources,
  - Mobilising the best expertise for the analysis and interpretation of space data, selecting the most innovative and challenging objectives in emerging scientific fields,
  - Promoting the contribution of space assets to the scientific and technological knowledge and foster its transfer to educational bodies.

# 7th Framework Programme (III)

## 7th FP Space Foundation Areas / Space Technology

- **The work programme will support upstream research activities related to critical components for Non-Dependence aspects, including studies for the utilization of commercial components in innovative special architectures suited for space use. In particular:**
  - Digital components at the heart of data processing tasks for critical operations on every spacecraft, with a focus on deep sub-micron technology, high capacity reprogrammable gate arrays, high speed digital/analogue and analogue/digital converters and high speed serial links.
  - Microwave components as used in telecommunication and payloads, navigation satellites and earth observations/science instruments such as radars, with a focus on Gallium Nitride

# 7th Framework Programme (IV)

## 7th FP Space Foundation Areas Space / Space Transportation

- **in the context of preparing new generation of advanced space transportation systems, innovative propulsion concepts are necessary to reduce in particular the space transportation costs. In addition, space exploration could benefit from the progress made on this area. To that aim research should focus on novel techniques or on consolidating new technologies such as:**
  - heliothermic propulsion, new generation of solid, electric and cryogenic propulsion and associated components technologies. International cooperation with existing and emerging space powers may be considered when necessary, appropriate and possible.
  - A particular added value is also seen in contributions which the new EU Member States and the international community can make.
  - Preference will be given to conceptual studies through Coordination and Support Actions