

ASTROMADRID

PARTICIPACIÓN ESPAÑOLA EN LOS PROGRAMAS CIENTÍFICOS DE LA ESA

(29-junio-2011)

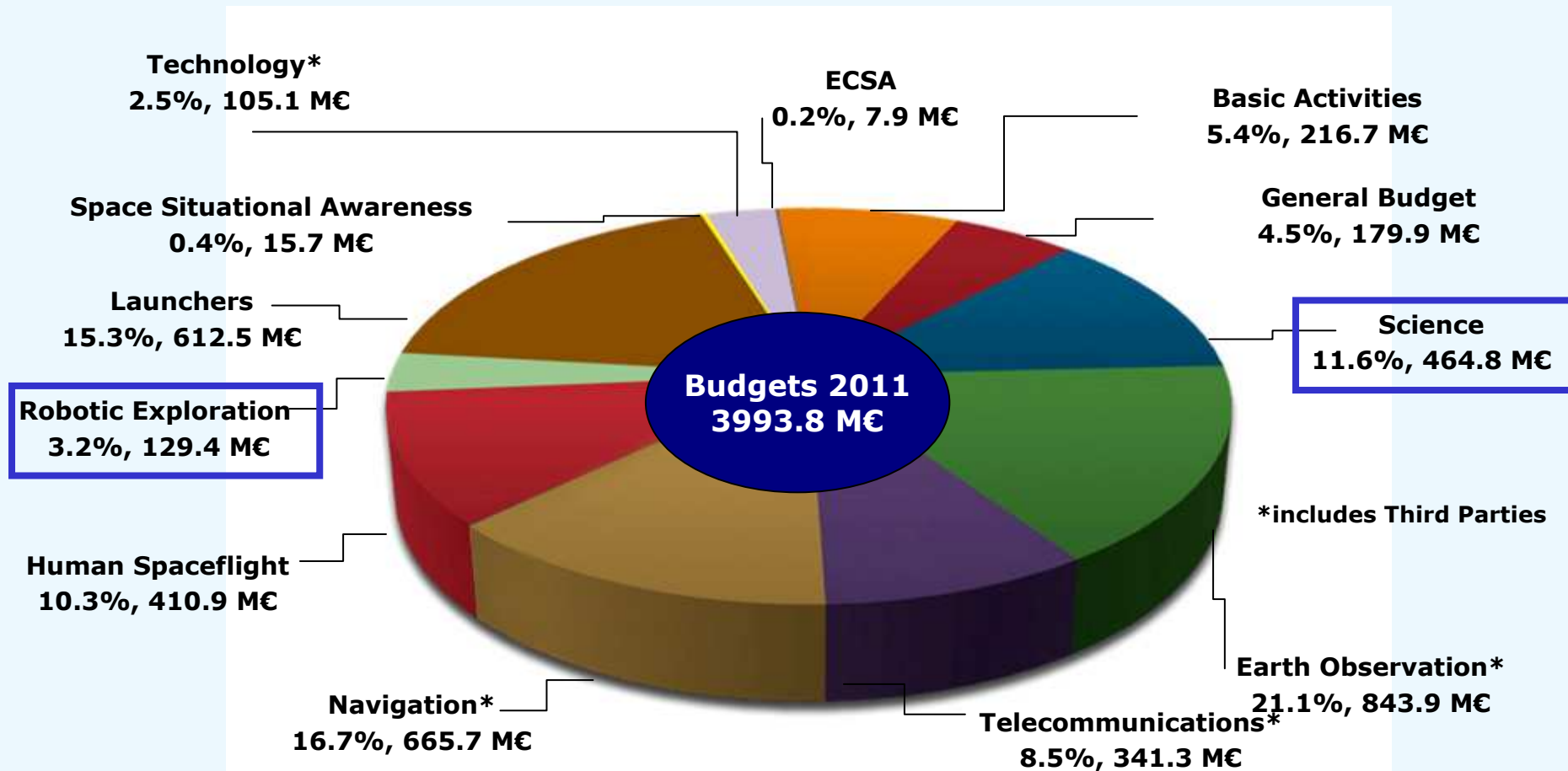
Pilar Román
Dpto. de Industria de la Ciencia y Espacio
CDTI

CONTENT

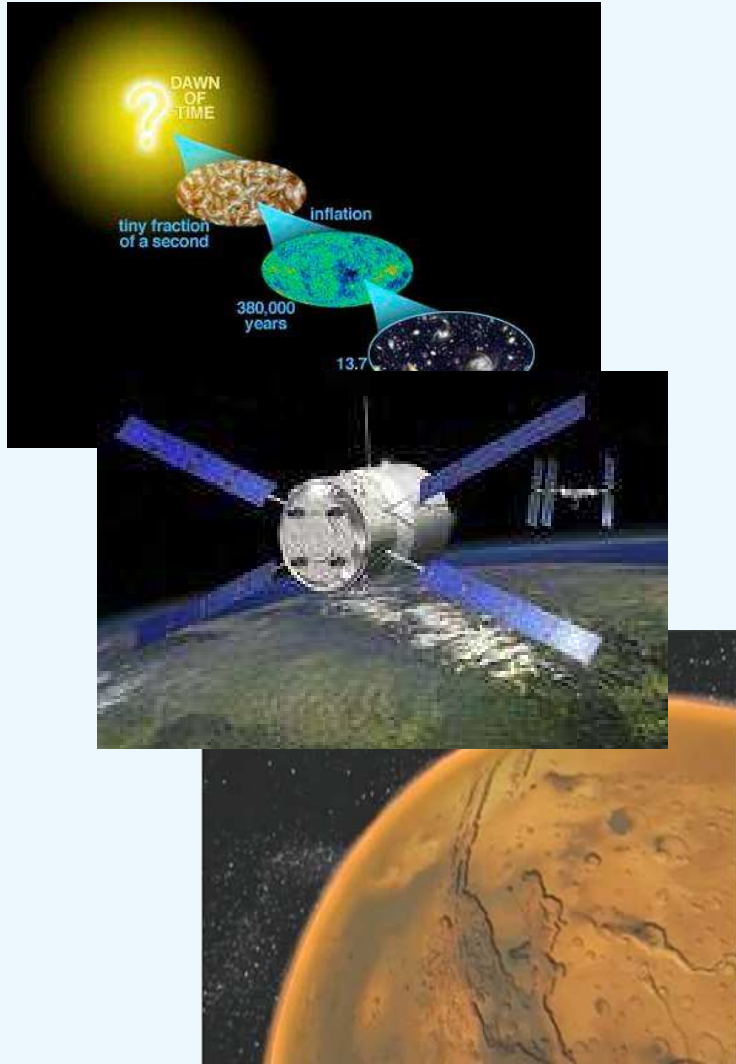
- 1. ESA budget 2011**
- 2. Science and Exploration programme characteristics**
- 3. Spanish participation in the scientific programme**
- 4. Spanish participation in the exploration programme**
- 5. Future opportunities**

ESA BUDGET BY PROGRAMME (2011)

ESA 's budget for 2011 is 3994 M€
78% for optional programmes, 22% for mandatory activities



SCIENCE AND EXPLORATION PROGRAMME CHARACTERISTICS



The Scientific Programme together with the basic activities are the only mandatory element of ESA programmes

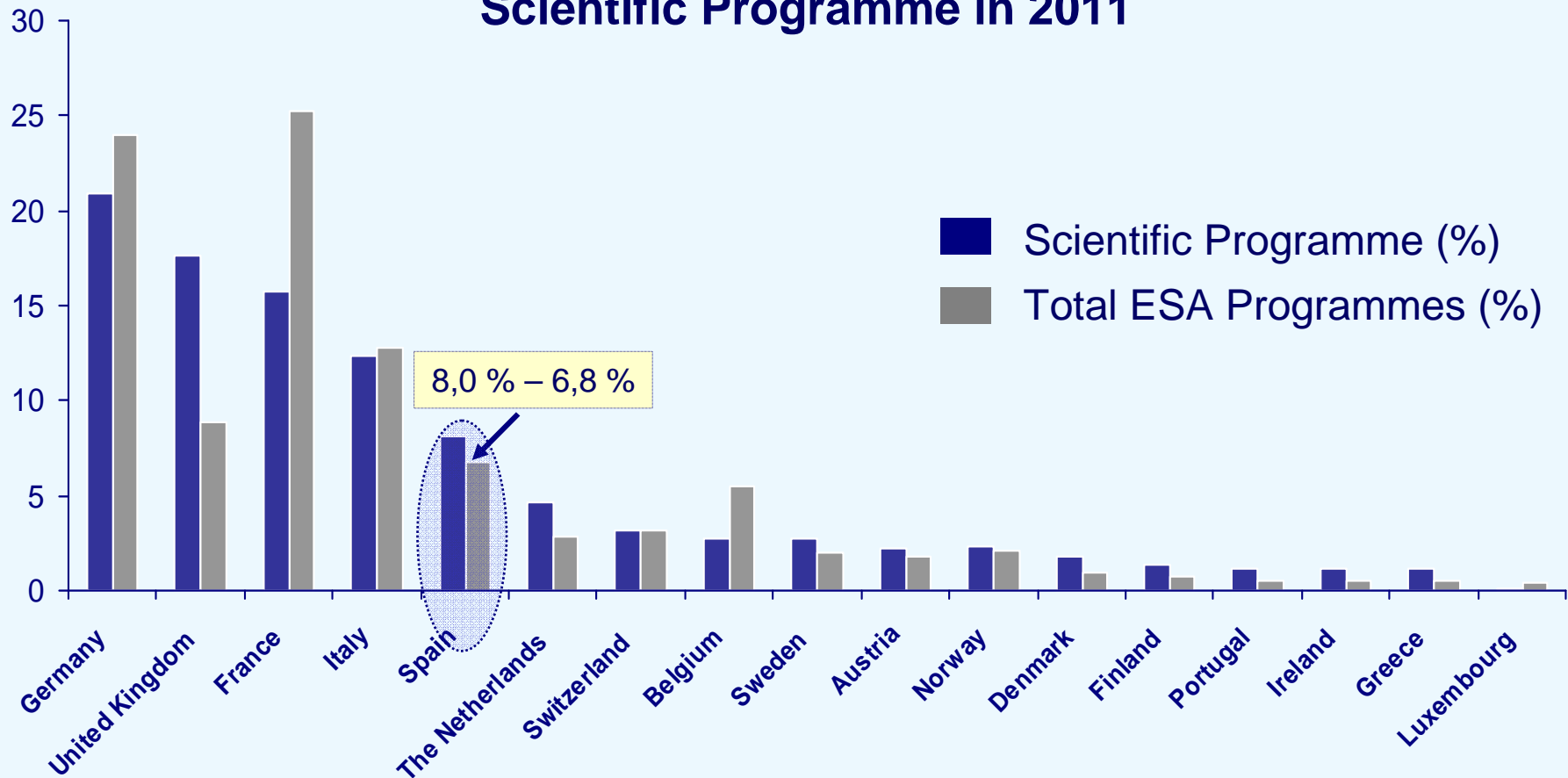
The Programme budget is approved at ESA Ministerial Council. The present annual resources is around 465 M€

HME is an Optional Programme with 3 building blocks:

1. H - Human Spaceflight
2. M - Microgravity
3. E – Exploration

SPAIN IN THE SCIENTIFIC PROGRAMME

Member States contribution to the ESA budget and to the Scientific Programme in 2011



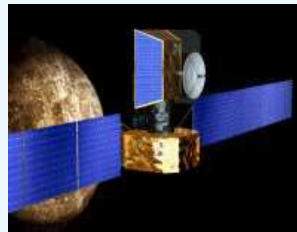
MISSIONS IN OPERATION

<i>SISTEMA SOLAR</i>	<i>ASTRONOMÍA</i>	<i>FASE</i>
<p>CLUSTER (2000) SOHO (1995) MARS EXPRESS (2003) VENUS EXPRESS (2005)</p>	<p>HST (1990) XMM (1999) INTEGRAL (2002)</p>	<p>Extensión</p>
<p>ROSETTA (2014)</p>	<p>HERSCHEL (2009) PLANCK (2009)</p>	<p>Operación nominal</p>

MISSIONS UNDER DEVELOPMENT



Gaia
May
2013



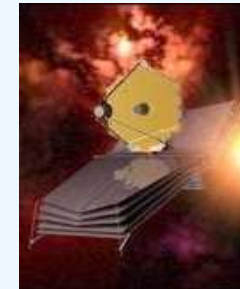
Bepi-C
summer
2014



**Lisa
Pathfinder**
2014?



Microscope
(CNES-ESA)
summer
2015



JWST
(NASA-ESA)
2016?

2013

2014

2015

2016

SCIENTIFIC PARTICIPATION - MISSIONS UNDER DEVELOPMENT

LISA PATHFINDER

- *Instituto de Ciencias del Espacio (CSIC)*. Provision of the Data Management Unit, Data Management Unit Software and the Diagnostic Sensors

GAIA

- *Universidad de Barcelona, Universidad de la Coruña*. Development of the mission simulator and the software packages for the selection of sources for internal photometric calibration

JAMES WEB SPACE TELESCOPE

- *Instituto de Estructura de la Materia (CSIC), INTA*. Development of the MTS (MIRI Telescope Simulator), the optical bench for MIRI

BEPICOLOMBO

- *Instituto de Astrofísica de Andalucía (IAA), Centro de Astrobiología (CAB)*. Participation in the laser altimeter (BELA) and Mercury Imaging X-ray Spectrograph (MIXS)

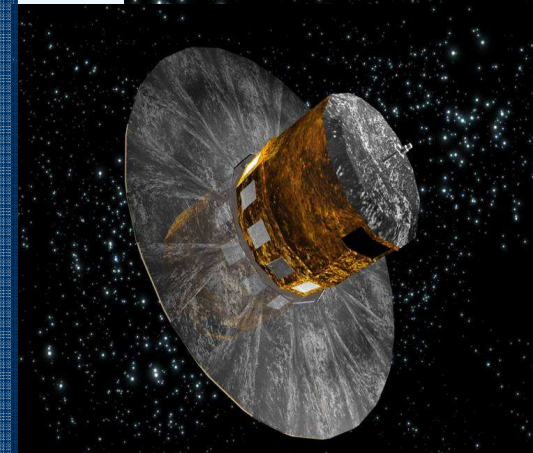
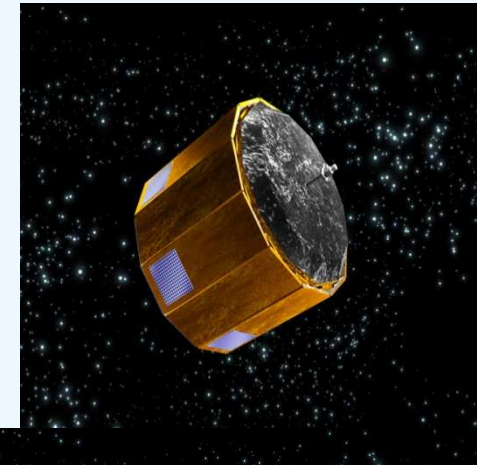
INDUSTRIAL PARTICIPATION - MISSIONS UNDER DEVELOPMENT

GAIA

- SENER. Deployable Sunshield Assembly
- EADS-CASA. Phased Array Antenna
- CRISA. PLM Proximity Electronics Module

BEPICOLOMBO

- SENER/RYMSA. Medium and High Gain Antenna Major Assembly
- CRISA. Power Supply and Control Unit for the Solar Electric Propulsion



COSMIC VISION 2015-2025

M1 y M2:

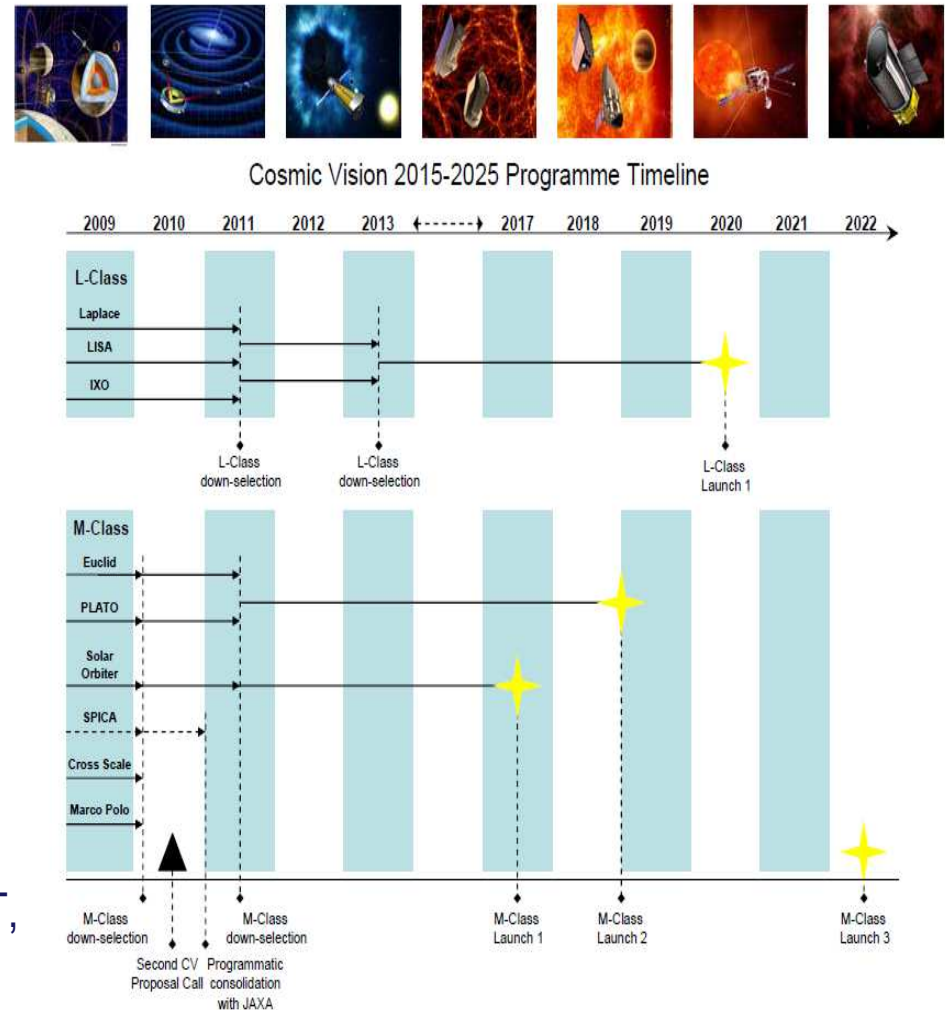
- Solar Orbiter, Euclid and Plato
- Final selection: October 2011
- 2 launches (2017 and 2018)

L1:

- EJSM/Laplace, IXO and LISA .
- Budgetary problems at NASA
- Fast-track reformulation
- Selection in early 2012

M3:

- 58 proposals
- 4 missions in assessment study: ECHO, LOFT, Marco Polo R, STE- QUEST



SCIENTIFIC PARTICIPATION - MISSIONS M1, M2

MISSION	INSTITUTION	PAYLOAD PARTICIPATION
PLATO	CAB	Design, fabrication and qualification of the focal plane assembly (FPA) structures for 34 telescopes, Main Electronics Units (MEU) and MEU Power Supply Units (MEU-PSU) for on board automatic photometry.
EUCLID	IAC ICE	Spectrograph: DPU and on-board SW Imager: Common Opto-Mechanical Assembly and VISible imaging channel (tbd)
SOLAR ORBITER	IAC – INTA UAH	Polarimetric and Heliosismic Imager (co-Principal Investigator): full disk telescope, polarization modulators based on liquid crystal, polarization inverter, global thermal control Energetic Particle Detector (Principal Investigator): Common Data Processing Unit for EPD

SCIENTIFIC PARTICIPATION – MISSION L1

MISSION	INSTITUTION	PAYLOAD PARTICIPATION
X-ray observatory mission (IXO)	IFCA	Data center, SOC, tbd
Gravity wave measurement mission (LISA)	ICE-CSIC	Diagnostic sensors
Mission to Jupiter system (Laplace)	IAA	tbd

SCIENTIFIC PARTICIPATION – MISSION M3

MISSION	INSTITUTION	PAYLOAD PARTICIPATION
ECHO	ICE	Fine Guidance System, on-board and ground-segment data processing and calibration SW, Mid-infrared optical design, electronics
LOFT	ICE	Wide Field Monitor mask (co-IP), deployment mechanism of LAD (Large Area Detector)
Marco Polo - R	IAC, ICE, IAA	Control electronics, power supply and test of the thermal mapper (Thermap) Visible Spectrometer tbd

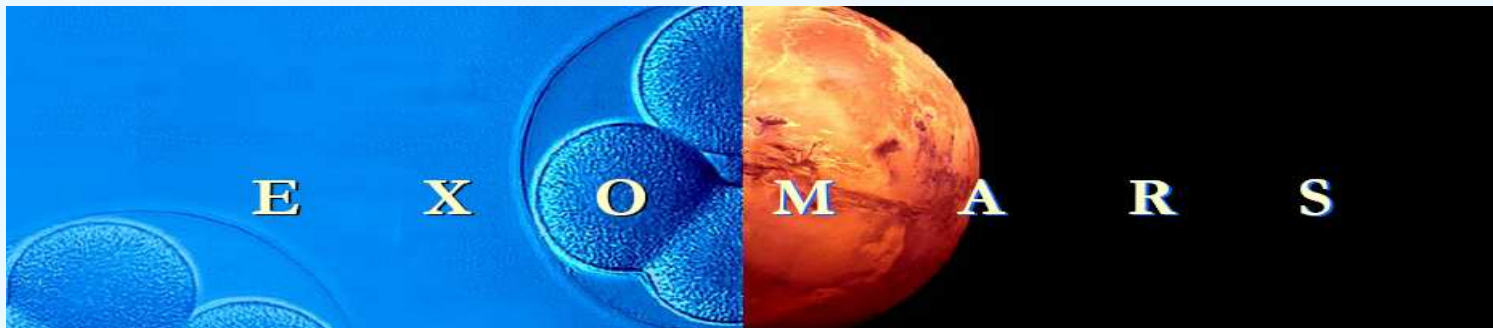
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ROBOTIC EXPLORATION PROGRAMME EXOMARS

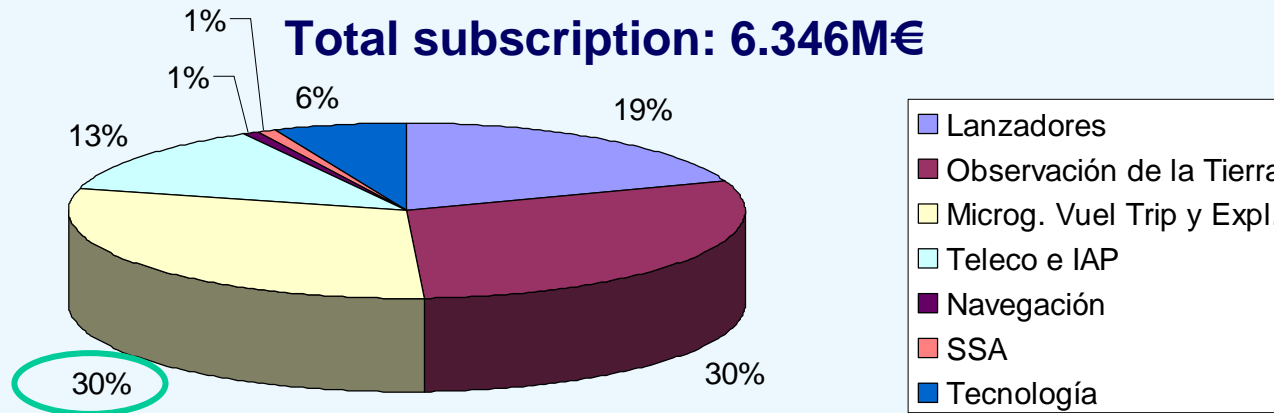
The ExoMars Programme is the first ESA robotic exploration mission to Mars

- ExoMars objectives:
 - ✓ Entry, descent and landing technologies
 - ✓ Search of signs of past and present life on Mars
- The programme will be developed in cooperation with NASA
- Two missions are foreseen:
 - 2016. Telecommunication orbiter, EDL and P/L
 - 2018. rover with drill system and Pasteur P/L

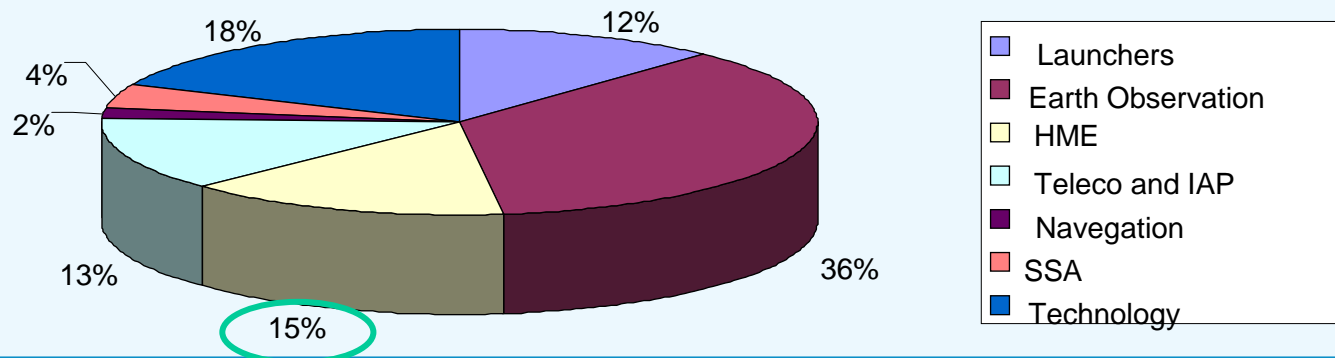


HME BUDGET

Subscriptions in ESA optional programmes at CM-2008



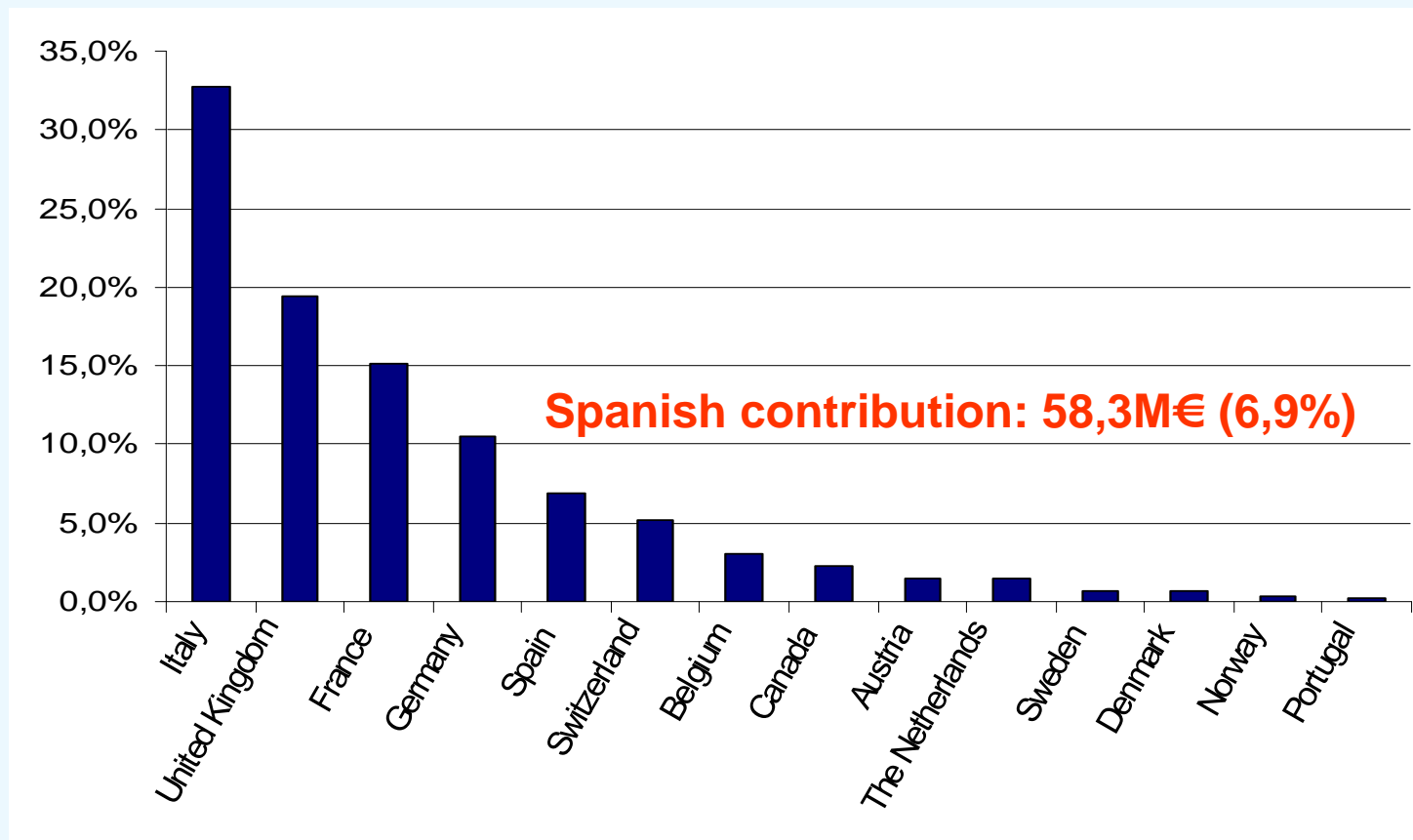
ESA optional programmes subscribed by Spain at CM-2008



EXOMARS SCALE OF CONTRIBUTIONS

Financial envelope: 1000M€

Total contribution subscribed: 850M€. Uncovered amount: 150M€



SPANISH SCIENTIFIC PARTICIPATION

The Scientific participation is channeled through the contribution of the National Agencies that are in charge of the development of the instruments for:

- **The orbiter (SOIR-NOMAD). IAA contribution at Co-PI level**
- **The Rover (Ramman). CAB contribution at PI level**

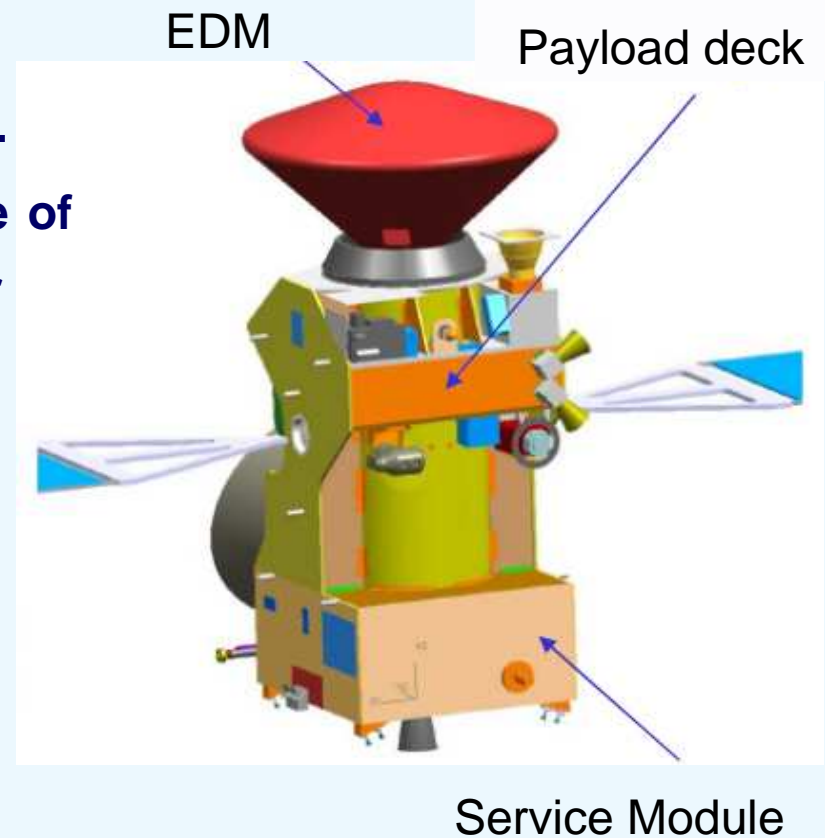
SPANISH INDUSTRIAL PARTICIPATION (I)

Entry, Descent and Landing (EDL) demonstrator

- **SENER. Crusable structure**
- **DEIMOS. Mission Analysis 2016 mission.**
- **EADS-CASA EDL Front-Shield Structure of the EDL system and the Central Cylinder**

ROVER

- **GMV Rover Operation Control Centre**
- **SENER Extension Rods exchange mechanism of the drill system**



FUTURE OPPORTUNITIES

FP7 next space call in July

- Area: Research to support space science and exploration
- Topic: Exploitation of space science and exploration data (combination of space based observations with ground observations)
- Four projects (2 M€)

Small missions in the frame of the science programme

- Selected through open Calls for Missions (Scientifically driven)
- Cost: Less than 150 M€)
- Fast development time (4 years)



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