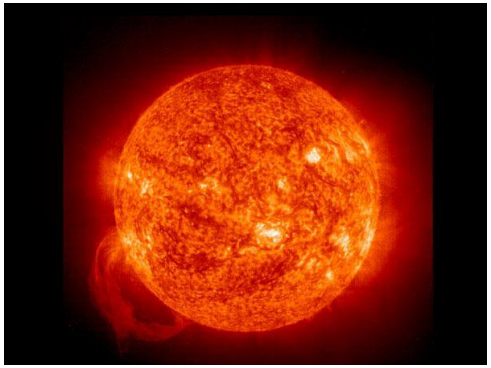
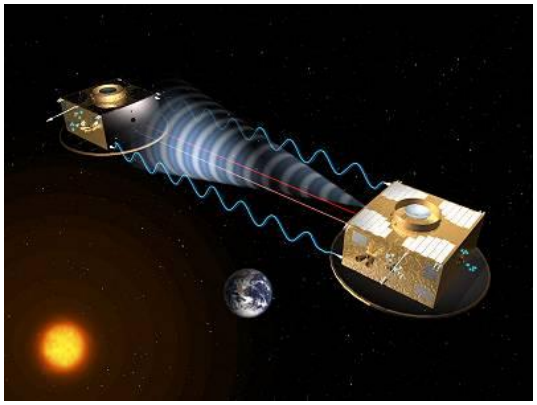
The Science Programme

Main subjects:





Fundamental physics

Solar System

- **Sun**
- **Planets**

Astrophysics

- **Galactic**
- **Extragalactic**

- ✓ Mandatory Programme
- ✓ Contributions according to relative GNP

- ✓ "Backbone" of ESA = provides stability
  - world-class science
  - cutting-edge technologies and innovation

The balance between creativity and feasability is provided by technological progress

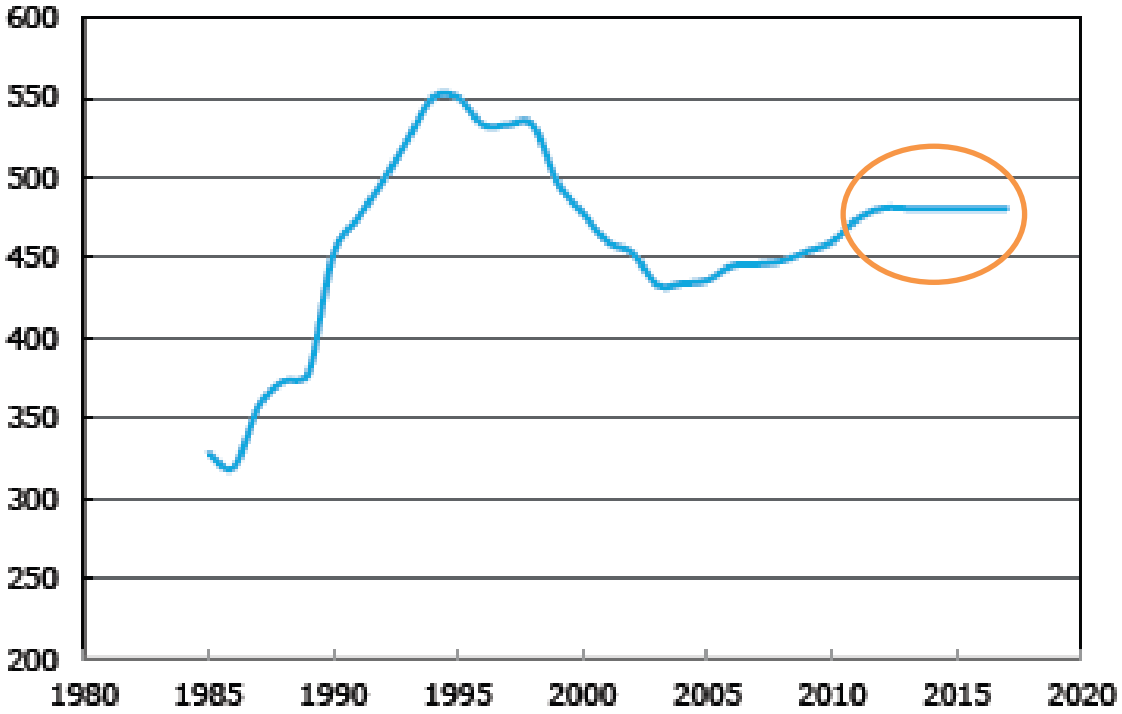
- ✓ Driven by the scientific community:
  calls, competition, peer review
- ✓ Payload is funded by national programmes (for us: PRODEX)
- ✓ Shows what Europe can do together in science and technology
- ✓ Provides a framework for additional national programmes

Types of missions and calls

	one every	**cost**	**dev. time**	**techno**	**intern. coop.**
L	7 y	≈ 2 LoR ≈ 900 M	15 y	challenging	≤ 20%
M	3 y	≈ 1 LoR ≈ 500 M	11 y	limited	any
S	4 y	≤ 50 M ESA 150 M total	4 y	no risks	national agencies
MoO (no call)	5 y	≈ 100 M			any

Target = 1 launch/year

Evolution of the budget (*Level of Resources*)



Proposal for 2013-2017:

constant purchasing power at the 2012 level = 481 MEUR/year

Missions in operation

Name	Science	Launch	Cooperation	BE payload participation
HST	Vis+UV astronomy	1990	NASA	
SOHO	solar physics	1995	NASA	X
CASSINI-Huygens	Saturn, Titan	1997	NASA	
XMM	X-ray astronomy	1999		X
CLUSTER	Earth magnetosphere	2000		X
INTEGRAL	γ-ray astronomy	2002		X
MARS-EXPRESS	Mars orbital science	2003		X
ROSETTA	cometary science	2004		X
VENUS-EXPRESS	Venus orbital science	2005		X
HINODE	solar physics	2006	JAXA	
COROT	exoplanets, asteroseismology	2006	CNES	X
HERSCHEL	infrared astronomy	2009		X
PLANCK	cosmology	2009		
PROBA-2	solar physics, space weather	2009		X

Missions in development

Name	Science	Launch	Cooperation	BE payload participation
GAIA	astronomy	2013		X
LISA-Pathfinder	gravitational waves	2014		
ASTRO-H	X-ray astronomy	2014	JAXA	
BEPI COLOMBO	Mercury orbital science	2015	JAXA	X
MICROSCOPE	equivalence principle	2016	CNES	
SOLAR ORBITER (M1)	solar physics	2017	NASA	X
JWST	infrared astronomy	2018	NASA, CSA	X
EUCLID (M2)	cosmology	2020	NASA	(X)
JUICE (L1)	Jupiter and moons	2022	(Roscosmos)	(X)

M-missions still in competition (M3)

Name	Science	Launch	Cooperation	BE payload participation
ECHO	exoplanets	2024	TBD	(X)
LOFT	X-ray astronomy	2024	TBD	
MARCOPOLO-R	asteroid sample return	2024	TBD	
PLATO	exoplanets, asteroseismology	2024	TBD	X
STE-QUEST	fundamental physics	2024	TBD	

phases A ongoing
selection of one mission planned for 6/2013

S-missions still in competition (S1)

26 proposed missions (5 with Belgian participation)
evaluation ongoing
selection of one mission planned for 11/2012

Missions of Opportunity (still to be approved)

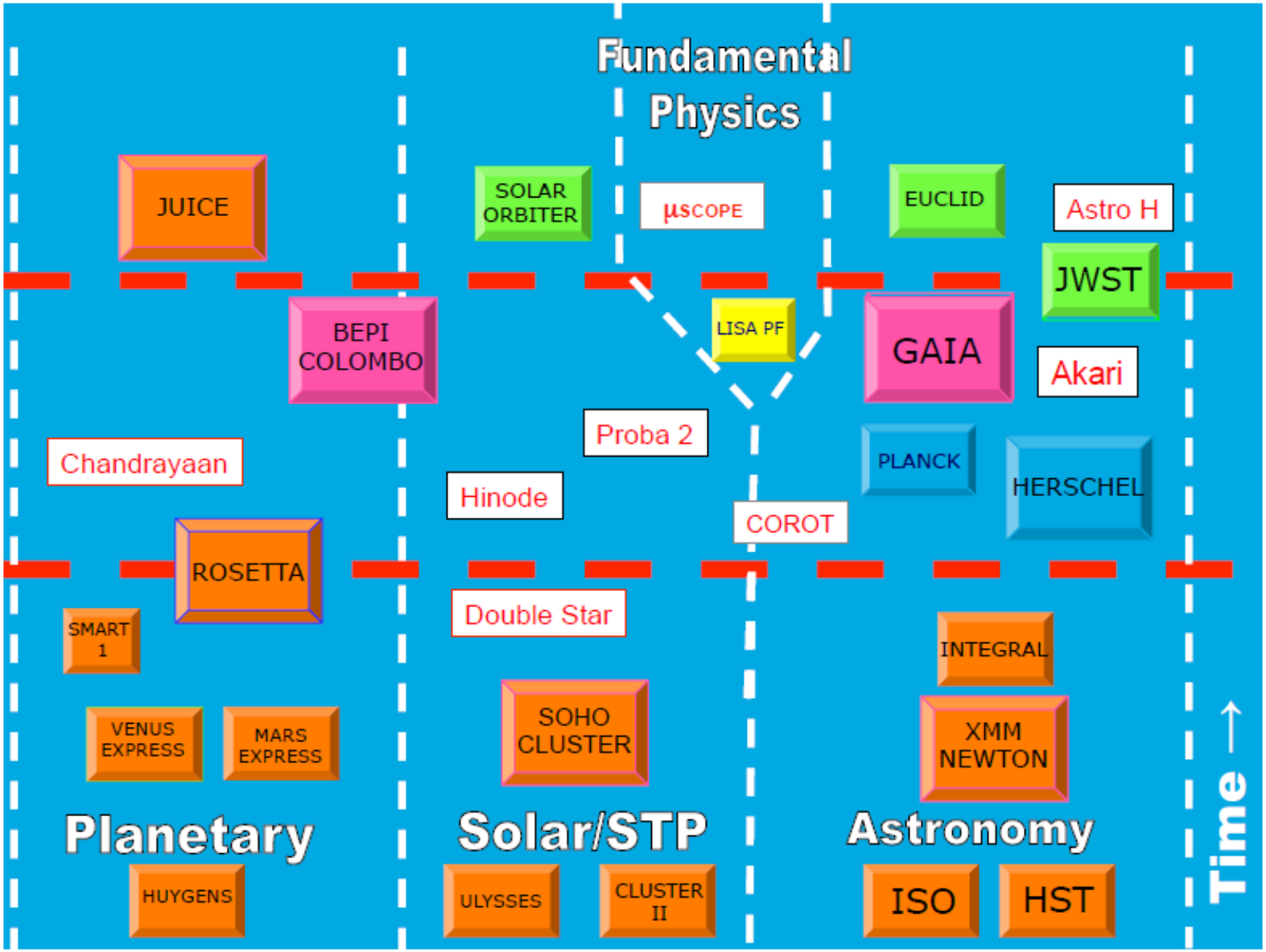
Name	Science	Launch	Cooperation	BE payload participation
EXOMARS	Mars orbital/in-situ science	2016/2018	ESA/Exomars	X
KUAFU	solar physics, space weather	2017	China	(X)
SPICA	infrared astronomy	2020-2022	JAXA	X

EXOMARS and KUAFU : decision planned for 11/2012
SPICA: decision expected in Japan by mid-2013 and in ESA in 11/2013

Next calls:

- L2/L3: survey in 2013 to determine the science themes
- M-call (M4) : 2014
- S-call (S2) : 2015

Questions?


Fundamental Physics
JUICE
SOLAR ORBITER
µSCOPE
EUCLID
Astro H
JWST
BEPI COLOMBO
LISA PF
GAIA
Akari
Proba 2
Chandrayaan
PLANCK
HERSCHEL
Hinode
COROT
ROSETTA
Double Star
SMART 1
INTEGRAL
SOHO CLUSTER
VENUS EXPRESS
MARS EXPRESS
XMM NEWTON
Planetary
Solar/STP
Astronomy
HUYGENS
ULYSSES
CLUSTER II
ISO
HST
Time →