The role of low cost missions in the ESA program

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Science-driven
both long-term science planning and mission calls are bottom-up processes, relying on broad community input and peer review.

Mandatory
all member states contribute pro-rata to GDP providing budget stability, allowing long-term planning of its scientific goals and being the backbone of the Agency.
In 2005, a new programme was introduced to replace H2000+, for one more decade (until 2025) with the name Cosmic Vision (2015-2025).
1. What are the conditions for planetary formation and the emergence of life?

2. How does the Solar System work?

3. What are the physical fundamental laws of the Universe?

4. How did the Universe originate and what is it made of?
COSMIC VISION
A bottom-up approach

ESA Executive
DG, D/SRE

Science Programme
Committee

Advice
Recommendations

Space Science
Advisory
Committee

National Agencies

Scientists

European Science
Community

Solar System and
Exploration Working Group
Astronomy
Working Group
Fundamental Physics
Working Group

European Space Agency
COSMIC VISION (2015-2025)
Step 1

- Proposal selection for assessment phase in October 2007
  - 3 M missions concepts: Euclid, PLATO, Solar Orbiter
  - 3 L mission concepts: X-ray astronomy, Jupiter system science, gravitational wave observatory
  - 1 MoO being considered: European participation to SPICA

- Selection of Solar Orbiter as M1 and Euclid as M2 in 2011.

- Selection of Juice as L1 in 2012.
COSMIC VISION (2015-2025)
Step 2

- Second “Call for Missions” issued in 2010
- Only M mission proposals solicited
- EChO, MarcoPolo-R, LOFT, STE-QUEST selected for assessment with PLATO retained from previous round
- Selection planned for early 2014
Novel component within the ESA Science Programme

Call to the scientific community for novel ideas and explore approaches complementary to the current (L-M) components of the ESA Science Programme (March 2012)

- 26 proposals submitted

The Call imposed strict limits on the cost of the missions that can be implemented under the advertised scheme

Small-size missions with a development time not exceeding 4 years

Proposals can address all areas of space science

Cheops mission selected (October 2012)

Characterize transiting exoplanets on known bright and nearby host stars

**Targets:** Known exoplanet host stars with a V-magnitude < 12.5 (goal: 13) anywhere on the sky

**Wavelength:** Visible range: 400 to 1100 nm (Option: NIR to 1700 nm)

**Telescope:** 33 cm reflective on-axis

**Orbit:** Low Earth Sun-synchronous orbit 6am, altitude 800 km

**Lifetime:** 3.5 years
ESA Science Program budget is decided at ministerial-level conferences with a 5 yr horizon

Ministerial conference in November 2012

Planning horizon 2013-2017 - “Flat cash” settlement at 2013 e.c. (507.9 M€ p.a. with no inflation correction)

For 2013, modest increase w.r.t. CMIN08 decision (10 M€)

Yearly purchasing power decrease from 2014 to 2017, amount will depend on actual inflation level (2.5% assumed for planning purposes)
Programme Building Blocks

1. Large missions, L
2. Medium missions, M
3. Small missions, S
4. Opportunity missions, O (previously known as cooperative)
5. Extensions of missions in operation
6. Basic activities
   a. Preparation for the future
   b. Technology development
   c. Science management support
7. Programme-level contingency

- Development times (from call to launch):
  - L missions: >13 years
  - M missions: 11 years

- Cost envelopes:
  - L missions => order of 2 years of LoR
  - M missions => order of 1 year of LoR
1. Programme Planning
   • Regular sequence of Medium and Large missions
   • Extensions of operations of ongoing Missions
   • Planning allocation for Small Missions, Missions of Opportunity
   • Basic activities (include preparation of future)

2. Conditions
   • Strict capping of OPs cost
   • Cost control of ongoing and new projects, with prudent risk and contingency management
   • Capping of basic activities
   • Capping of expenditure toward Small and Opportunity missions

3. Small missions
   • Long-term planning line at ca. 3% of LoR
   • Allow implementation of S1 and timely start of S2 with cost capping at 50M€.
Call page: http://sci.esa.int/Call-WP-L2L3

Release of Call for White Papers 5 March 2013
White Paper submission deadline 24 May 2013, 12:00 CEST (noon)
Open workshop 3-4 September 2013 (TBC)
Director's proposal to the SPC concerning Late October 2013
the L2/L3 science themes
Selection of L2/L3 science themes by SPC November 2013

L2 and L3: currently planned for launch in 2028 and 2034

White Papers advocating science themes and questions for the L2 and L3 flight opportunities.

• the science questions that are proposed to be addressed by an L-class flight opportunity

• one (or more) strawman mission concept(s), or possible approaches to obtaining the necessary measurements, that could provide the answers to the science questions proposed
M3 Selection timeline

Call for M3 launch opportunity
Selection of M-class candidate missions for assessment
ESA internal assessment phase of candidate missions
Industrial assessment phase and parallel definition
studies of model payload
Call for proposals for scientific P/L
SPC selection of scientific P/L

Definition studies on selected payloads

Public presentation of missions
Recommendations of Advisory Structure

SPC selection of one mission for the M3 launch opportunity
SPC adoption of mission
Mission launch year target

July 2010
February 2011
Mar. – Oct. 2011
Sep. 2012
Feb. 2013
Feb. – Sep. 2013

29 Jan. 2014 (TBC)
29-31 Jan. 2014 (TBC)
Feb. 2014
Q4 2015
2022 – 2024
The first small Mars lander by ESA

Although designed to demonstrate entry, descent and landing technologies, the EDM also offers limited, but useful, science capabilities. The EDM will deliver a science package that will operate on the surface of Mars for a short duration after landing, planned to last approximately 2-8 days.
The EDM surface payload, based on the proposed DREAMS (Dust Characterisation, Risk Assessment, and Environment Analyser on the Martian Surface) package, consists of a suite of sensors to measure the wind speed and direction (MetWind), humidity (MetHumi), pressure (MetBaro), surface temperature (MarsTem), the transparency of the atmosphere (Optical Depth Sensor; ODS), and atmospheric electrification (Atmospheric Radiation and Electricity Sensor; MicroARES).