

Edited by Emma Sanders

Astrowatch reports on the meeting of the European Space Agency's governing body with European science ministers in Brussels in May.

Space agency looks to the future

"The decisions taken here in Brussels will set the direction for the agency for the next five years and beyond," said European Space Agency (ESA) director Antonio Rodota, following a meeting of ESA's governing body with European science ministers in May.

The ministers agreed to keep the core budget of €2112 million constant for the next four years and announced a top-up fund called "complementary science funding", which is expected to average around €10 million a year. The remaining 85% of ESA's funding is provided by governments on an "à la carte" basis – the governments subscribe to the schemes that interest them.

Following the Brussels meeting, ESA's

Scientific Policy Committee met in Berne to define the launch schedule of the major science missions up until the year 2007. The schedule comprises:

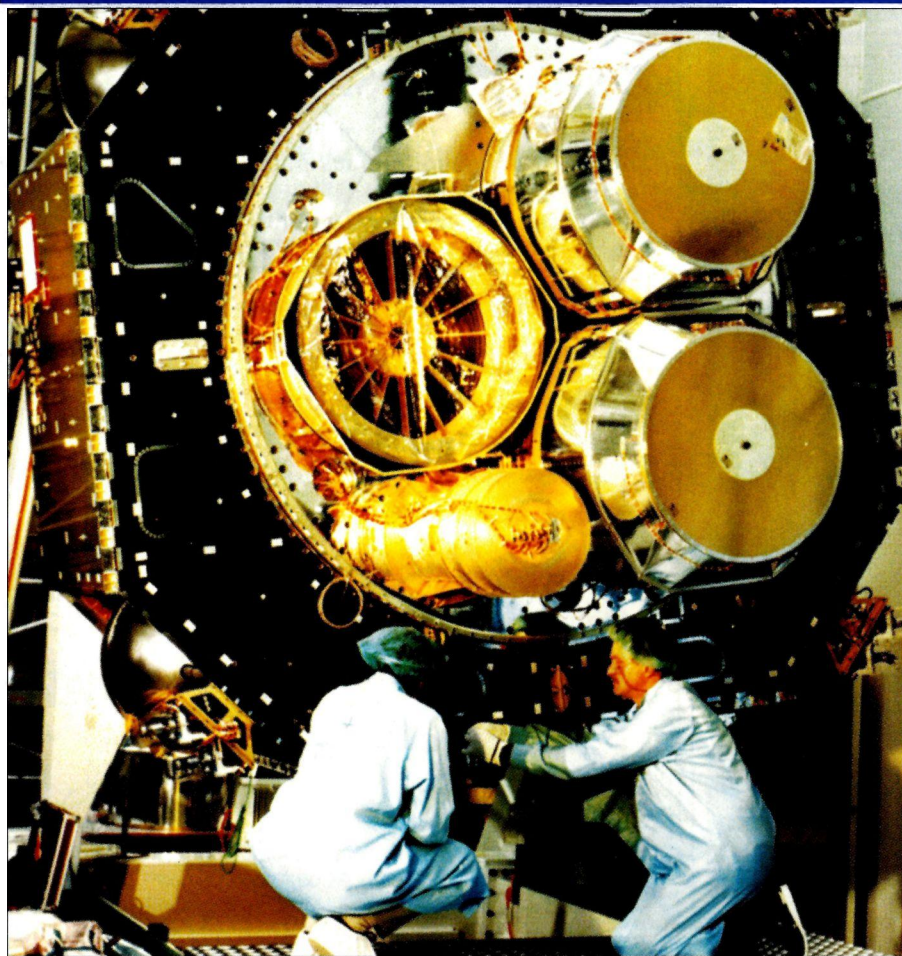
- 1999: XMM, an X-Ray telescope (see "Picture of the month");
- 2000: Cluster II, to study plasmas in the Earth's magnetosphere (March p9);
- 2001: Integral, a gamma-ray telescope with a ground station in Geneva. (November 1998 p9);
- 2003: Rosetta, a mission to land on the comet Wirtanen, and Mars Express (October 1998 p9);
- 2007: FIRST, a far-infrared telescope, and Planck, a microwave telescope (see "Planck

and FIRST given go-ahead" p14).

The space agency's contribution to the International Space Station was also confirmed. However, Hans Balsiger, outgoing chairman of the scientific policy committee, said that he had "hoped to gain more". In particular, he is worried that budget constraints will limit ESA's smaller missions, such as the SMART technology test missions that are planned for 2001.

One thing is certain: European industry will have a significant role to play. The science ministers emphasized the importance of transferring greater responsibility to industry and engaging in a wider range of partnerships.

Picture of the month



Three gold X-ray mirrors have been fitted to ESA's X-ray space observatory (XMM), which is under construction in the Netherlands. XMM stands for X-ray Multi-Mirror, and these mirrors will give the most sensitive picture of the X-ray universe ever. In particular, the telescope will be used to look at emissions from gas circling black holes and from extremely hot objects that formed when the universe was young. An additional telescope will provide complementary observations in visible and ultraviolet light. The satellite is due for launch next January. (European Space Agency.)

Correction: Alert readers will have noticed that May's image, labelled supernova remnant, was in fact a planetary nebula.

Planck and FIRST given go-ahead

The planning of two major astrophysics missions has been approved by ESA's scientific policy committee. The satellites Planck and FIRST will be launched together in 2007.

Planck is a cosmology mission that is designed to test models of the origin and evolution of the early universe by studying the cosmic microwave background radiation.

This radiation was released around 300 000 years after the Big Bang, when the universe had cooled sufficiently for atoms to remain bound together. Originally at a temperature of some 3000 K, it has now cooled to microwave radiation at a mere 3 degrees above absolute zero.

Studying small variations in this background radiation shows how matter was clumped together in the very early universe, revealing the "seeds" of future galaxies. Planck's angular resolution will be two orders of magnitude better than that of NASA's 1990 COBE satellite and its sensitivity will be improved by an order of magnitude.

FIRST (the Far InfraRed and Submillimetre Telescope) will look for planetary systems and study the evolution of galaxies in the early universe. The satellite's name is appropriate because the instrument will be able to observe certain wavelengths for the first time and will be more powerful than any of its predecessors.

To avoid background noise caused by emission from the instruments, FIRST will be cooled to 2 degrees above absolute zero by liquid helium. The telescope is the successor to ESA's Infrared Space Observatory (ISO).

For more information on ESA's physics missions, see "Fundamental physics in space" by Maurice Jacob (p16), chairman of ESA's Fundamental Physics Advisory Group.

Diamonds in space?

Results from the Infrared Space Observatory (ISO), after three years of data collection, reveal what appear to be diamonds in space.

The analysis of infrared emission from dust surrounding a dying star shows the presence of a carbon compound resembling diamond or buckyballs – football-shaped carbon molecules. Neither has been detected before in space, though their presence was predicted.

The feature originates from a complex carbon-based organic molecule (in gaseous or solid form). This shows that complex organic forms can be made by stars, over short periods (probably a few thousand years).

Understanding their chemistry will help our understanding of the origin of life.

The astronomers say that industry may benefit from their discovery. If diamonds are indeed formed in the dust surrounding stars, at relatively low temperatures and pressures, new production methods could be developed.

ISO finished collecting data last year.

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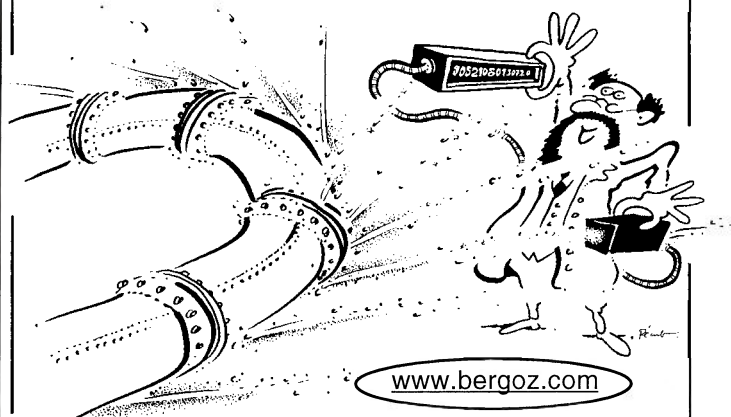
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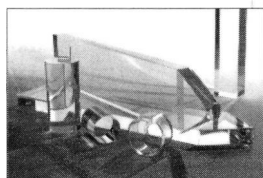
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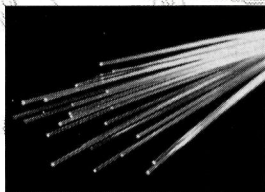
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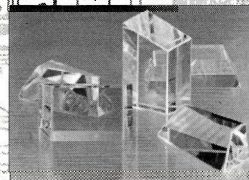


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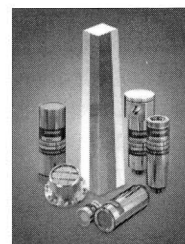
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