

II. FUTURE MISSIONS

(A) X-RAY AND GAMMA-RAY MISSIONS

RÖNTGEN SATELLITE

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The ROSAT launch on June 1, 1990 happened to be after the IAU Colloquium No. 123 before the deadline for submitting manuscripts. I therefore take the liberty to deviate grossly from the manuscript of my talk and give a short up to date mission summary. A more complete description of the mission can be found in References 1 and 2.

The launch of the Delta II rocket was perfect and the orbital parameters reached are very close to nominal: height 580 km, inclination 53°. The predicted satellite's lifetime in this orbital is at least 10 years. The switch-on of the spacecraft and instrument subsystems could be completed without any losses. All systems are in good health.

ROSAT carries two instruments:

- a large Wolter telescope covering the energy range 0.1–2.4 keV with two position sensitive proportional counters (PSPC) and one high resolution imager (HRI)
- and
- Wolter-Schwarzschild-telescope with two channel plate detectors covering the adjacent XUV-range.

The novel features of the X-ray telescope are:

- large collecting power
- good spectral resolution of the PSPC's: $\Delta E/E \sim 0.4$ at 1 keV; four colours
- low background of the PSPC's: 3×10^{-5} cts/arcmin² sec
- high angular resolution with the HRI: < 4 arcsec half power width (PSPC ~ 25 arcsec)

The ROSAT mission comprises three phases: After the initial calibration and verification phase an all sky survey is carried out during half a year, followed by a period of pointed observations.

The *calibration and verification programme* which was completed on 30 July 1990 confirmed the excellent performance of all instruments. The satellite and the ground control worked well, leading to an observational efficiency (fraction of useful time spent on targets) of $\sim 50\%$. The ROSAT "First Light" observation was performed with the PSPC and covered a field in the Large Magellanic Cloud. Highlights of this early phase are a new map of the LMC region, including a number of new sources and an upper limit of the X-ray flux from SN 1987A, the first X-ray picture of the moon, and observations of several bright supernova remnants as well as of the cluster of galaxy Abell 2252.

Y. Kondo (ed.), Observatories in Earth Orbit and Beyond, 61–62.

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The *all sky survey* represents a quantum jump in sensitivity compared with previous X-ray surveys (\sim factor 100 compared with HEAO-1). The limiting flux of the ROSAT survey will be 3×10^{-13} erg/cm² s (0.1–2.4 keV). In the XUV range ROSAT will perform the first survey ever done.

The ROSAT survey which commenced on 30 July will play a pathfinder role for further pointed X-ray missions. At the same time the survey will provide for the first time large bias-free samples of various types of sources (in particular stars, white dwarfs, galaxies, AGN's and clusters of galaxies). In order to stimulate correlated observations the ROSAT survey time line has been published in Reference 3. After the completion of the sky survey which is expected at the end of January 1991 the AO-1 pointed programme will be executed.

The *ROSAT pointed programme* will allow to carry out detailed observations of selected sources whereby the performance in terms of sensitivity, angular resolution and spectral resolution exceeds considerably that of previous X-ray telescope missions.

The announcement of opportunity for the second period (AO-2) will be issued in December 1990.

References

- Trumper, J.: 1984, *Physics Scripta* **T7**, 209
ROSAT call for proposals, technical appendix, Max-Planck-Institut für Extraterrestrische Physik, 1989.
Schmitt, J.H.M.M., IAU circular 5069, 1990.