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ROSETTA: LANDING ON A COMET

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ABSTRACT. The European Space Agency will launch in January 2003 a mission called "Rosetta" to visit a comet. This spacecraft will rendezvous with comet Wirtanen, follow it on its way to the sun in a close orbit and observe the comet core from this position. As part of the mission, a small package is carried, the "Rosetta Lander", which separates and lands softly on the surface of the comet, where it will carry out a sequence of scientific investigations.

Comets are amongst the most interesting bodies in our near space environment. They can be regarded as messengers from the time of formation of our planetary system, 4.5 billion years ago. A concise view on the origin and properties of comets in the context of the development history of our solar system is presented. The only direct information on comets available so far stems from the GIOTTO mission carried out during the last encounter with comet Halley in 1986. From the results obtained there, rough estimates are possible on the local environment near a comet and thus on the design requirements for a landing probe.

The Rosetta mission follows a complicated flight path, which will reach the comet after a number of swing-by manoeuvres that use Mars and Earth to gain momentum. The information we have on comet 64P/Wirtanen is very limited. Therefore the final parameters for separation, descent and landing will be set after close observation of the target object by the Orbiter instruments.

An overview will be given on the main components of the Lander, and short animations will be used to illustrate the Orbiter separation, descent and landing. The payload will be described, consisting of nine scientific instruments, chosen to complement each other in the fulfilment of the scientific objectives, which are discussed in some detail.

Use of CD-ROM

The bulk of the paper is given as a PowerPoint presentation on the attached CD-ROM entitled "RoLand". It is in the form of a self-explaining lecture, with automatic timing within the pages and manual continuation between them. The total running time is about 12-15 minutes. At several occasions, additional information may be called by the "?" button. You may return to your system at any time by using the "ESC" key.

For a Windows9X, ME or NT System, just insert the CD-ROM into your disk drive, where it will automatically open and run as a PowerPoint Viewer presentation. If your disc drive has not enabled the Autorun function, open the file "ppview32.exe", select "Rolandpp.ppt" and hit "show". The disc does not introduce any changes to your system nor leave residues.

If you want to use the presentation with MS PowerPoint, open the CD (right mouse key, open) and find the file "Rolandpp.ppt".