

## Project plan for Degree Project (Examensarbete, 20 p):

# The Rosetta Mars flyby

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### Background

Rosetta is an ESA (European Space Agency) spacecraft, launched towards a comet in March 2, 2004. To be able to catch up with the comet, Rosetta has to take a long route through the planetary system, including three flybys of Earth and one of Mars. At the Swedish Institute of Space Physics in Uppsala, we have built an instrument called LAP (Langmuir probe) to study the ionized gas (plasma) close to the comet. We will not reach the target comet until 2014, but while en route, we will do a close fly-by of Mars, going down as far as to 200 km above the surface. This is a good opportunity to study the Martian space environment, but to do so, we must know what to expect so that our instrument is suitably tuned.

### Project

Investigate what we may expect to see at Mars, and how we should tune our instrument. Summarize observations of the Martian space environment from the literature. Use this knowledge model what we may expect to encounter, and compare this to the performance LAP to see how we should best run our instrument. Data from the Earth fly-by in March 2004 may also be used as test cases for the Mars flyby operations.

### Plan

The work will be carried out at the Swedish Institute of Space Physics (IRF) in Uppsala. The work should start in late August 2005 and be completed by Christmas 2005. The plan is detailed in the table below. All dates, and to some extent also the content, are subject to change, which is one of the reasons for including two interim reviews in the schedule (intended for September 16 and November 11).

Start date	Task	Effective number of full-time work weeks
22 Aug 2005	Start of work. Practical arrangements, computer setup, software, literature search.	1
29 Aug 2005	Literature studies. Study measurements and models for the Martian plasma environment, and measurement principles and performance of the LAP instrument. Initiate project report.	3
16 Sep 2004	Review of initial work and planning of further work.	
19 Sep 2004	Continued studies and modelling of the Mars flyby.	8
11 Nov 2005	Review and detailed planning of further work	
14 Nov 2005	Completion of modelling, intensifying report writing.	6
22 Dec 2005	Christmas break	
2 Jan 2006	Finalizing report and presentation.	2
Mid-Jan 2006	Work completed. Presentation at seminar.	