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Europlanet NA1 Expert Program Report

Dear Maria Genzer,

From April 8 to 12, a team from the University of Tartu (UT) participated in a concurrent design study for the Cubesat for Refining Ephemerides (CURE) mission which would support the ESA's ARIEL mission by provided ephemerides with minimized uncertainty. My role in the study was Project Manager and I mostly focused on the development of the Science Traceability Matrix (STM).

The main mission of CURE is to support the ARIEL mission by observing targets with high uncertainties and thus providing accurate ephemerides. CURE must complement other facilities (ground observations, TESS, Twinkle, CHEOPS). This can be achieved by acquiring eight or more measurements per transit with the signal to noise ratio of five or more. A cost effective approach was taken by designing a mission of a three-unit CubeSat with two kinds of payload: Fibered photometer and Imager.

Each of the instruments can observe 45-60 targets from the ARIEL catalogue with a 9-cm aperture. It was also analysed that by increasing the aperture to 18 cm, which requires a larger satellite, up to 320 targets could be observed.

In order to provide a trade-off between the satellite size and the number of potential targets, the next session will be organized in the ["Design of small satellite missions for planetary studies"](#) summer school at the University of Tartu.

The mission study took place at Paris Observatory's concurrent design facility PROMESS. It was one of the first studies with external experts. We showed the feasibility to use PROMESS for rapid mission design and provided inputs for improvements, some of which were made during the week.

Please find attached the STM and the final presentation.

Yours sincerely,



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