

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Small Bodies Missions and Technologies (Part 2) (4B)

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DARKO: DUST ANALYSIS AND REMOTE SENSING OF KORDYLEWSKI DUST CLOUDS

Abstract

A Polish astronomer, Kazimierz Kordylewski, in 1961 detected two bright patches around the L5 point of the Earth-Moon system, which was later termed as Kordylewski Dust Clouds (KDCs). However, since then only 16 reported sightings have been made owing to the stringent constraints on the optimum observation conditions in the night skies for these dust clouds (around L4 and L5 points).

In the past, an attempt had been done to reach this cloud and understand better its dynamics and composition. However, the mission failed to achieve this result and thus, still much is unknown about these clouds and their origin. The composition of these dust grains would shed light on their origin, their age, and mapping their dynamics inform us about their stability around the triangular Lagrange point.

The proposed mission DARKO (Dust Analysis and Remote sensing of KOrdylewski dust clouds) aims to send a probe weighing less than 100 kg to the L5 point as the dust cloud around L5 has been observed the most and are supposedly more dense than the ones in L4. The key instruments on board DARKO include: a dust analyzer for in-situ measurements of composition and mass of dust particles; a spectropolarimeter for remote measurements of light polarization and the absorption bands due to the dust cloud. Thus, the paper proposes a mission to the less-studied dust clouds around the triangular Lagrange points of the Earth-Moon system and would dive into the essential instruments and the complete mission design for DARKO.