CASTAway - DTU Orbit (07/11/2019)

CASTAway: An asteroid main belt tour and survey

CASTAway is a mission concept to explore our Solar System's main asteroid belt. Asteroids and comets provide a window into the formation and evolution of our Solar System and the composition of these objects can be inferred from space-based remote sensing using spectroscopic techniques. Variations in composition across the asteroid populations provide a tracer for the dynamical evolution of the Solar System. The mission combines a long-range (point source) telescopic survey of over 10,000 objects, targeted close encounters with 10–20 asteroids and serendipitous searches to constrain the distribution of smaller (e.g. 10 m) size objects into a single concept. With a carefully targeted trajectory that loops through the asteroid belt, CASTAway would provide a comprehensive survey of the main belt at multiple scales. The scientific payload comprises a 50 cm diameter telescope that includes an integrated low-resolution (R = 30–100) spectrometer and visible context imager, a thermal (e.g. 6–16 µm) imager for use during the flybys, and modified star tracker cameras to detect small (~10 m) asteroids. The CASTAway spacecraft and payload have high levels of technology readiness and are designed to fit within the programmatic and cost caps for a European Space Agency medium class mission, while delivering a significant increase in knowledge of our Solar System.

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