

SPACE DEBRIS SYMPOSIUM (A6)
Modelling and Risk Analysis (2)

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THE SPACE-BASED TELESCOPES FOR ACTIONABLE REFINEMENT OF EPHEMERIS (STARE)
MISSION**Abstract**

Space-debris poses an increasing risk to space-flight safety. The rapid growth in the amount of debris on orbit can be mitigated either actively through debris removal, or passively through collision avoidance. For instance, had the operator of the Iridium 33 satellite been given accurate information in February 2009, prior to the collision with the Cosmos 2215 satellite, a small maneuver would have prevented the massive amount of debris generated by this collision. With this in mind, we have designed a constellation of inexpensive nano-satellites for the specific purpose of refining the orbits of objects that could potentially collide in the near future. Each satellite in the constellation will collect many optical images of the targets over a period of several days. The position information contained in these images will be used by state-of-the-art orbital refinement algorithms to produce accurate predictions for the distance between the target objects expected at the time of close conjunction, typically 24 to 36 hours in advance. The level of orbital accuracy expected to be achieved by this nano-satellite constellation design, based on detailed modeling and simulation, would reduce the collision warning false alarm rate for active LEO satellites by two orders of magnitude over the current state of affairs - about one warning per decade per satellite instead of the current rate of about one per month - enabling most satellites to be moved in response to these warnings. We will report on our mission and hardware design, and the status of our 3 path-finder satellites planned to be launched in the 2012 / 2013 time-frame.