

Abstract Submitted
for the NWS12 Meeting of
The American Physical Society

Evaluation of Low-Thrust Propulsion Options for Cargo Missions to Near-Earth Objects¹ CHRISTOPHER GROCHOWSKI, JONATHAN HOFF, Whitworth University — This study evaluated the ability of eight existing ion and Hall thrusters to meet some of the key requirements of the OSIRIS-REx mission – to carry a dry mass of 750 kg to the asteroid 1999RQ36, land on it in 2019, stay for 219 days, and return it with a 10 kg sample to Earth. The thrusters were chosen based on demonstrated performance and lifetime characteristics at power levels higher than 5 kW, and were evaluated for this mission at their measured performance levels. It was shown that all the evaluated thrusters could complete the mission in a significantly less time (< 4 years) than the current 7-year round-trip plan of the OSIRIS-REx mission, and still remain within the mass requirements of conventional launchers considered for the mission (10000 kg at 500-km LEO). This study was conducted with a fixed landing date, and did not specifically estimate the shortest trip possible. Because it was assumed that the thrusters always operated at full power, and did not consider throttling to reduce fuel requirement, there could be other options to save even more time and fuel with these thrusters than what has been discussed here.

¹Supported by NASA Washington Space Grant Consortium

Kamesh Sankaran
Whitworth University

Date submitted: 10 Sep 2012

Electronic form version 1.4