

## Courier XL SEP Module

### Product Overview

ExoTerra's Courier XL Solar Electric Propulsion Module delivers up to 9.4 km/s to a 150 kg Payload. The revolutionary system enables delivery of 175 kg microsattellites to GEO from a small launch vehicle delivery to LEO. It's optional bus module supports interplanetary missions throughout the inner solar system.

Courier begins with ExoTerra's Halo12 Hall Effect Thruster. Halo operates between 250-1000W and can process >250 kg of propellant for high impulse missions.

Courier XL is powered by ExoTerra's high specific power Fold Out Solar Arrays (FOSA). The arrays provide up to 1500 W of power to payloads during operations.

Courier XL Provides >11000 m/s  $\Delta V$  and fits within Small Launch Vehicles

### Small Launch Vehicle Upper Stage

ExoTerra's high impulse Solar Electric Propulsion Module, Courier XL, enables microsatellite transfer from LEO to GEO, Cislunar and Interplanetary destinations. With Courier XL, microsattellites can now reach distant destinations from a dedicated small launch vehicle. Courier's 6000-11,000+ m/s  $\Delta V$  offers the ability to optimize the mission orbit by adjusting inclination or raise orbit altitude after a drop-off, reduces life cycle cost by extending mission lifetime, enables end of life deorbiting, or performs large orbit insertions. In addition, the module's high specific power solar arrays can deliver up to 1500W of power to the payload when the thruster is not in use, expanding payload performance options and increasing telecommunications potential. Designed for interplanetary missions, the 100 kRad electronics offer extended mission lifetime and reliability to any mission.

A bus module can be added to the system to transform the stage into a full bus for GEO or interplanetary missions. The bus module adds improved telecommunications, pointing and processing capability. Contact ExoTerra for details.

**Customer Interface:** 24" Lightband

**Customer Mass:** Up to 200 kg

**Customer Power:** up to 1.5 kW

**Propellant Capacity:** 225 kg

**$\Delta V$ :** 6-11 km/s

**Thrust Range:** 96-138 mN

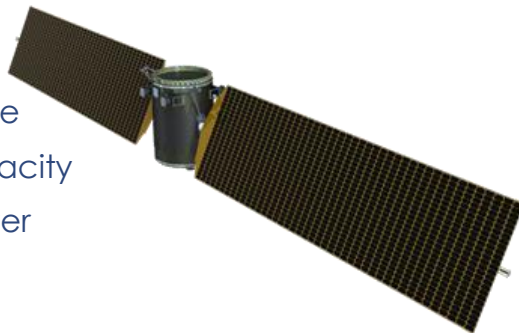
**Radiation Tol:** 100 kRad

**Propellant:** Xenon or Krypton

**ESPA Payload Volume**

**200 kg Payload Capacity**

**1500 W Payload Power**



**100 kRad Electronics**

**96-138 mN Thrust**

**6-11 km/s  $\Delta V$**



**Courier XL Expands Small Launch Vehicle's Reach to GEO, Cis-Lunar and Beyond**

For more information contact:

## About ExoTerra

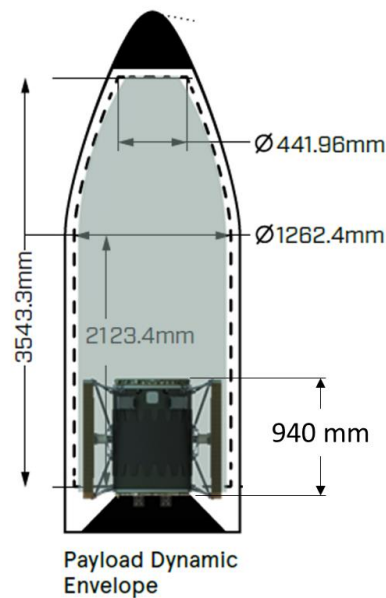
ExoTerra was founded in 2011 with a vision of reducing the cost of space exploration. We pursue this goal by developing affordable technologies that reduce the cost of gravity by minimizing spacecraft mass through electric propulsion, miniaturization of components, and in-situ resource utilization.

## Bus and Module Options

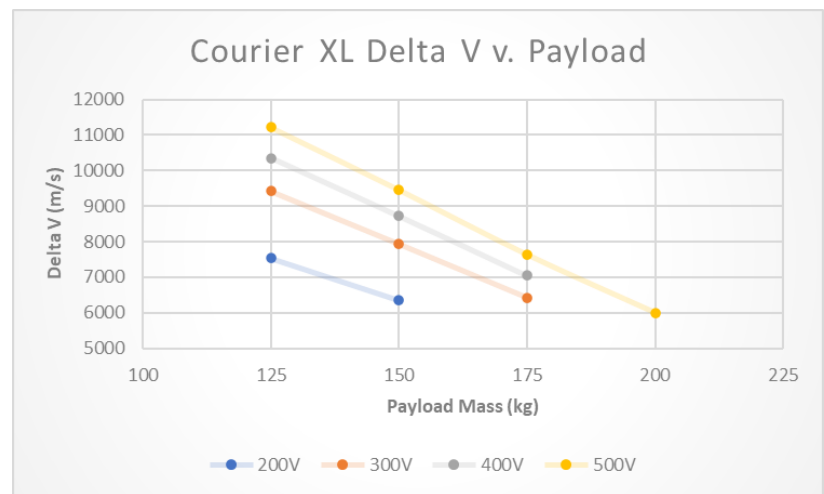
The standard Courier XL system is designed to fit with a Virgin Orbit LauncherOne. ExoTerra has variations that can fit within standard rideshare volumes or alternative small Launch Vehicles. ExoTerra also offers stand-alone SEP and propulsion modules that can be attached to customer supplied spacecraft. Please inquire about details.

## Courier XL Development Status

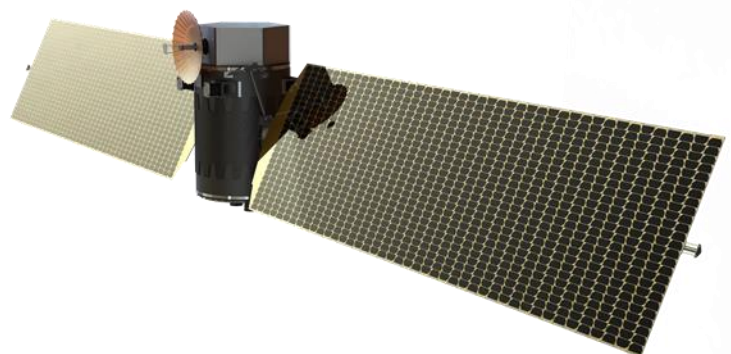
ExoTerra's Solar Electric Propulsion Components have completed flight qualification testing. A prototype Courier XL is being built and tested under the NASA SBIR program with support of Virgin Orbit.



**Courier XL in Virgin Orbit LauncherOne Fairing**



**Courier XL Performance Envelope.**  
Higher Voltages Trade  $\Delta V$  for Trip Time



**Courier XL with Optional Bus Module**

For more information contact: