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EDDE

The ElectroDynamic Debris Eliminator

Trash in the Skies III: Active Debris Removal
Russell Senate Office Building, 2 Nov 2017

Jerome Pearson, Star Technology and Research, Inc.
Joseph Carroll, Tether Applications, Inc.
Eugene Levin, Electrodynamic Technologies LLC

STAR, INC.

The Revolutionary EDDE Spacecraft

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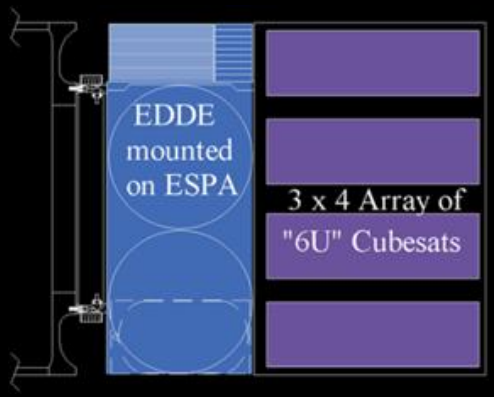
- **The propellantless EDDE sails in the magnetic field like a clipper ship in the wind**
- **Solar arrays provide the current, and the Earth's magnetic field provides the force for orbit transfers without rockets**
- **An 80 kg EDDE takes under half an ESPA slot**



EDDE in ESPA Slot

EDDE can master LEO like clipper ships mastered the oceans

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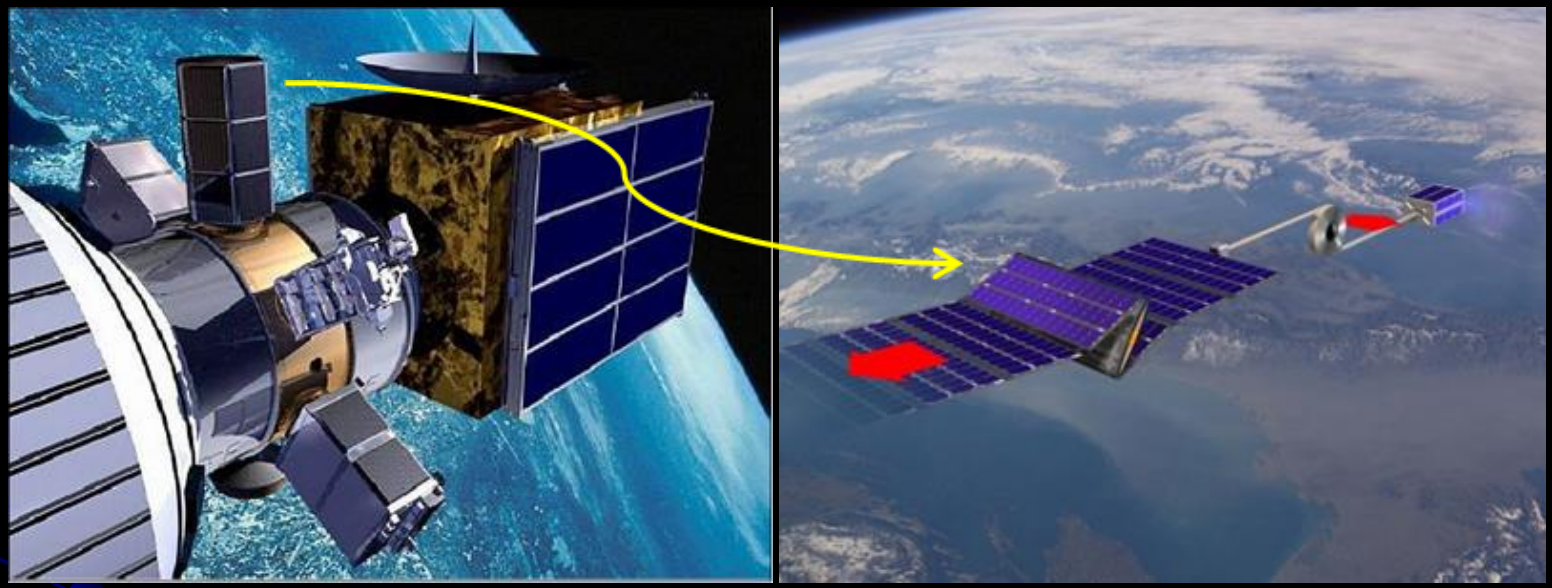
EDDE on DVD for “Gravity”

Narrated by Ed Harris, Apollo 13 “Mission Control”

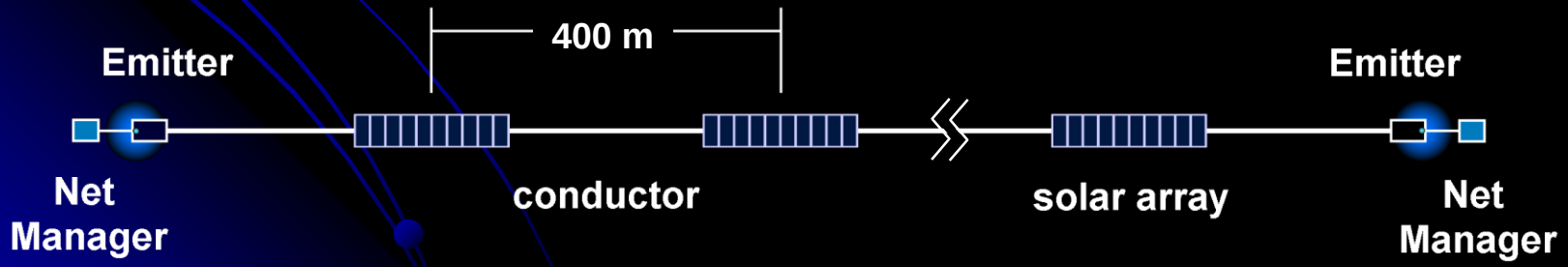
http://www.star-tech-inc.com/id121.html

Low-Cost Secondary Payload

- Deploy from ESPA ring (shown) or Dragon spacecraft:



- After components deploy, spin pulls them out to full length



EDDE is Affordable

The task: remove all 2600 objects over 2 kg (2200 tons) from LEO

Propulsion	Example	Cost to Develop	Launch Mass, MT	Program Cost	Cost/kg
Chemical Rocket	ESA	Existing	3500	$57B	$26,000
Ion Rocket	Busek	$80M	52	$4.4B	$2,000
EDDE Vehicle	STAR, Inc.	$18M	1	$0.8B	$350

- Chemical rockets: thousands of tons on dedicated launch vehicles
- Ion rockets: scores of tons on dedicated launch vehicles
- EDDE: less than one ton secondary payload on a single launch

EDDE Status, Challenges, Plan

STATUS:

- **$4M in AF, NASA, DARPA funding**
- **EDDE designed and tested; ready to be built and demonstrated in space**
- **STAR team includes NASA, Boeing, and Naval Research Lab**

Challenges:

- **Technical: demonstrate deployment and control**
- **Operations: "space control" agency for flight plans and clearances**
- **Policy: commercial contracts for removal by US/international agencies**

Plan

- **Build and fly EDDE space demo in 3 years**
- **Remove all LEO debris >2 kg in 10 years**
- **Stop Kessler Syndrome to keep LEO safe**

LEO Debris Removal by EDDE