

A person in a white space suit with a large clear helmet and a backpack is standing on a red, rocky planet. They are holding a long pole with a Finnish flag attached to it. The background shows rolling red hills under a clear blue sky.

Boosting Planetary Data Flows and Space Travel with Solar Wind

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James Wheeler, CC-NC-SA





Tunguska 1908

Earth

Weather

Climate change

Wars

Asteroid impact

Maintenance costs:

- **power**
- **cooling**





SPACE

Space weather – no rain, no hurricanes

No climate change – stability

No biosphere – simplicity

Divided risk – safekeeping

Cheaper maintenance? Solar power and free cooling

Building and data transfer expensive and slow





**Other planets and
space stations?**



**Pics from:
Mars Desert Research Station
MDRS in Hanksville, Utah**

**All technology is
science fiction
until it isn't.**

2021 Ingenuity





Pic: Heikki Holstila, CC



Off-the-shelf servers in space

Spaceborne 1, 2017, 24/7/365 benchmarking

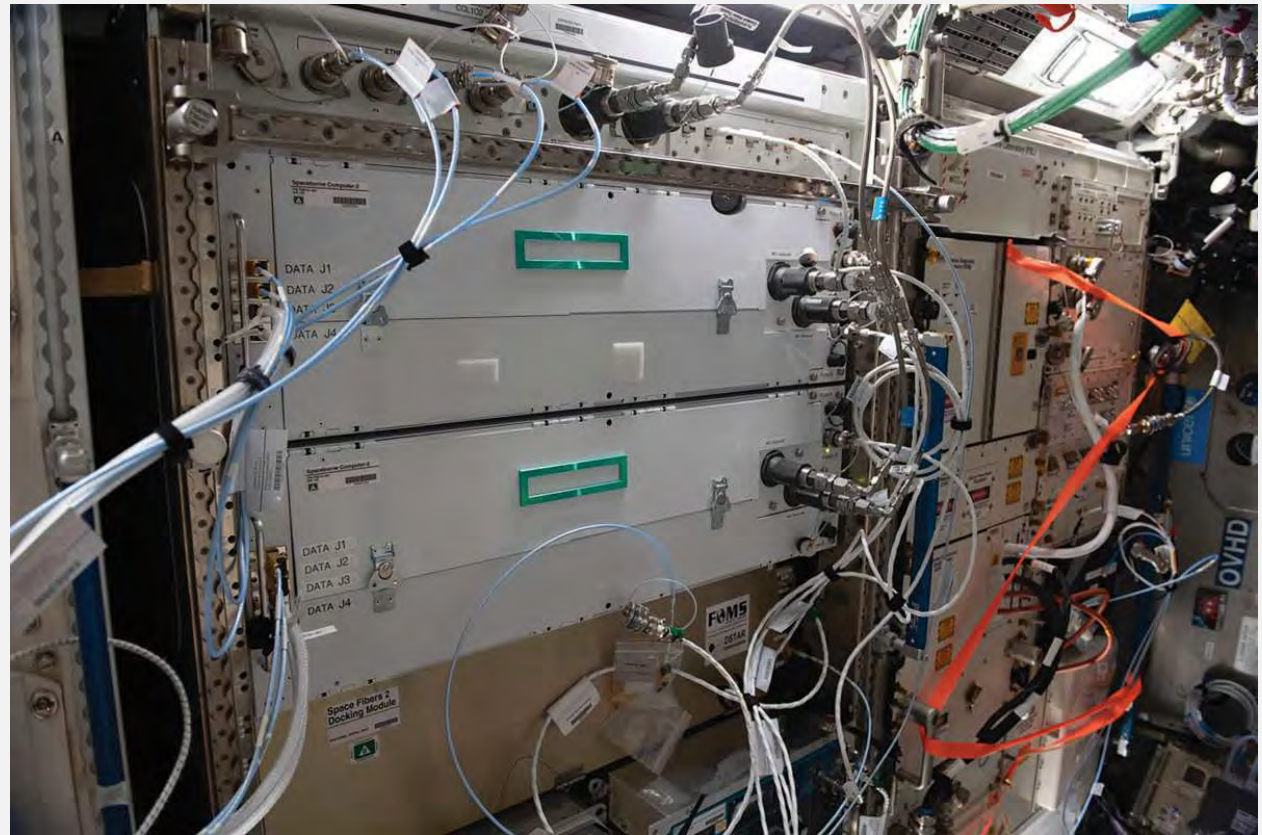
2 servers 2 years on orbit:

SSD:s 9/20 failed vs. 1/20 on Earth.

5 times more mistakes.

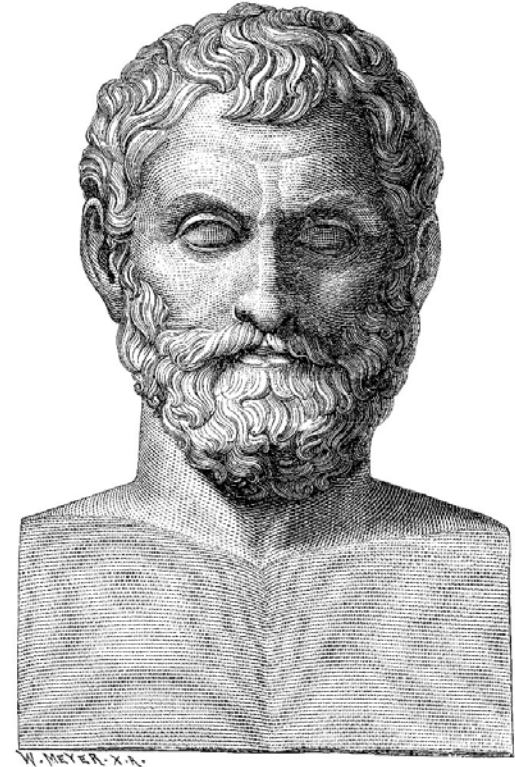
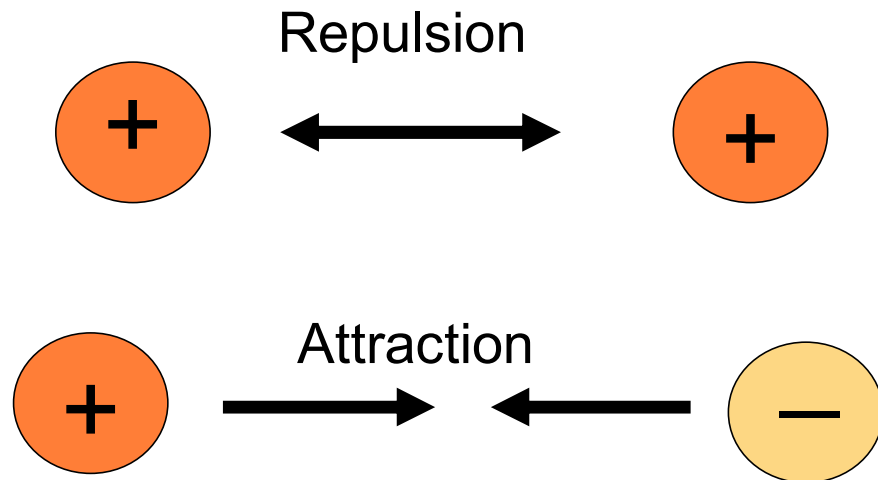
Spaceborne 2, 2021, normal use
goal 3 years (Mars and back).

- Automatic image interpretation
- AI
- Astronaut DNA analysis
from 12 hours down to 2 sec.



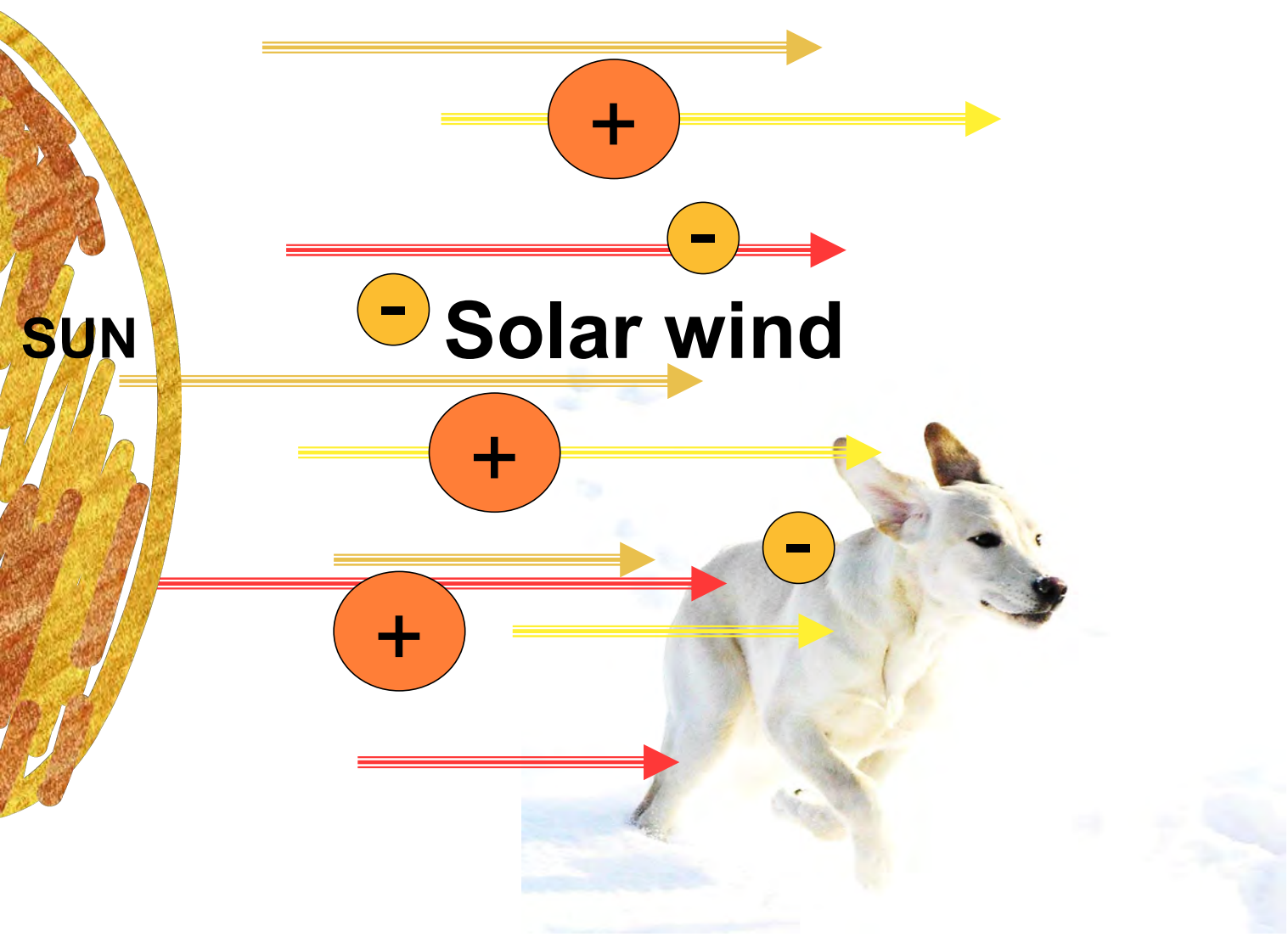
Pic: NASA

Physics!

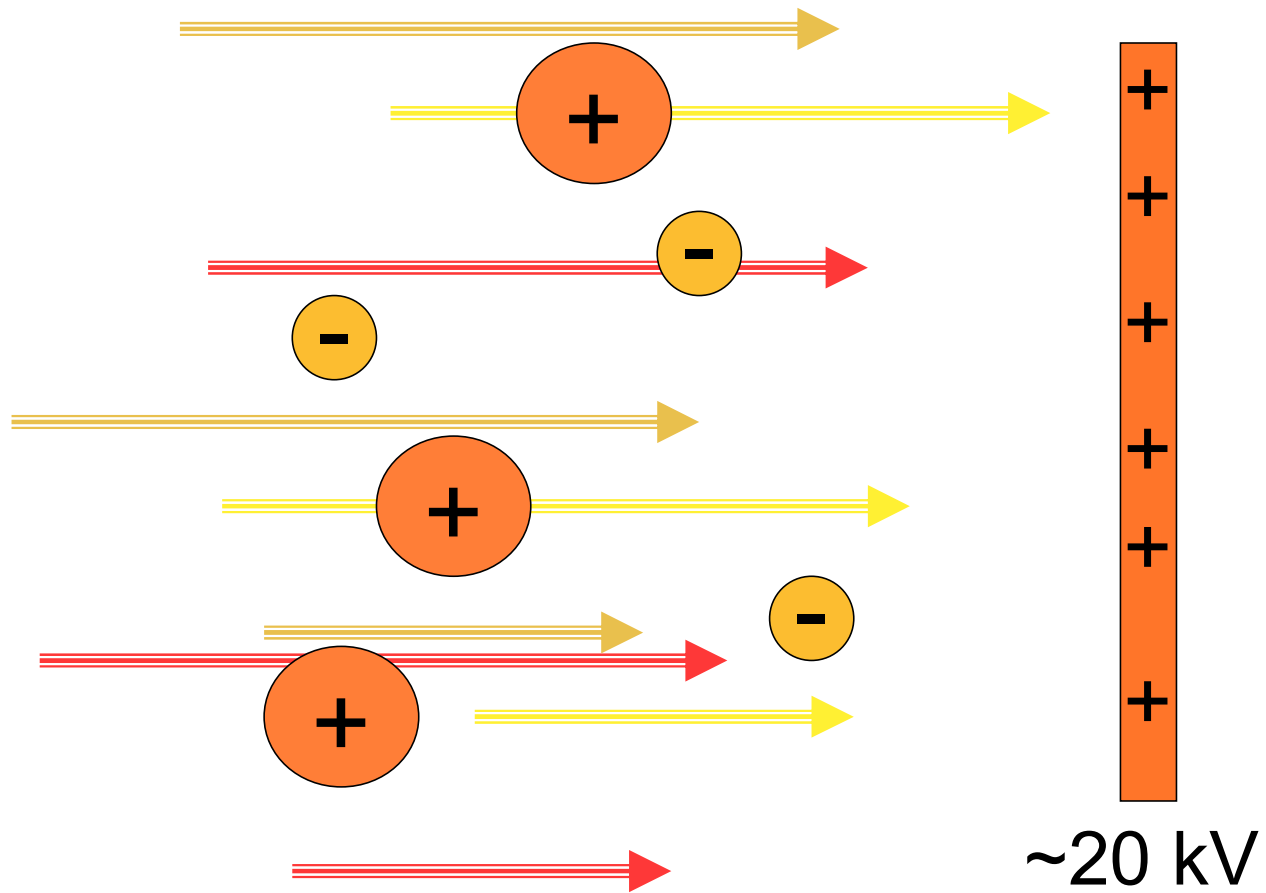


600 AD

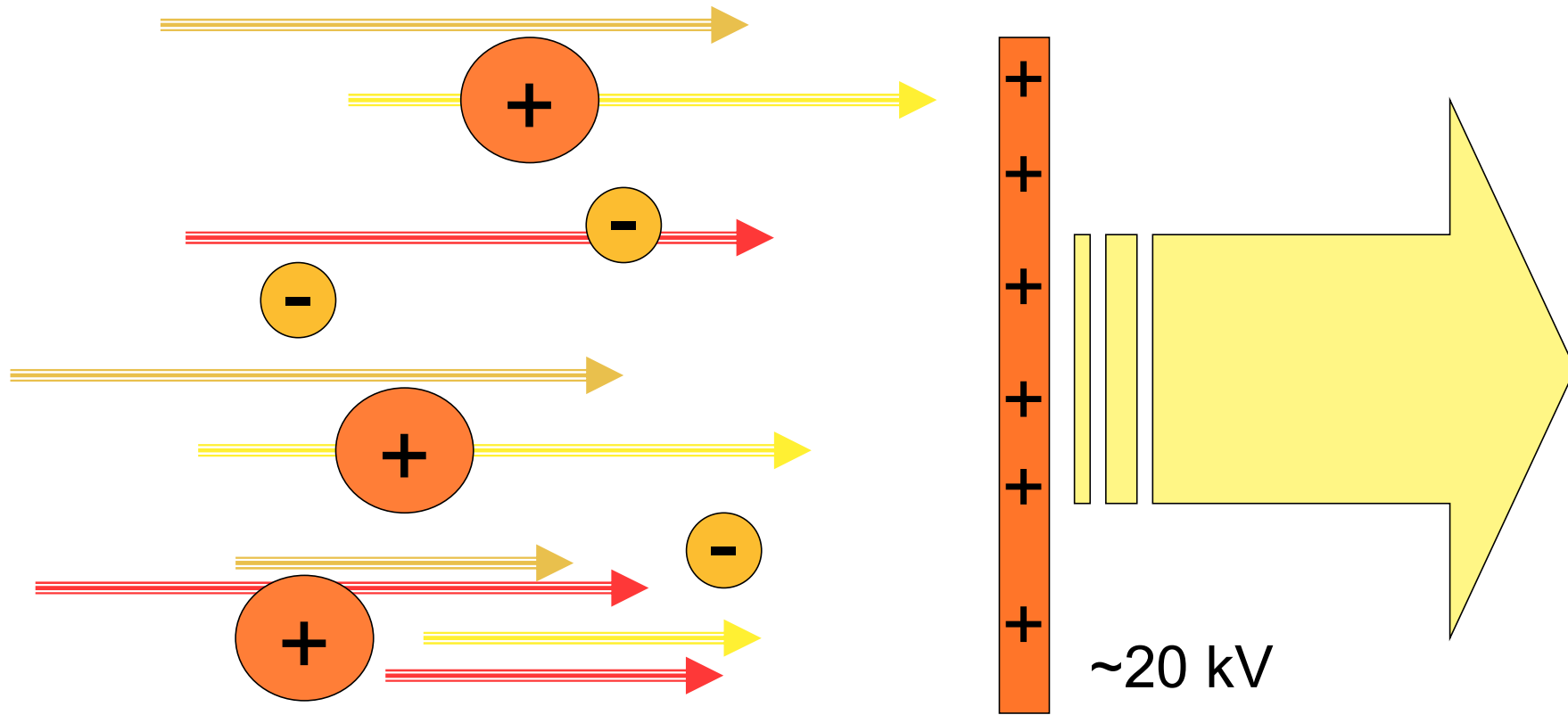
Thales of Miletus



If we put a charged object in the solar wind stream...



We'll get a push!



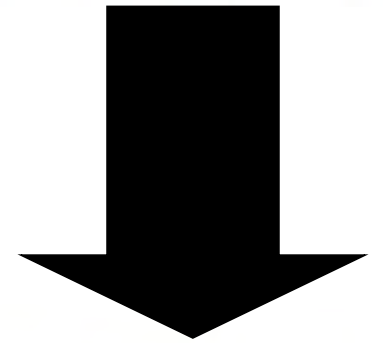
How much force do we get?

~0.5 mN/km →

2000 km of wire produces ~

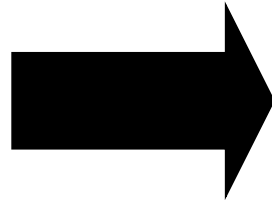
1 Newton

...for example 100 x 20 km wires.



Does not sound like much?

If that apple pushes your space taxi



...after a year in free space your velocity is 31 km/s, that is

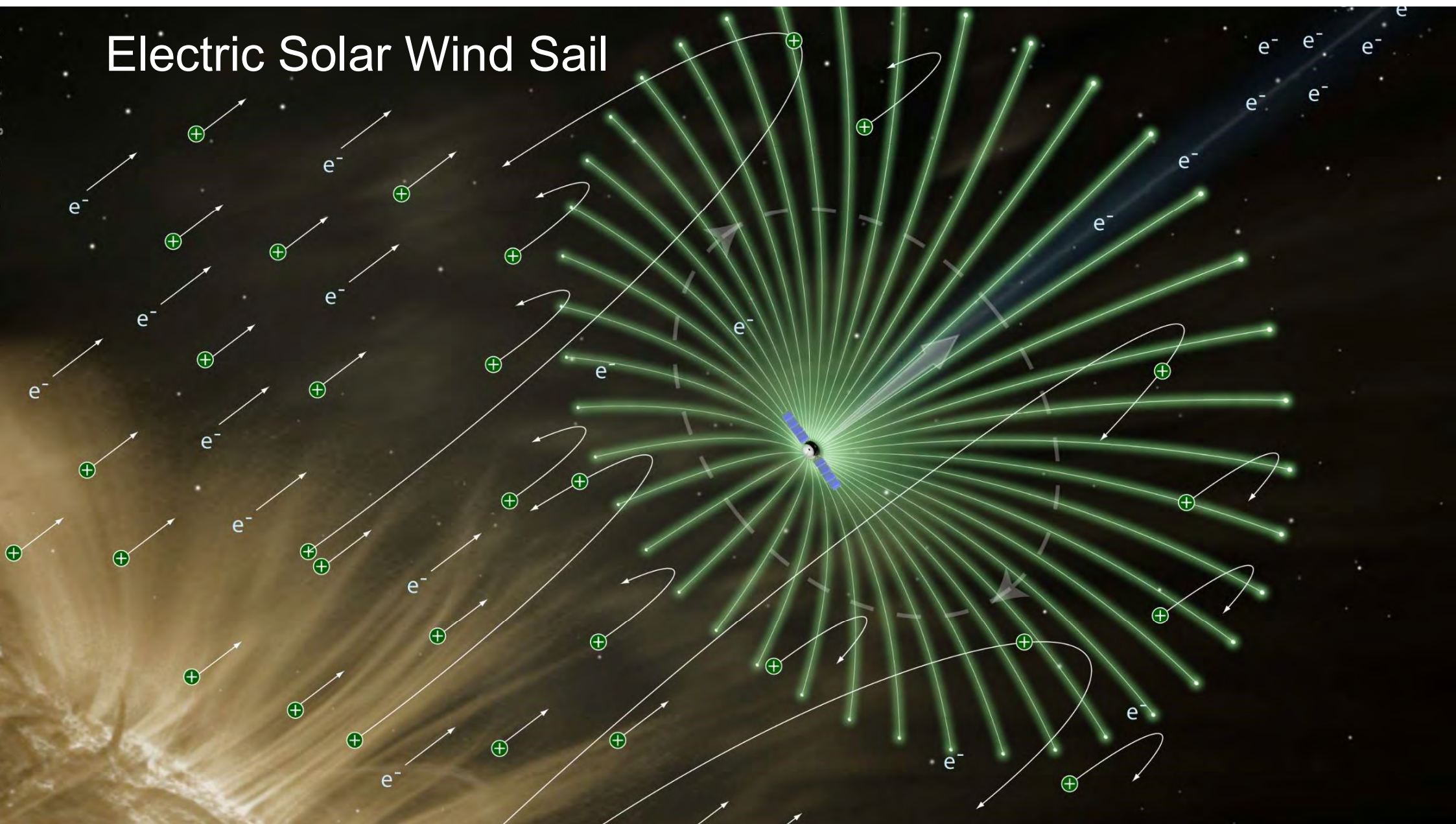
110 000 km/h (68 000 mph)

Constant acceleration without ANY fuel consumption leads to unfathomable speeds!!

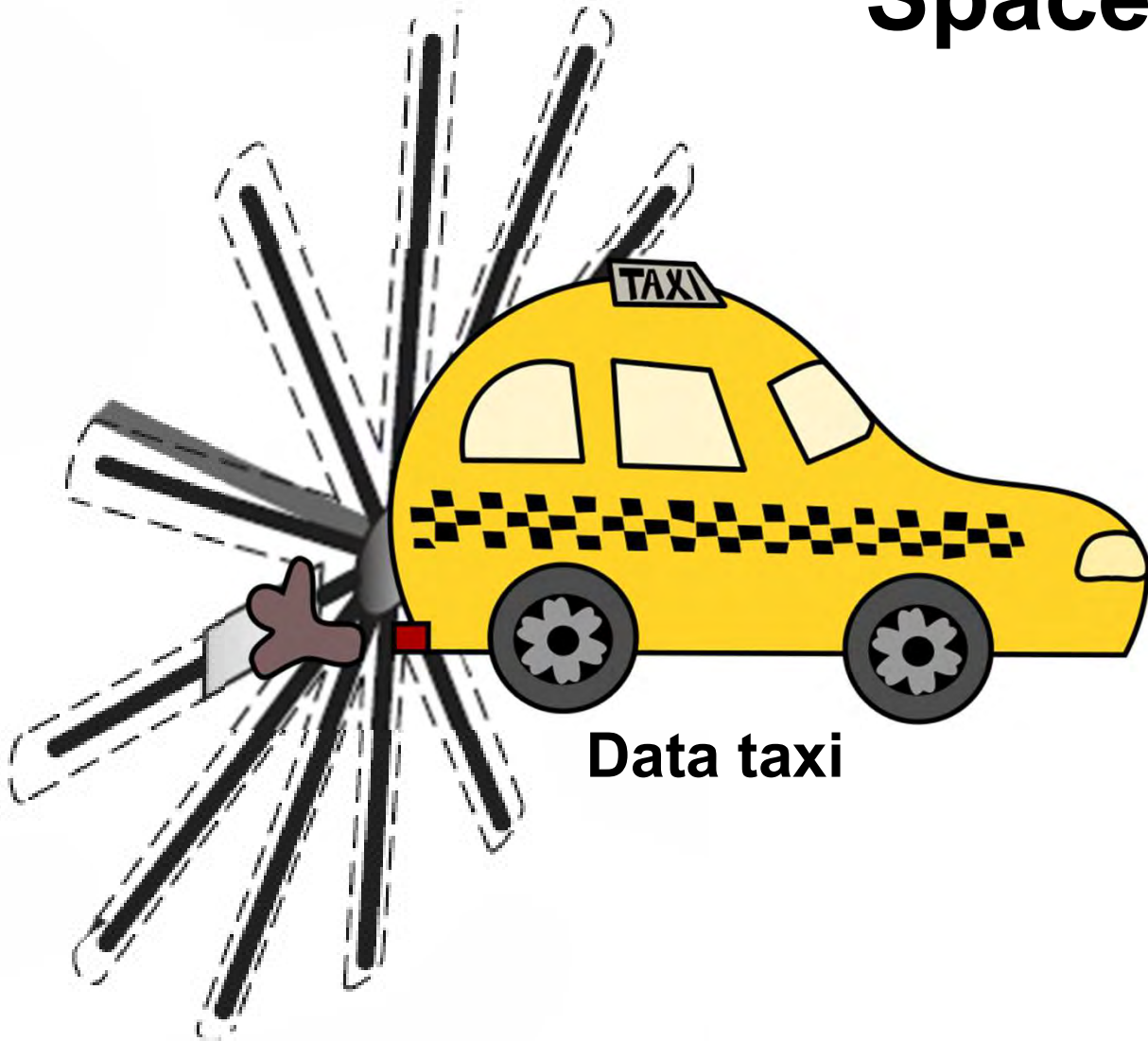


2000 km of wire,
how do we manage that?

Electric Solar Wind Sail



Space taxi



Data taxi

Building infra

Asteroid mining

New science

High volume hard
drive data transfer

Even towing an
asteroid and saving
the day!

A photograph of two people in white space suits riding ATVs in a desert landscape. The suits have the numbers '4' and '2' on the back. They are riding away from the camera on a dirt path. The background features rolling hills and mountains under a clear sky.

Ad astra!

- to the stars -

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