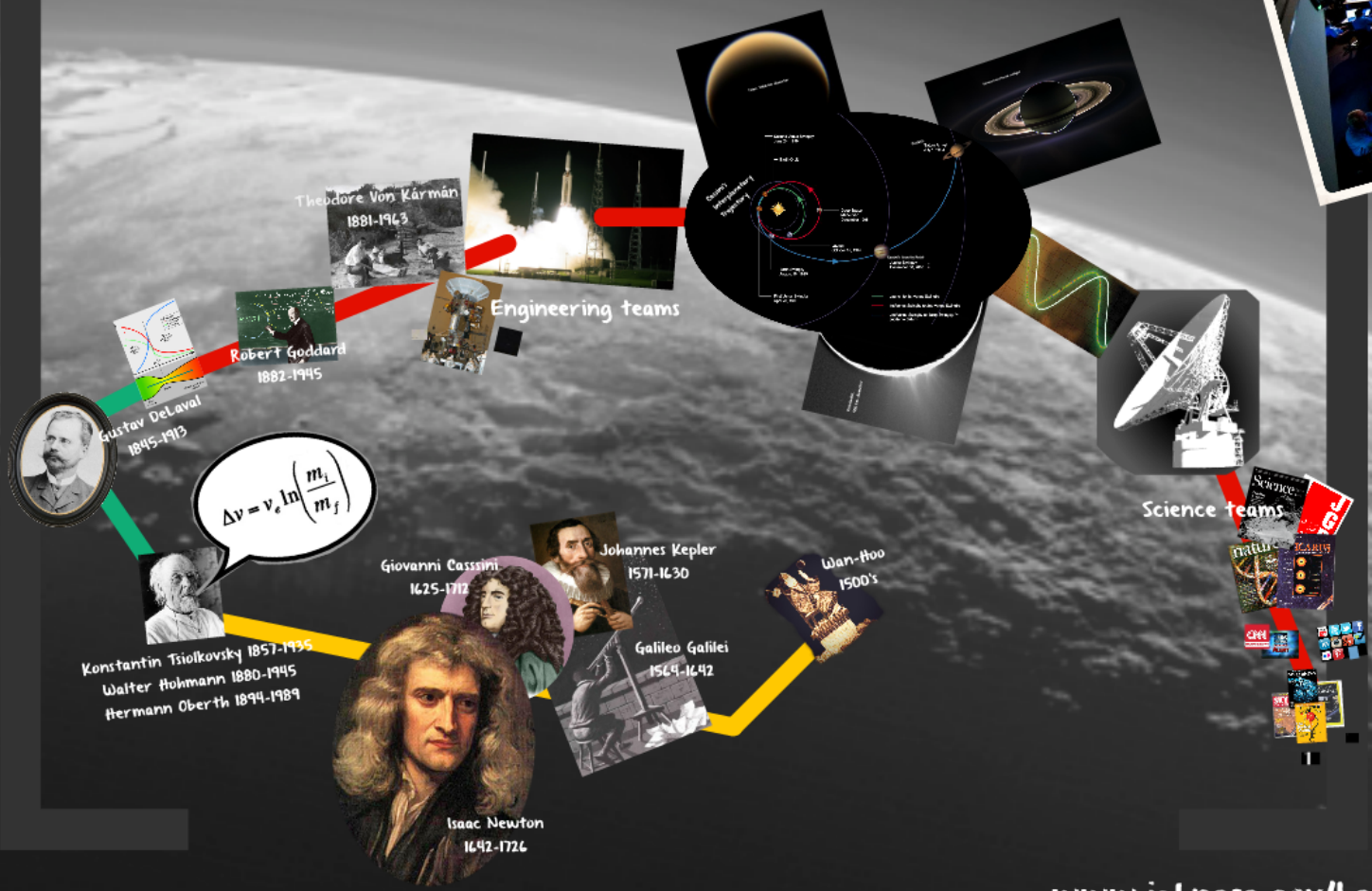
The View From Mission Control:
Dave deconstructs interplanetary flight, to see how it all works,
with an eye towards Cassini's 2017 Grand Finale plunge into Saturn.
Engineering teams
Science teams
Robert H. Goddard
1882-1945
Walter Dehmel
1940-1983
Giovanni Cassini
1625-1712
Johannes Kepler
1571-1630
Galileo Galilei
1564-1642
Isaac Newton
1642-1726
Hermann Oberth 1894-1989
www.jpl.nasa.gov/basics

The View From Mission Control:

Dave deconstructs interplanetary flight, to see how it all works, with an eye towards Cassini's 2017 Grand Finale plunge into Saturn.



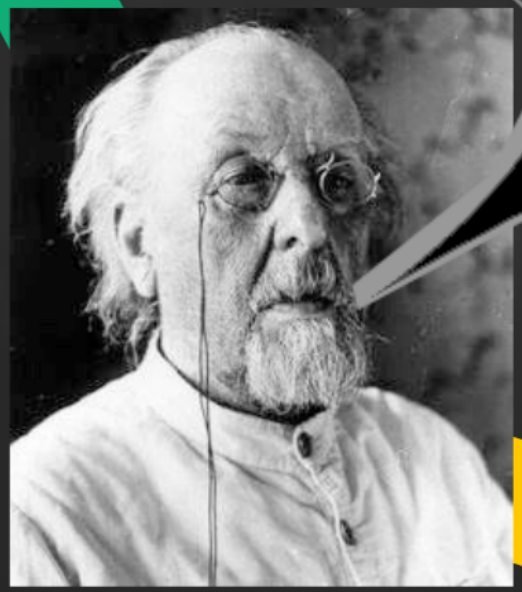
www.jpl.nasa.gov/basics

Wan-Hoo
1500's

nes Kepl
1571-1630
Galileo Galilei
1564-1642

Giovanni Casssini
1625-1712
Johannes Kepler
1571-1630
Galileo Galilei
1564-1642
Isaac Newton
1642-1726

$$\Delta v = v_e \ln\left(\frac{m_i}{m_f}\right)$$

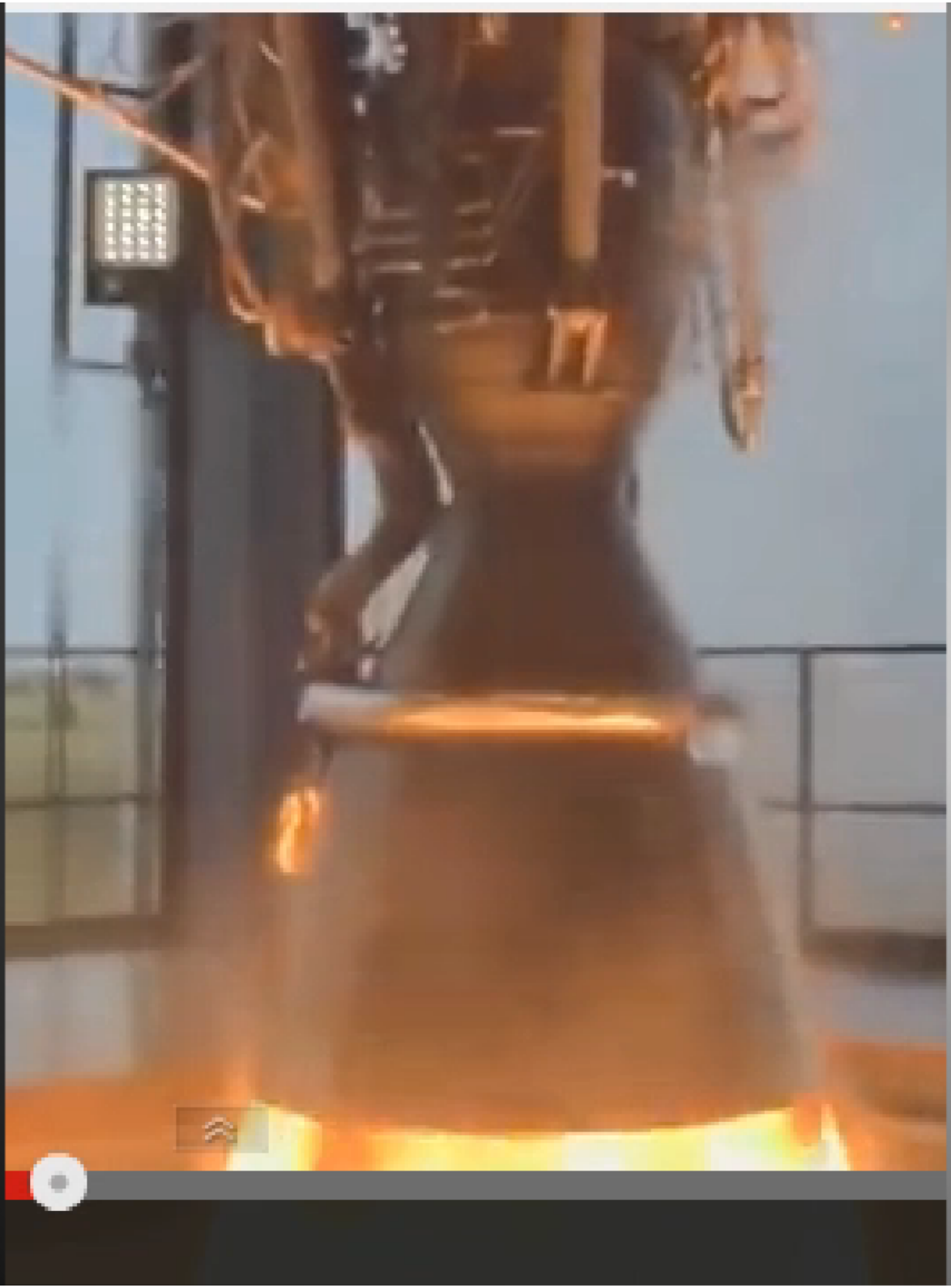


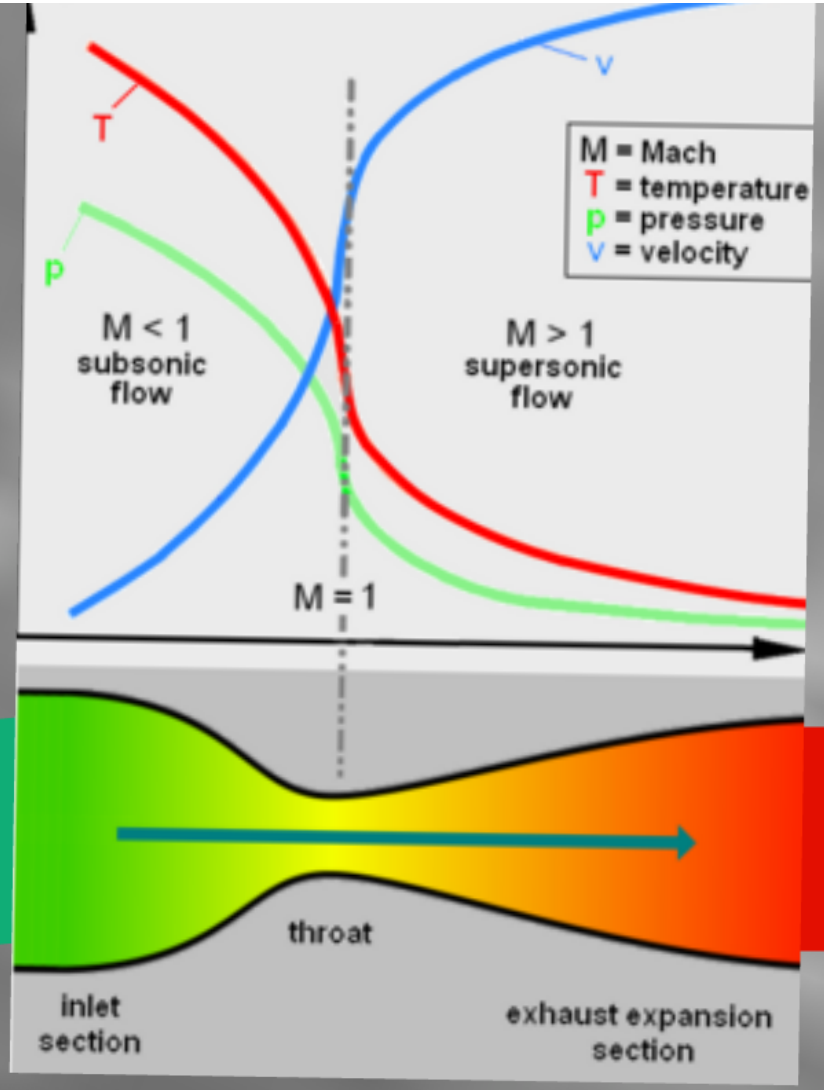
Konstantin Tsiolkovsky 1857-1935

Walter Hohmann 1880-1945

Hermann Oberth 1894-1989

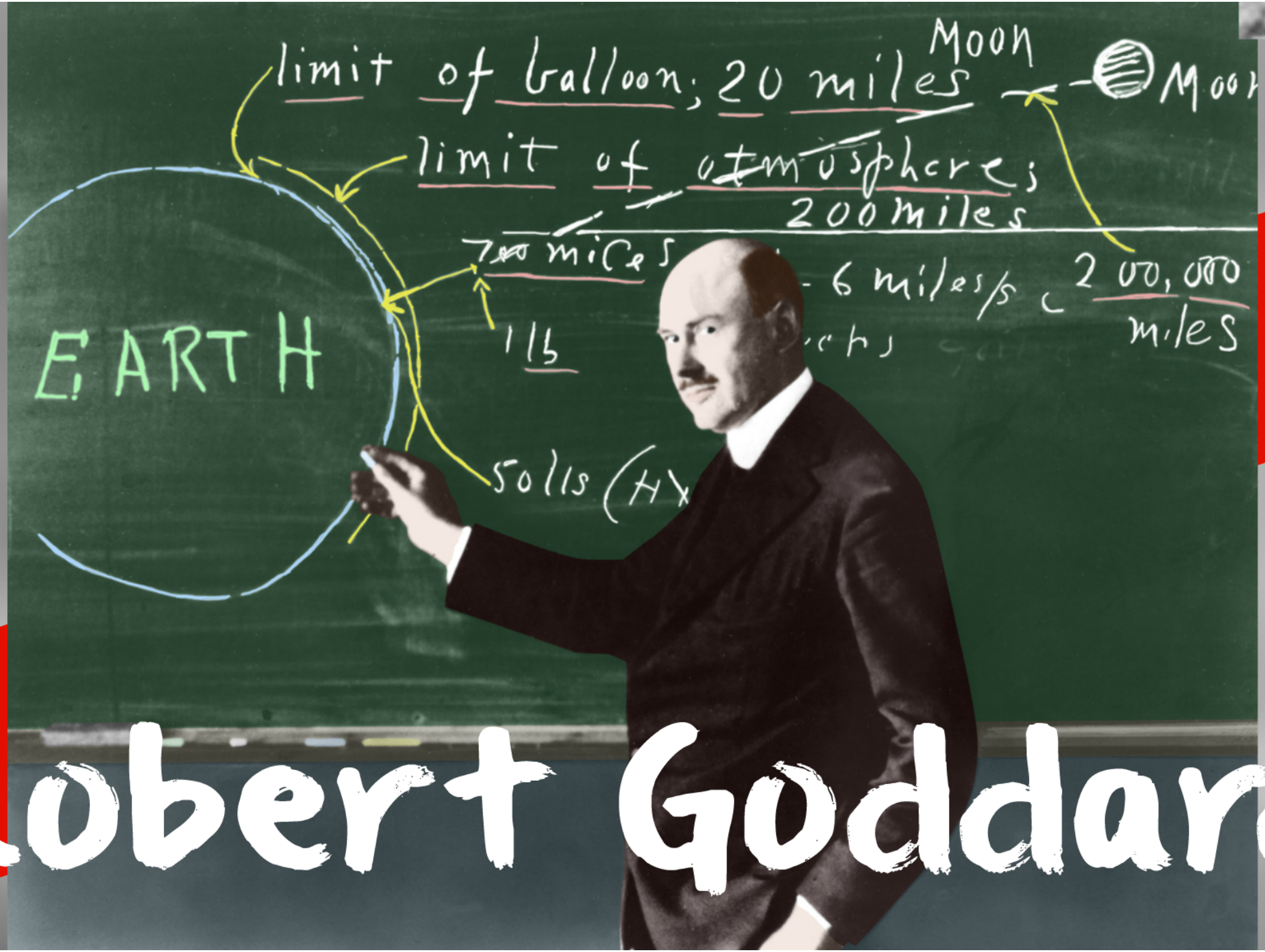
$$= v_e \ln$$





Gustav DeLaval

1845-1913



obert Goddar

odore Von Kármán

1881-1963

Rudolph Schott,

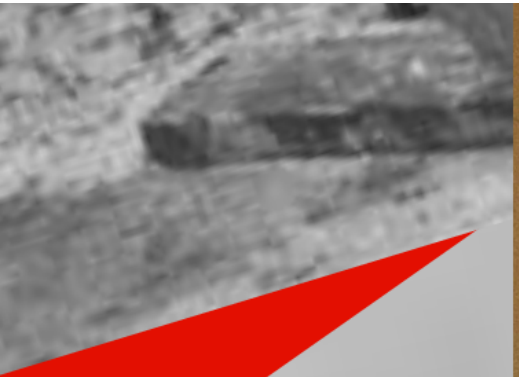
Apollo Smith,

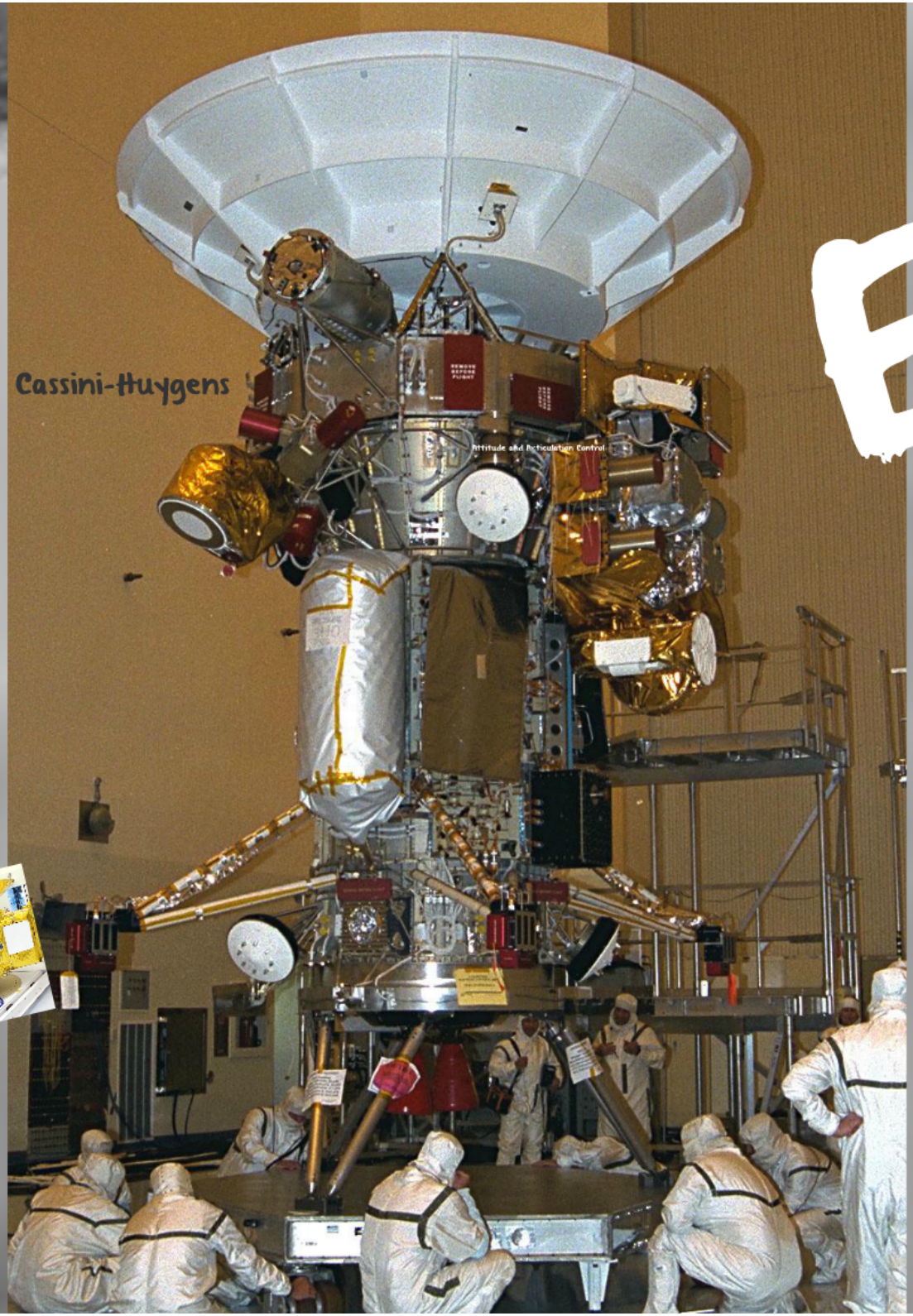
Frank Malina,

Hsue-Shen Tsien,

Ed Forman,

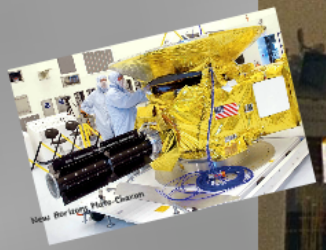
Jack Parsons, . . .

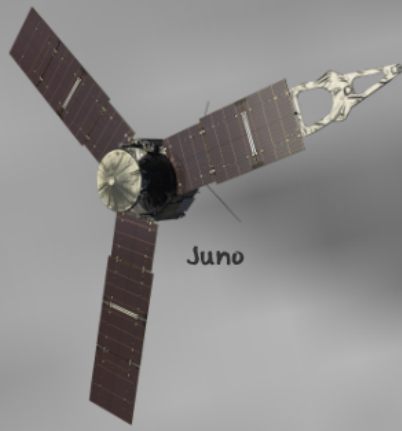




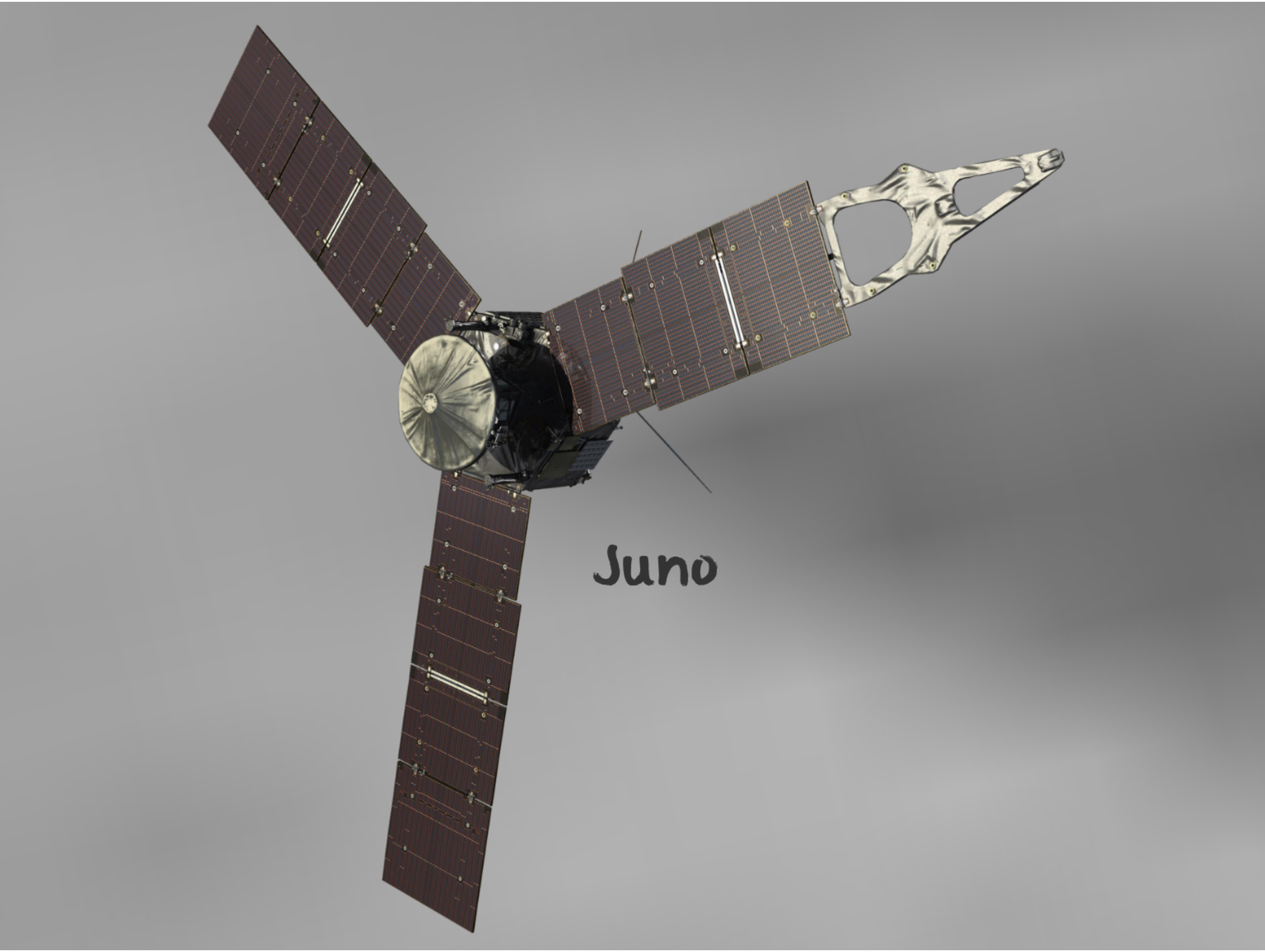
Cassini-Huygens

Eng



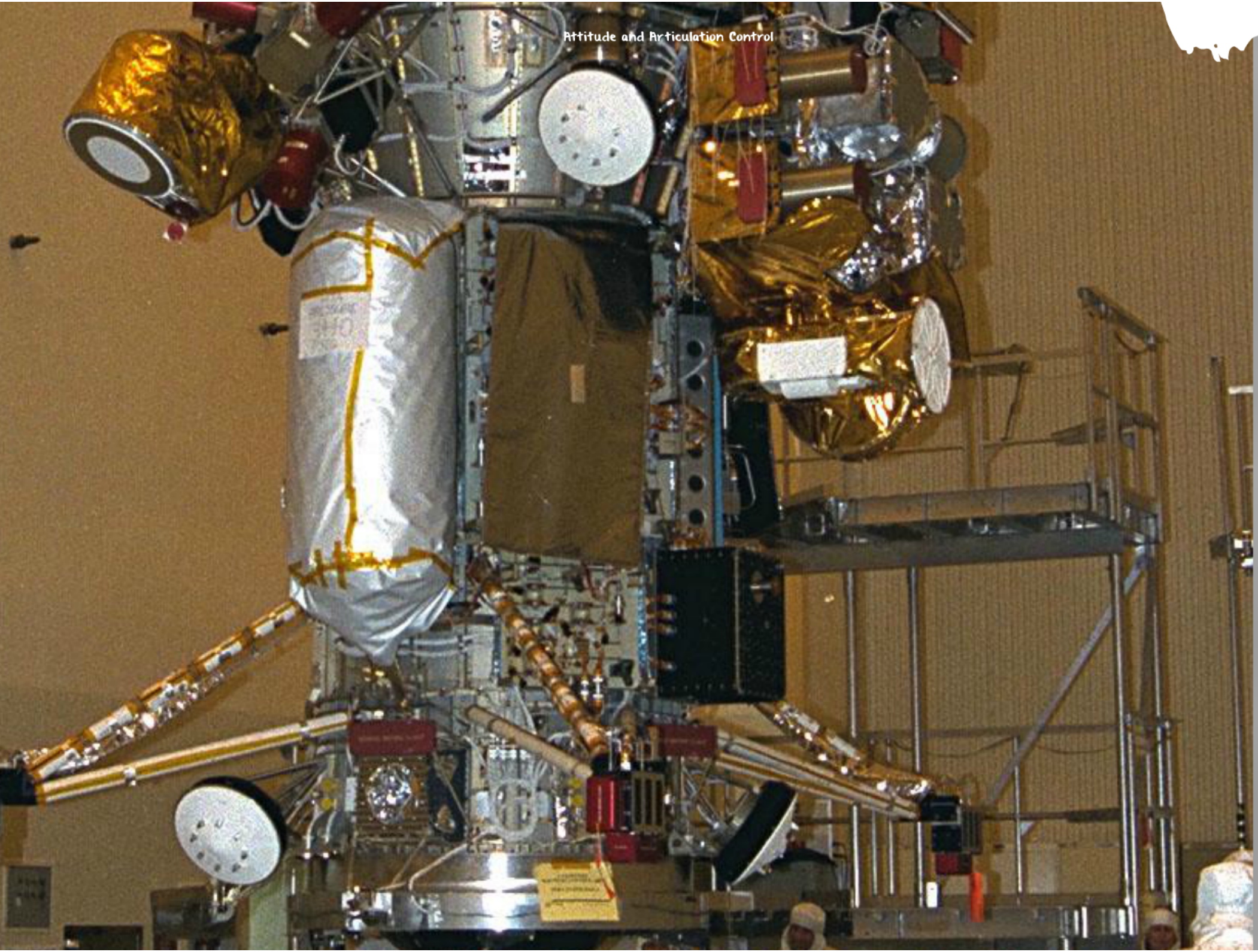


Juno

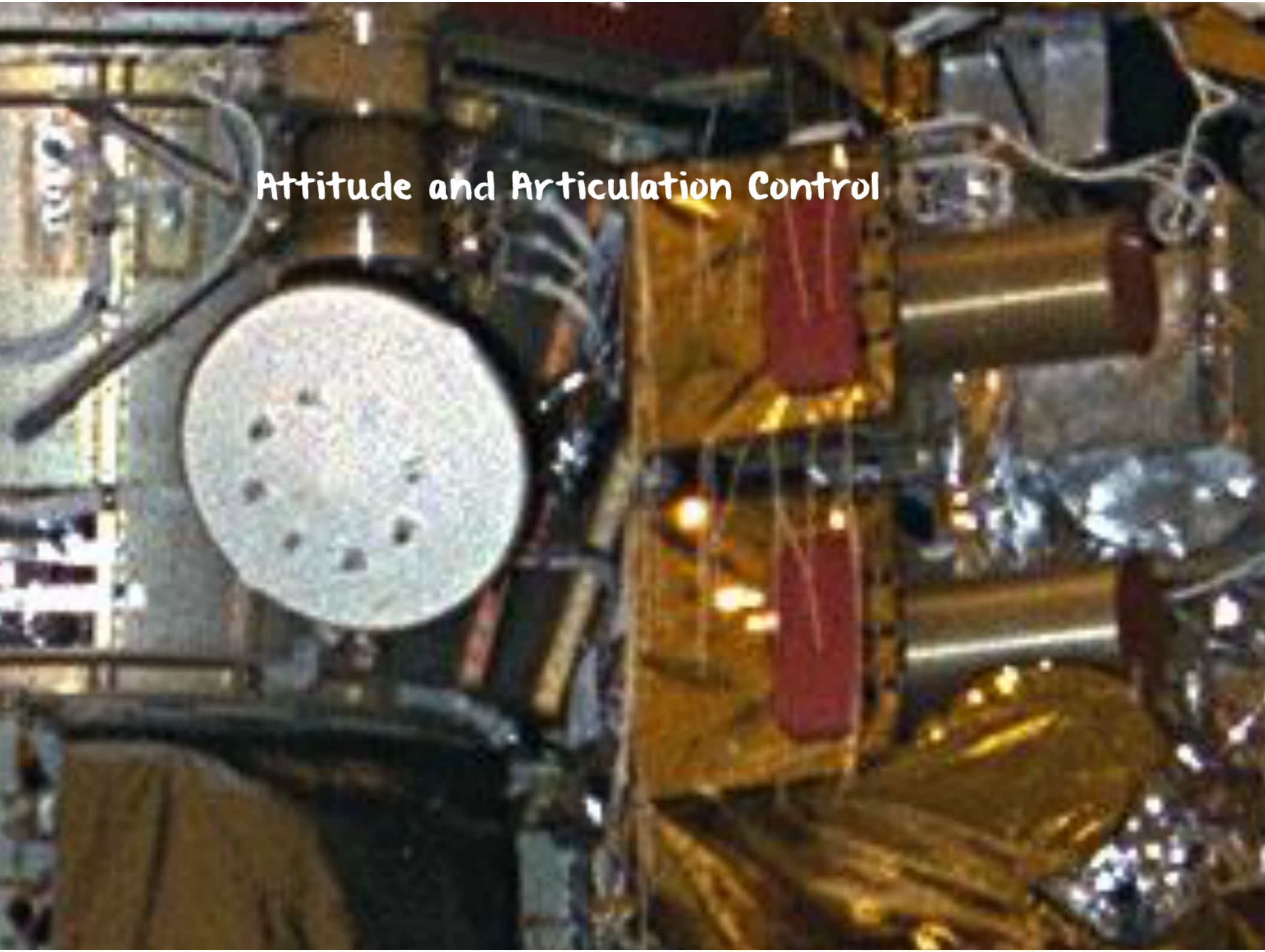

Juno

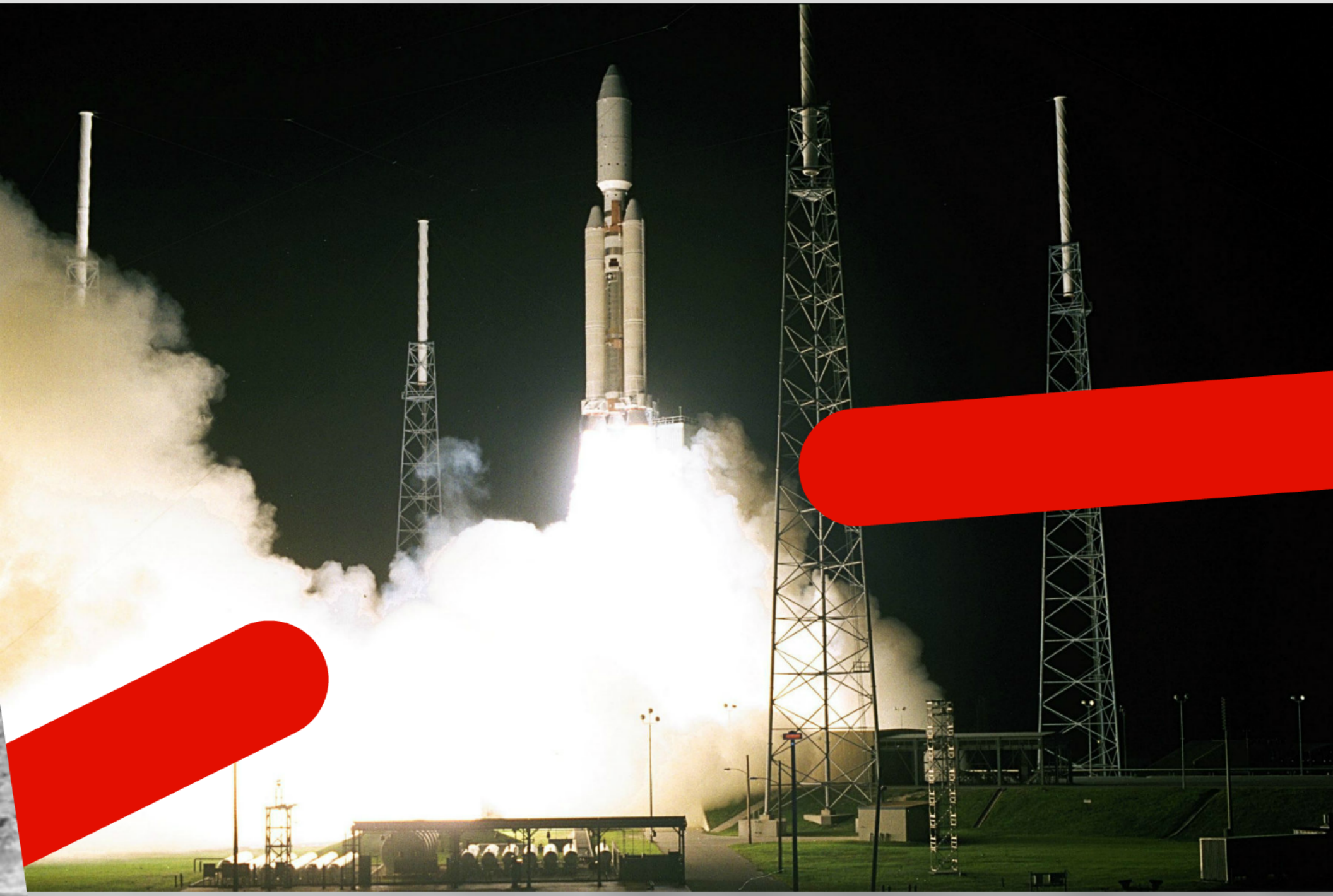
w Horizons Pluto-Charon

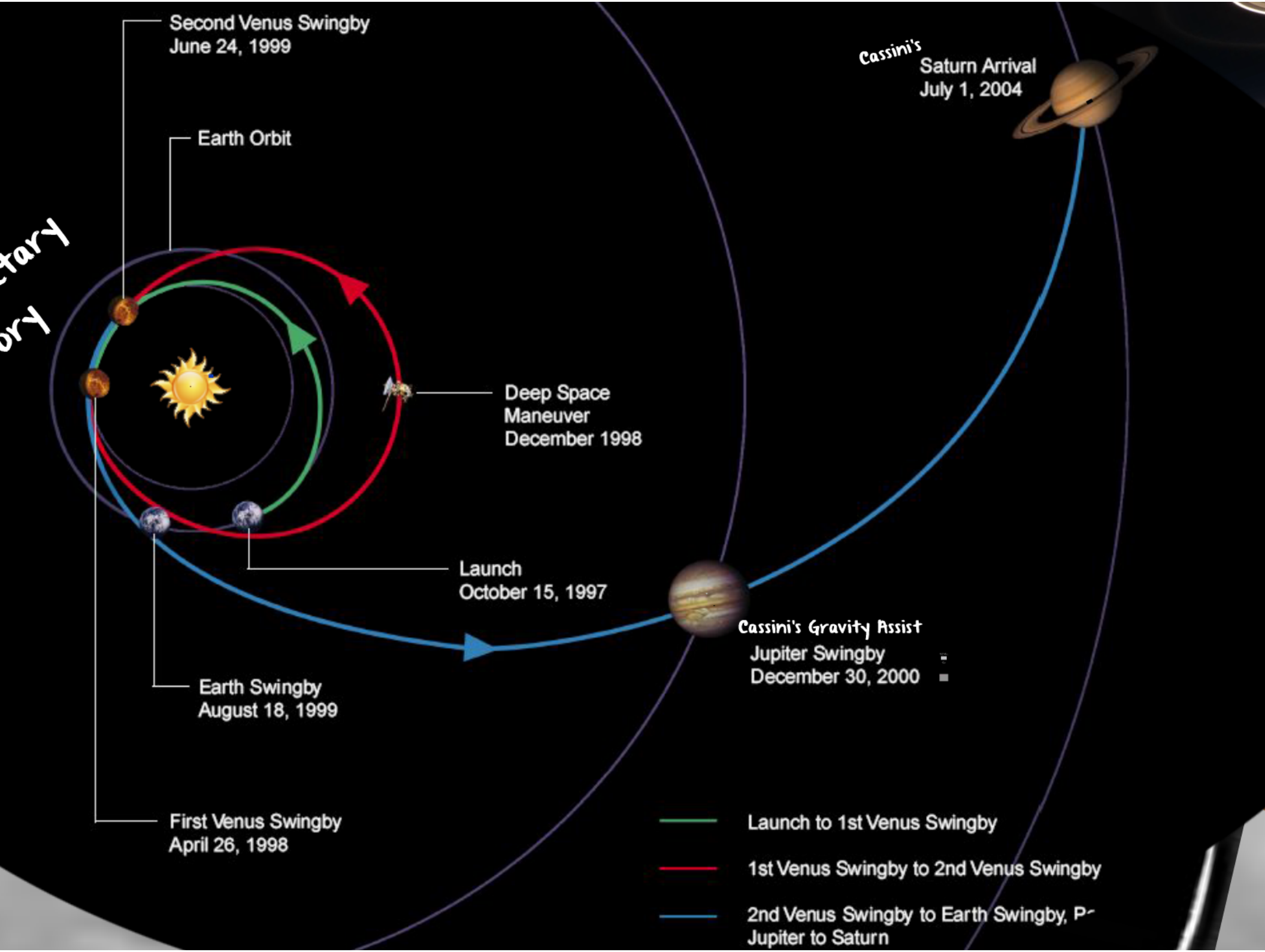
Seebeck Effect

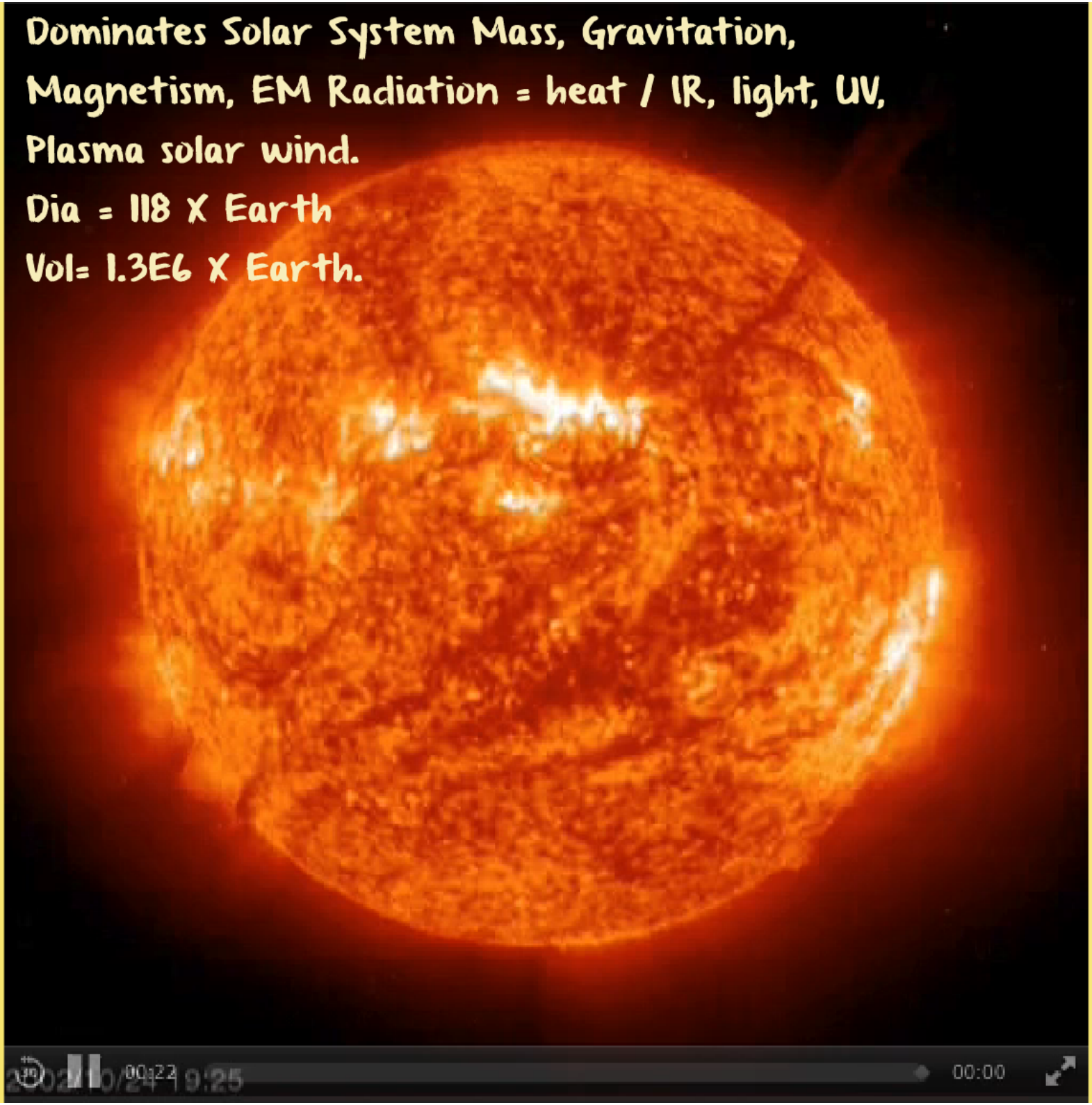


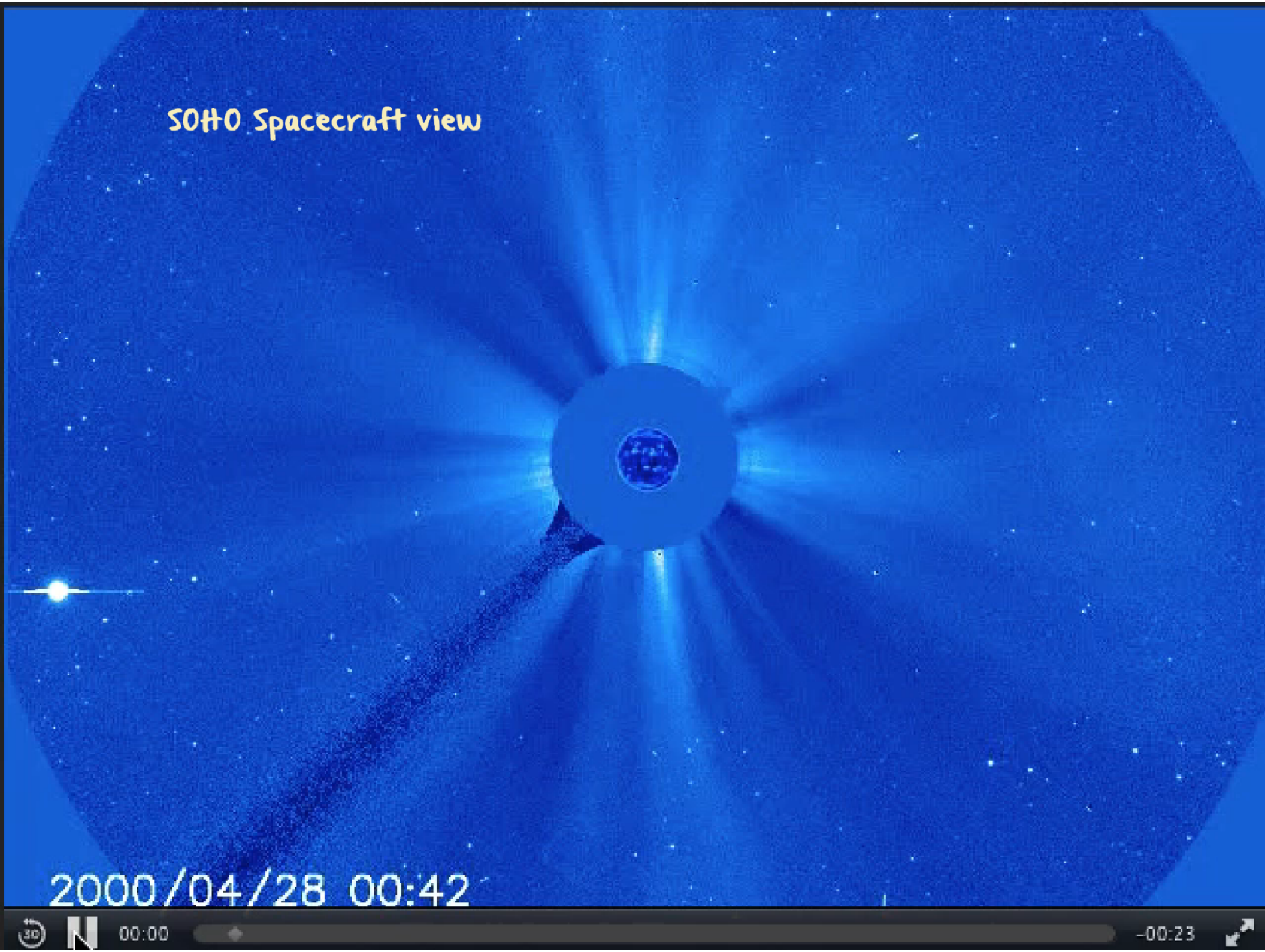
Attitude and Articulation Control

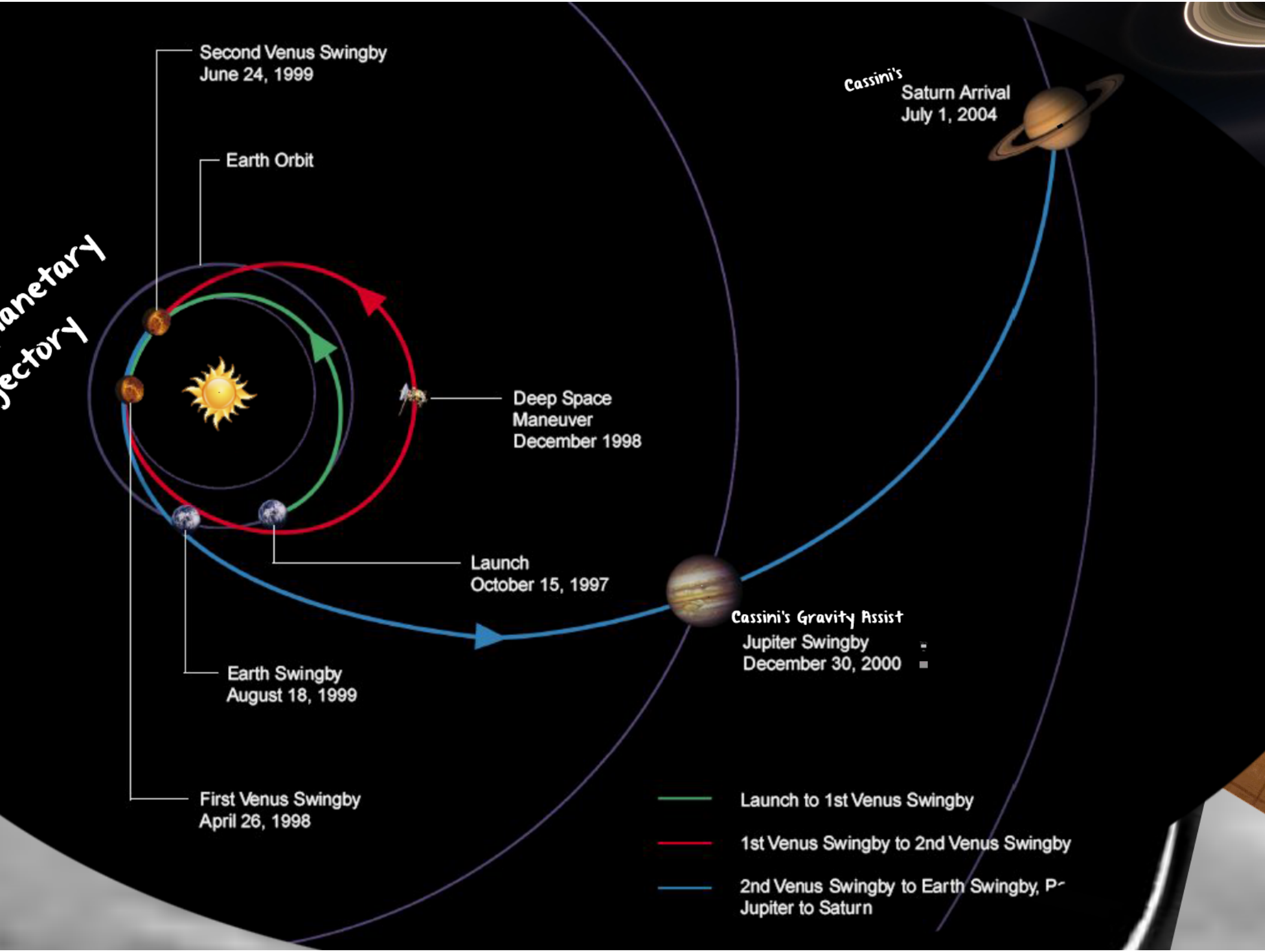





Second Venus Swingby
June 24, 1999
Earth Orbit
Cassini's
Saturn Arrival
July 1, 2004
Deep Space
Maneuver
December 1998
Launch
October 15, 1997
Cassini's Gravity Assist
Jupiter Swingby
December 30, 2000
Earth Swingby
August 18, 1999
First Venus Swingby
April 26, 1998
Launch to 1st Venus Swingby
1st Venus Swingby to 2nd Venus Swingby
2nd Venus Swingby to Earth Swingby,
Jupiter to Saturn


Dominates Solar System Mass, Gravitation,
Magnetism, EM Radiation = heat / IR, light, UV,
Plasma solar wind.
Dia = 118 X Earth
Vol= 1.3E6 X Earth.
00:00


SOHO Spacecraft view
2000/04/28 00:42
00:00
-00:23


Second Venus Swingby
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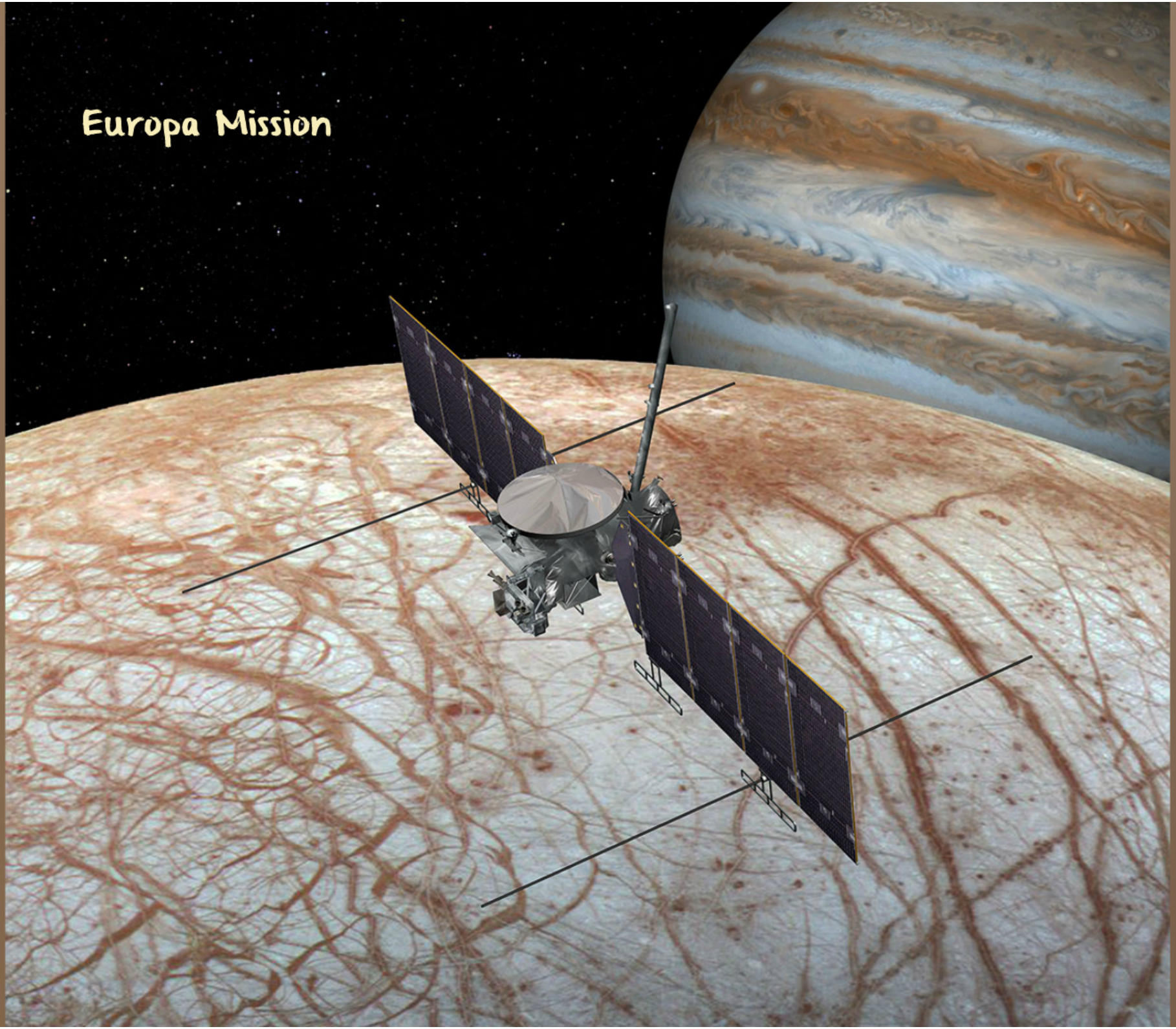
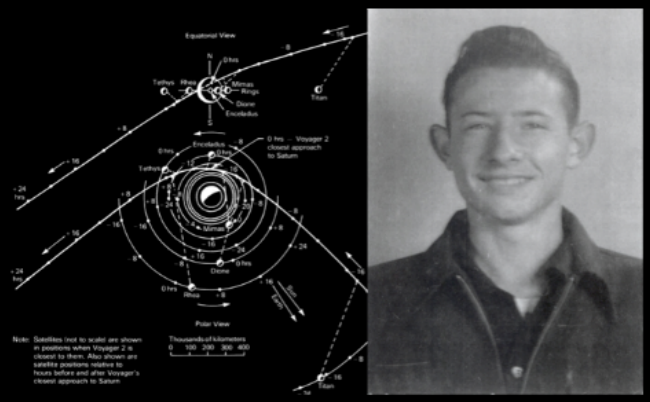

Europa Mission

97
Cassini's Gravity Assist
Jupiter Swingby
December 30, 2000
Launch to 1st Venus Swingby

Mike Minovitch 1936 -
JPL Summer Student 1961

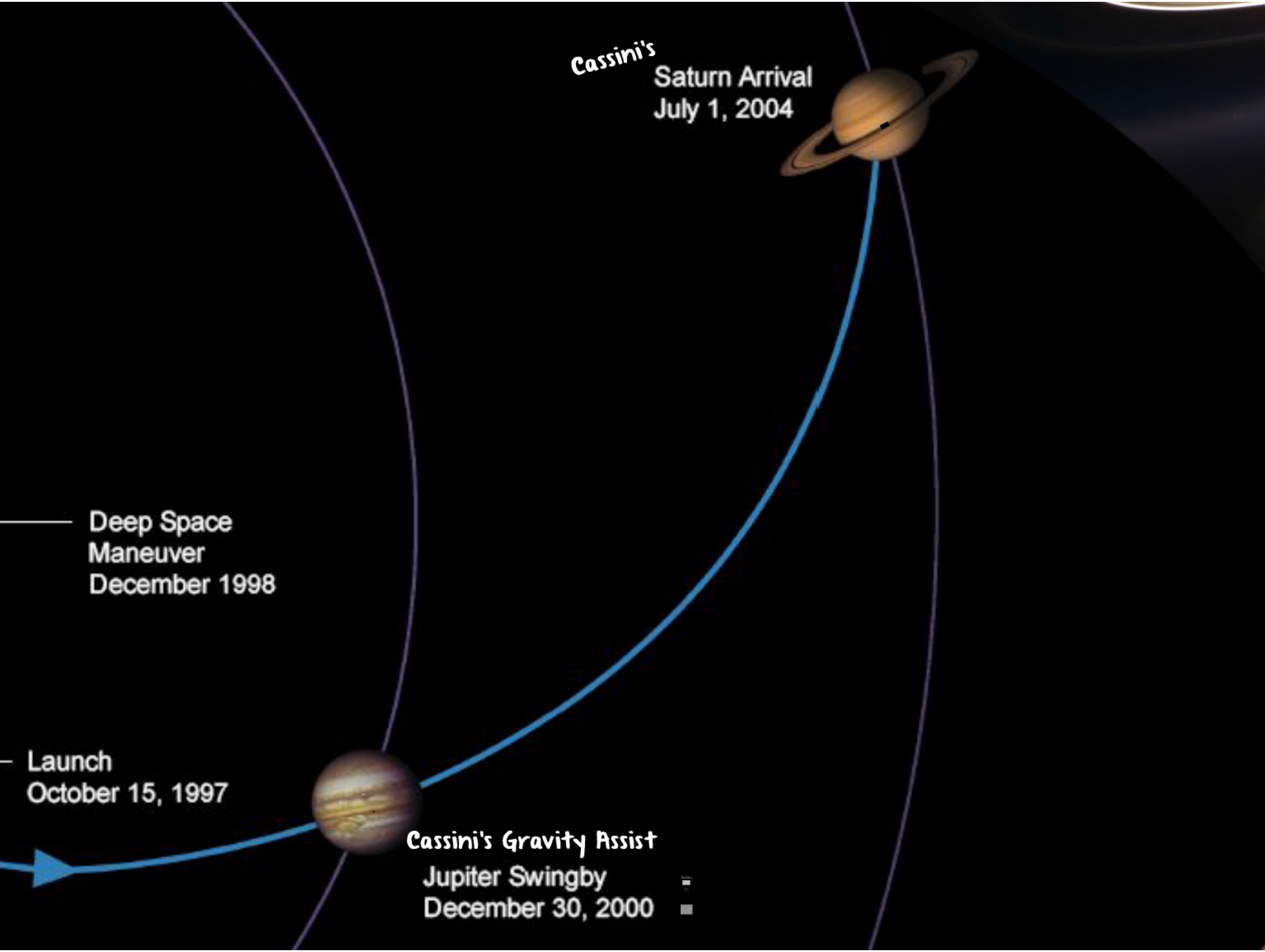


Cassini:

22 km/s Cruise

90 km/s Tour

The Gravity Assist Mechanical Simulator
Bldg 230 near first-floor elevator


Cassini's
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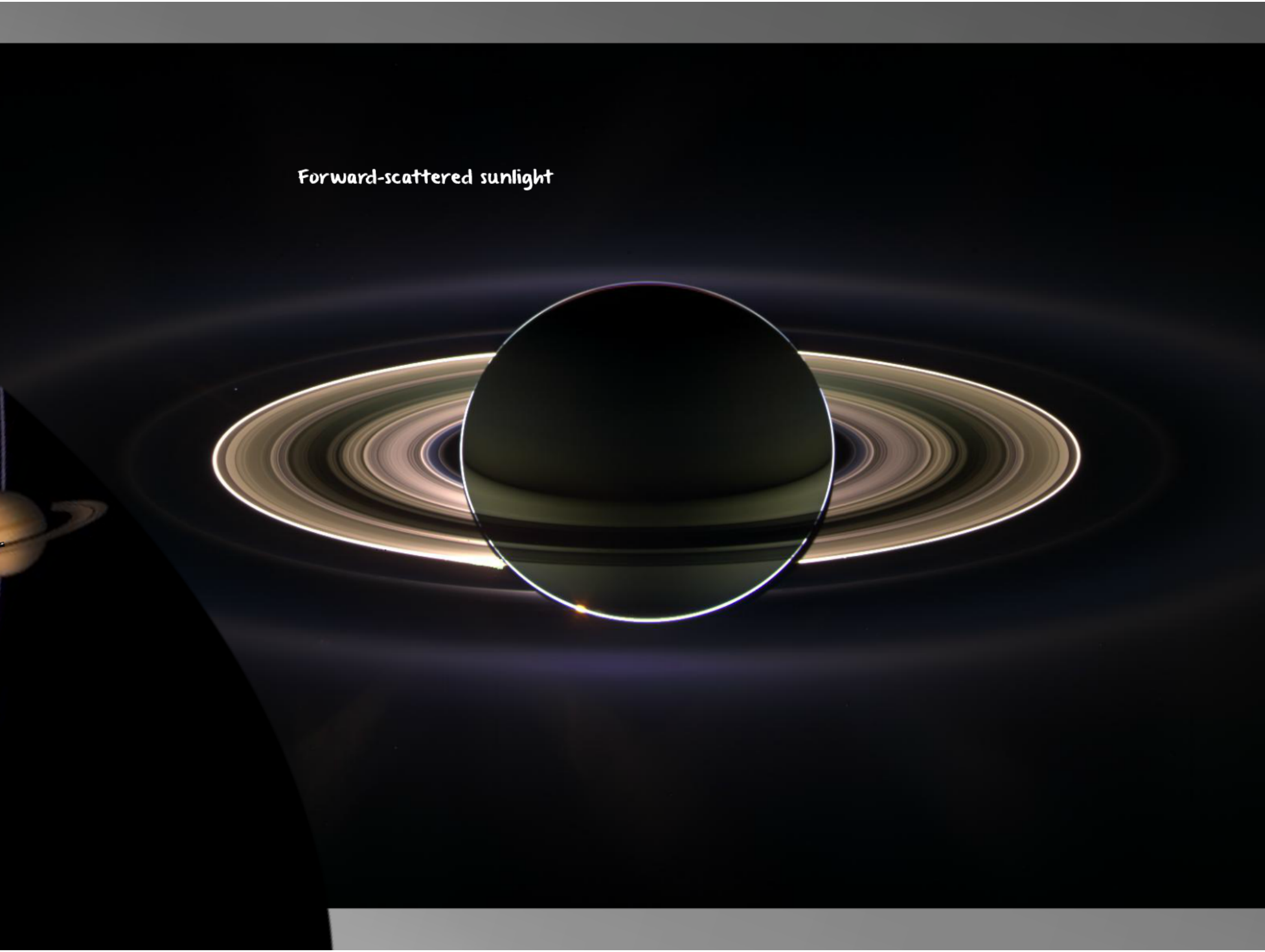
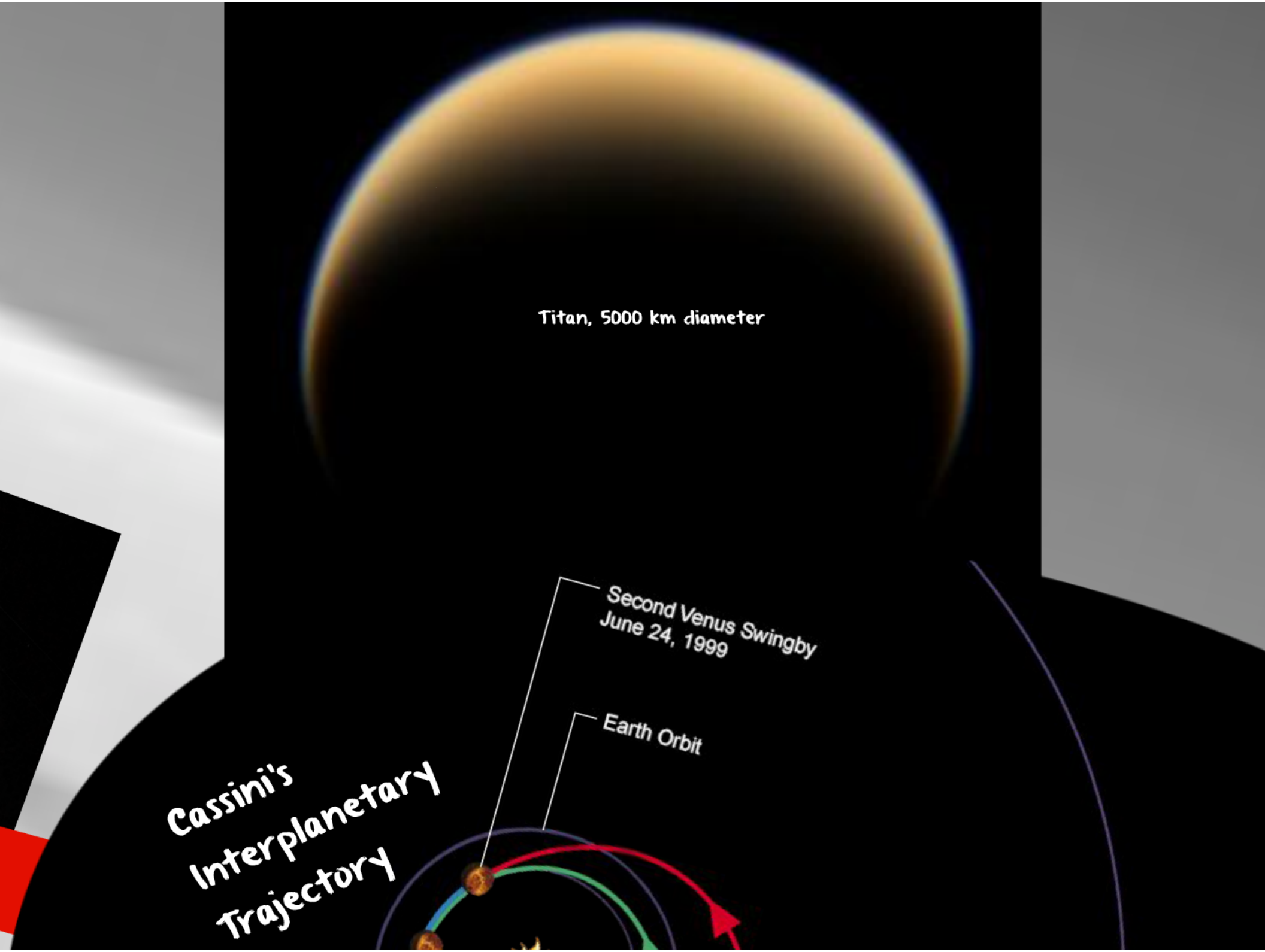
December 30, 2000

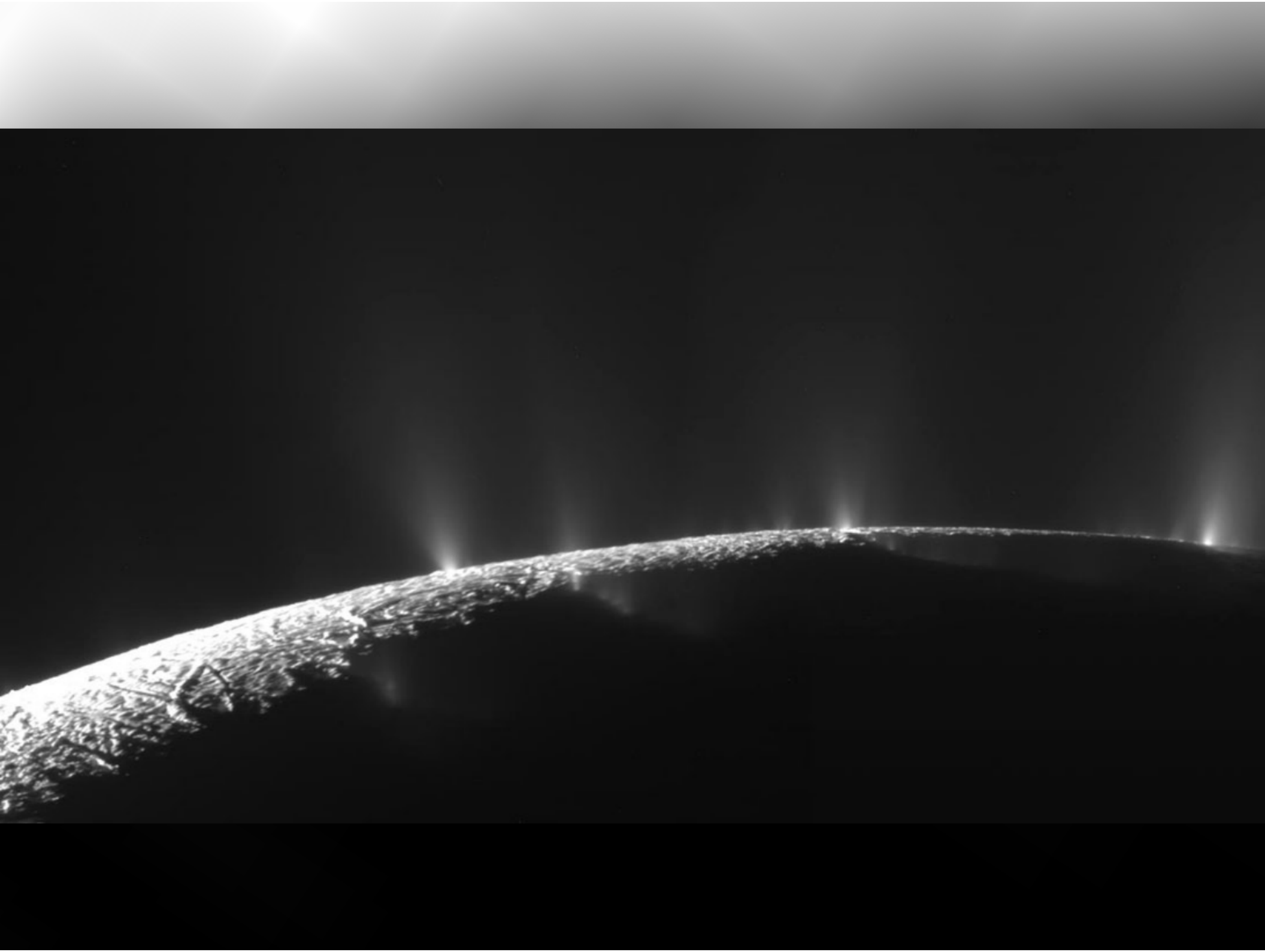

Forward-scattered sunlight

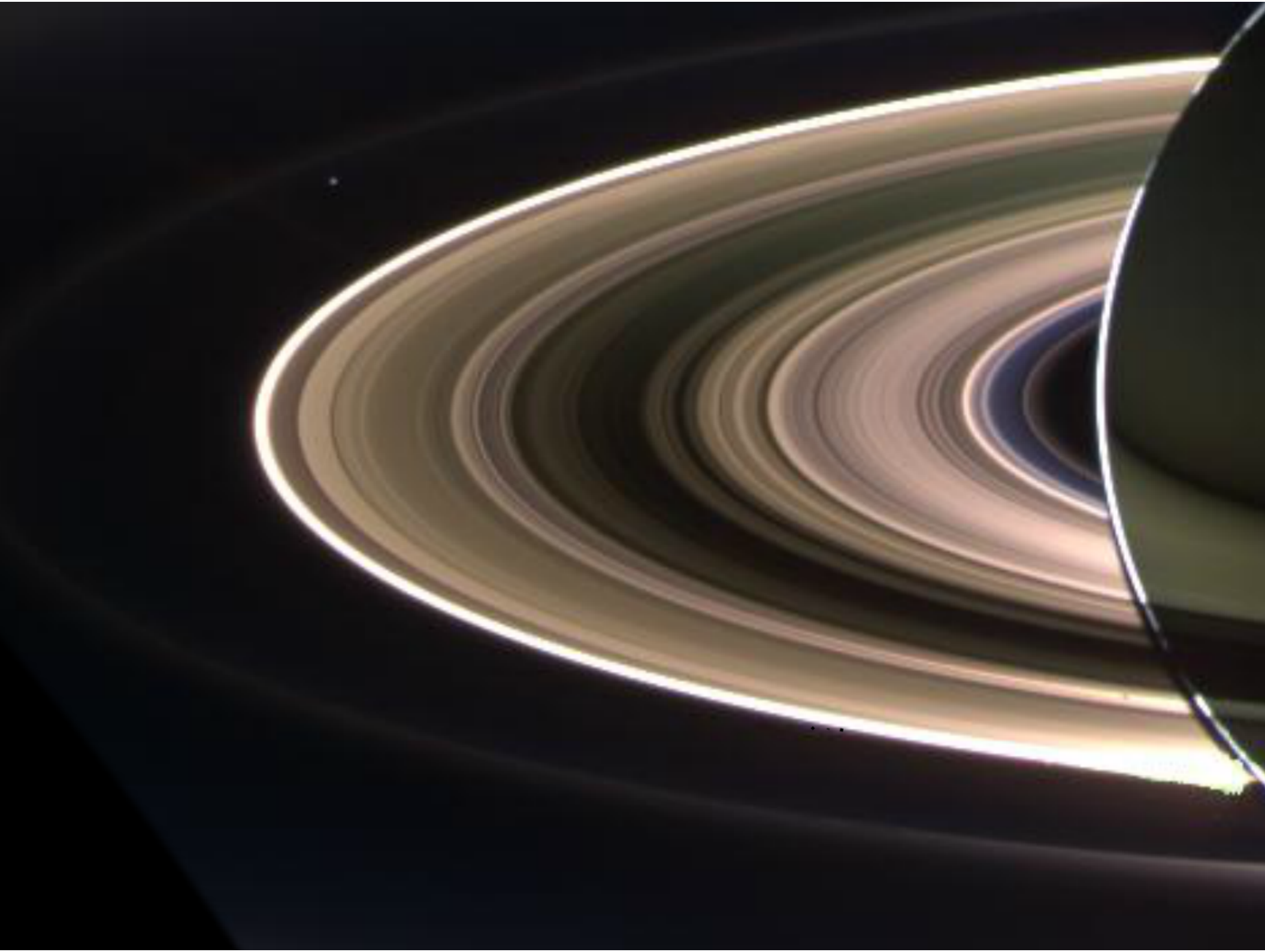
TS CENTER

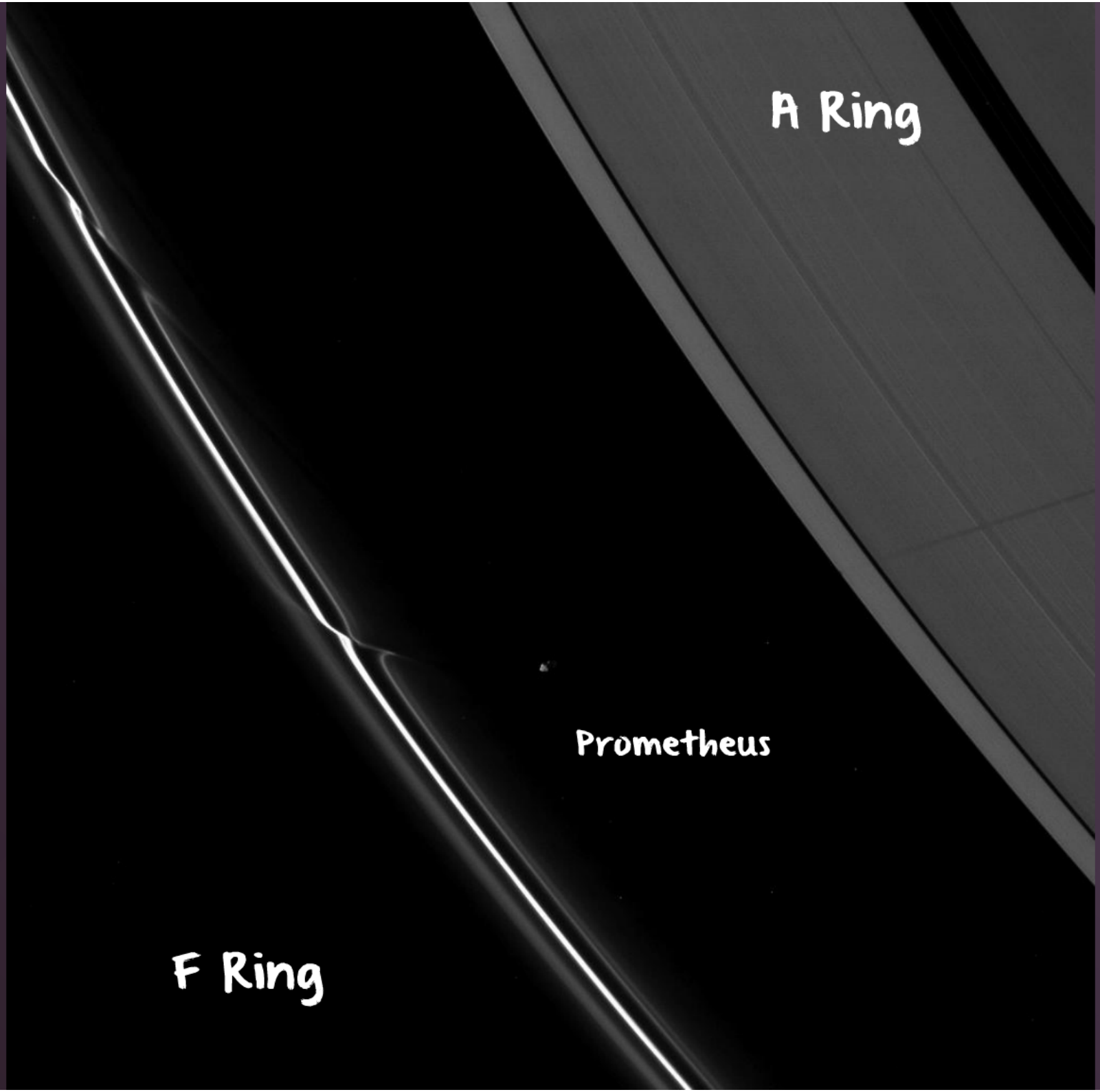

Titan, 5000 km diameter
Second Venus Swingby
June 24, 1999
Earth Orbit
Cassini's
Interplanetary
Trajectory

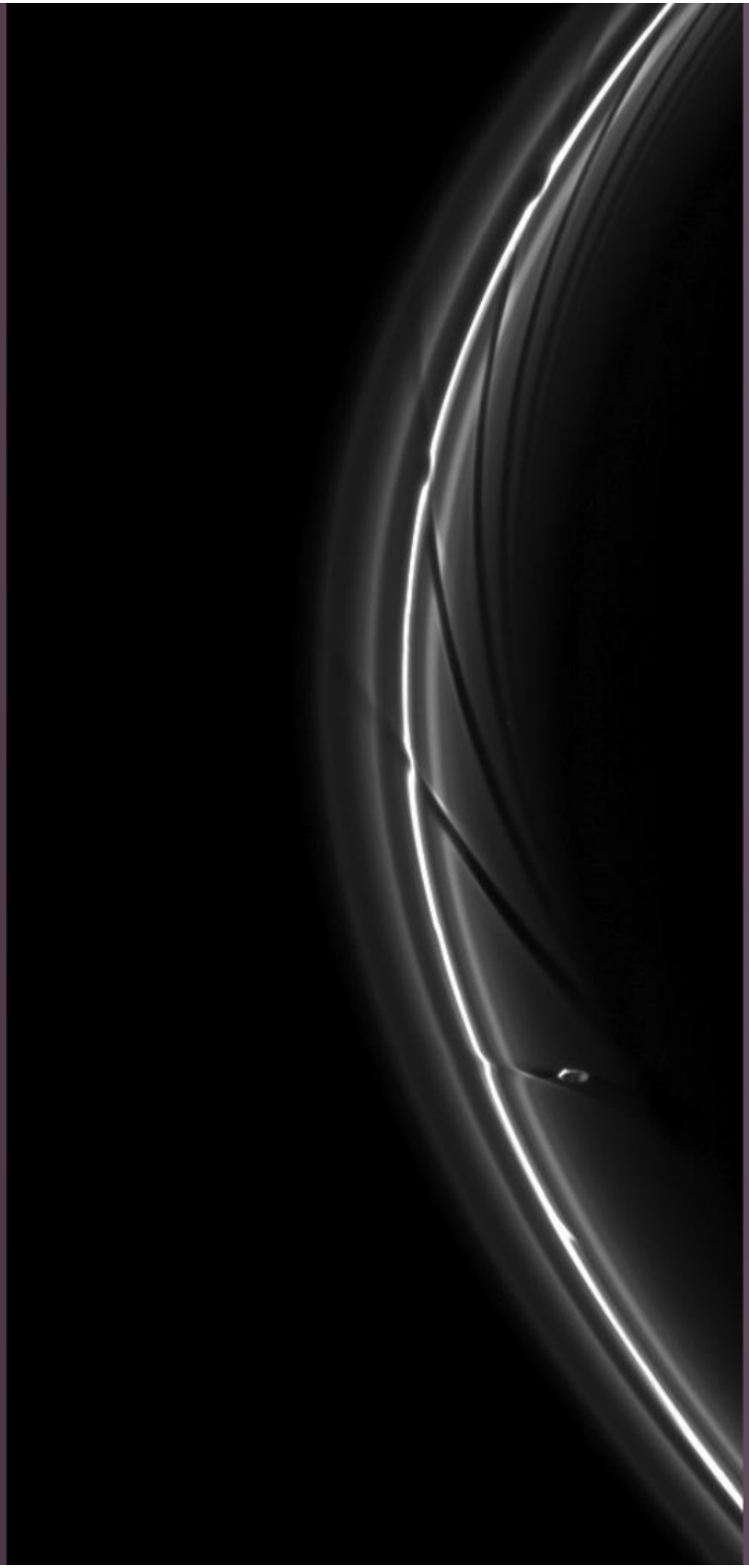
See Beautiful
ONTARIO
LACUS

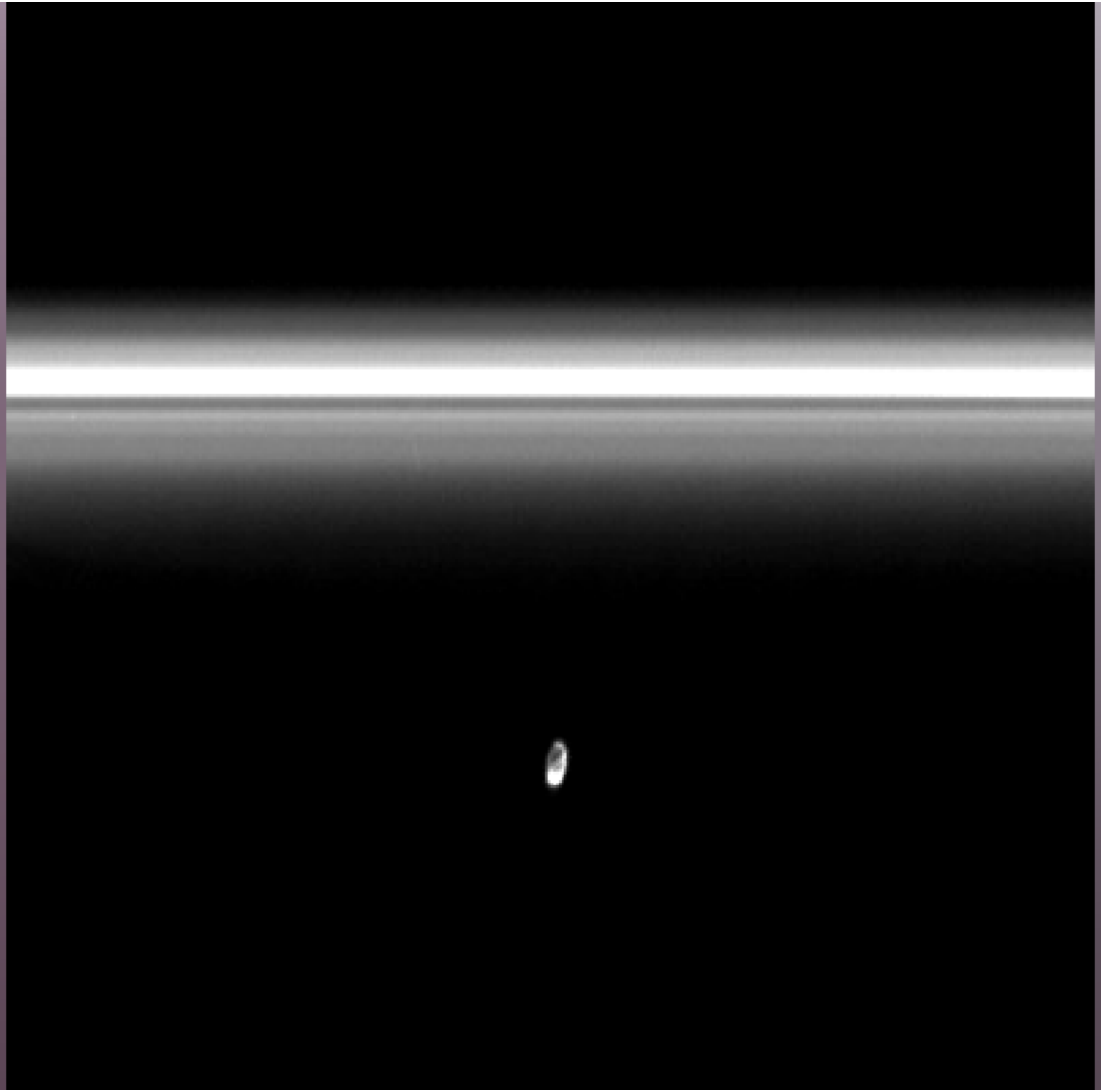
Enceladus,
500 km diameter

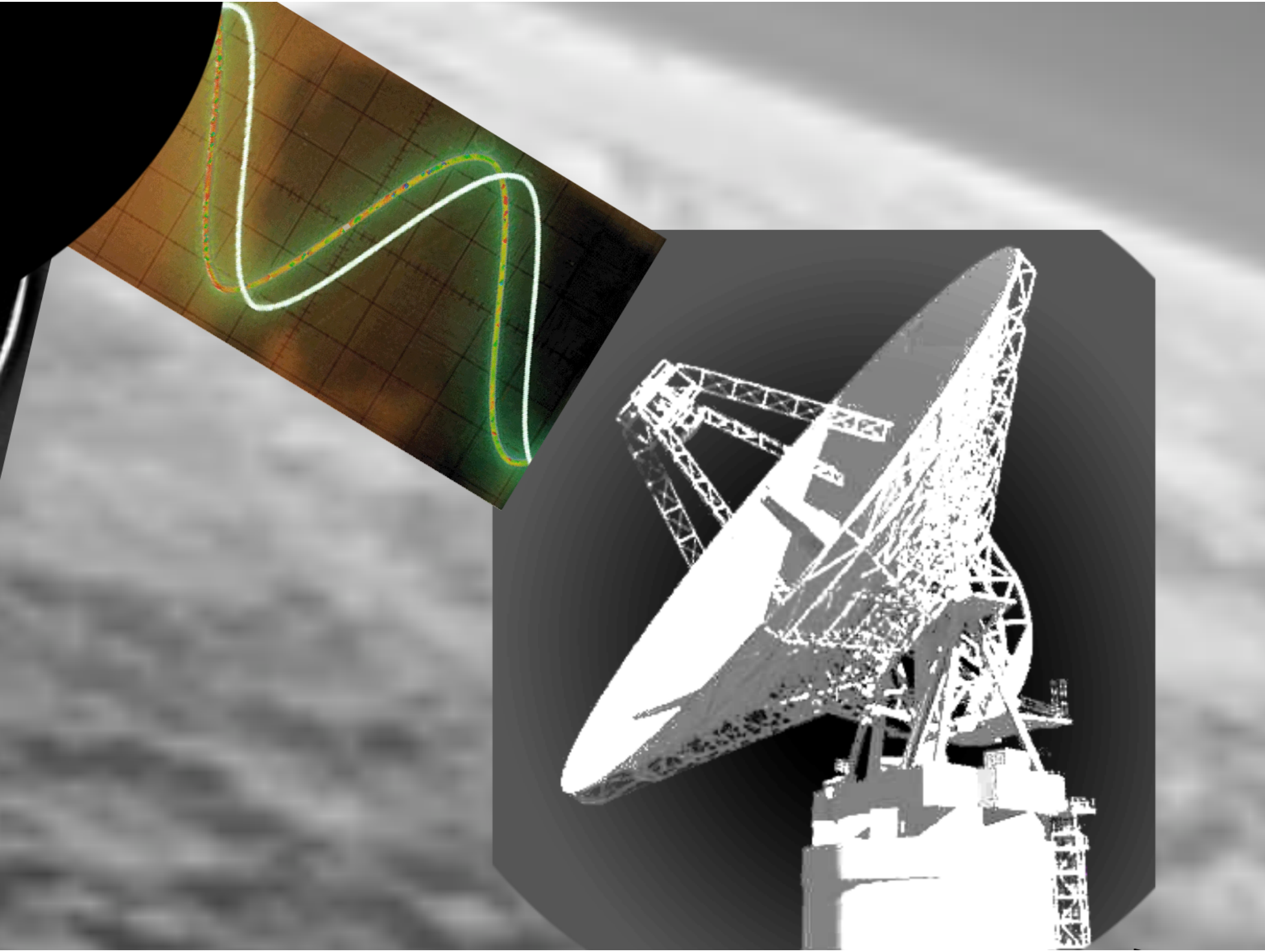


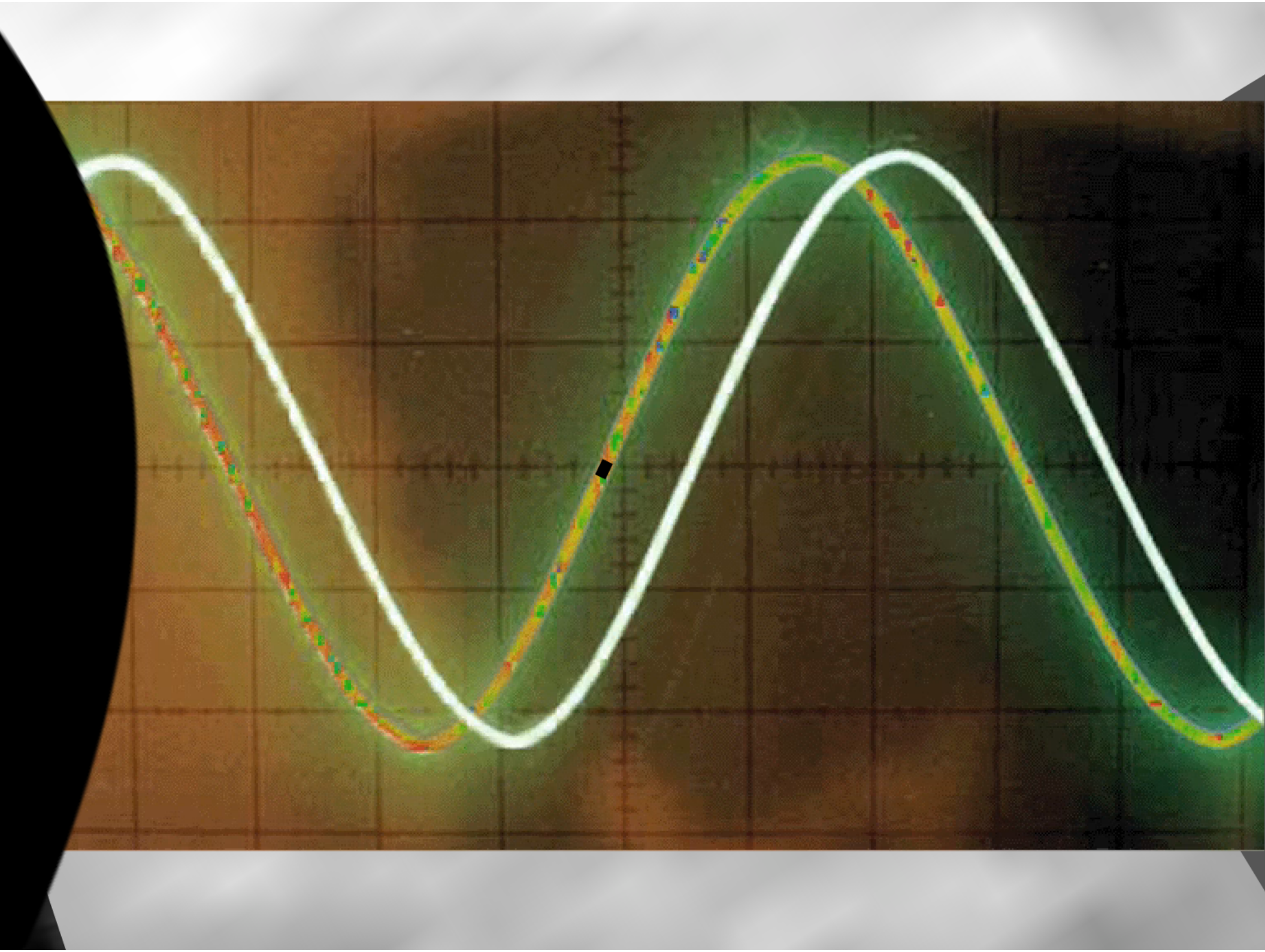



A Ring
Prometheus
F Ring

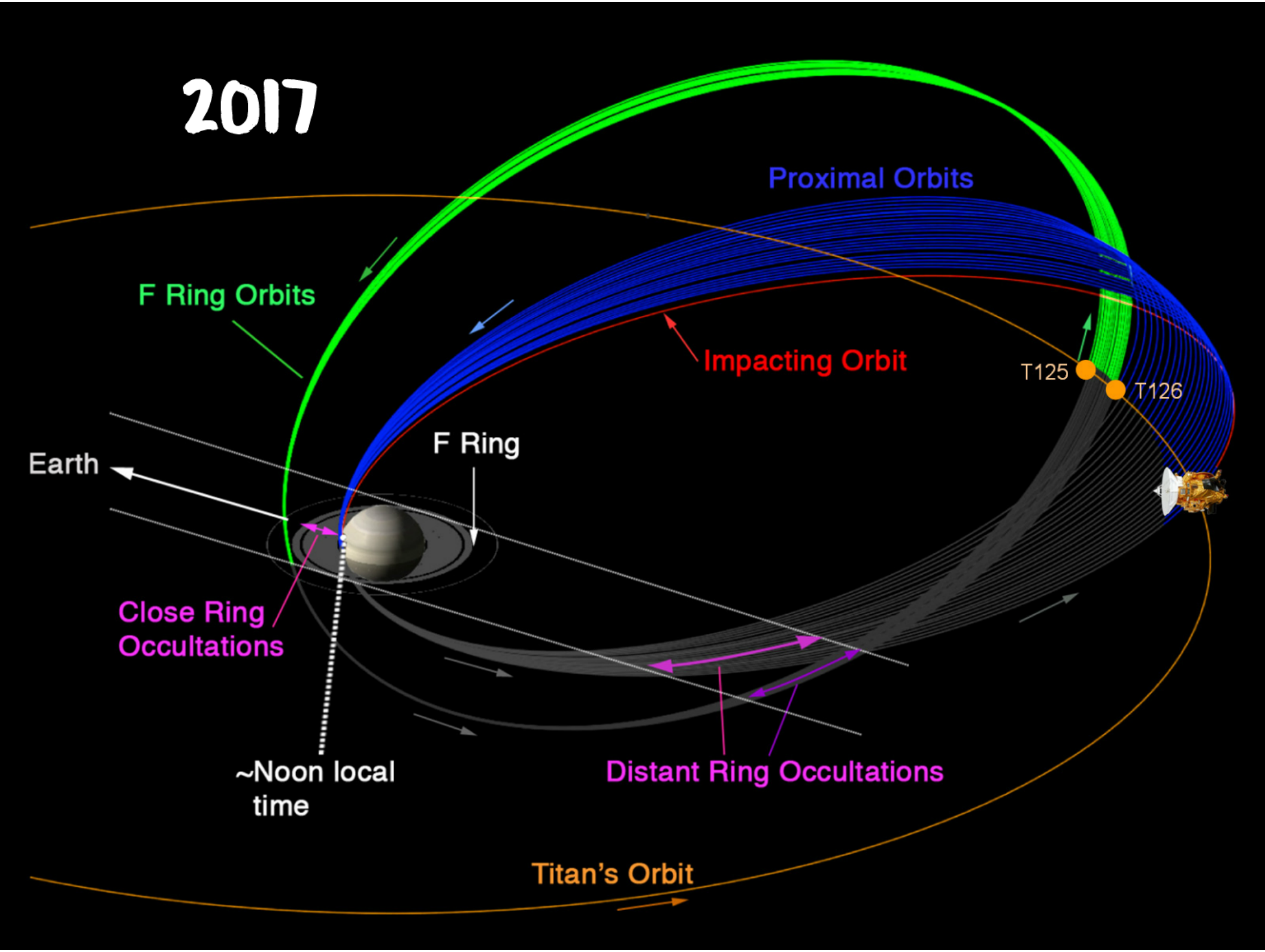


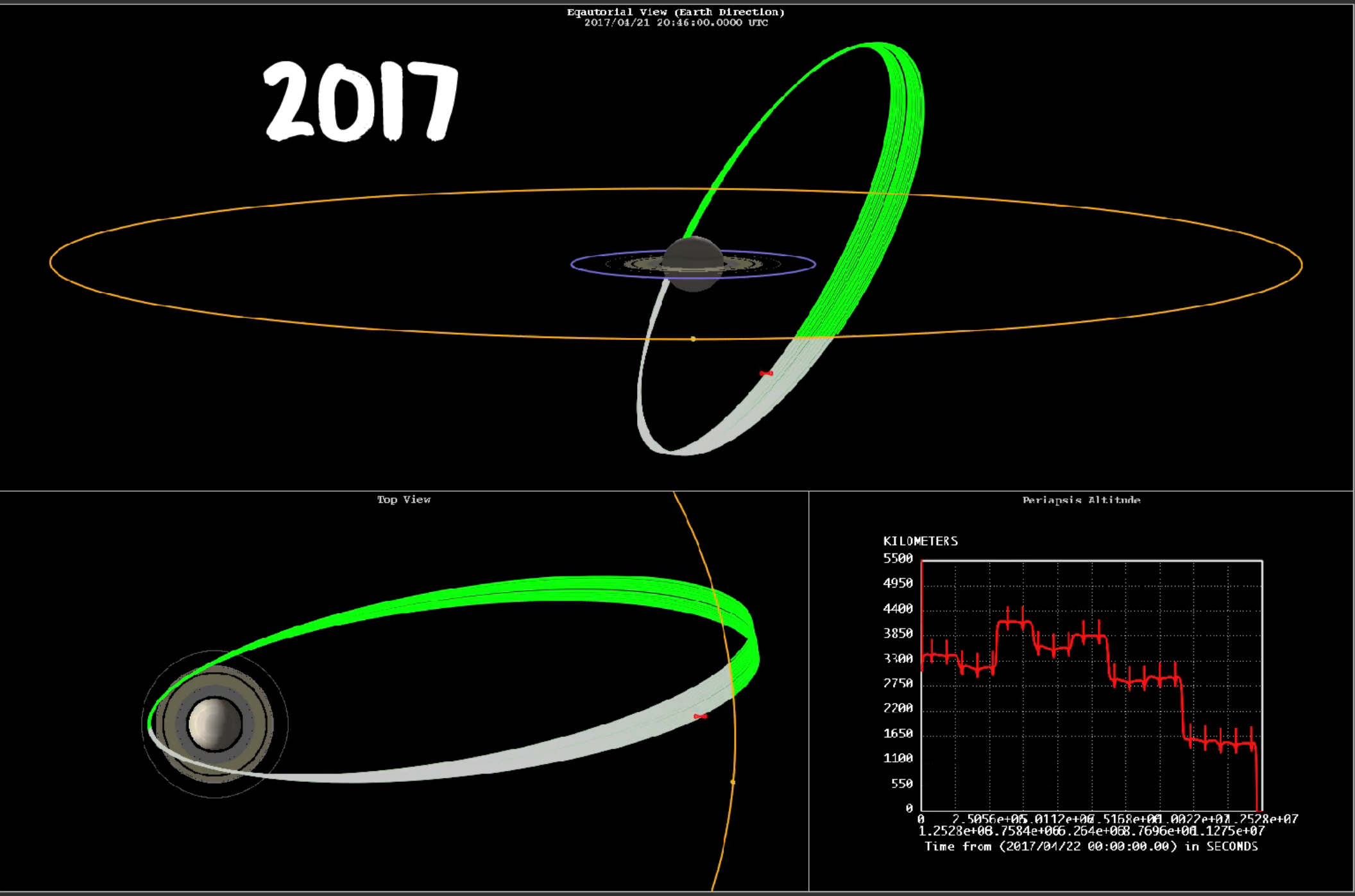


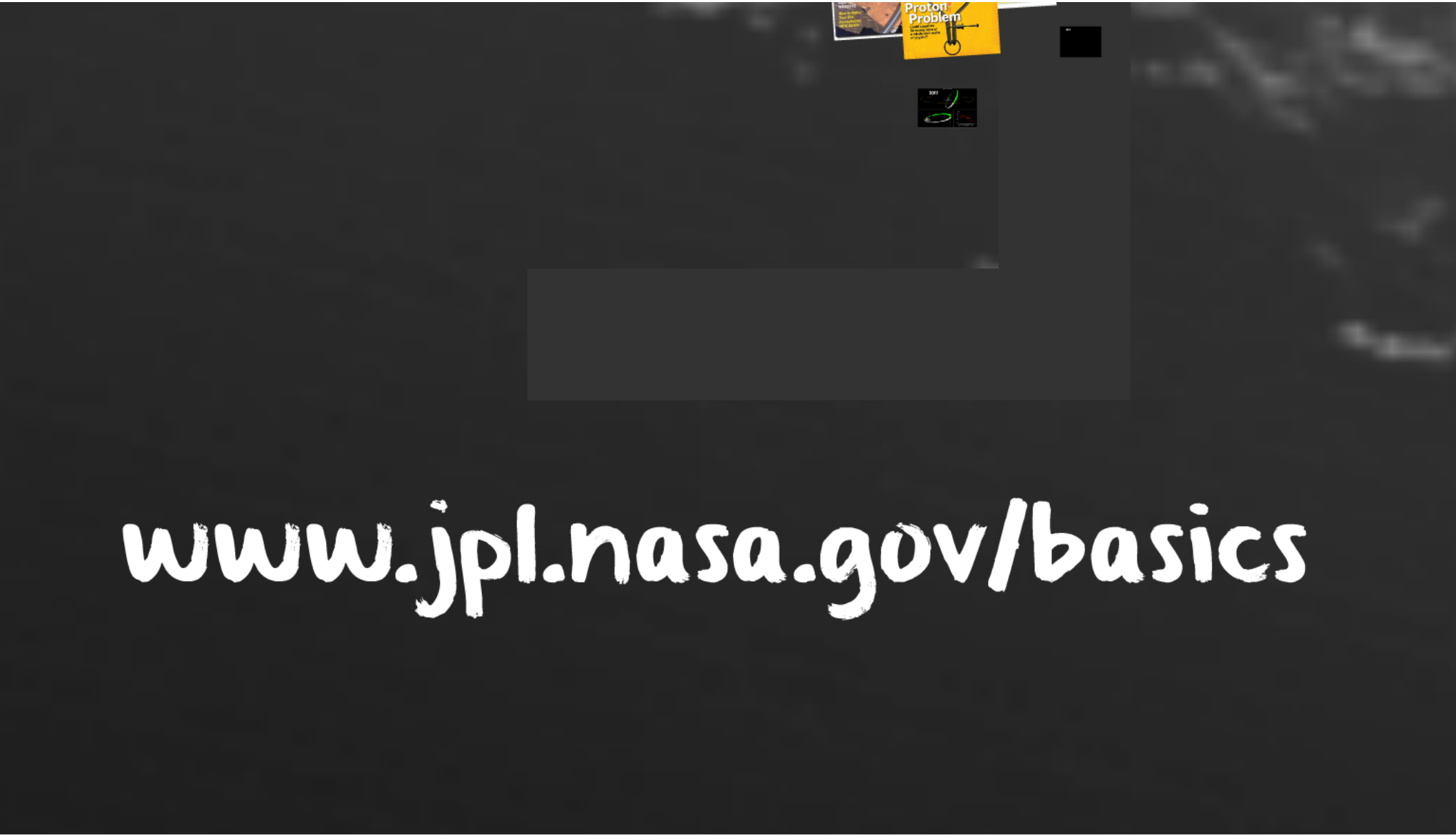




Science teams


2017
Proximal Orbits
F Ring Orbits
Impacting Orbit
T125
T126
F Ring
Earth
Close Ring
Occultations
~Noon local
time
Distant Ring Occultations
Titan's Orbit


Equatorial View (Earth Direction)
2017/04/21 20:46:00.0000 UTC
2017
Top View
Periapsis Altitude
KILOMETERS
5500
4950
4400
3850
3300
2750
2200
1650
1100
550
0
0
2.5056e+05
5.0112e+06
7.5168e+06
1.0022e+07
1.2528e+07
1.2528e+08
1.7584e+06
6.264e+06
8.7696e+06
1.1275e+07
Time from (2017/04/22 00:00:00.00) in SECONDS


Proton Problem
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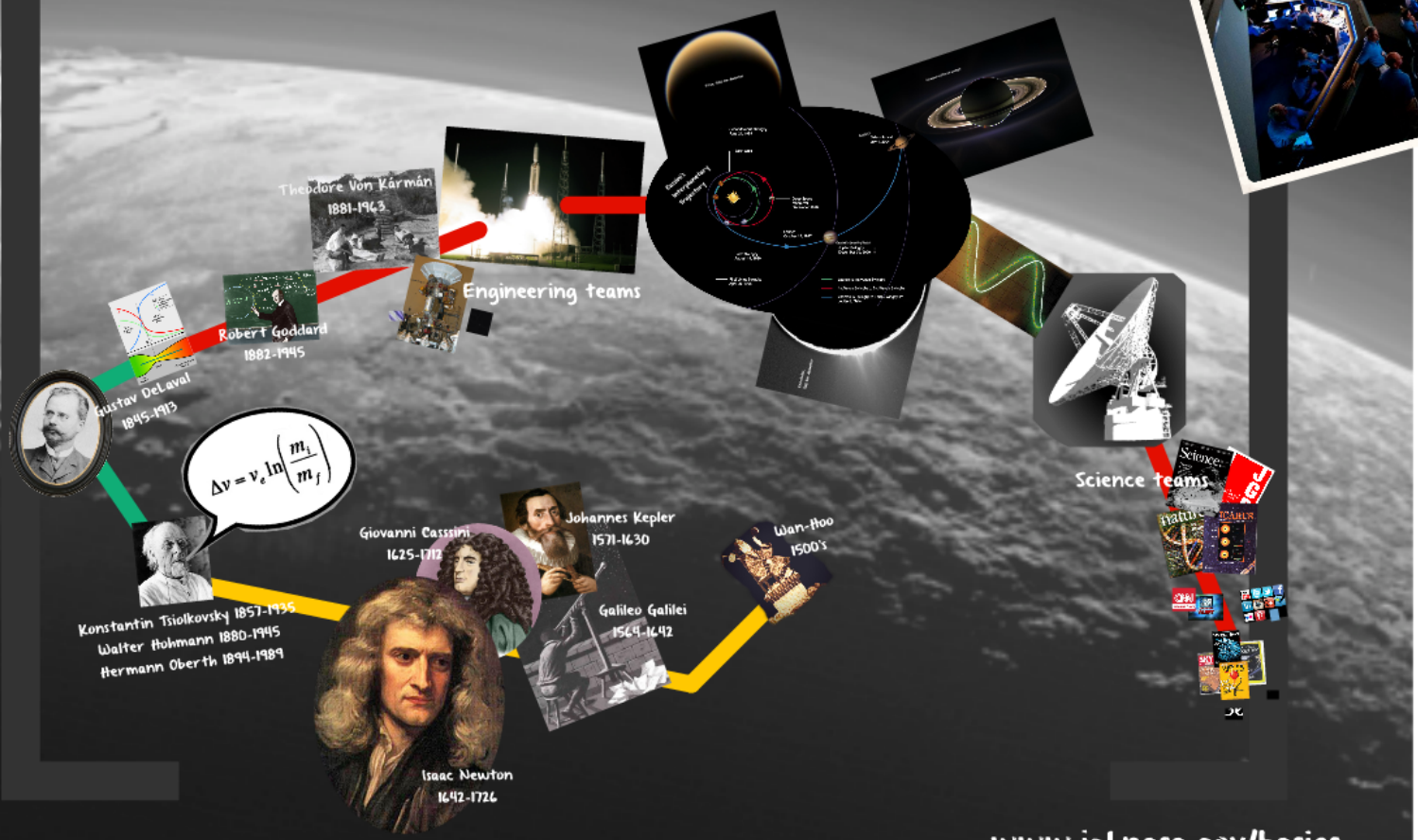

www.jpl.nasa.gov/basics