ASTEROID DAY!

Tyler Linder
Charleston, IL Library
July 30th, 2018

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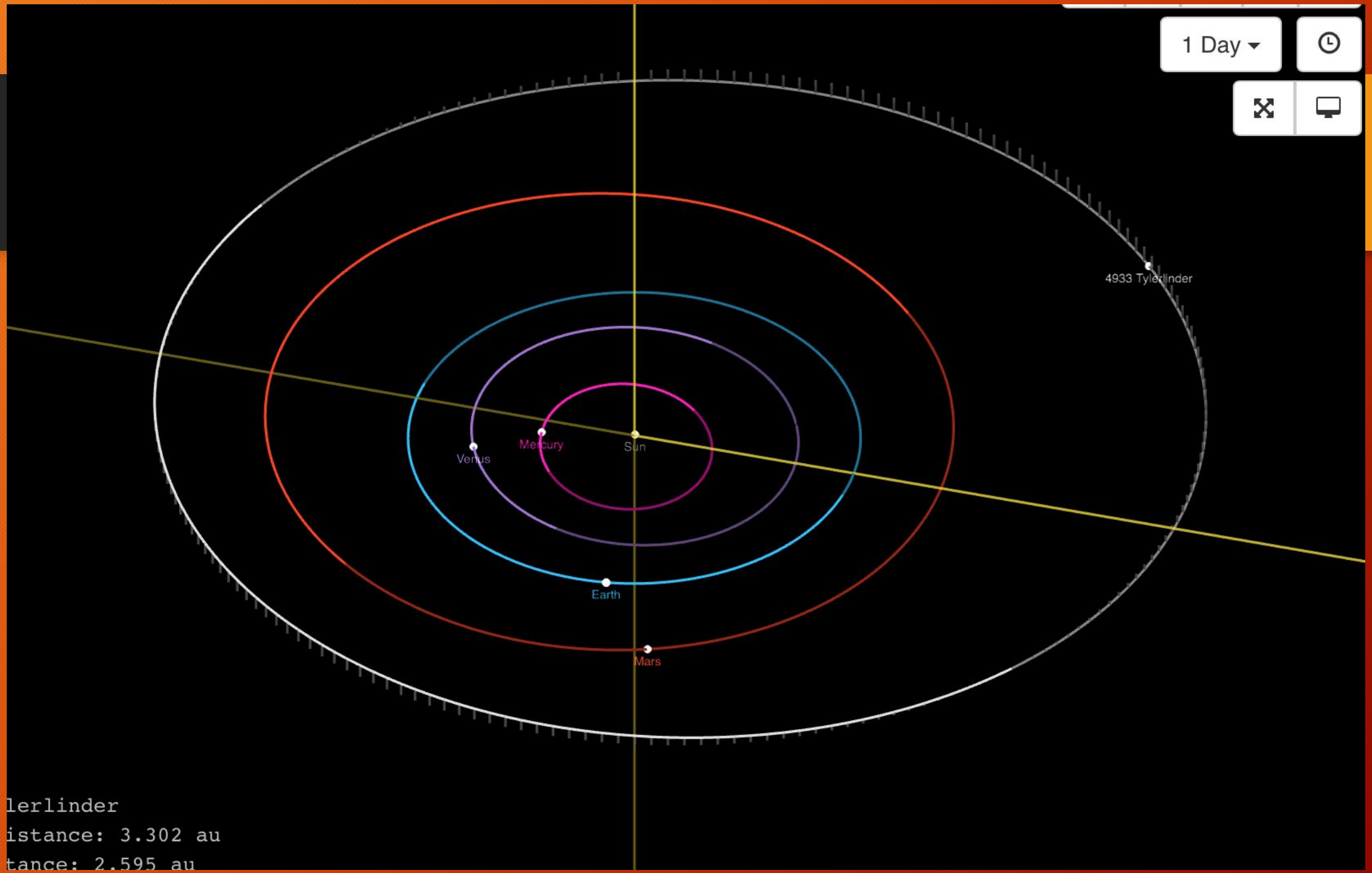
Who is Tyler Linder

- 32 years old
- I have a beautiful wife, Danielle
- 2 year old son, Owen

- Professional Asteroid Astronomer

Who is Tyler Linder

- 2004 Graduated High School from Marshall Il
- 2004-2008: U.S. Navy CVN-74 John C. Stennis (Engineering Department)
- 2009-2012: B.S. in Physics from Eastern Illinois University
- 2012-Present: Astronomers for NASA's Near Earth Object Observations program. Independent contractor.
- 2017: M.S. in Space Studies from University of North Dakota
- 2017-Present: Ph.D. Student in Space Studies from University of North Dakota


1 Day
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Venus
Mercury
Sun
Earth
Mars
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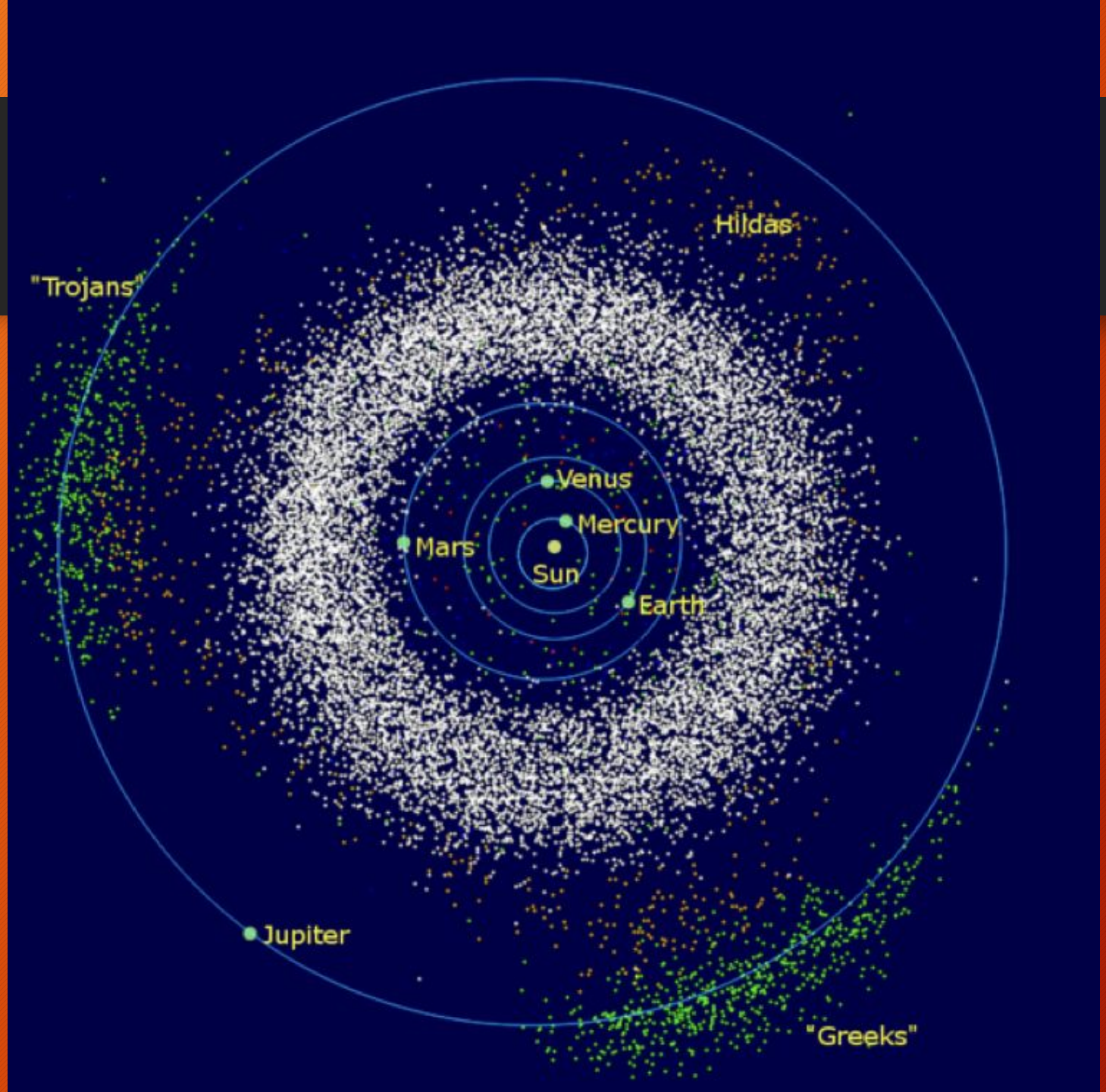
February 15th 2013

https://www.youtube.com/watch?v=FH7OxBHInX4

What is an Asteroid?

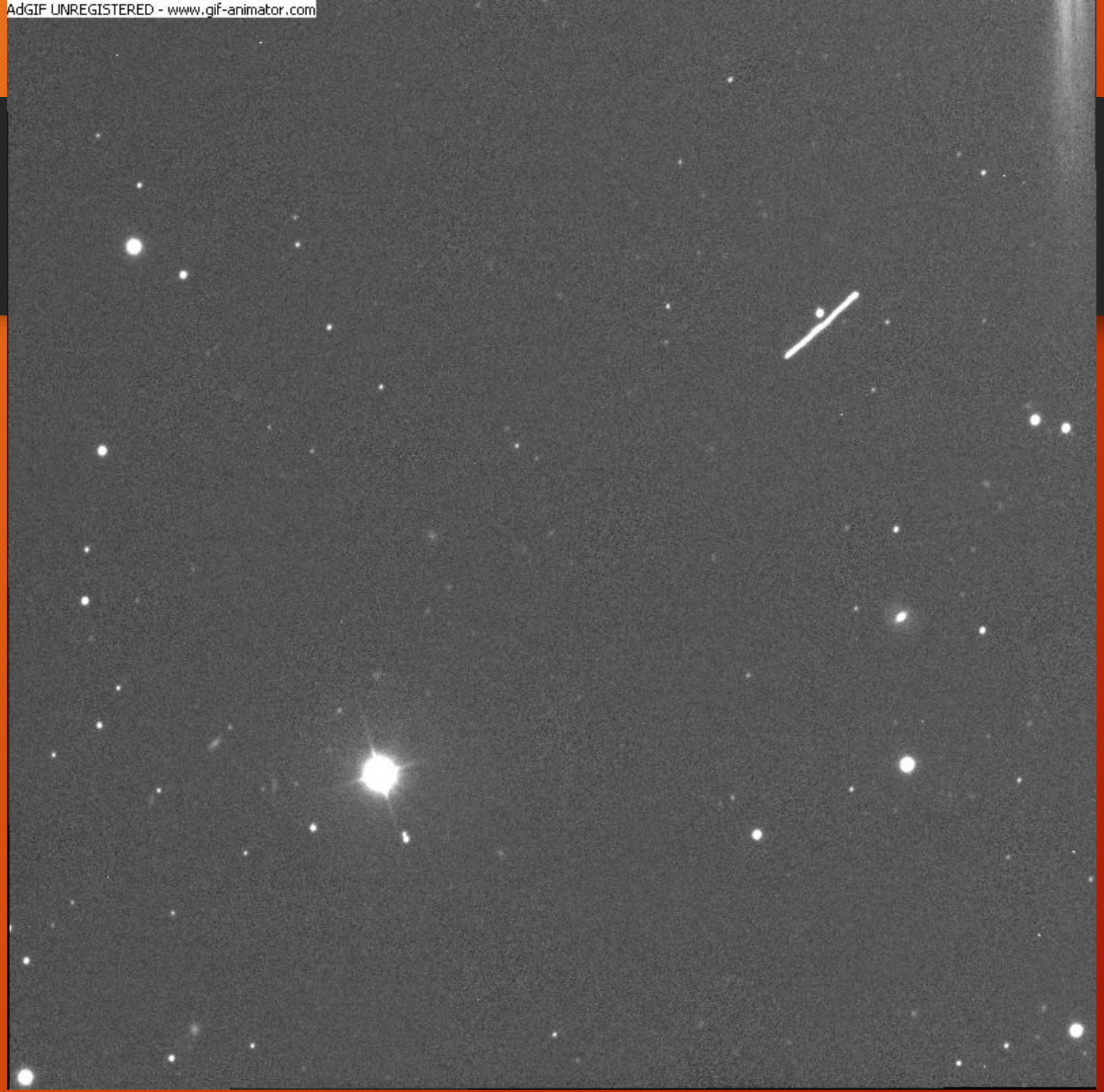

Hildas
"Trojans"
Venus
Mercury
Mars
Sun
Earth
Jupiter
"Greeks"

Current Population

- Near Earth Asteroids: 18,523 972 discovered in 2018
- Main Belt Asteroids: 779,736 4,047 discovered in 2018
- Comets: 4025 25 discovered in 2018

Size (Diameter) Versus Damage

- 1000-m (3280 feet): Global Killer
  - 90% of this asteroids have been found
- 100-m (328 feet): City Remover
  - ~15% have been found. Predicted population over 100,000
- 10-m (32-feet): City Block Remover
  - Less than 100 known, predicated population 100 million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Discovery and Follow-up

- There are 6 discovery telescopes:

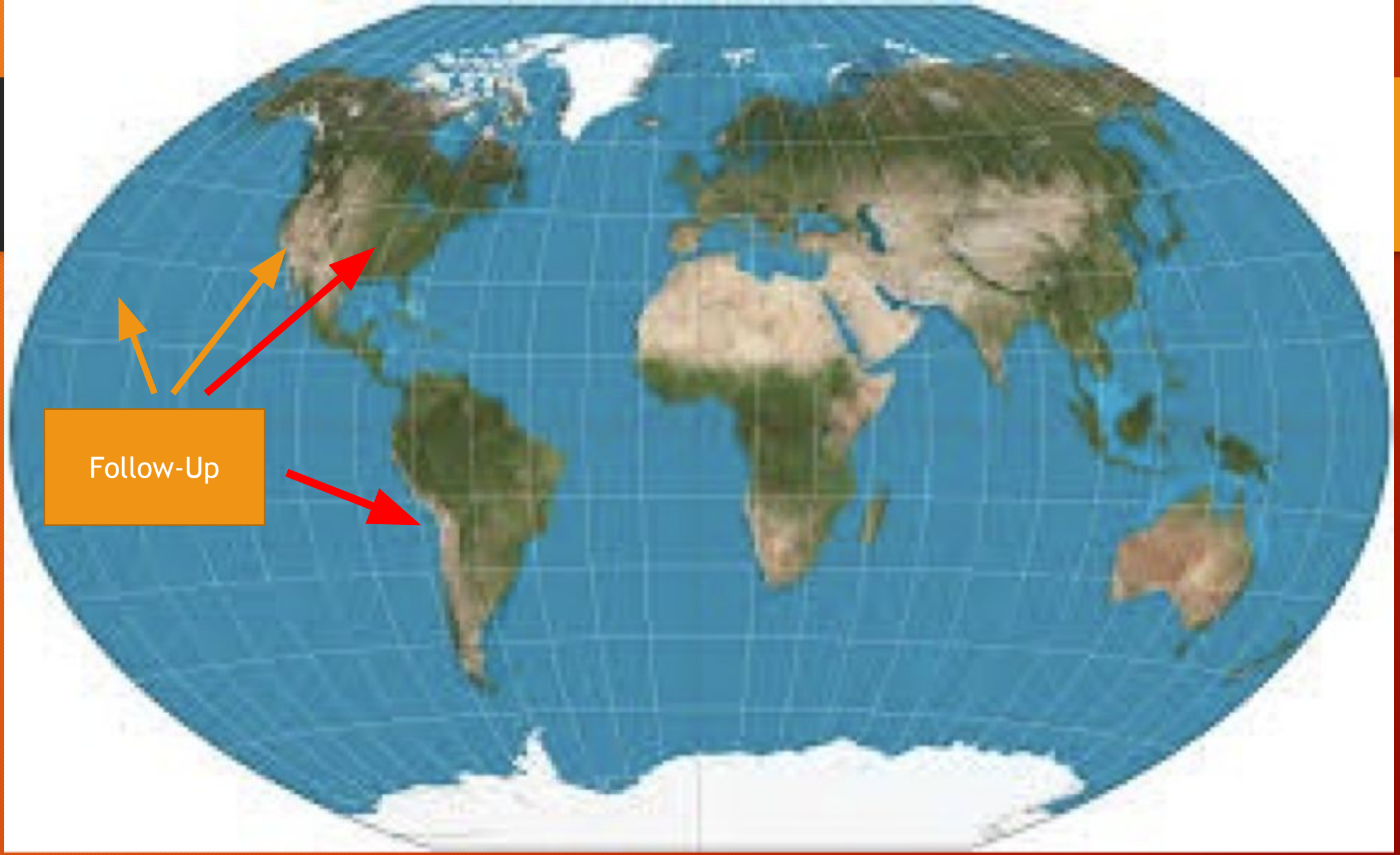
- 2: Arizona 0.9m and 1.5m (36/60 inch)
- 2: Hawaii 0.5m
- 2: Hawaii 1.8m

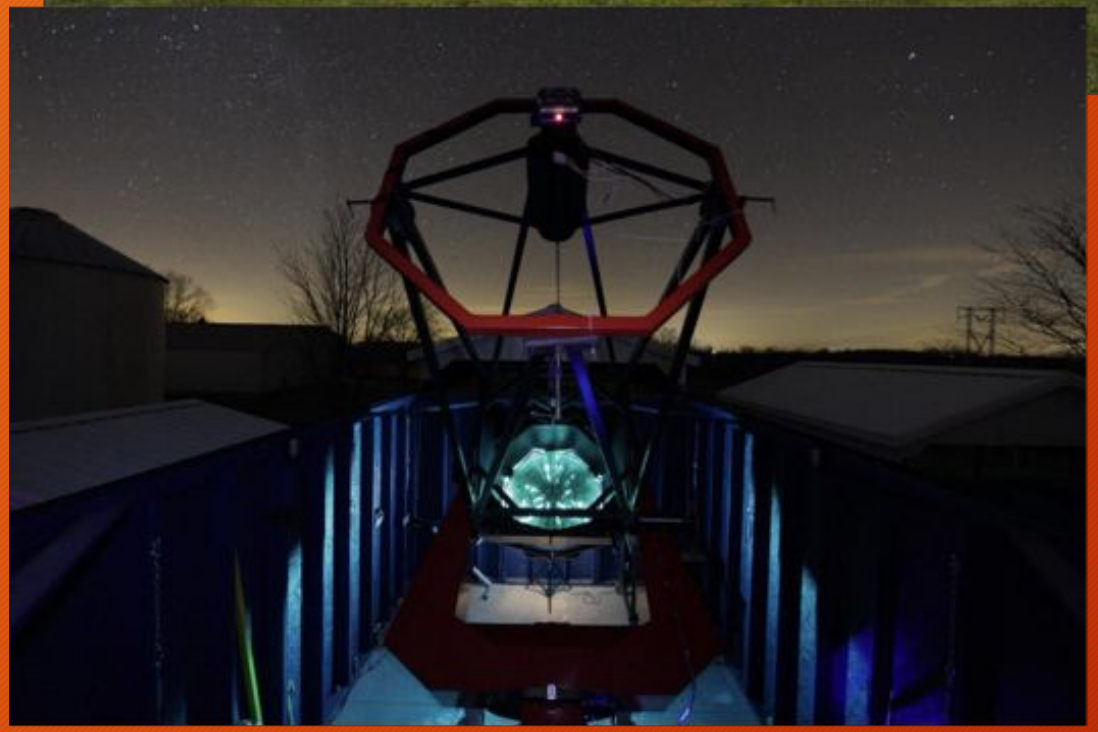

Discovery

Discovery

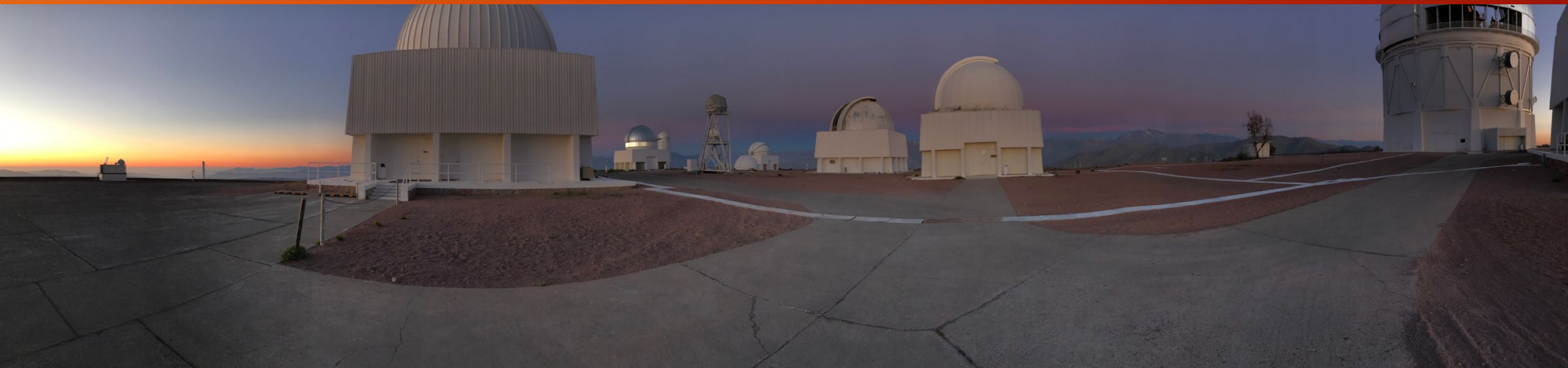
Follow Up

- 3: Arizona (0.9, 1.0, 1.3m)
- 1: New Mexico (2.5m)
- 4: Illinois (0.61, 0.76, 0.81, 1.3m)
- 3: Chile (0.61, 0.61, 1.0m)


Follow-Up



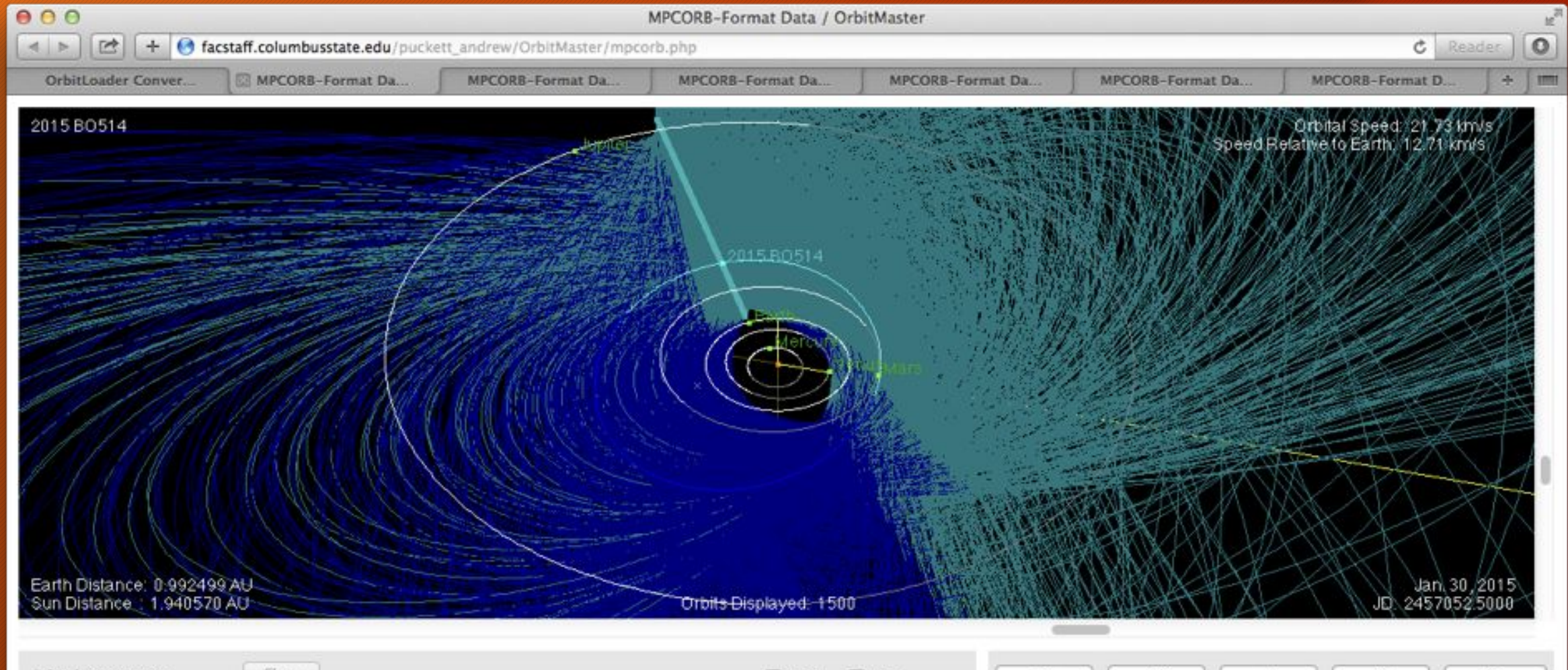
Google Earth



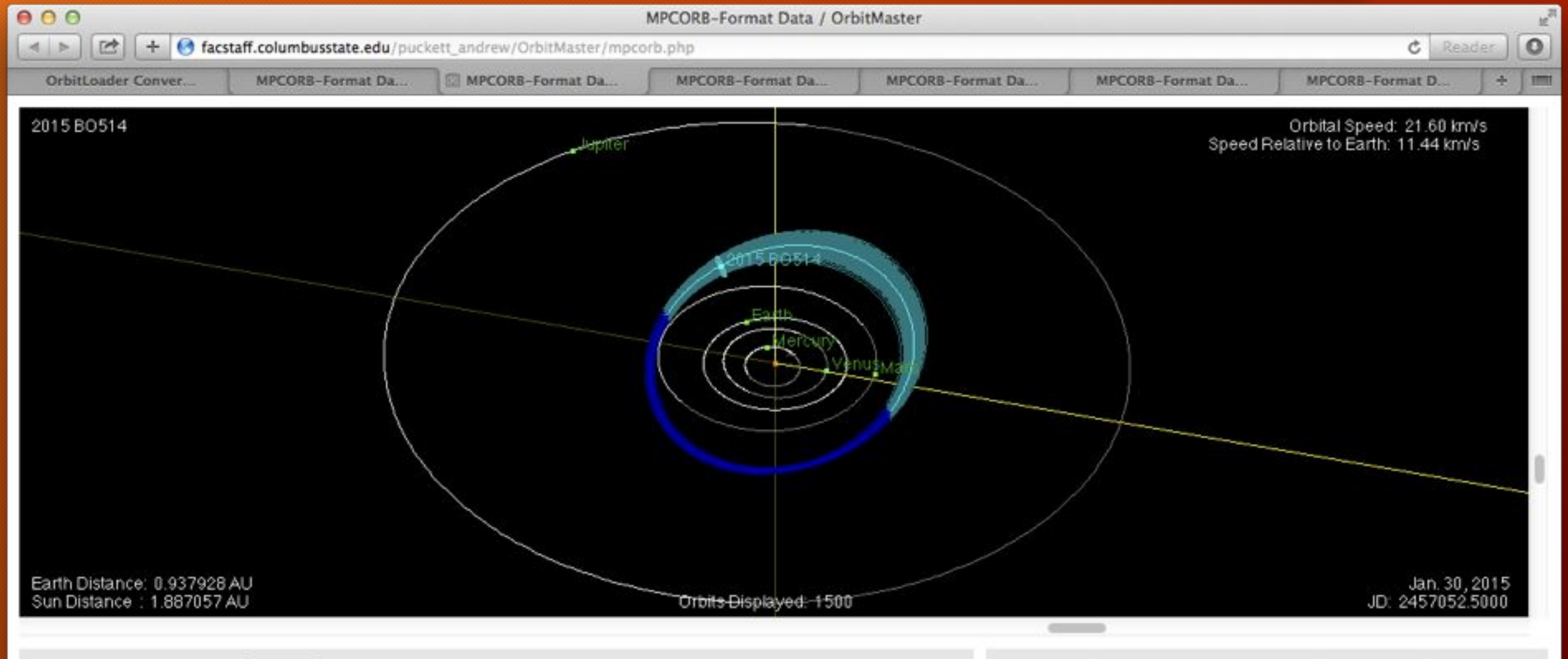
Kepler's Laws

- 1st: The orbit of a planet is an ellipse with the Sun at one of the two foci
- 2nd: Move faster when closer to the sun
- 3rd: Square of the orbital period is proportional to the cube of the semi-major axis

2015 BO514 Night of Discovery



7 days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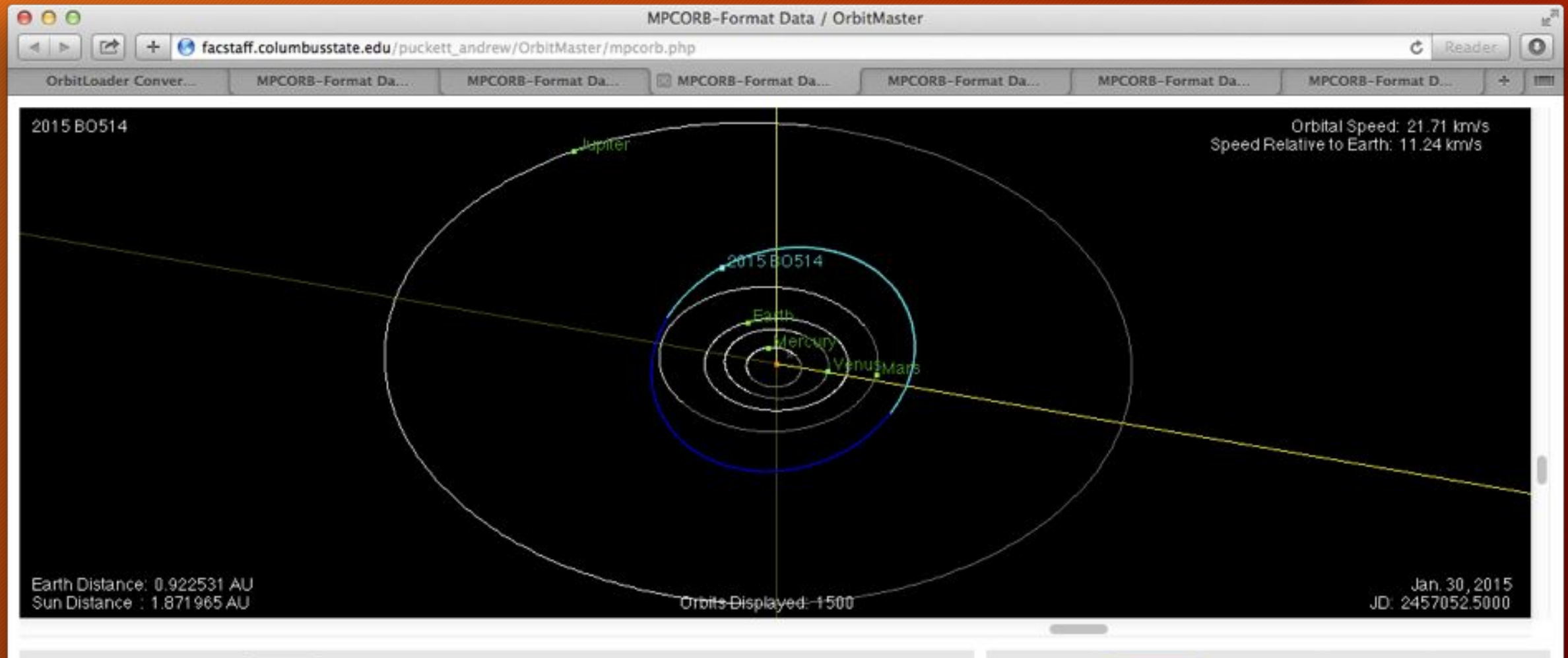
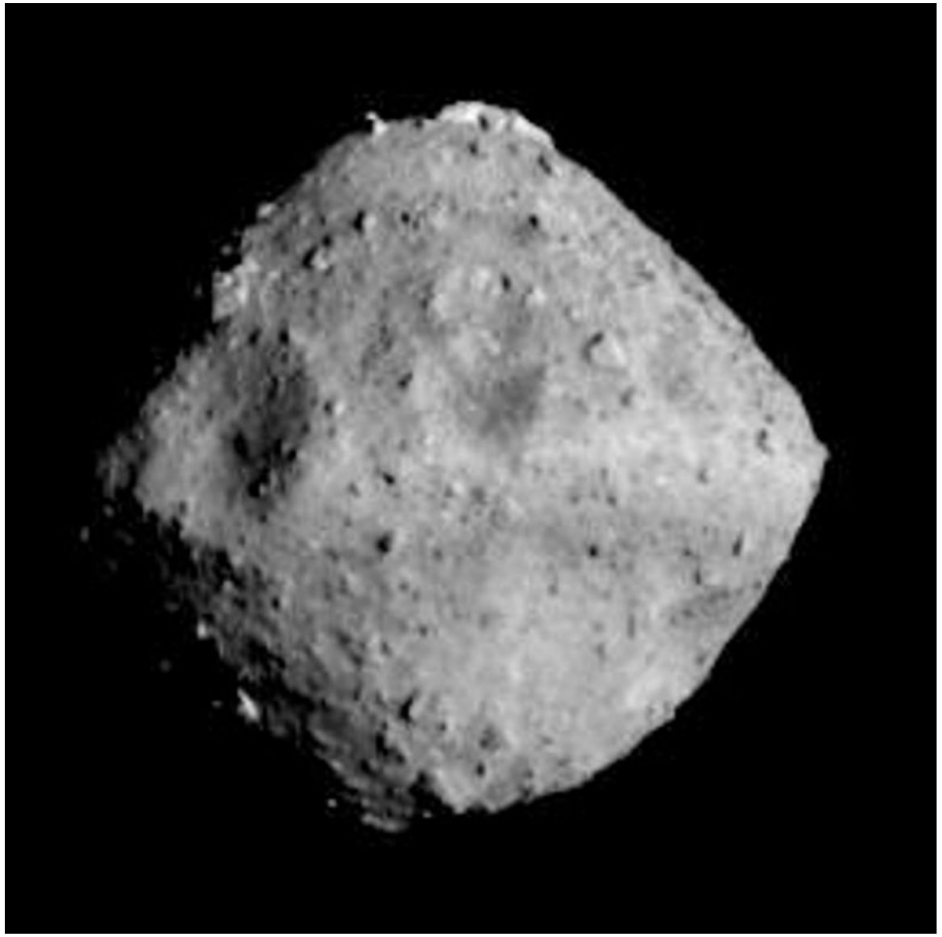
2015 BO514
Orbital Speed: 21.60 km/s
Speed Relative to Earth: 11.44 km/s
Jupiter
2015 BO514
Earth
Mercury
Venus
Mars
Earth Distance: 0.937928 AU
Sun Distance : 1.887057 AU
Orbits Displayed: 1500
Jan. 30, 2015
JD: 2457052.5000

30 days worth of observations

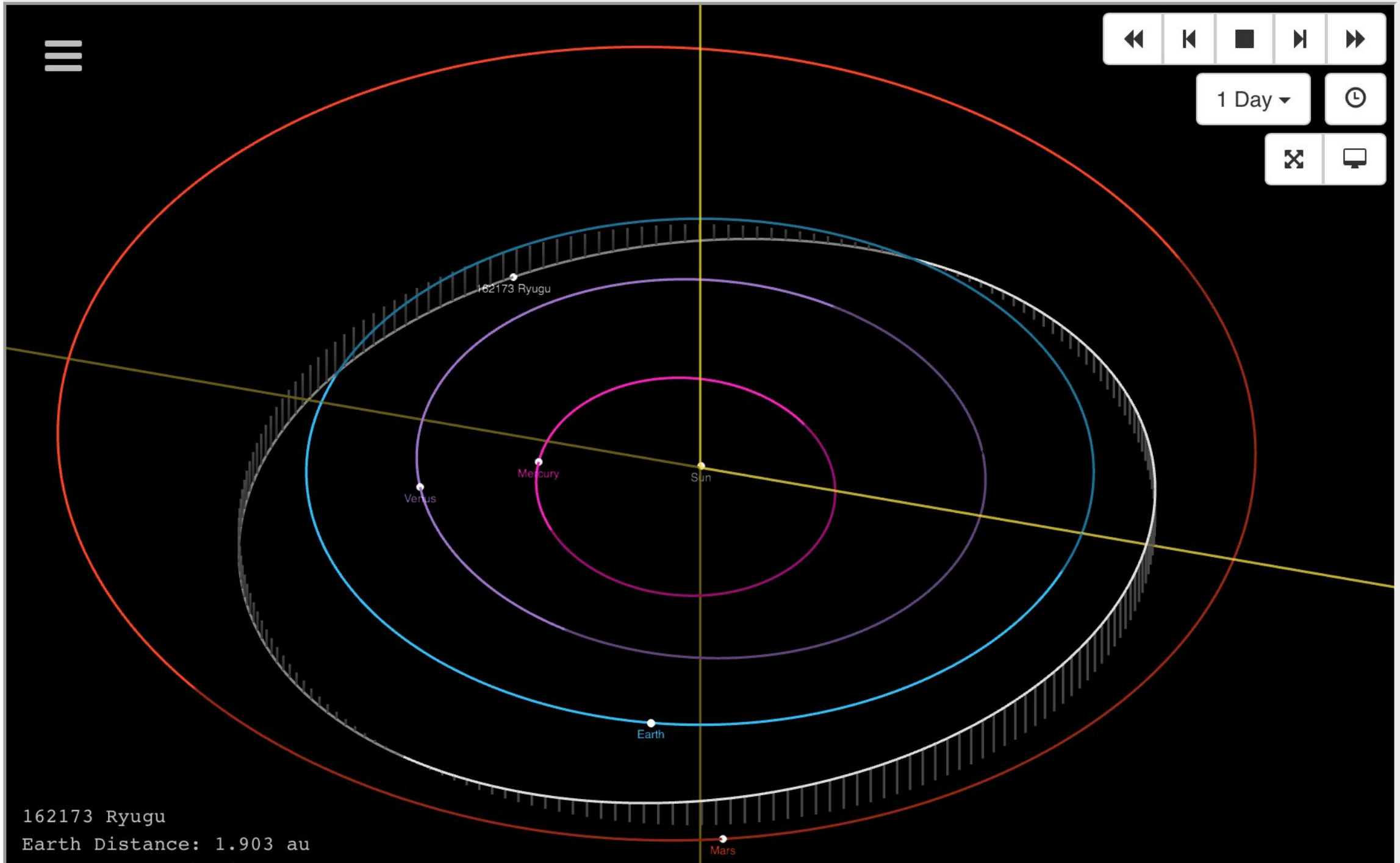


Hayabusa2: Japen's 2nd Asteroid Sample Mission



Asteroid Ryugu from a distance of roughly 40 kilometres. Credit : JAXA, University of Tokyo, Kochi University, Rikkyo University, Nagoya University, Chiba Institute of Technology, Meiji University, Aizu University, AIST

should not be used for determining accurate **long-term trajectories** (over several years or decades) **or planetary encounter circumstances**.



International Asteroid Warning Network

- http://iawn.net

- Will you tell me when an asteroid is coming??

Any Questions?