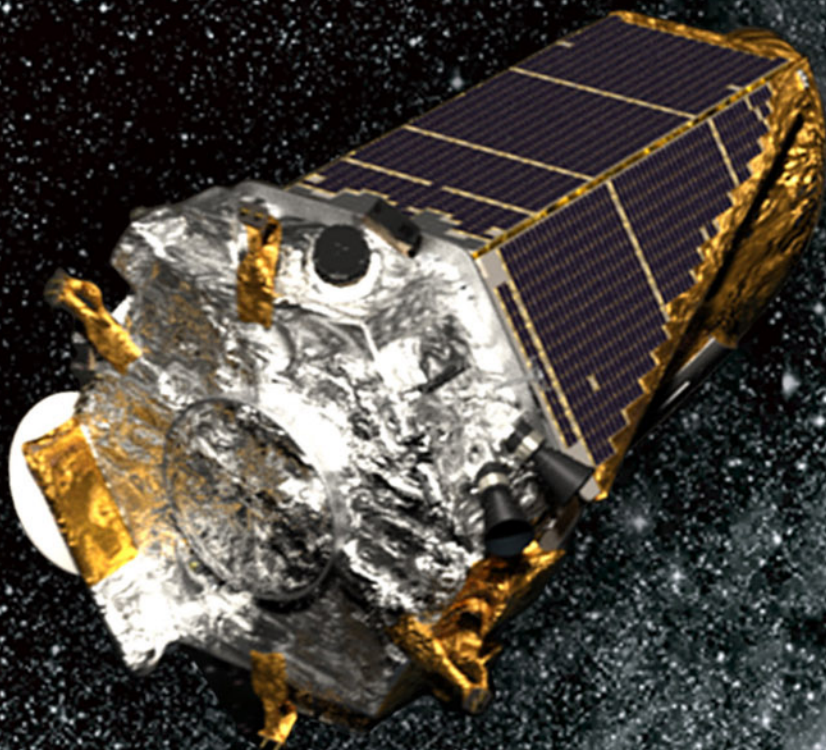
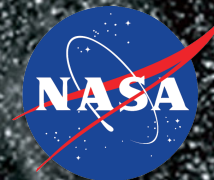


Media Briefing • February 26, 2014



Kepler

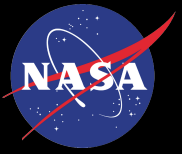
*A Search for Potentially
Habitable Planets*



Ames Research Center



NASA's Kepler Mission Announces a Planet Bonanza, 715 New Worlds



Douglas Hudgins

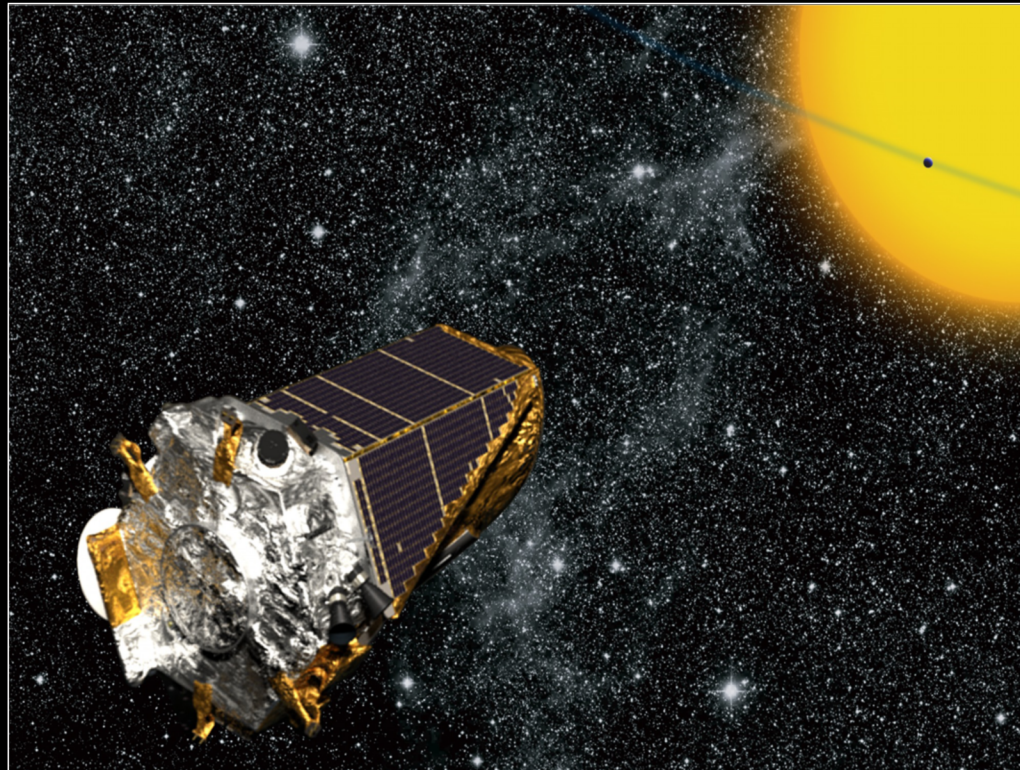
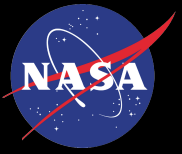
NASA Headquarters

douglas.m.hudgins@nasa.gov

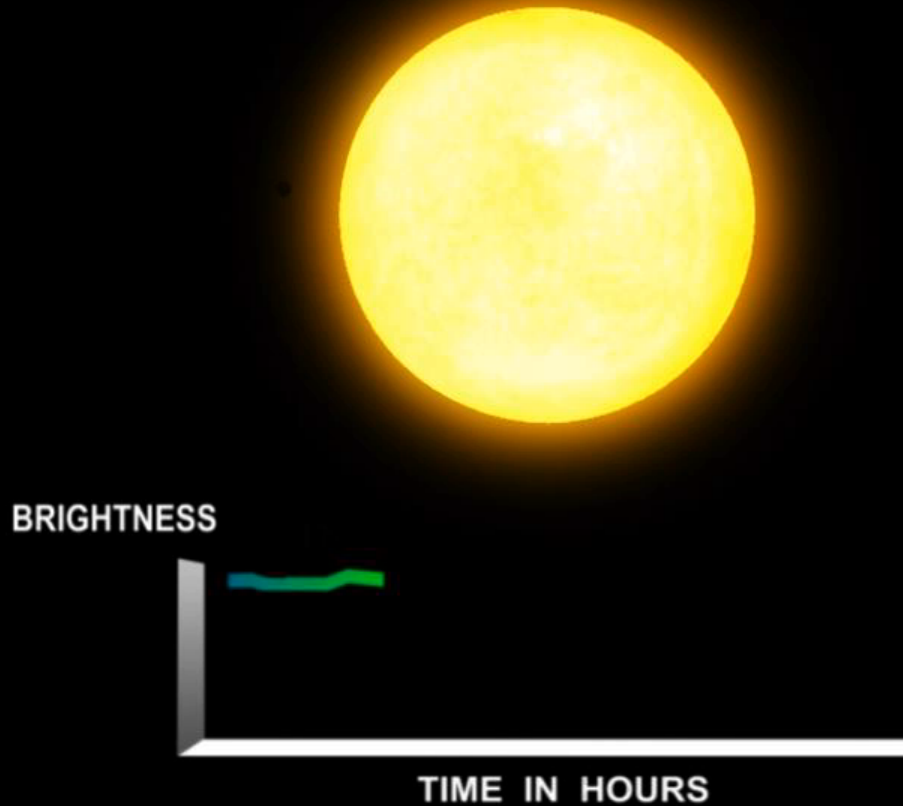


NASA's Kepler Mission:

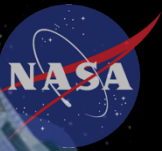
Searching for planets around other stars



Detecting Planets



Exoplanet Missions



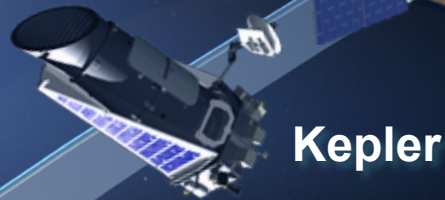
Ground-based
Observatories



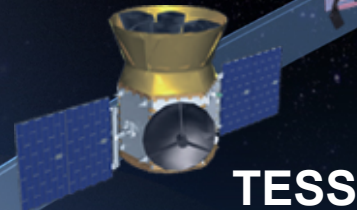
Hubble



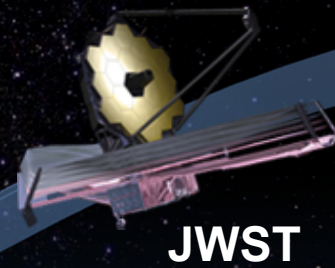
Spitzer



Kepler



TESS



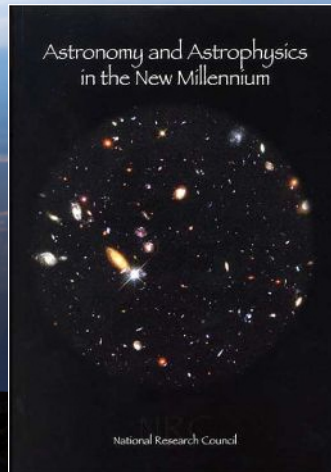
JWST



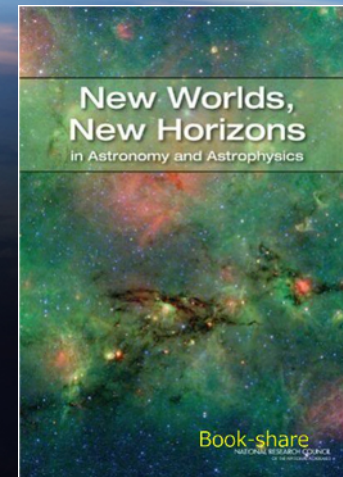
*New Worlds
Telescope*



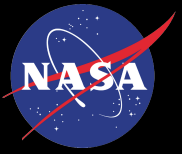
*WFIRST-
AFTA*



2001
Decadal
Survey



2010
Decadal
Survey

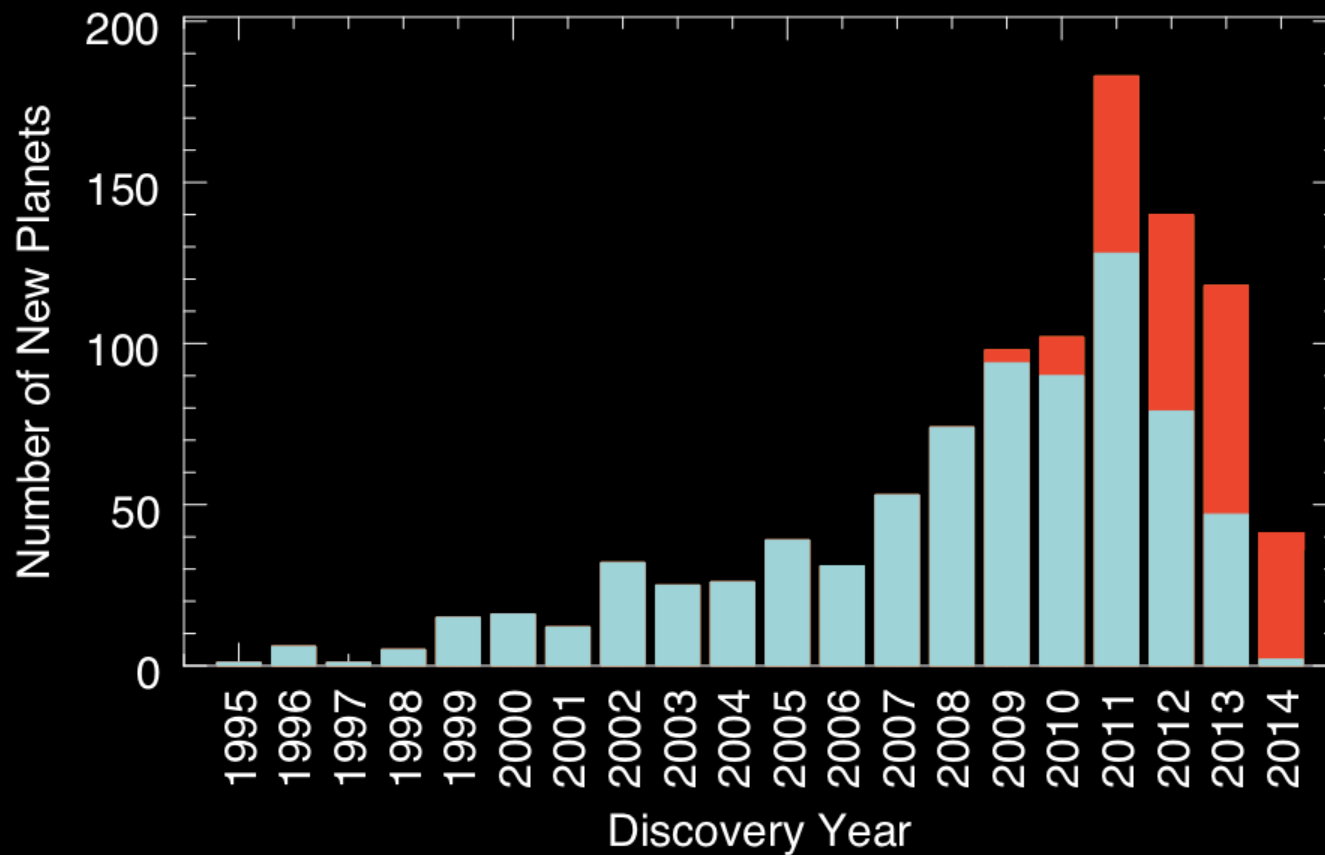


Jack Lissauer

NASA's Ames Research Center

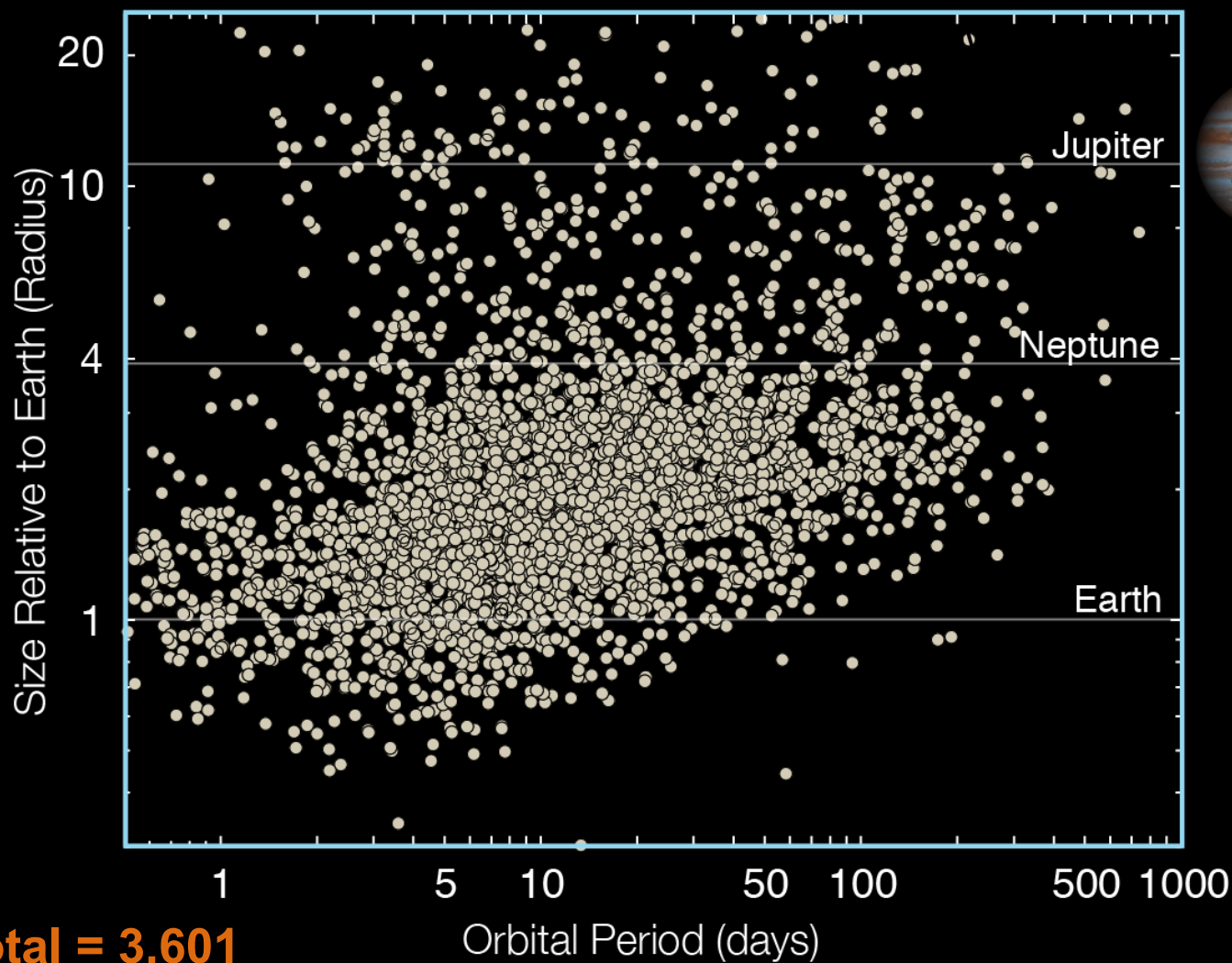
jack.lissauer@nasa.gov

Discoveries through the Years



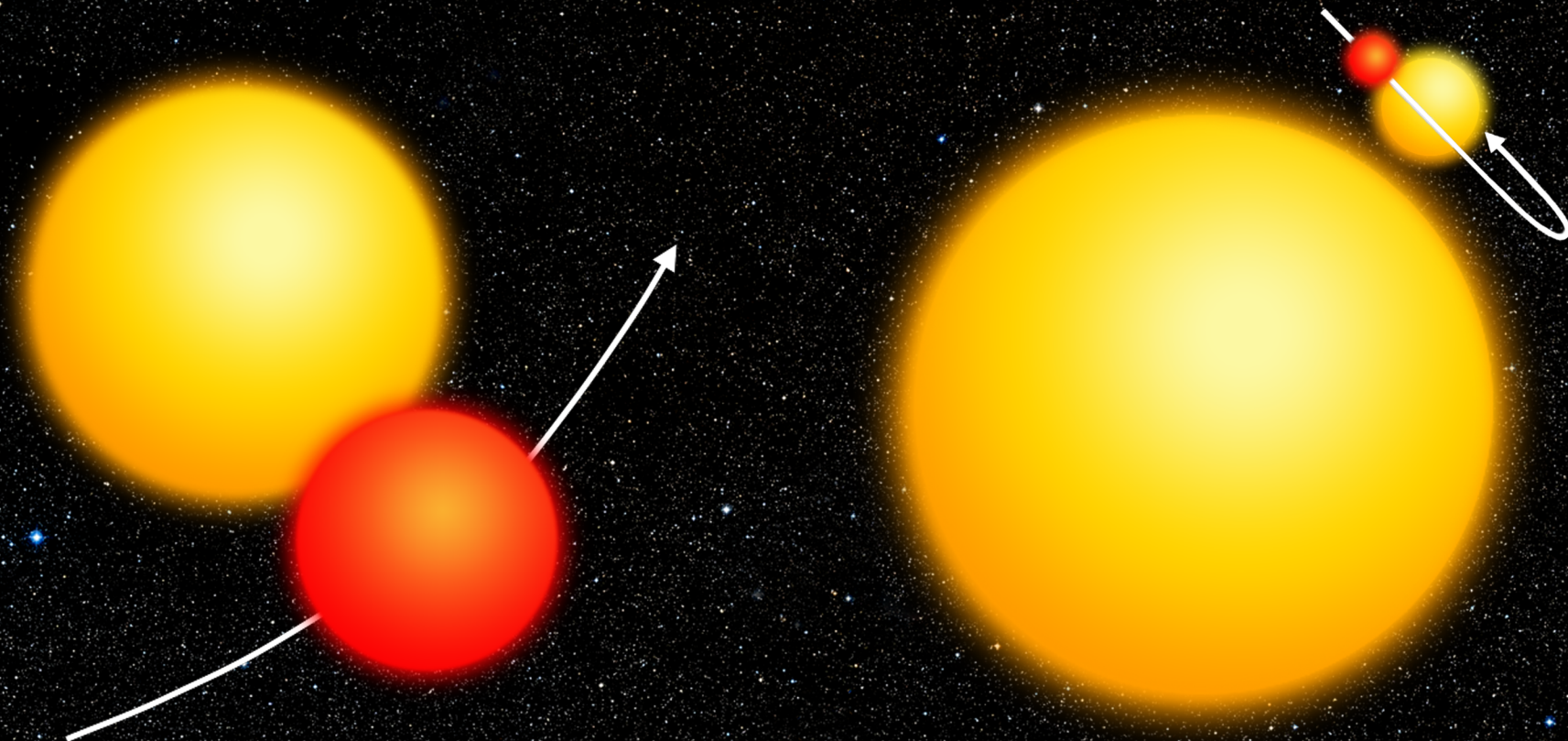
Planet Candidates

As of November 4, 2013



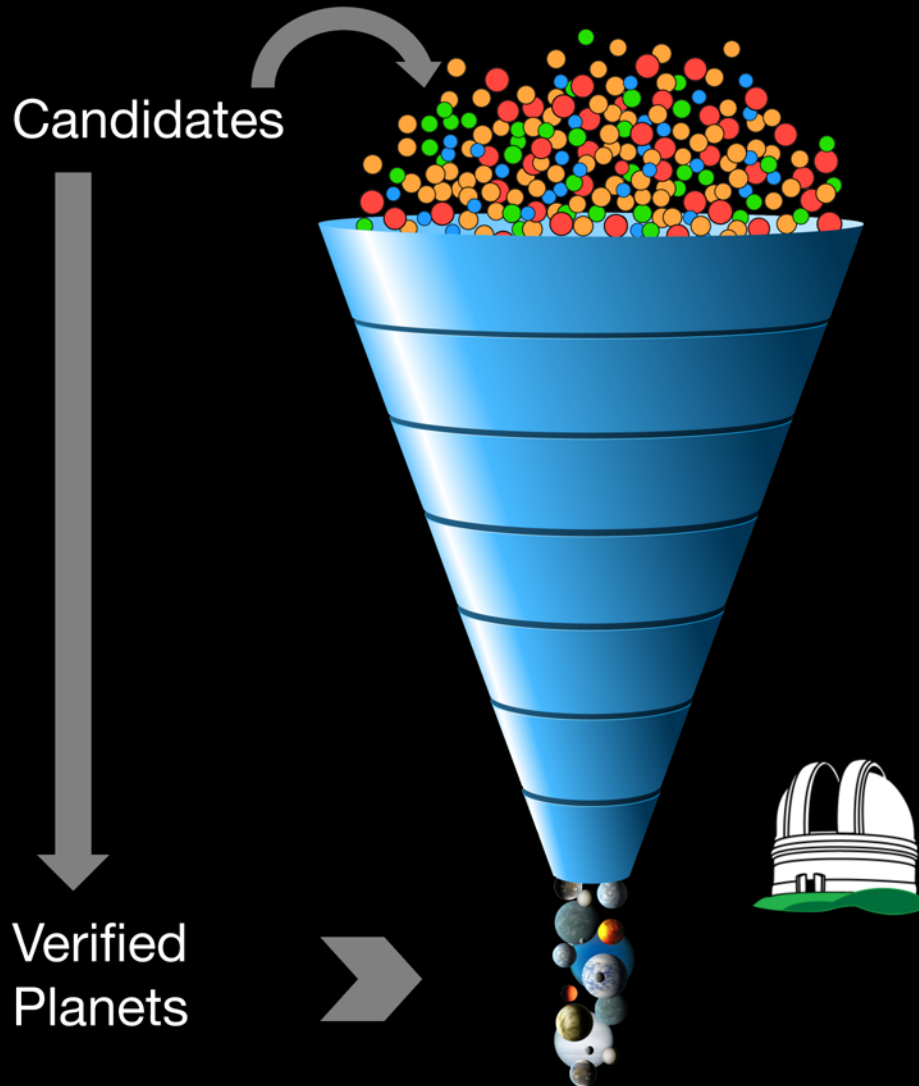
Total = 3,601

Common False Positives

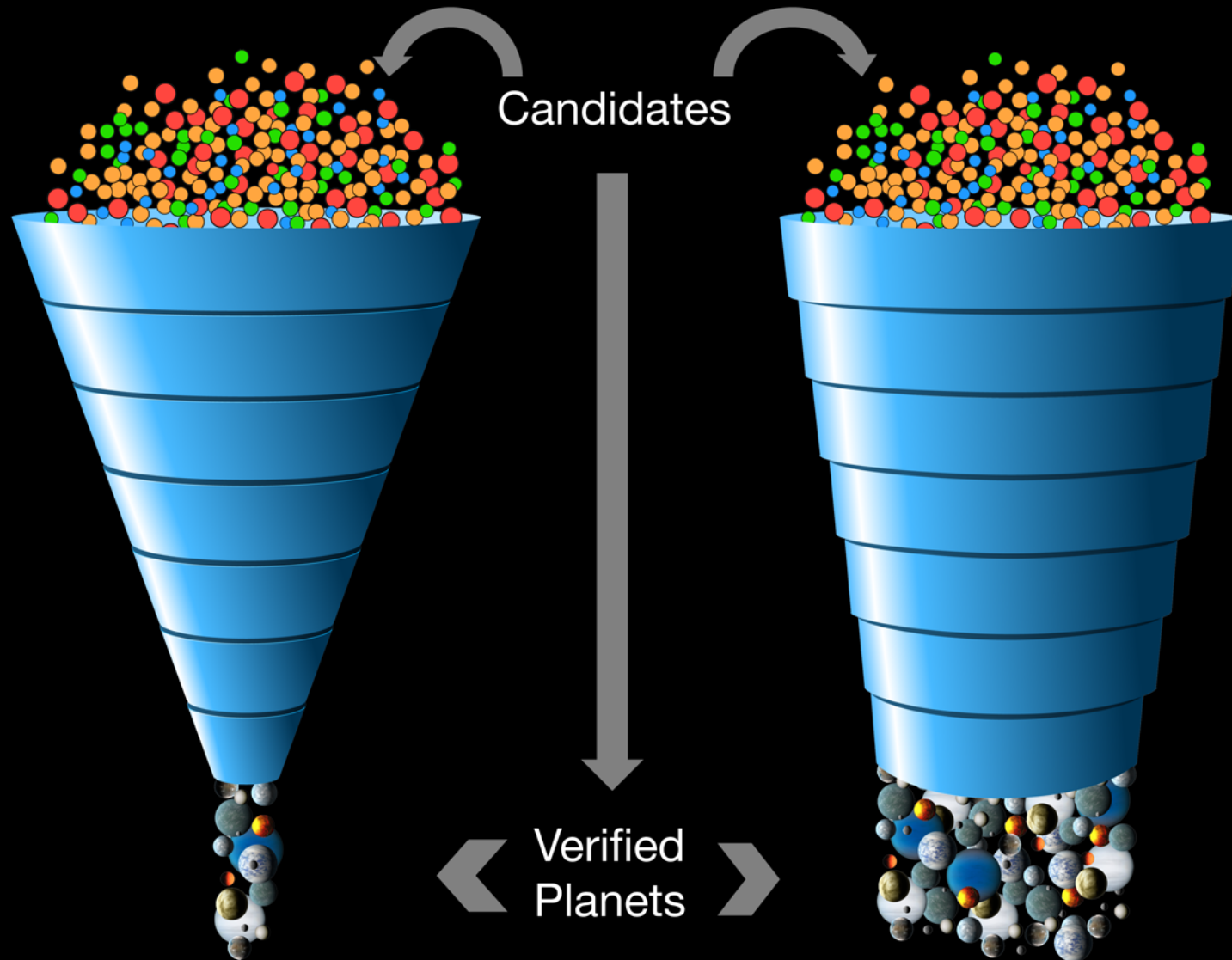


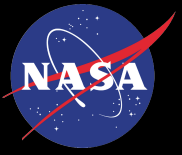


Planet Verification Bottleneck



Opening the Planet Verification Bottleneck





Multiplicity

- Of Kepler's 150,000 stars, only a couple thousand stars have a transit-like pattern
- If patterns appeared randomly, only a few stars would have more than one pattern
- But ... hundreds of stars have multiple transit-like patterns

Multiplicity is not random!

Kepler

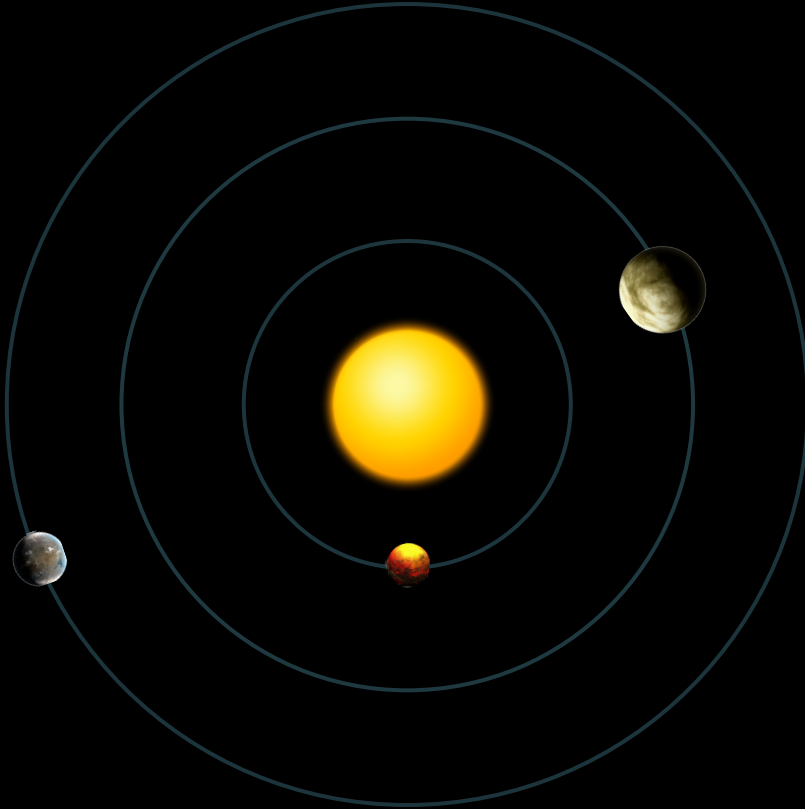


What are the Multis?



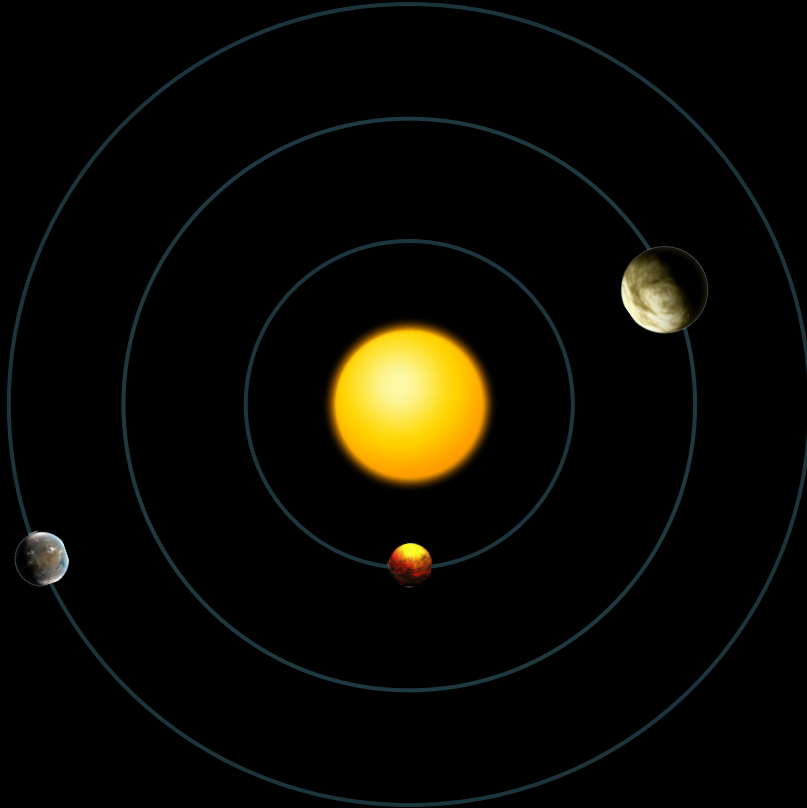
What are the Multis?

Planets occur in
systems like our solar
system

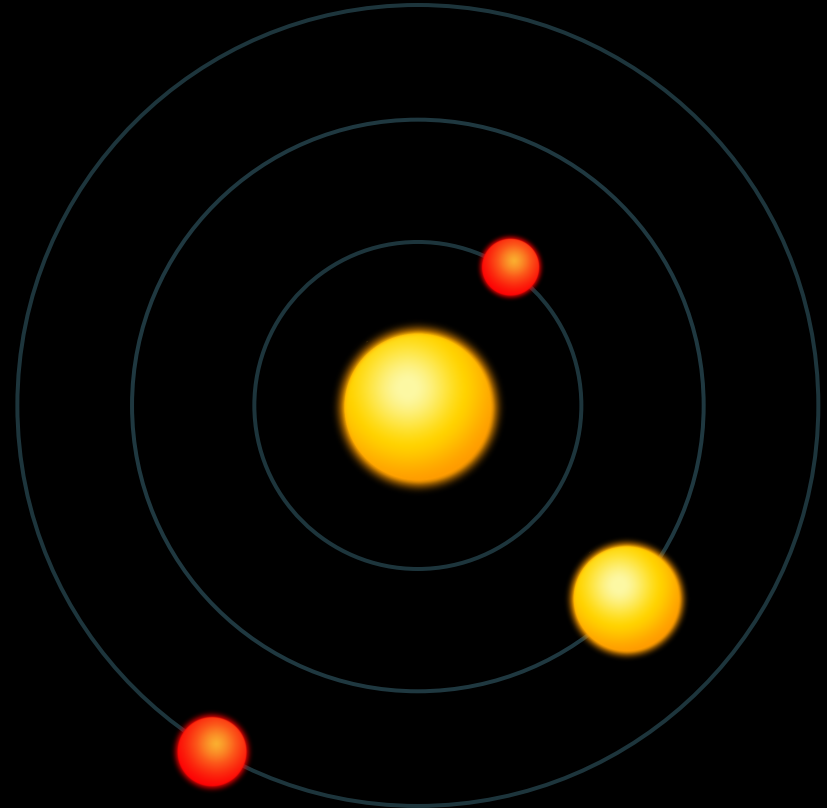


What are the Multis?

Planets occur in systems like our solar system

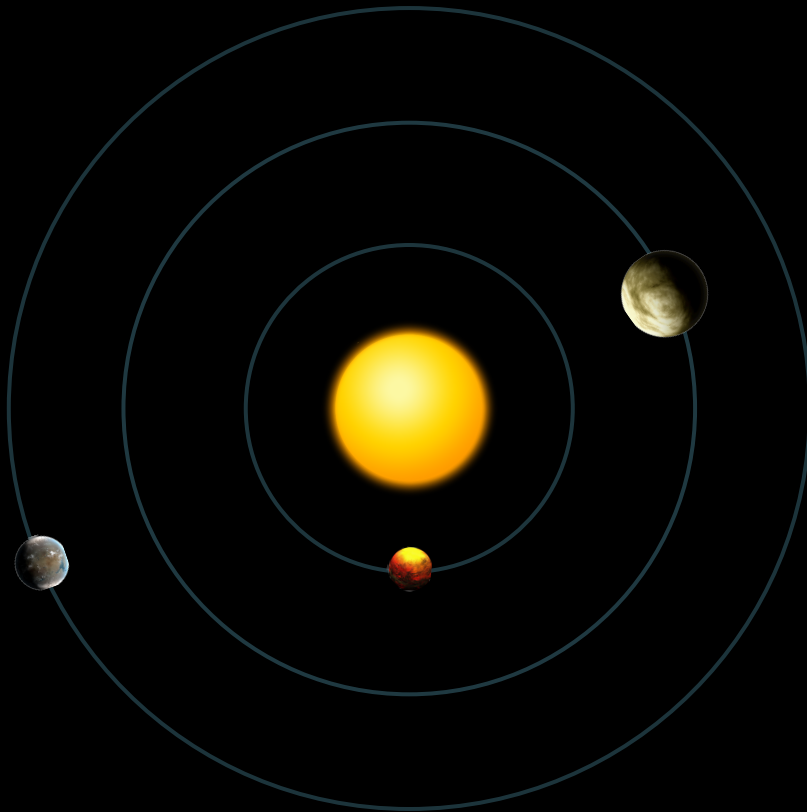


A similar configuration of stars would be unstable

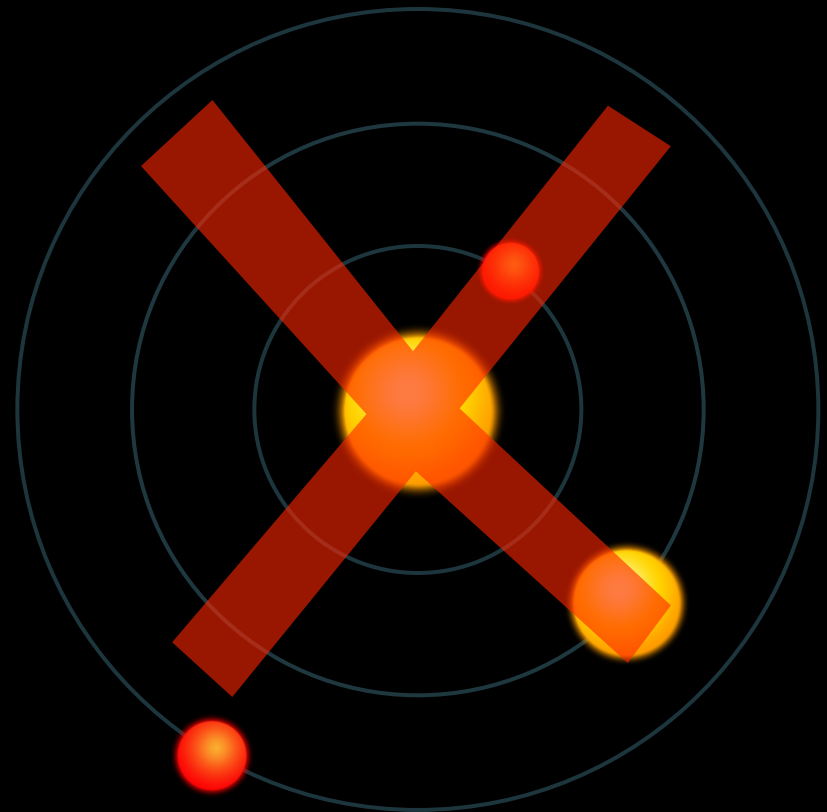


What are the Multis?

Planets occur in systems like our solar system

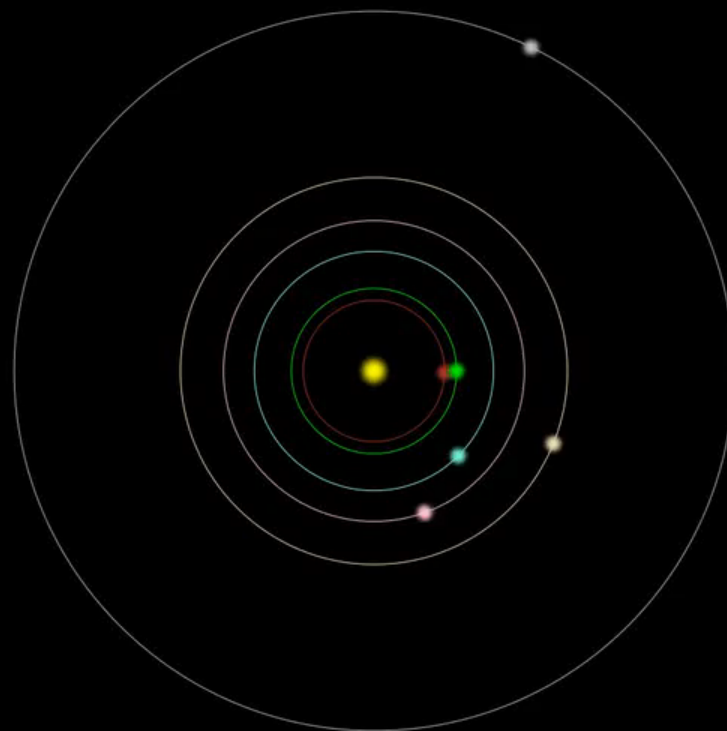
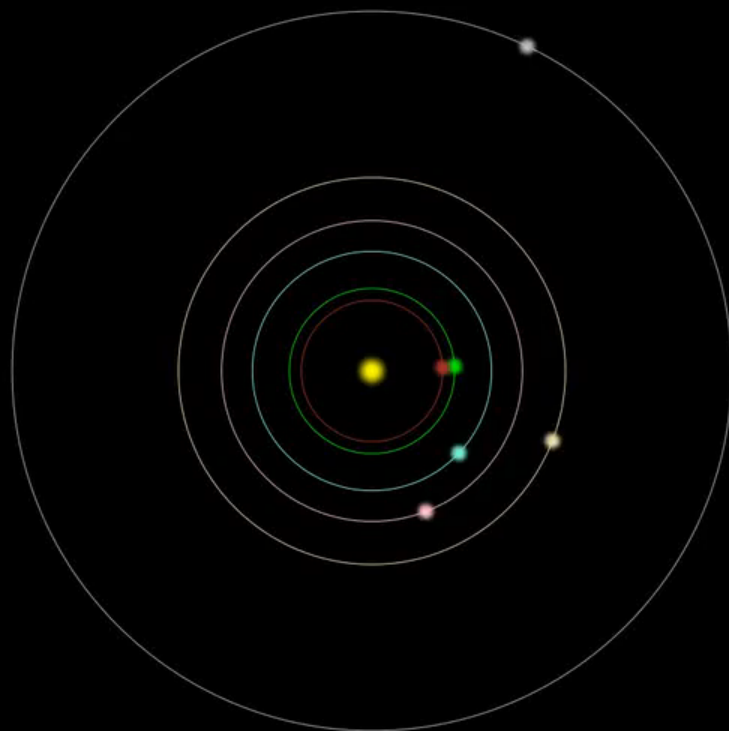


A similar configuration of stars would be unstable



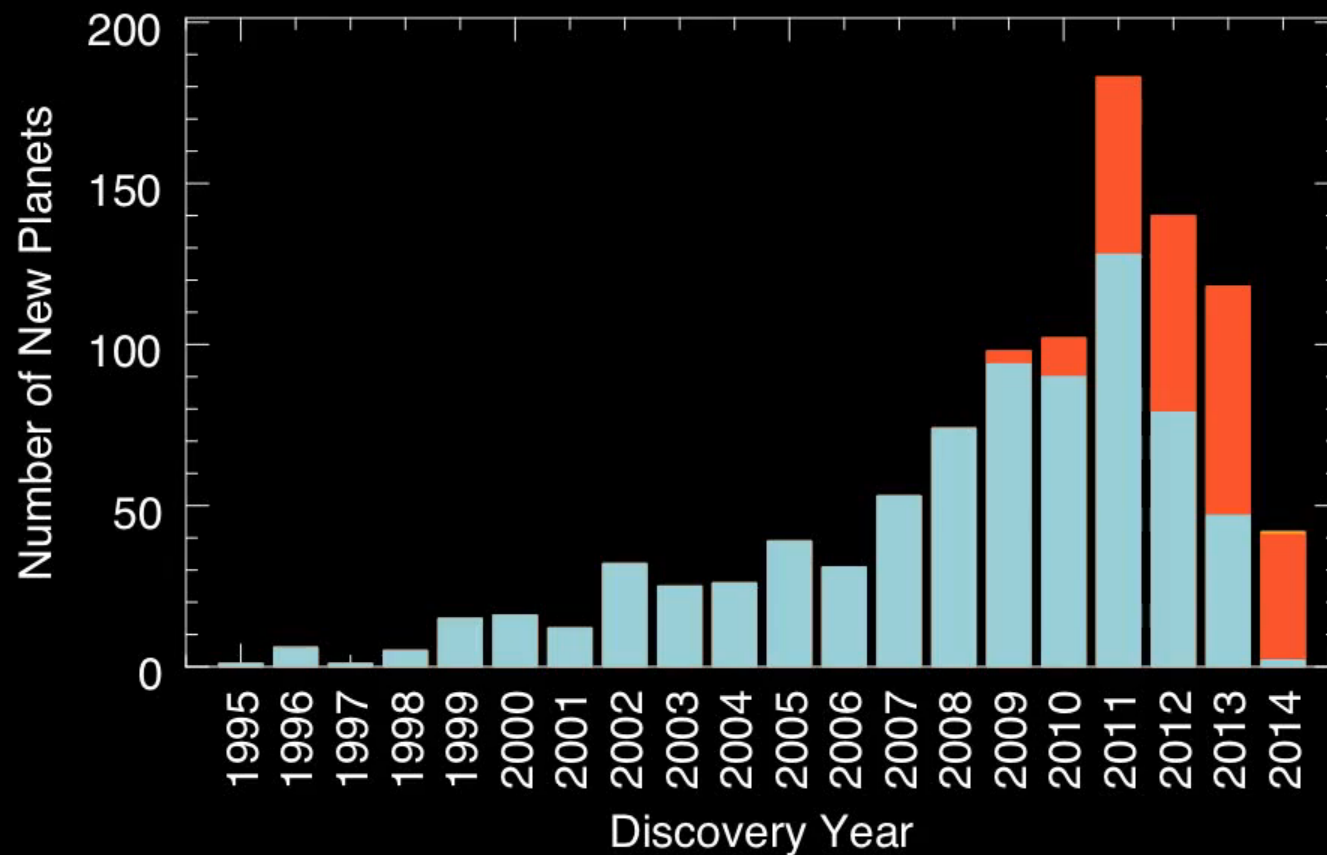
Planets

Stars



0.5 AU

Discoveries: Then and Now





Summary



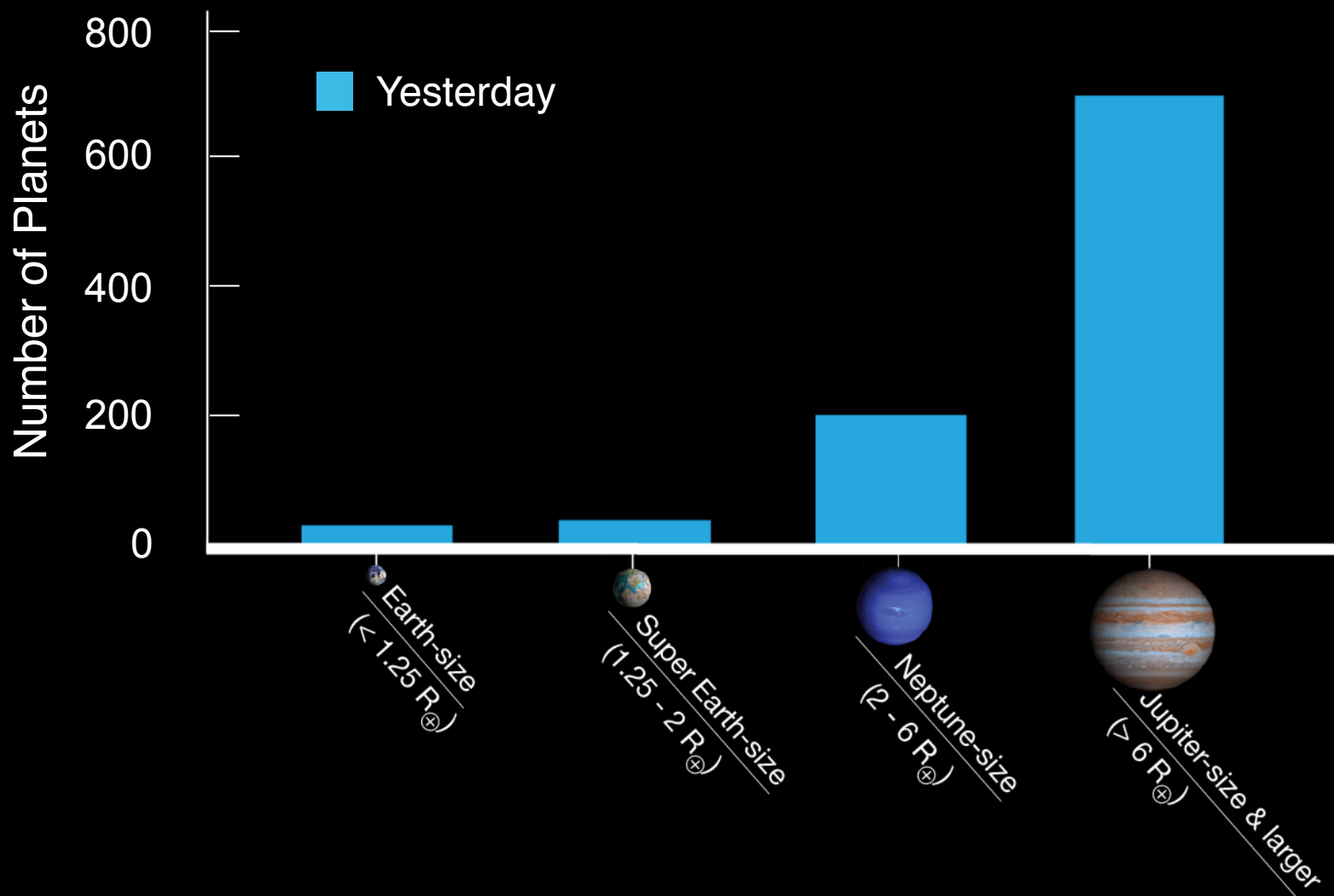
- 715 newly verified planets orbiting 305 stars
- Increases total known planets to nearly 1,700
- Multiplicity is a powerful technique for wholesale planet verification
- Results are based on the first two years of observations



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SETI Institute
jason.rowe@nasa.gov

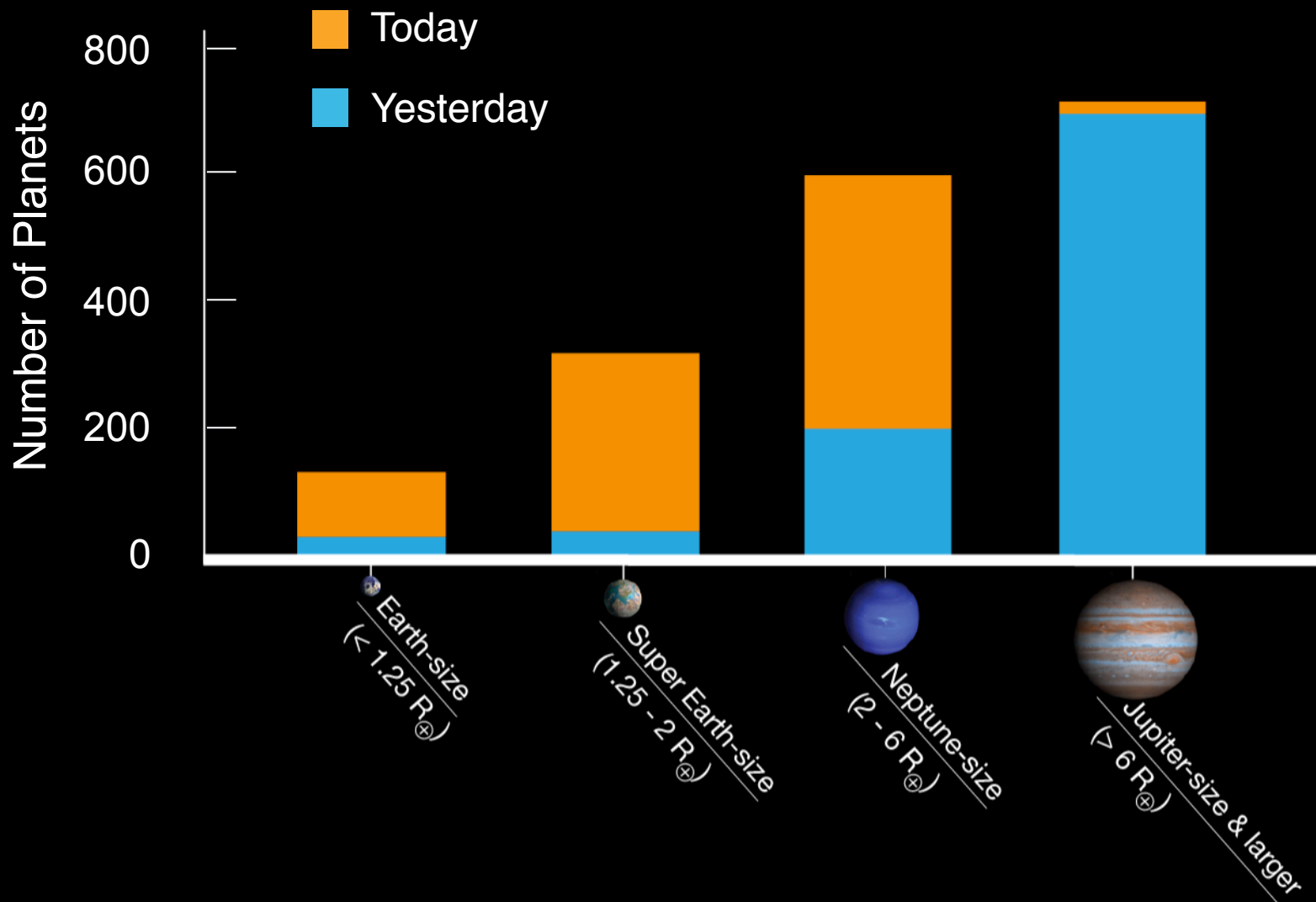
Sizes of Verified Planets

As of February 26, 2014



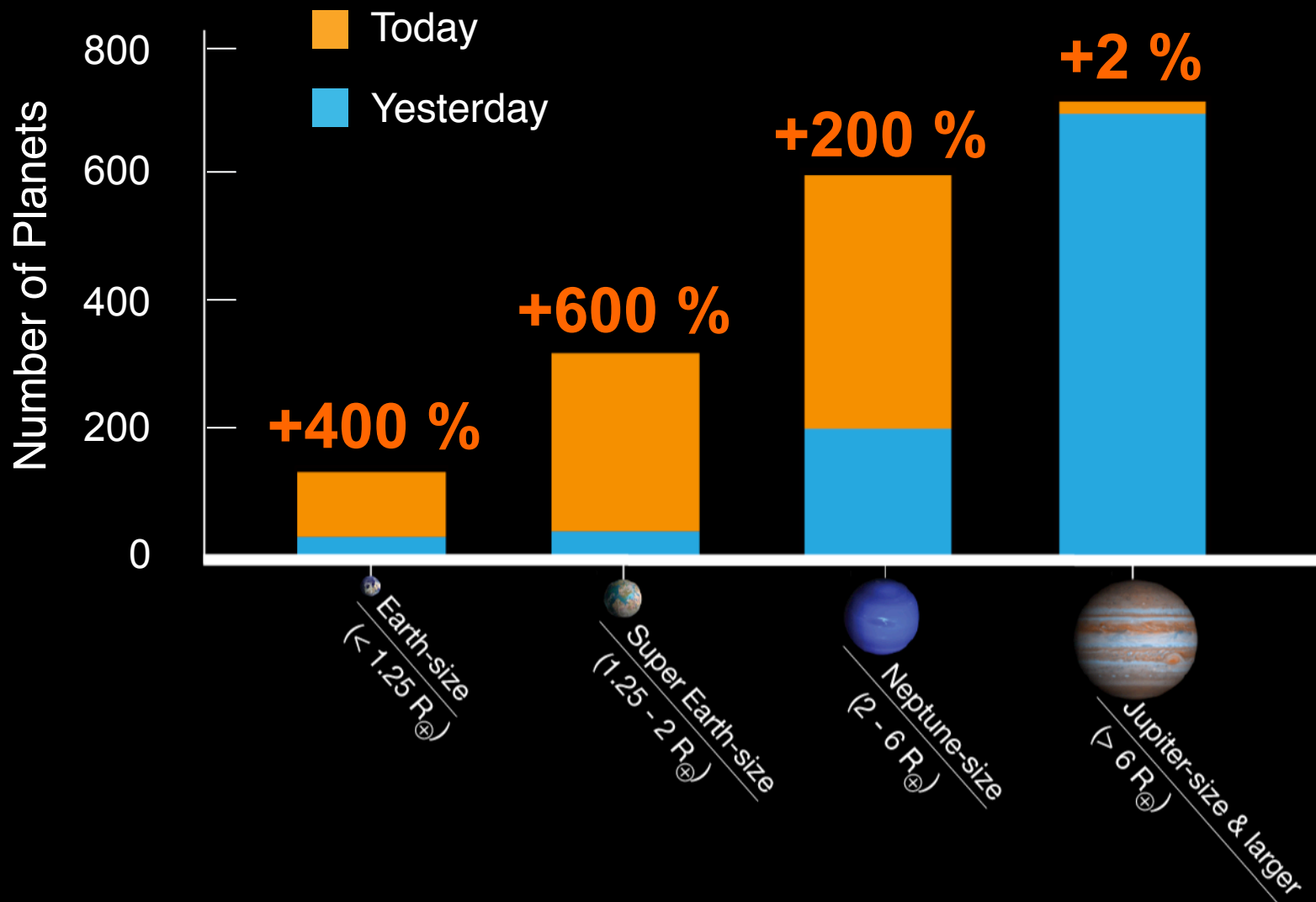
Sizes of Verified Planets

As of February 26, 2014

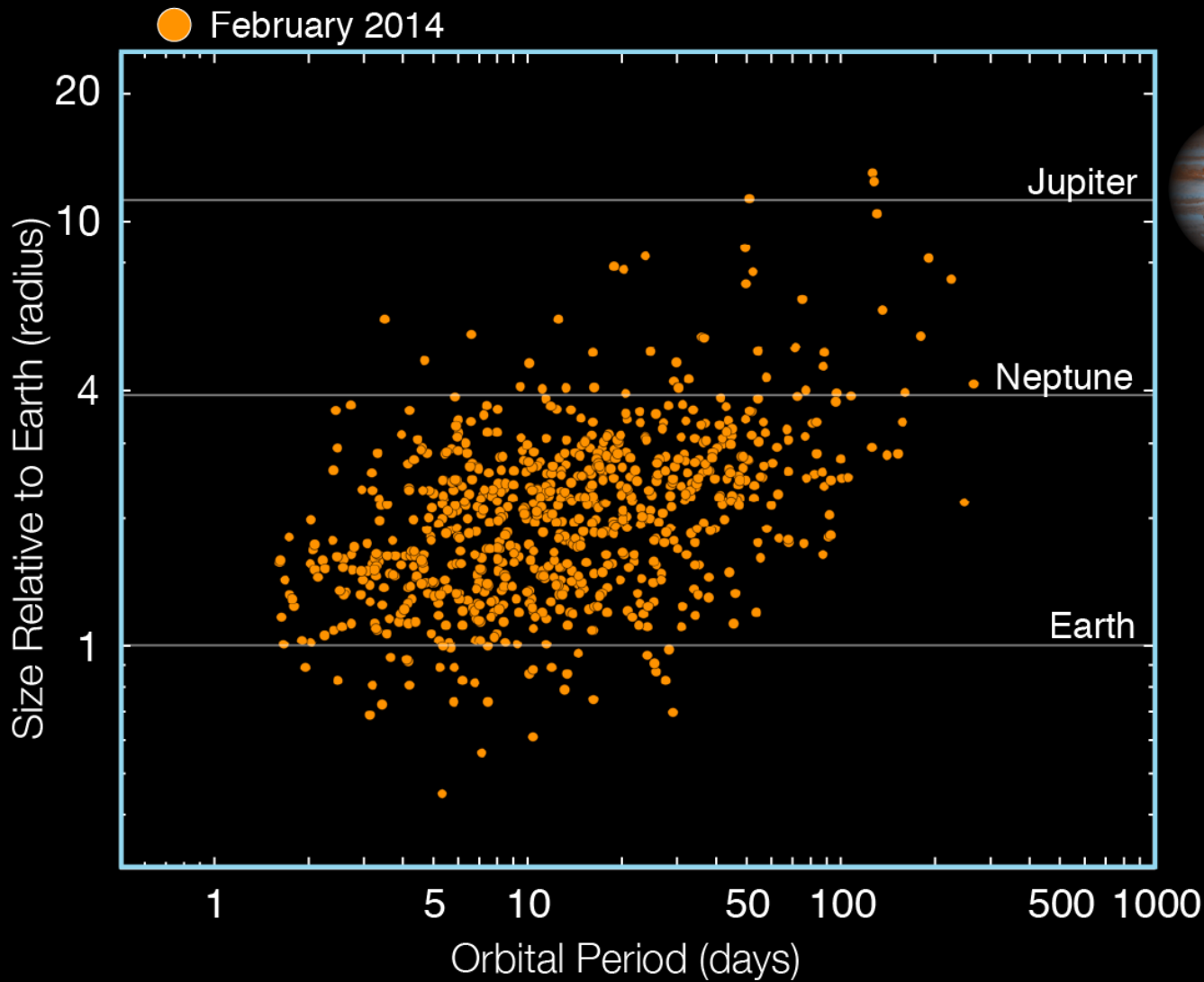


Sizes of Verified Planets

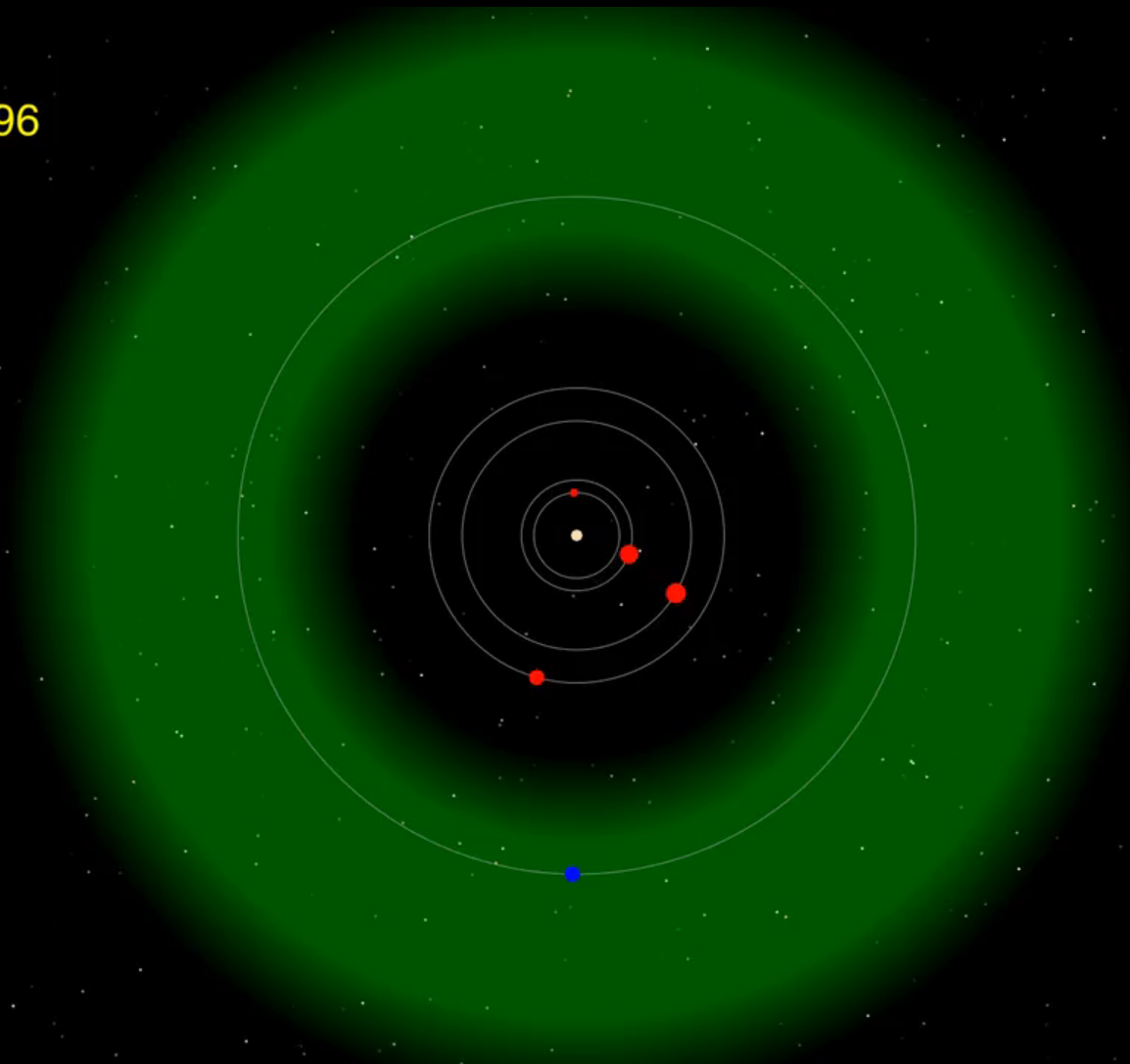
As of February 26, 2014



Multiple Planet Population

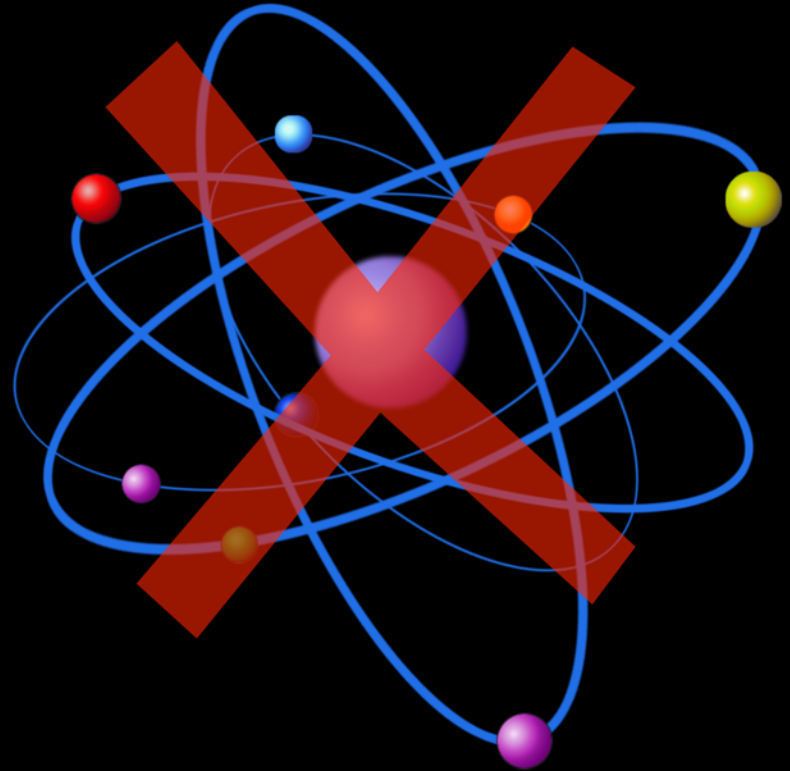
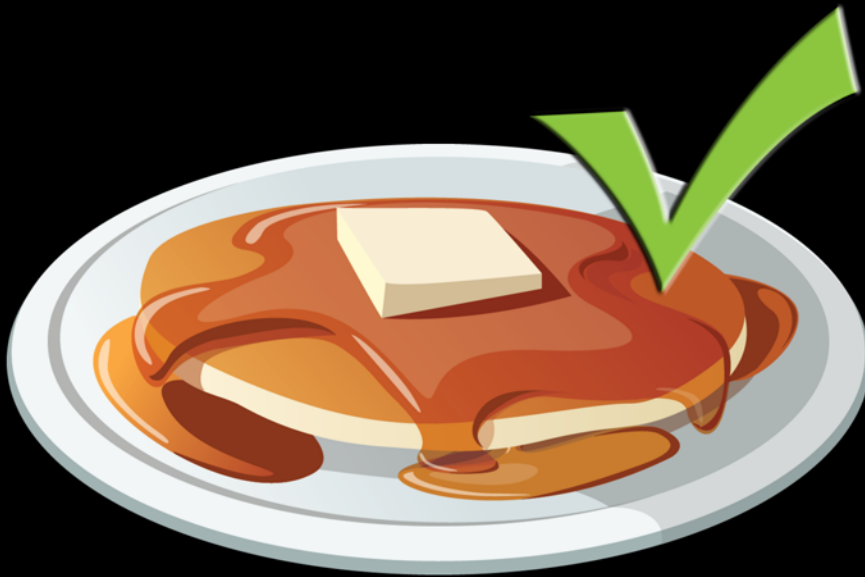


Kepler-296



Small, Flat, and Circular

Multiple planet systems are similar to our inner solar system



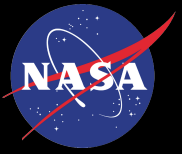


Summary

- Kepler introduces 715 new planets – all in multiple planet systems
 - 94% are smaller than Neptune
 - Four new habitable zone planets
- Multi-planet systems are highly valuable
 - Good for demographic studies
 - Tell us about planets and planet formation
- The new systems have small planets with flat and circular orbits like our inner Solar System
 - Reminds us of home, placing ourselves into context!
- Multiplicity is a powerful technique for wholesale planet verification
- Hundreds more planets are expected from Kepler's 4-years of data



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The Kepler logo, featuring the word "Kepler" in a stylized blue font with a small planet icon above the letter 'e'.

Kepler's Ongoing Legacy:

Understanding planet formation and evolution
and our place in the Galaxy



For more information, please visit:

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