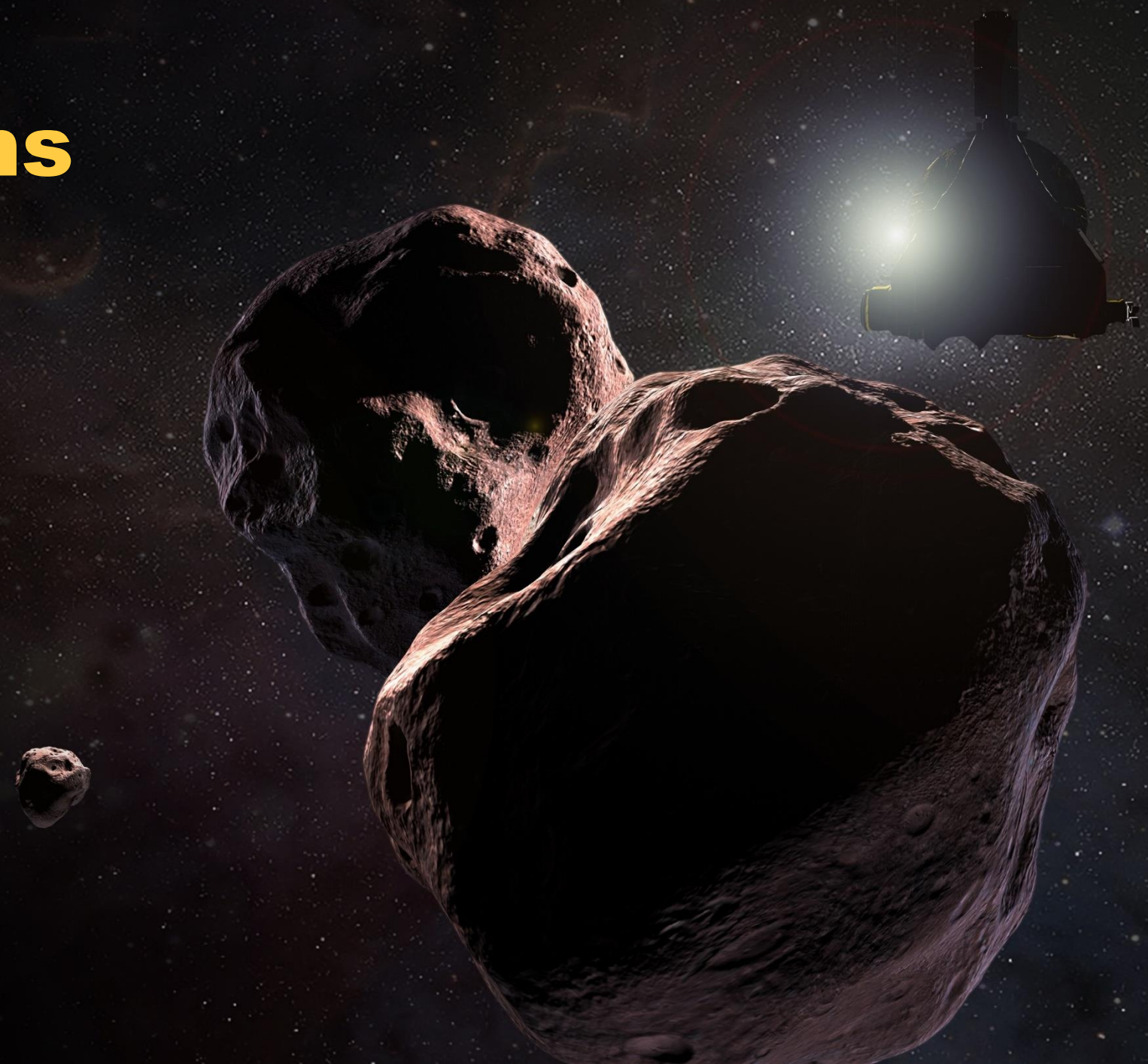
New Horizons

Kuiper Belt Extended Mission

December 12, 2017

Media Availability

AGU Fall Meeting



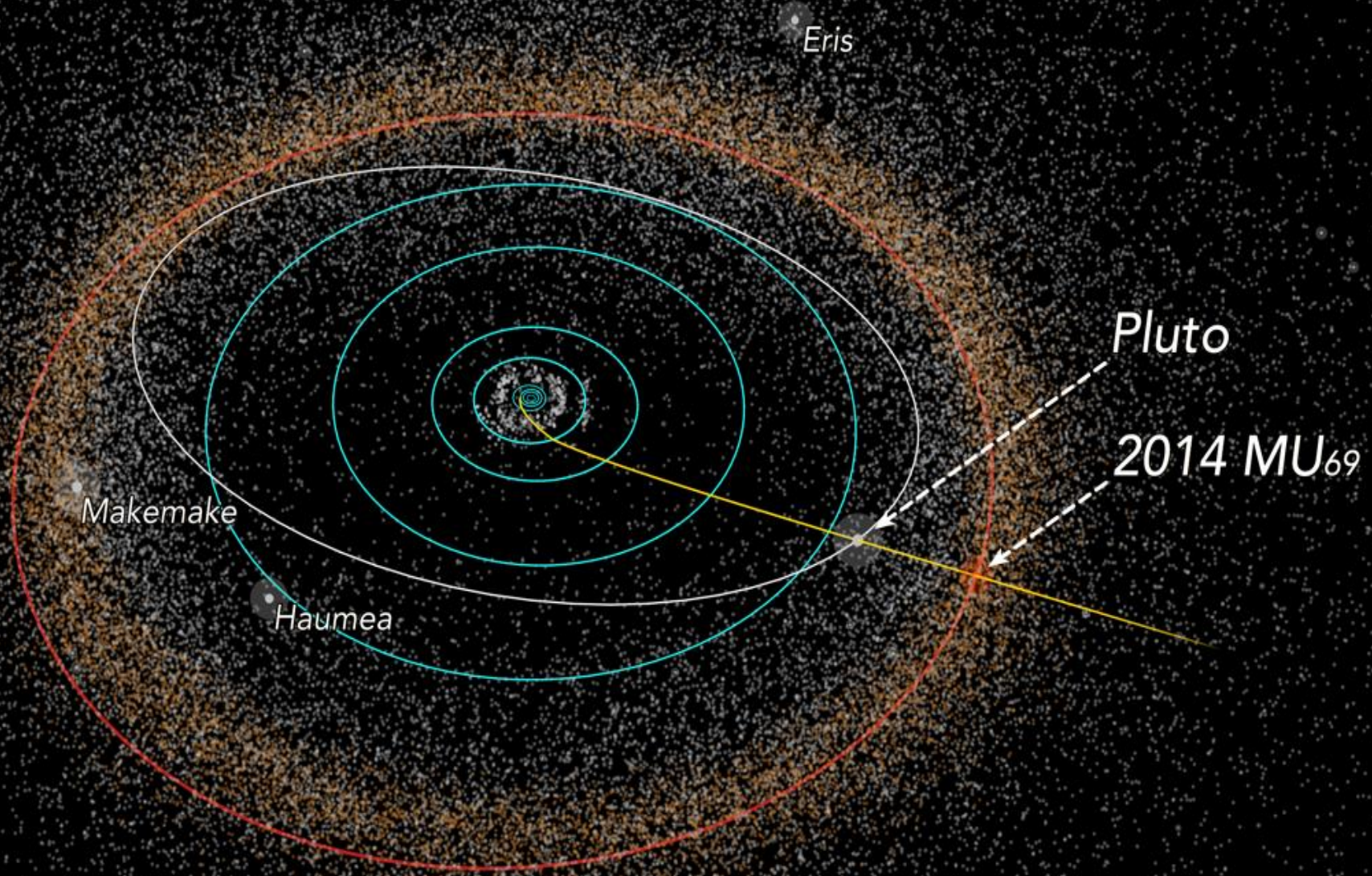
NASA Exploration of the Outer Solar System

Dr. Jim Green
Director, Planetary Science Division
NASA Headquarters

New Horizons
Kuiper Belt Extended Mission

Dr. Alan Stern
New Horizons Principal Investigator
Southwest Research Institute

First Mission to Explore the Kuiper Belt



First Mission to Explore the Kuiper Belt

- From 2016-2021, New Horizons will study the Kuiper Belt to 50 AU, meeting a Decadal Survey priority
- Centerpiece: Close flyby of an ancient object, 2014 MU69, on Jan. 1, 2019
  - Flyby data downlink through Fall 2020
- New Horizons is observing ~30 other KBOs in unique ways, while also studying the Kuiper Belt environment

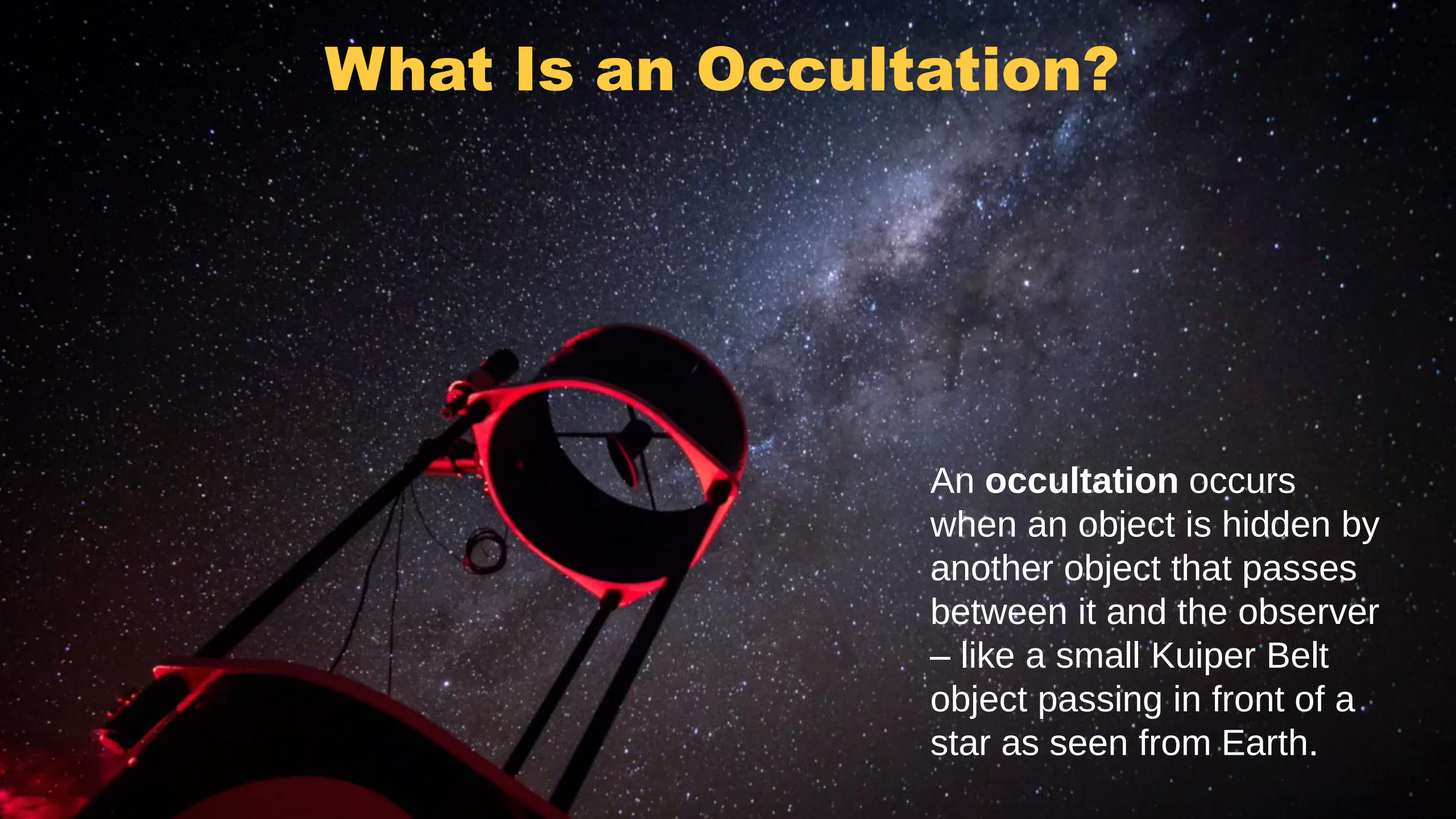
2014 MU69

The most distant and most primitive object ever explored

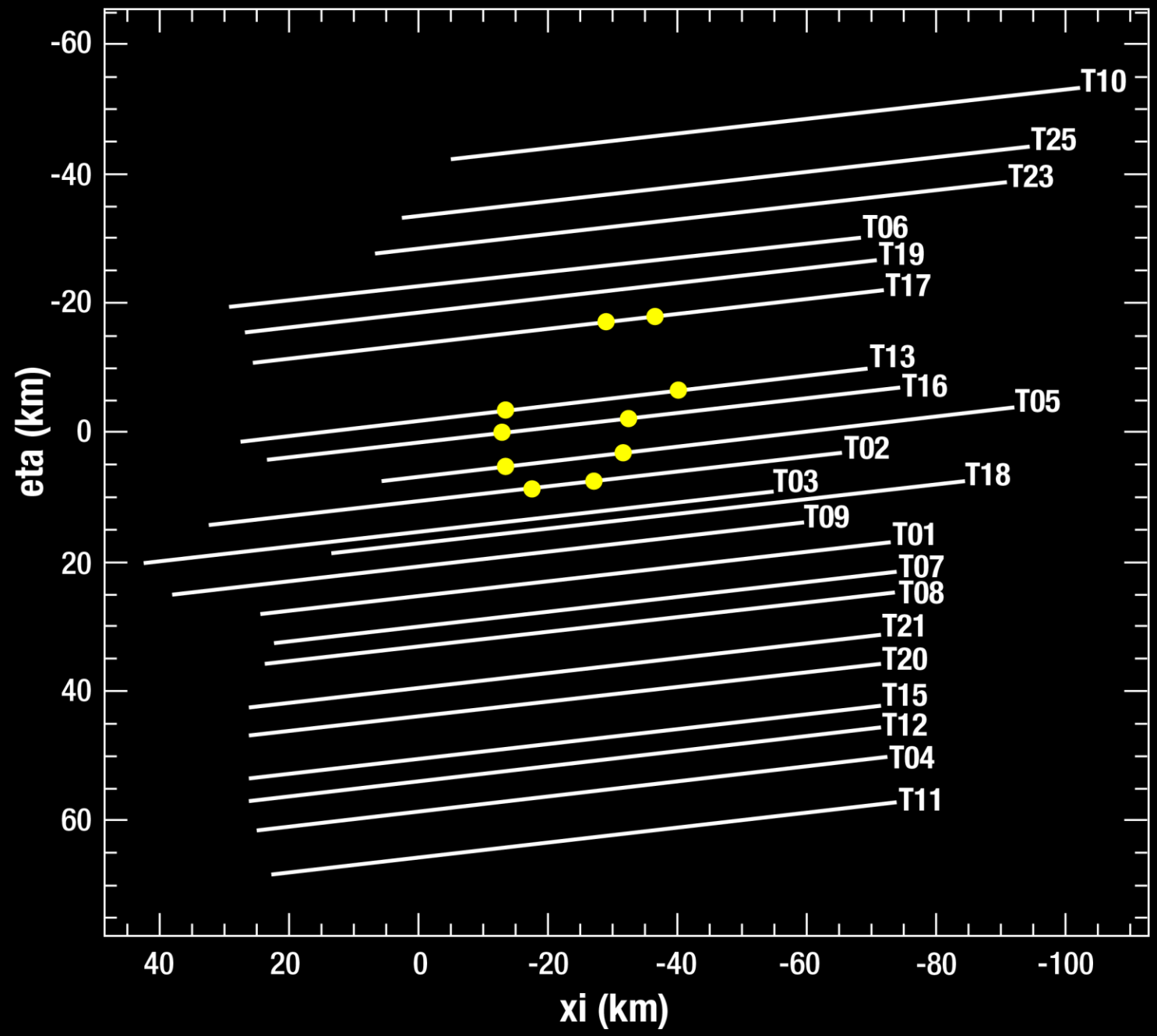
What Do We Know about MU69?

Dr. Marc Buie
New Horizons Co-Investigator
Southwest Research Institute

What Is an Occultation?



An **occultation** occurs when an object is hidden by another object that passes between it and the observer – like a small Kuiper Belt object passing in front of a star as seen from Earth.


-60
-40
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20
40
60
eta (km)
40
20
0
-20
-40
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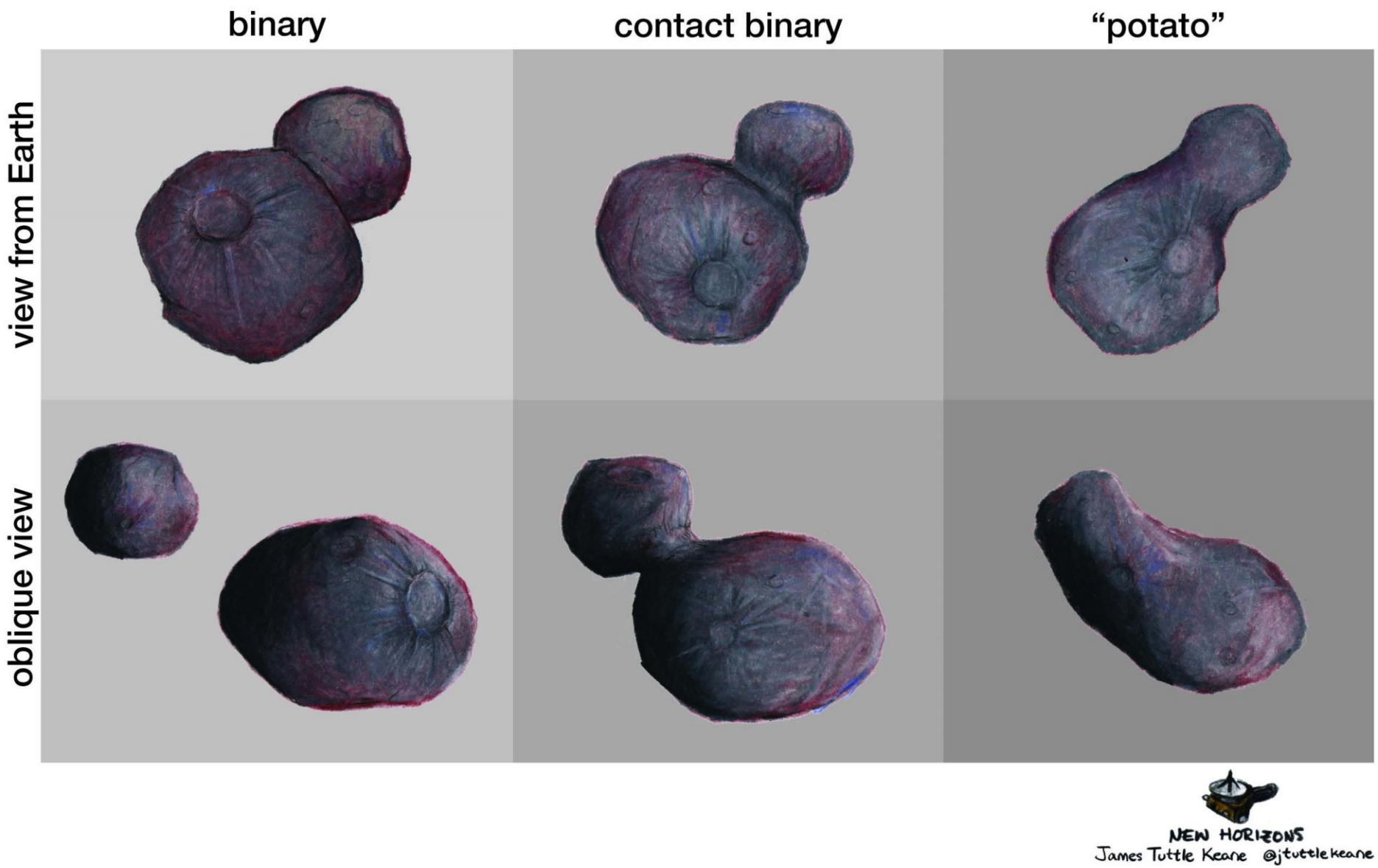
binary
contact binary
“potato”
view from Earth
oblique view
NEW HORIZONS
James Tuttle Keane @jtuttlekeane

June 3rd

astrometry-derived location

scale

10 kilometers
(6.2 miles)

Mt. Everest
(Sagarmāthā, Chomolungma)
8.8 kilometers tall
(5.5 miles tall)

sketch by James Tuttle Keane @jtuttlekeane

NEW HORIZONS

June 3rd

astrometry-derived location

July 10th

scale

10 kilometers
(6.2 miles)

Mt. Everest
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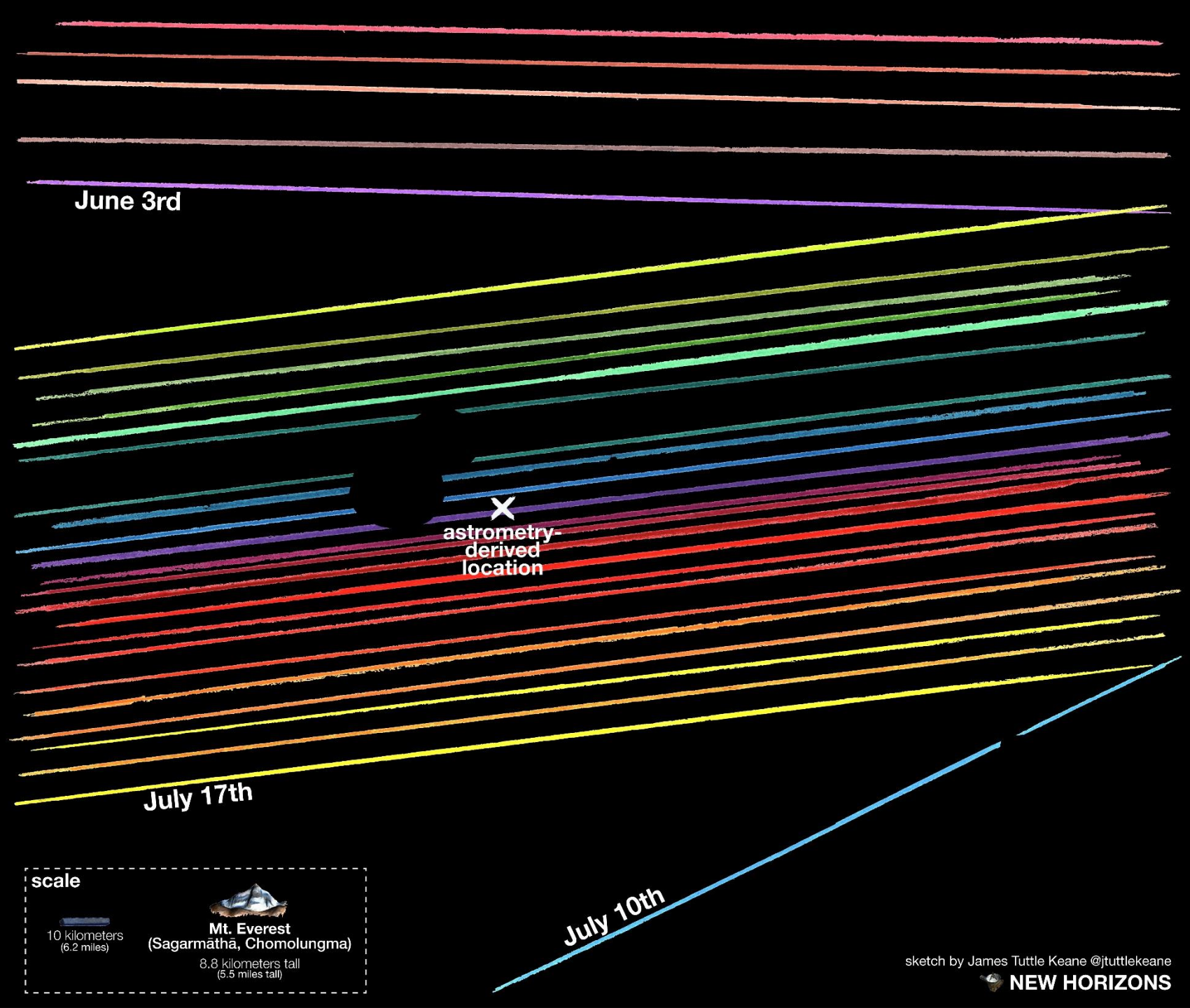
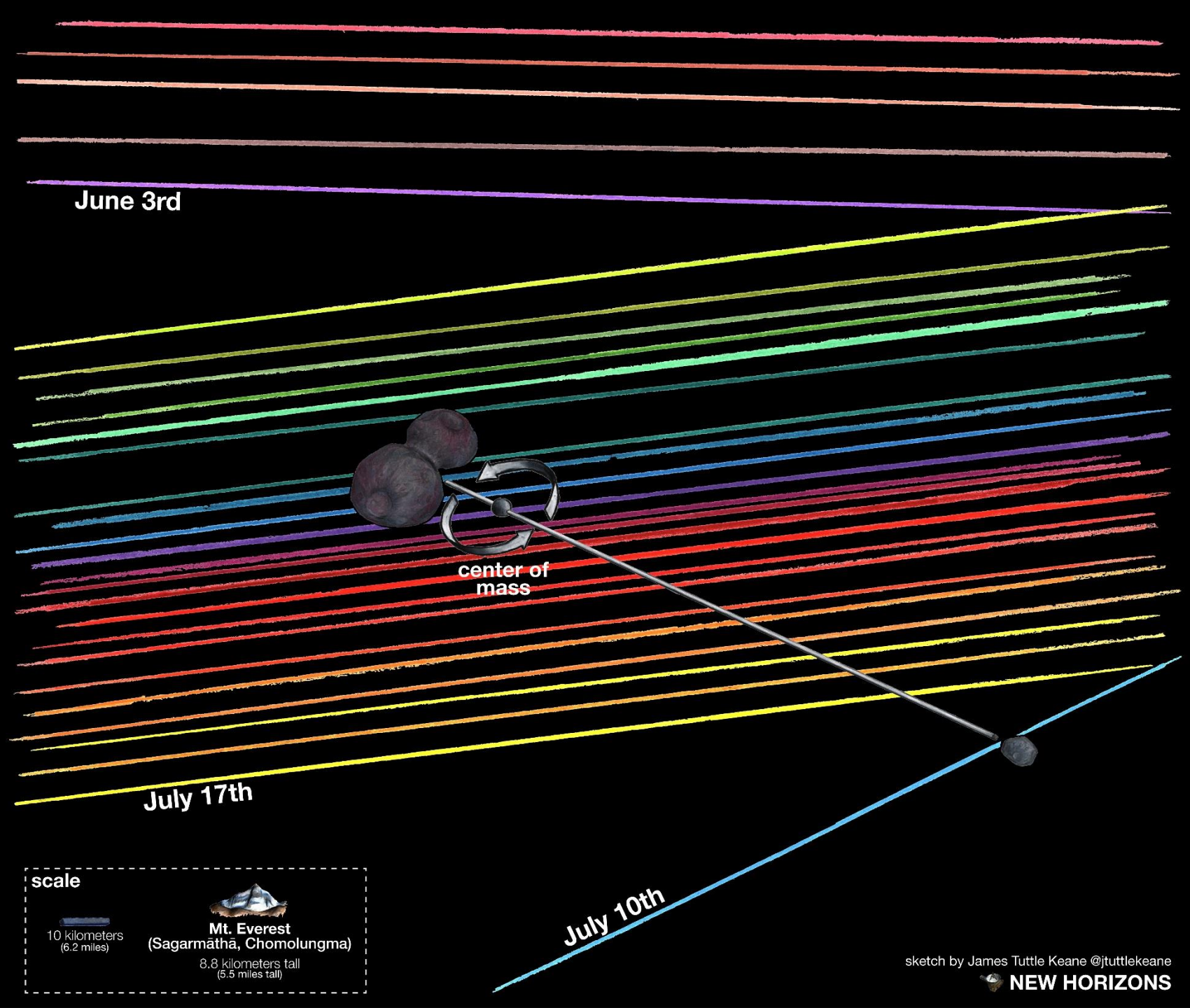
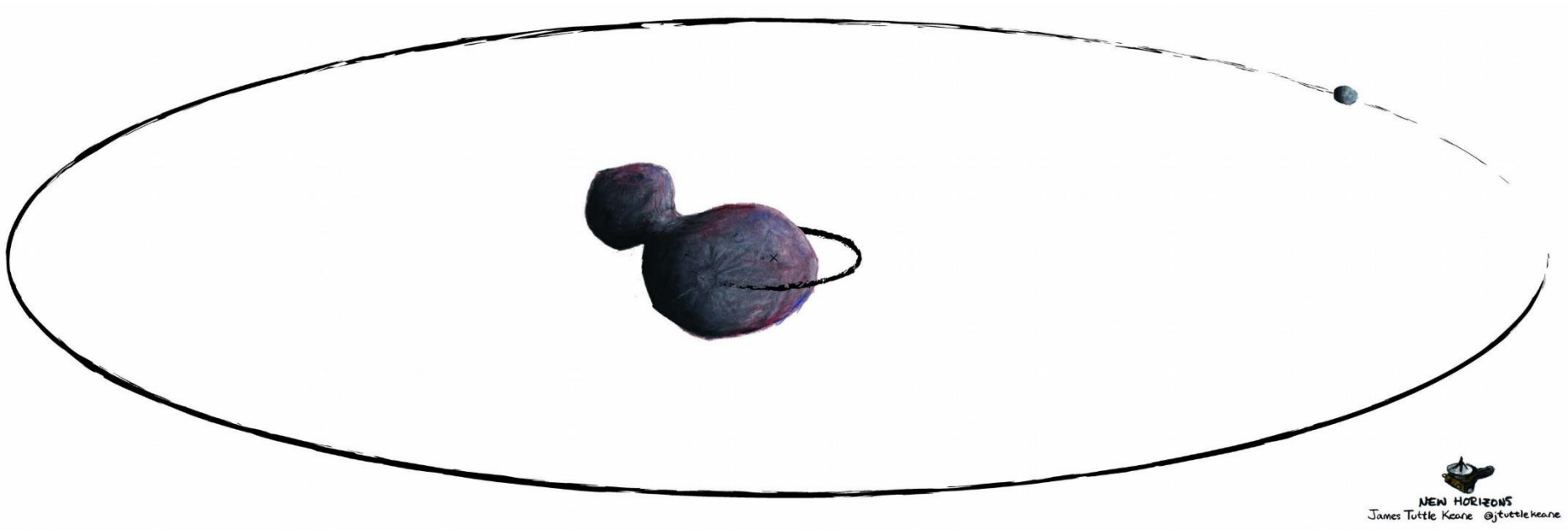
NEW HORIZONS


June 3rd
astrometry-derived location
July 17th
July 10th
scale
10 kilometers
(6.2 miles)
Mt. Everest
(Sagarmāthā, Chomolungma)
8.8 kilometers tall
(5.5 miles tall)
sketch by James Tuttle Keane @jtuttlekeane
NEW HORIZONS

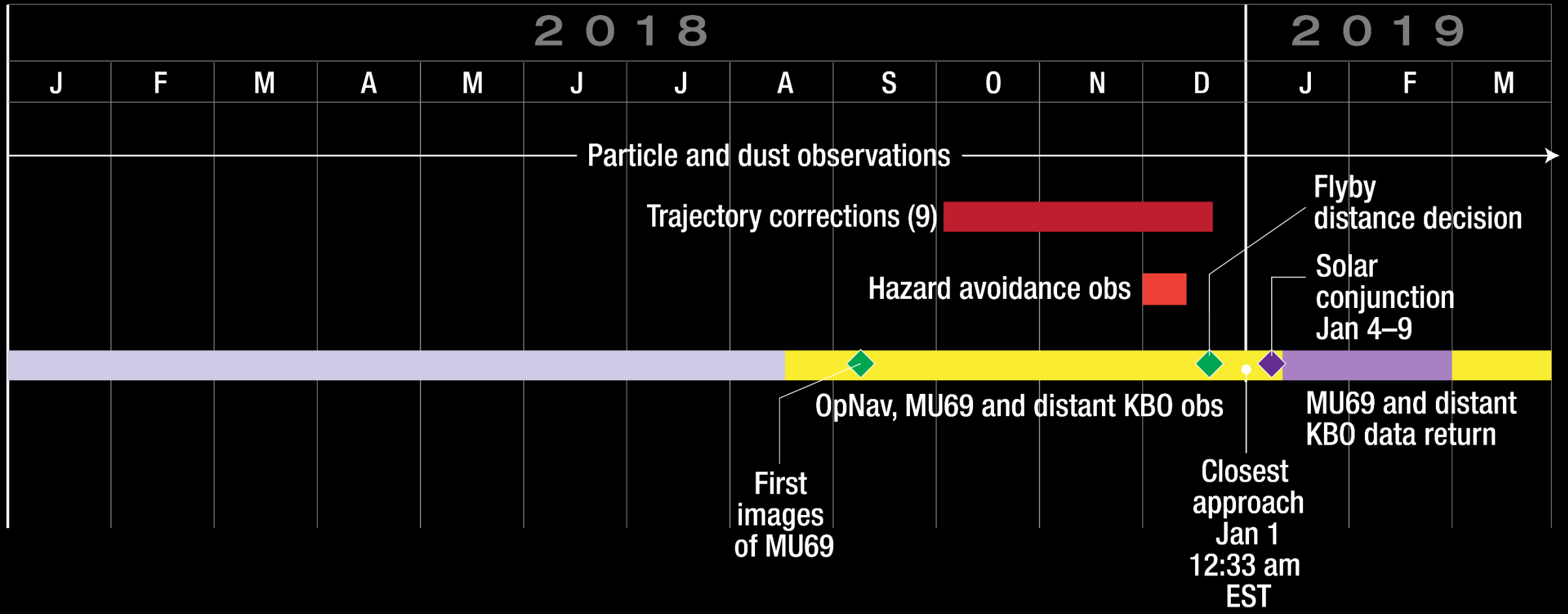

June 3rd
center of mass
July 17th
July 10th
scale
10 kilometers
(6.2 miles)
Mt. Everest
(Sagarmāthā, Chomolungma)
8.8 kilometers tall
(5.5 miles tall)
sketch by James Tuttle Keane @jtuttlekeane
NEW HORIZONS


NEW HORIZONS
James Tuttle Keane @jtuttlekeane

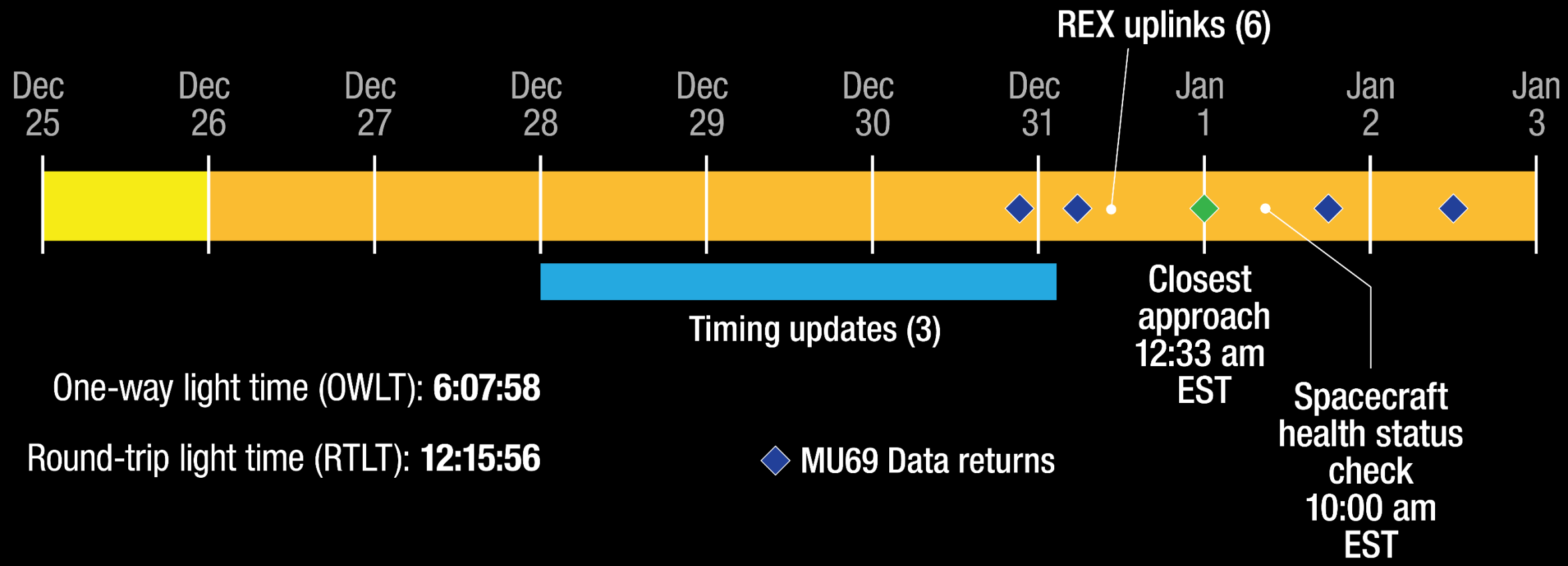
Encounter Timeline and Operations

Alice Bowman
New Horizons Mission Operations Manager
Johns Hopkins Applied Physics Laboratory

MU69 Operations Timeline Overview



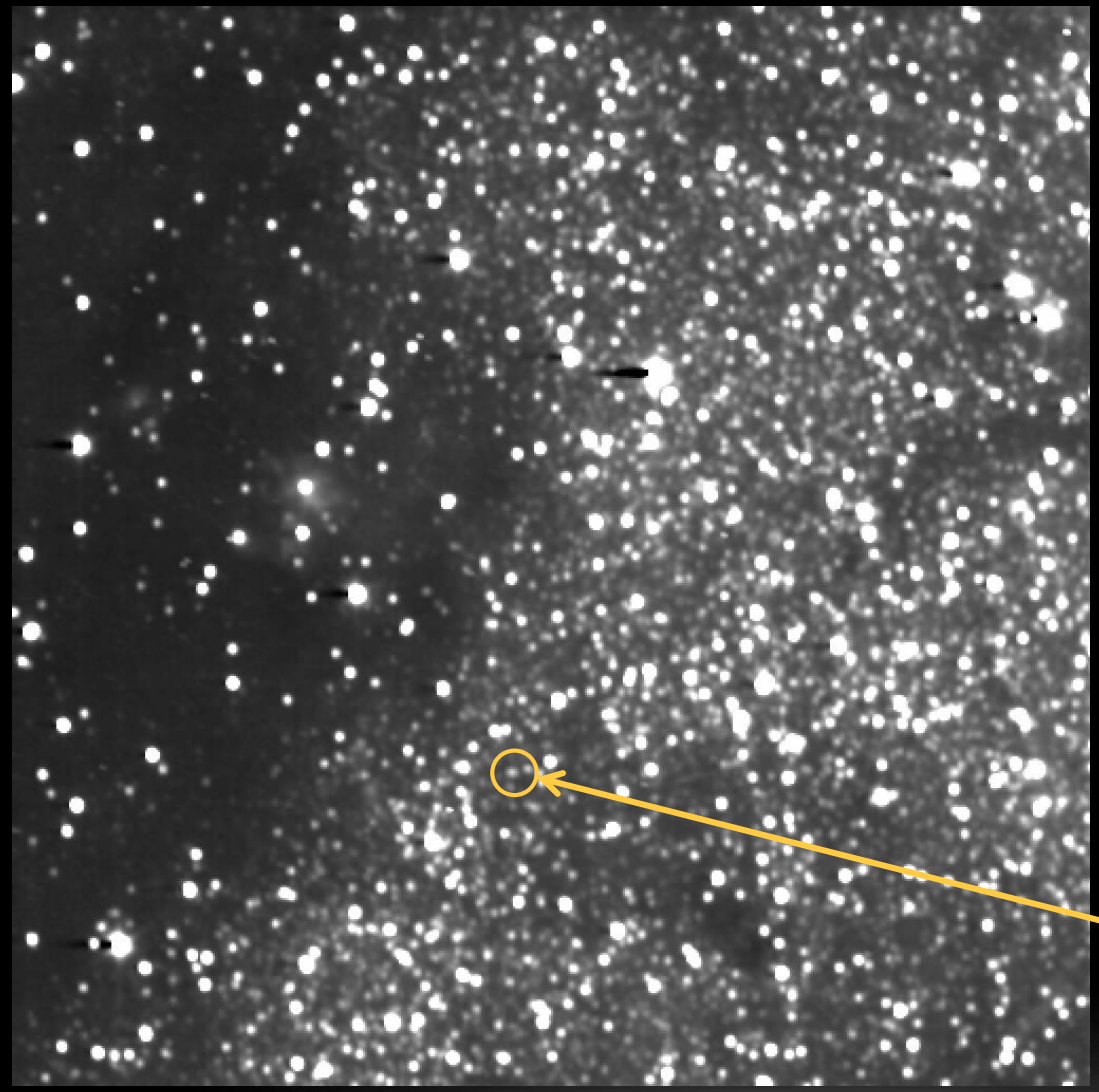
MU69 Flyby Detail



Challenges of Exploring the "Unknown"

Dr. John Spencer
New Horizons Deputy Project Scientist
Southwest Research Institute

Preparing for the Unknown



September 2017
New Horizons LORRI image of MU69 approach area

MU69 should appear here by September 2018

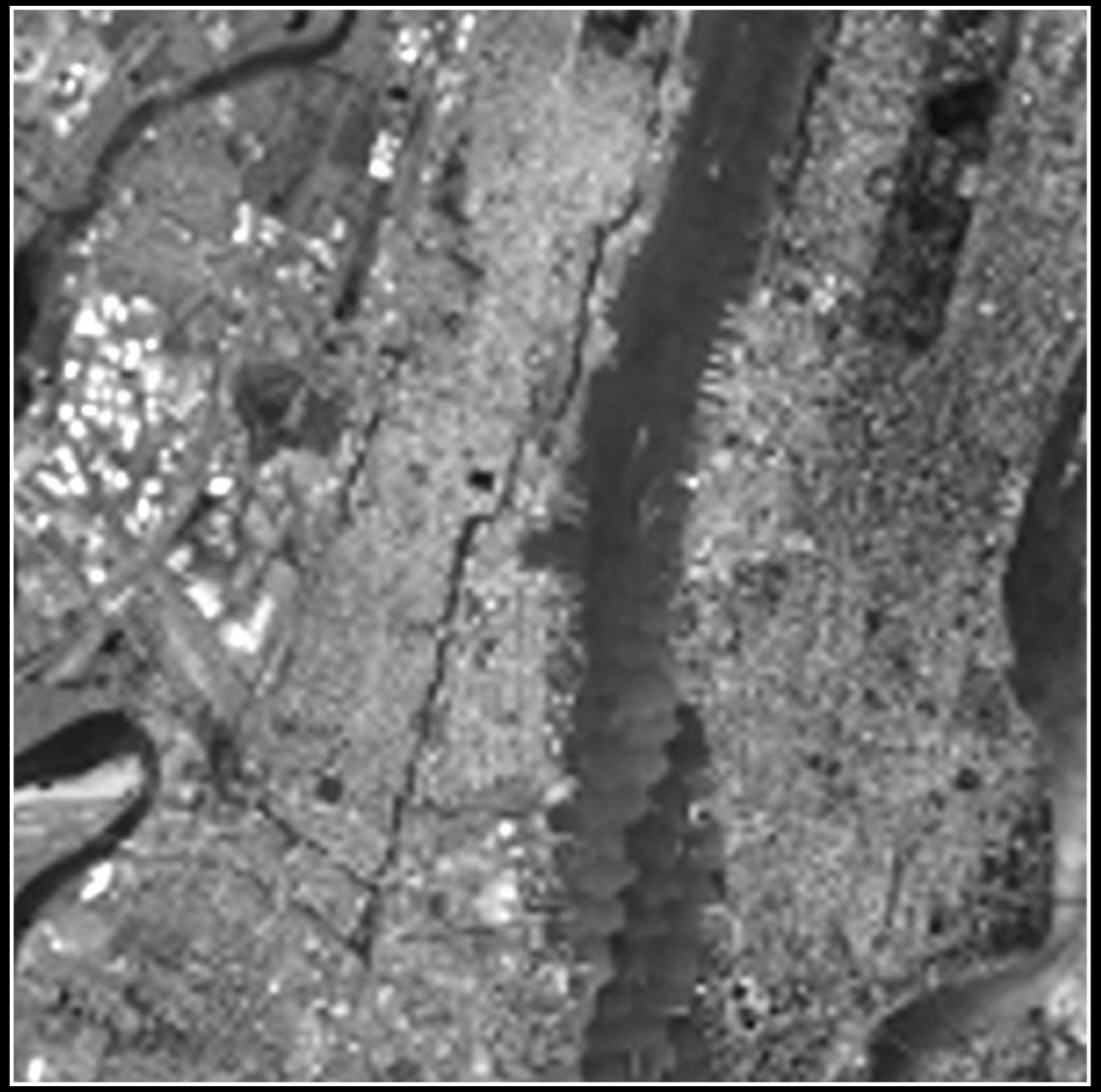
Preparing for the Unknown

- Once MU69 is detected in New Horizons images:
  - Search for moons
  - Survey surroundings for debris
  - Refine navigation
- Can divert to a more distant flyby of MU69 as late as mid-December 2018
  - 10,000 km (6,200 miles)

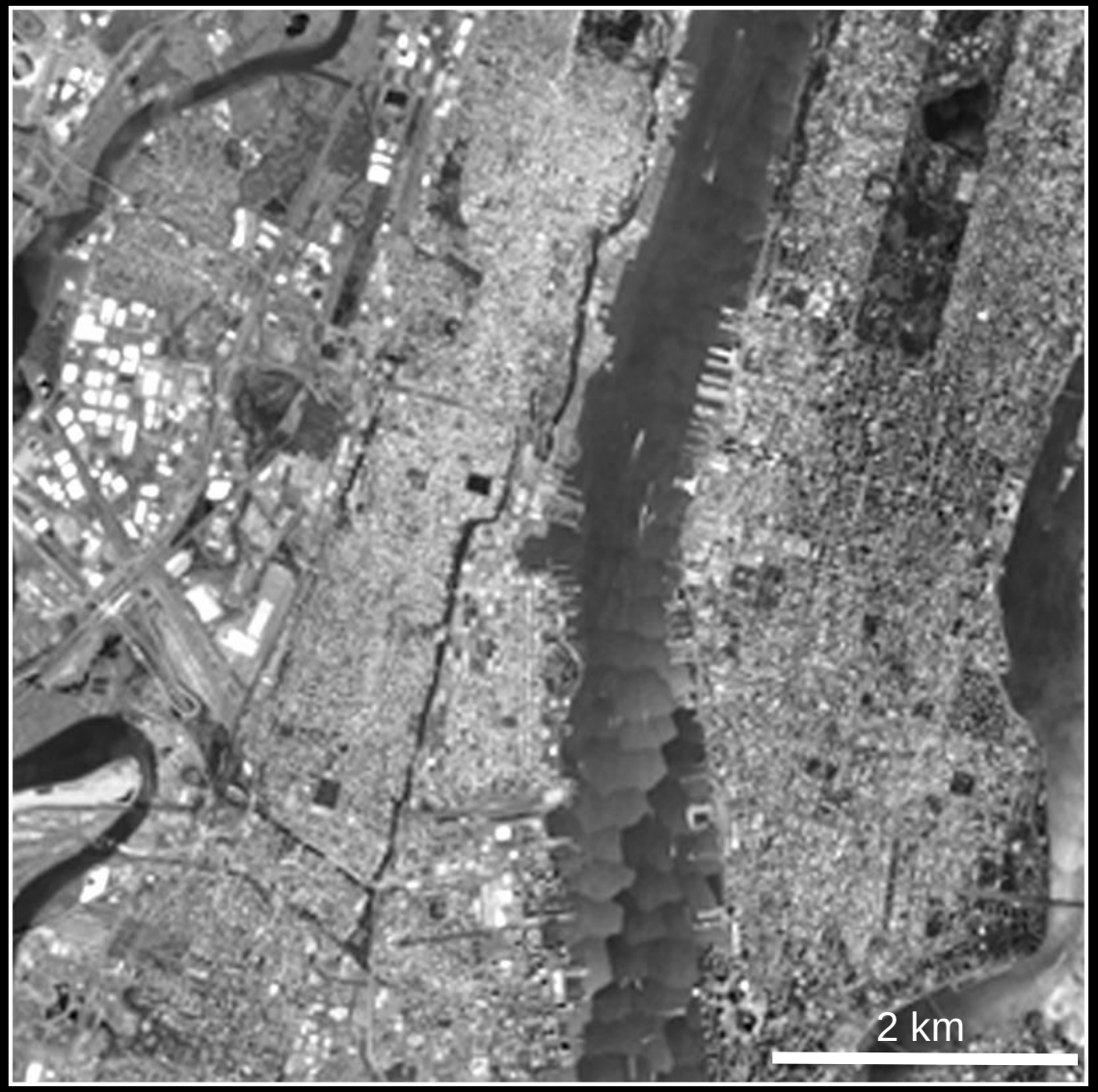
Anticipated View of MU69

Dr. Hal Weaver
New Horizons Project Scientist
Johns Hopkins Applied Physics Laboratory

Pluto Resolution vs MU69 Resolution



70 m/pixel



30 m/pixel

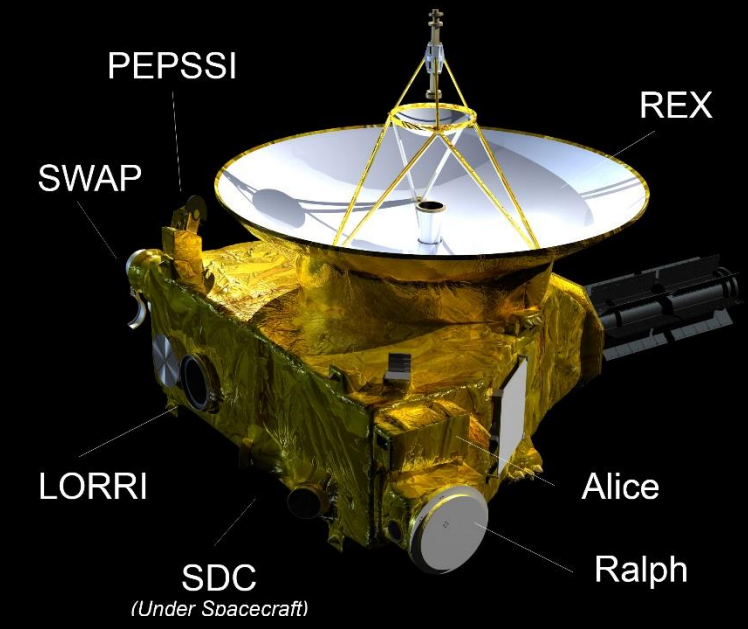
Images Courtesy of Google Earth0

MU69 Science Objectives

Dr. Anne Verbiscer
New Horizons Assistant Project Scientist
University of Virginia

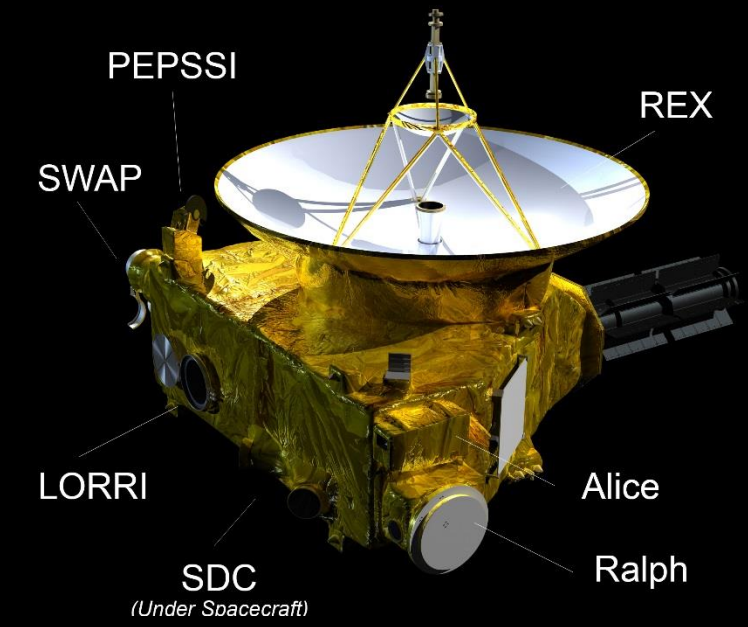
MU69 Science Objectives

- Characterize geology and morphology
  - Craters, grooves, topography
- Map surface composition
  - Search for ices: ammonia, carbon monoxide, methane, water ice
  - What makes MU69 dark and red?



MU69 Science Objectives

- Structure: Single body? Binary?
- Search for and study satellites and rings
  - Is the moon real? Is there more than one?
- Search for a coma (atmosphere and gases)



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