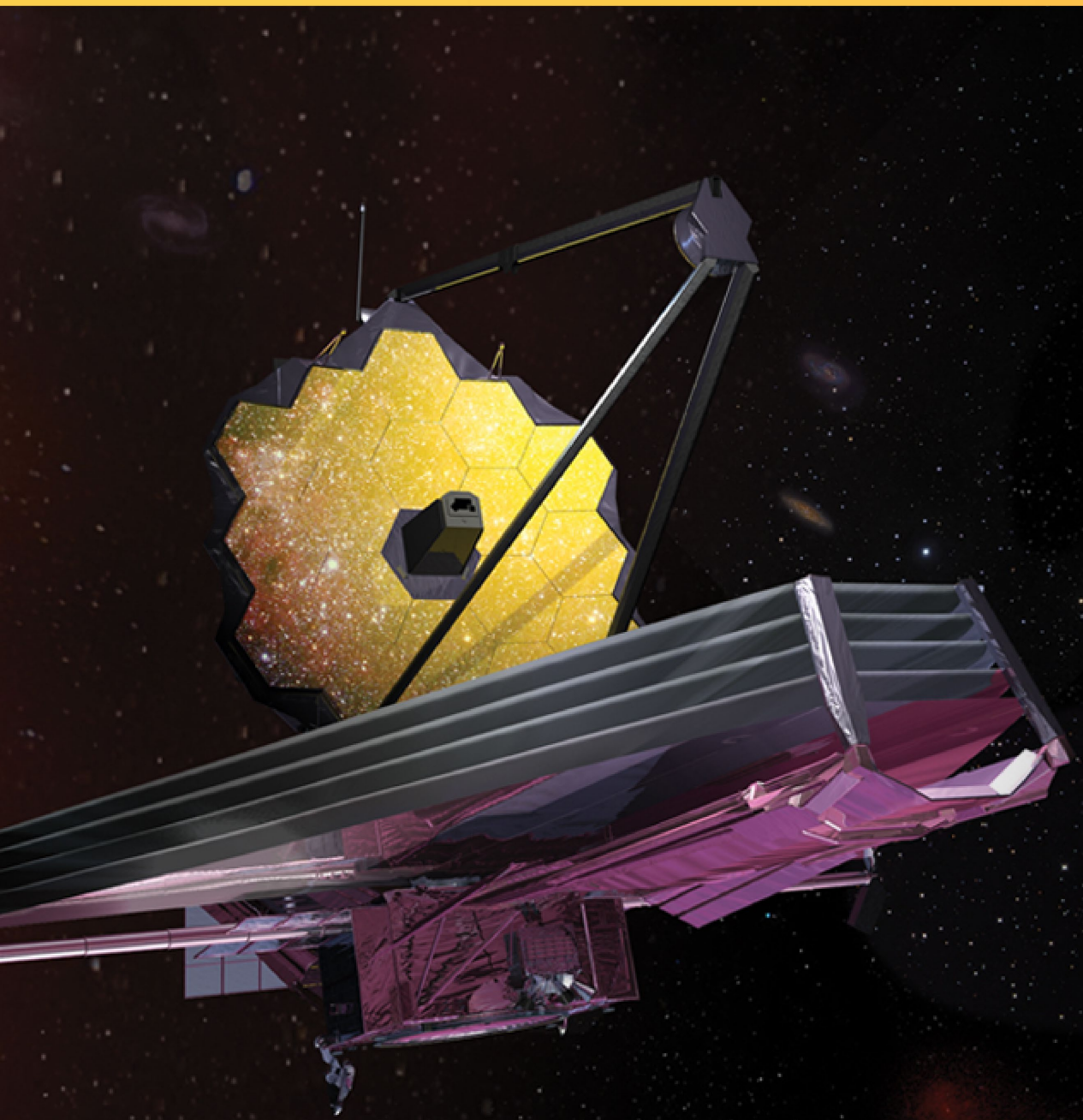


National Aeronautics and Space Administration

JWST's First Look at the Universe

Louis Barbier,
NASA Associate Chief Scientist

Contents

- Lift Off! Webb's Journey Begins
- Why Study Infrared Light?
- Exploring the Universe with Webb!
- Webb's Exciting Discoveries

Lift Off!



Play the launch video

JWST Deployment video

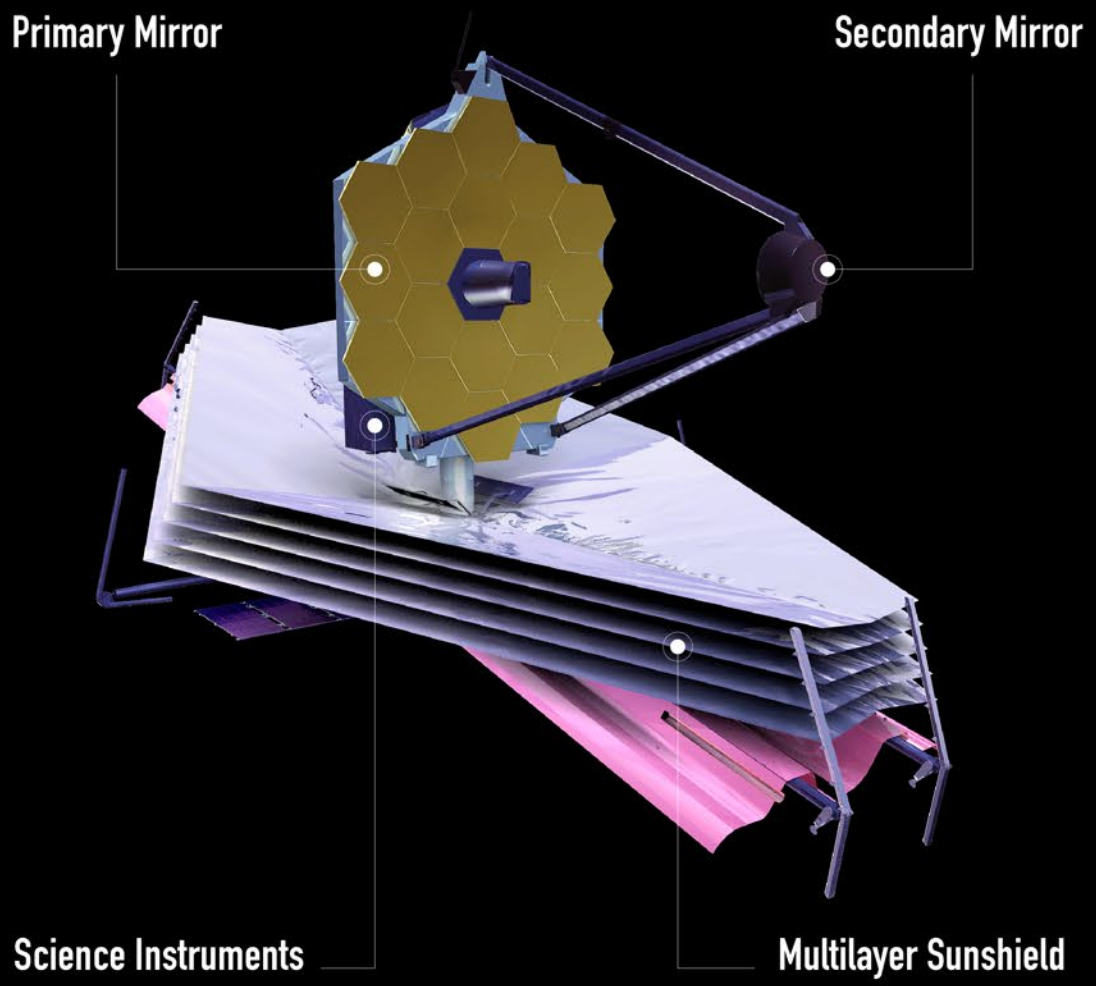
https://www.youtube.com/watch?v=RzGLKQ7_KZQ



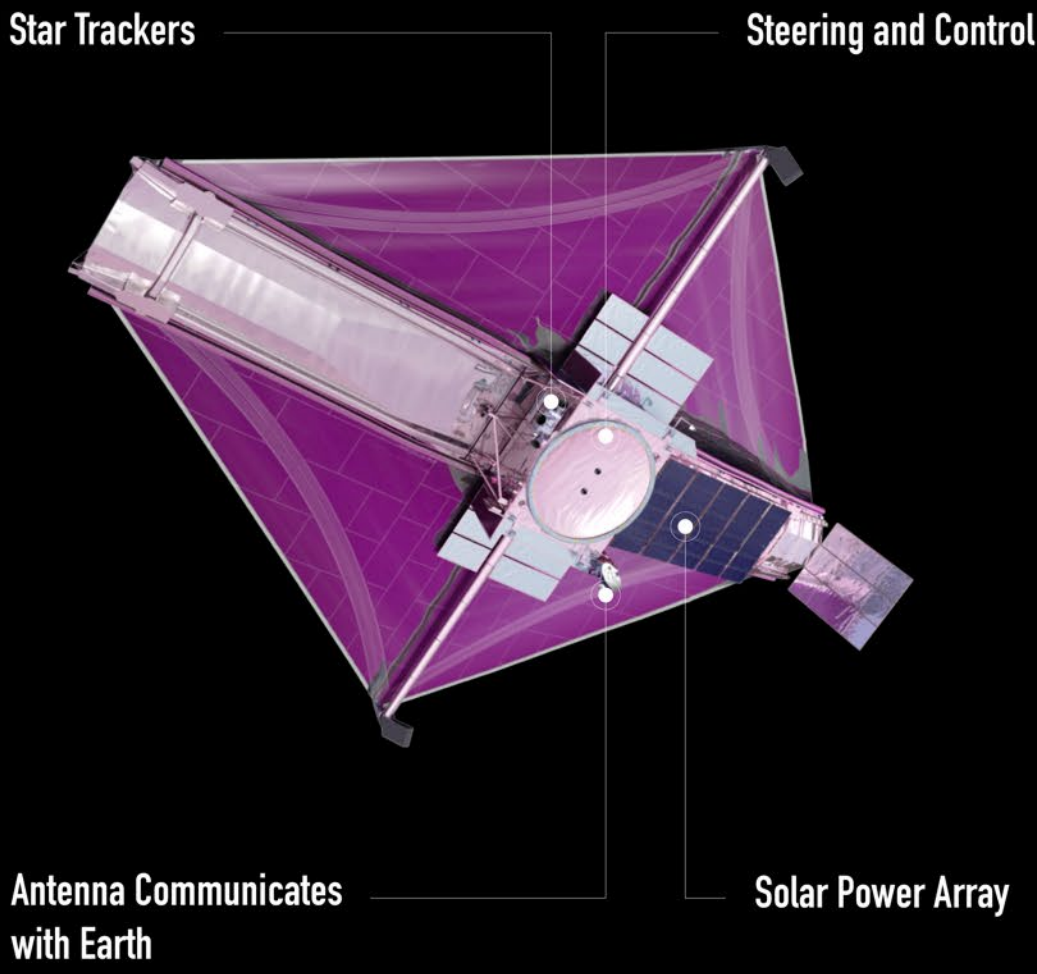


Webb's Journey Begins

Observing Side



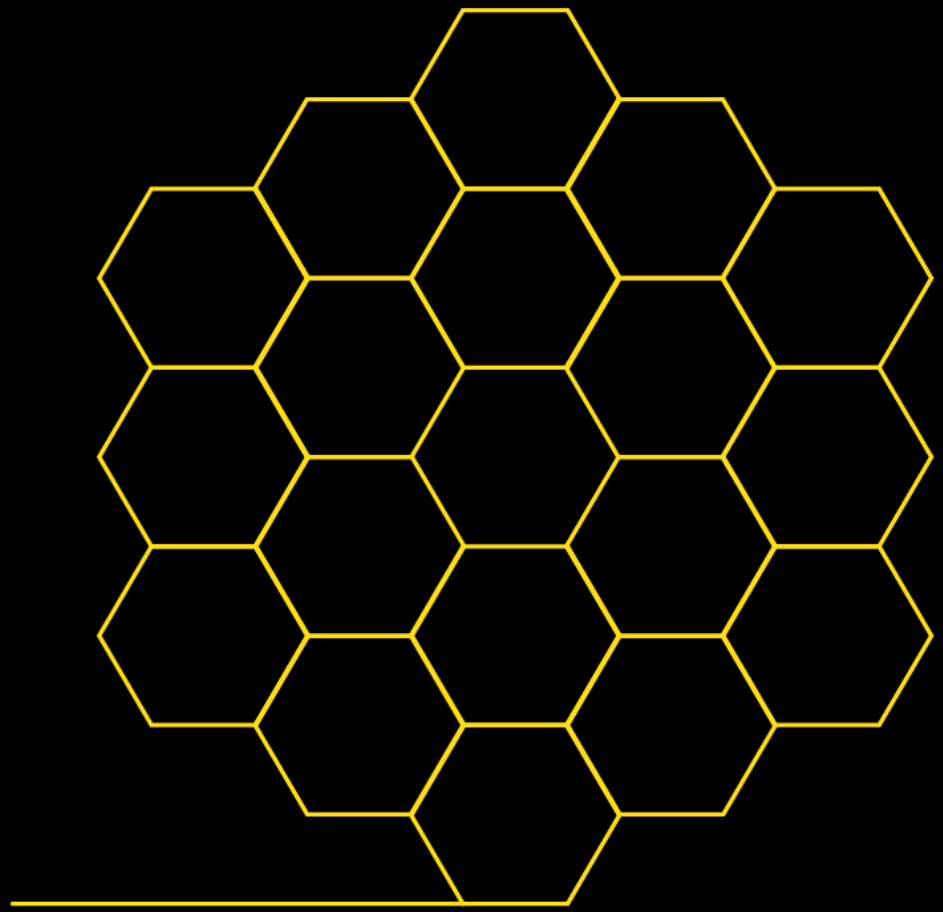
Sun-Facing Side



Capturing Faint, Infrared Light

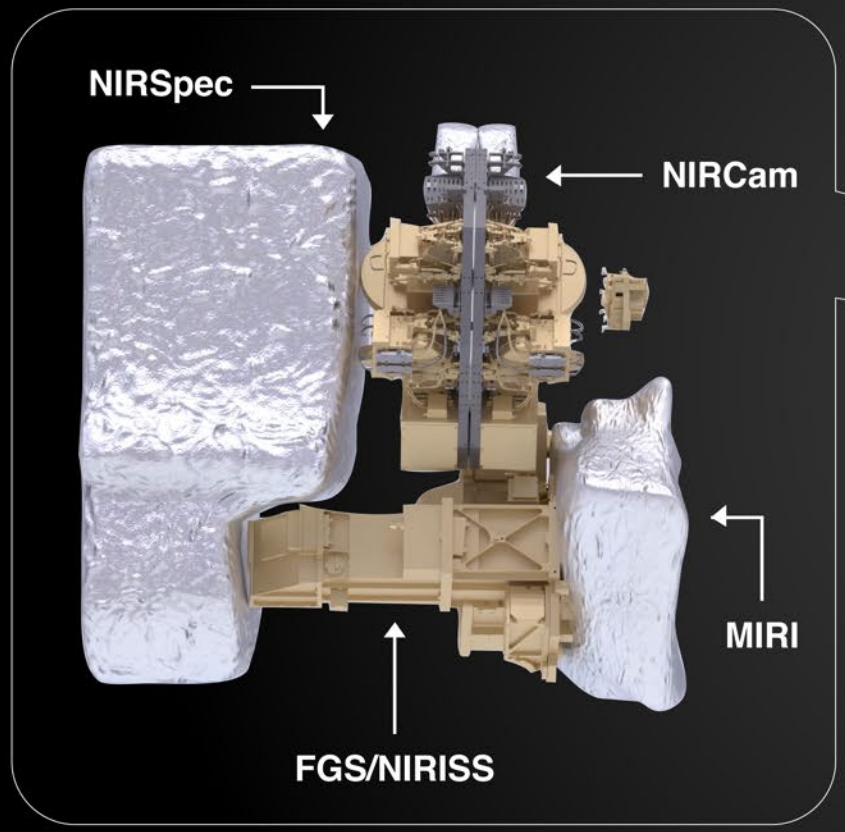


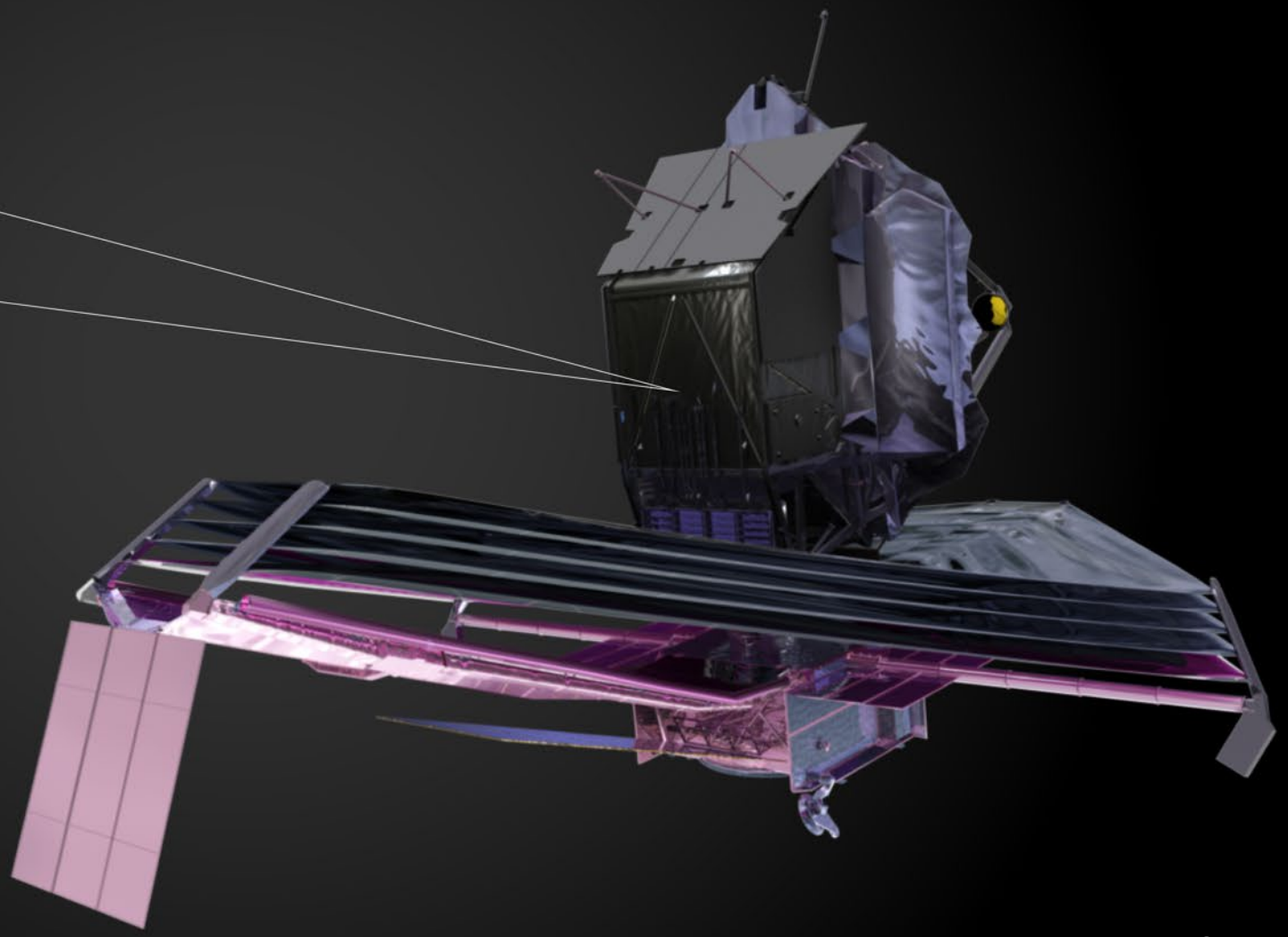
Hubble's PRIMARY MIRROR



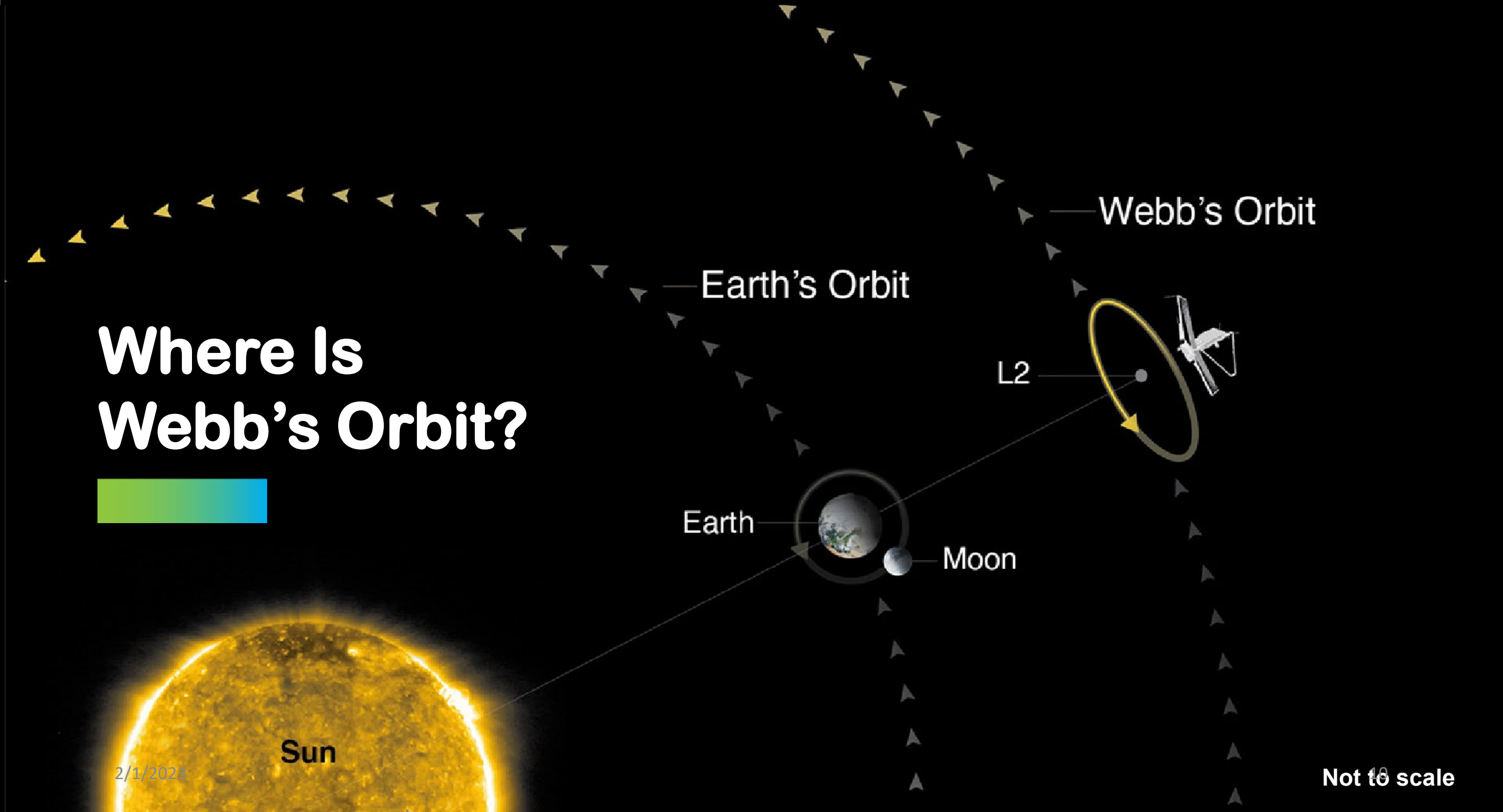
Webb's PRIMARY MIRROR

Webb's Science Instruments





Where Is Webb's Orbit?



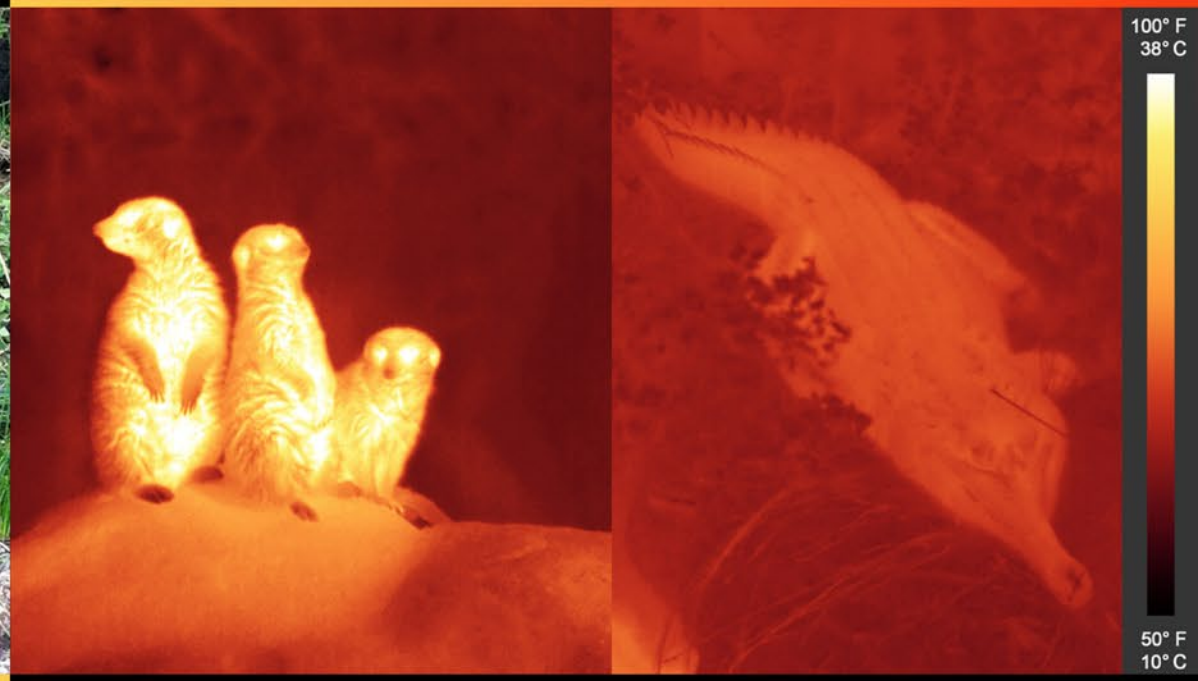
Not to scale

Why Study Infrared Light?

Visible vs. Infrared Light



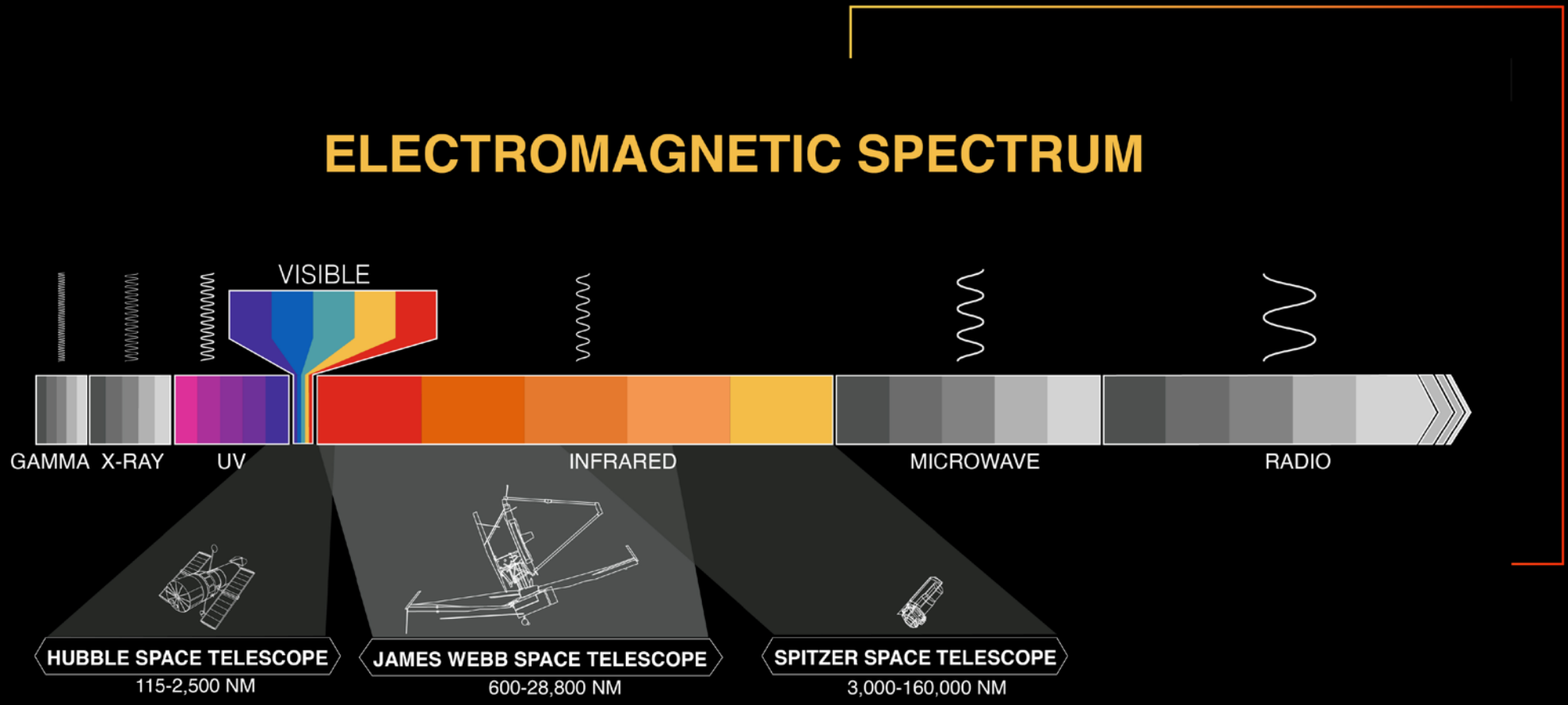




Meerkats

Freshwater crocodile

Webb's Specialization in Infrared Light



Webb Can Peer Through *and* Examine Dust



Visible Light (ESO)

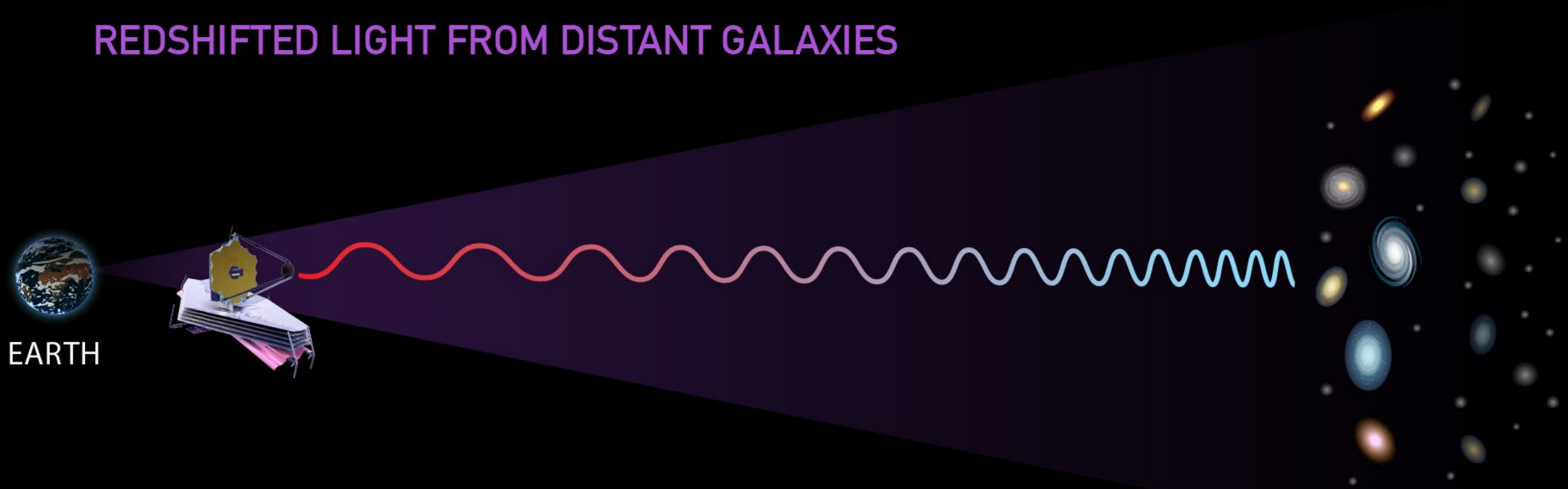


Near-Infrared Light (ESO)



Mid-Infrared Light (Spitzer)

Observing the Ancient Universe

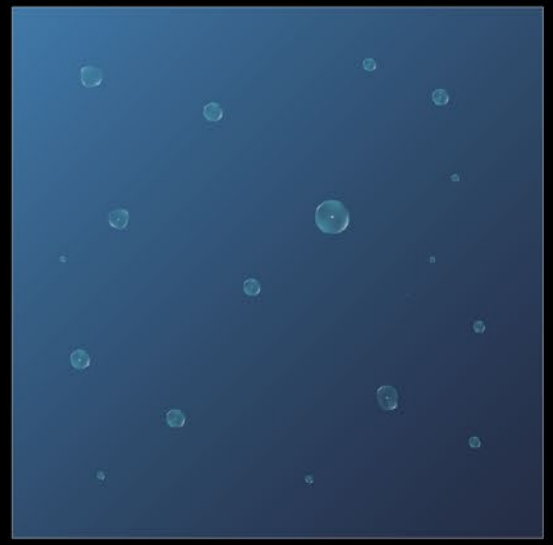


Exploring the Universe with Webb!

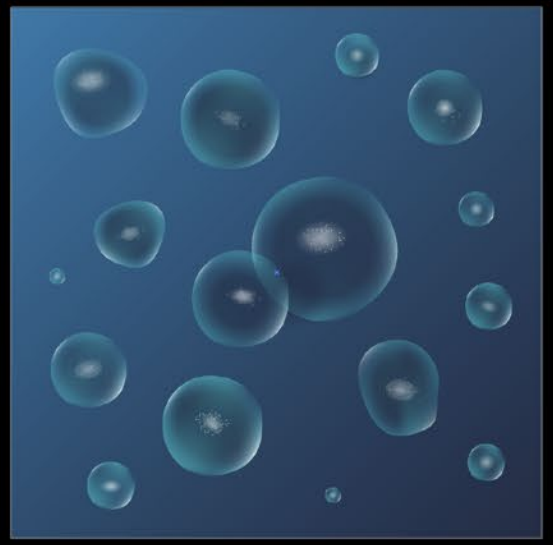


Crisscrossing the Early Universe

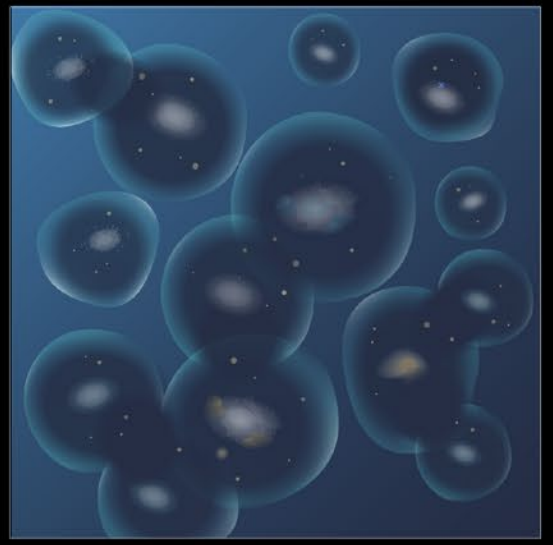
Beginning of reionization



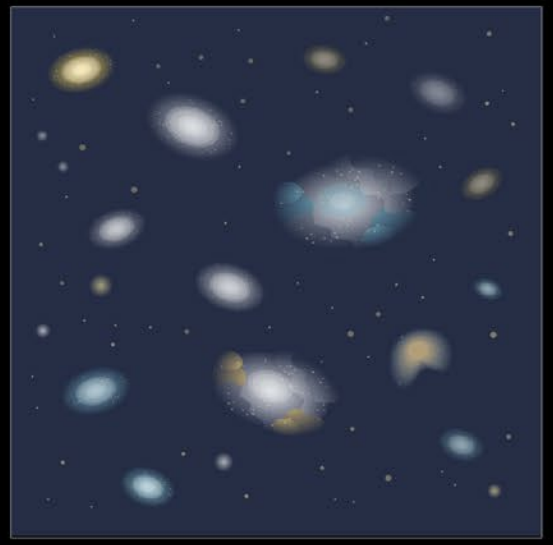
Stars begin forming, heating gas



Stars assemble into galaxies



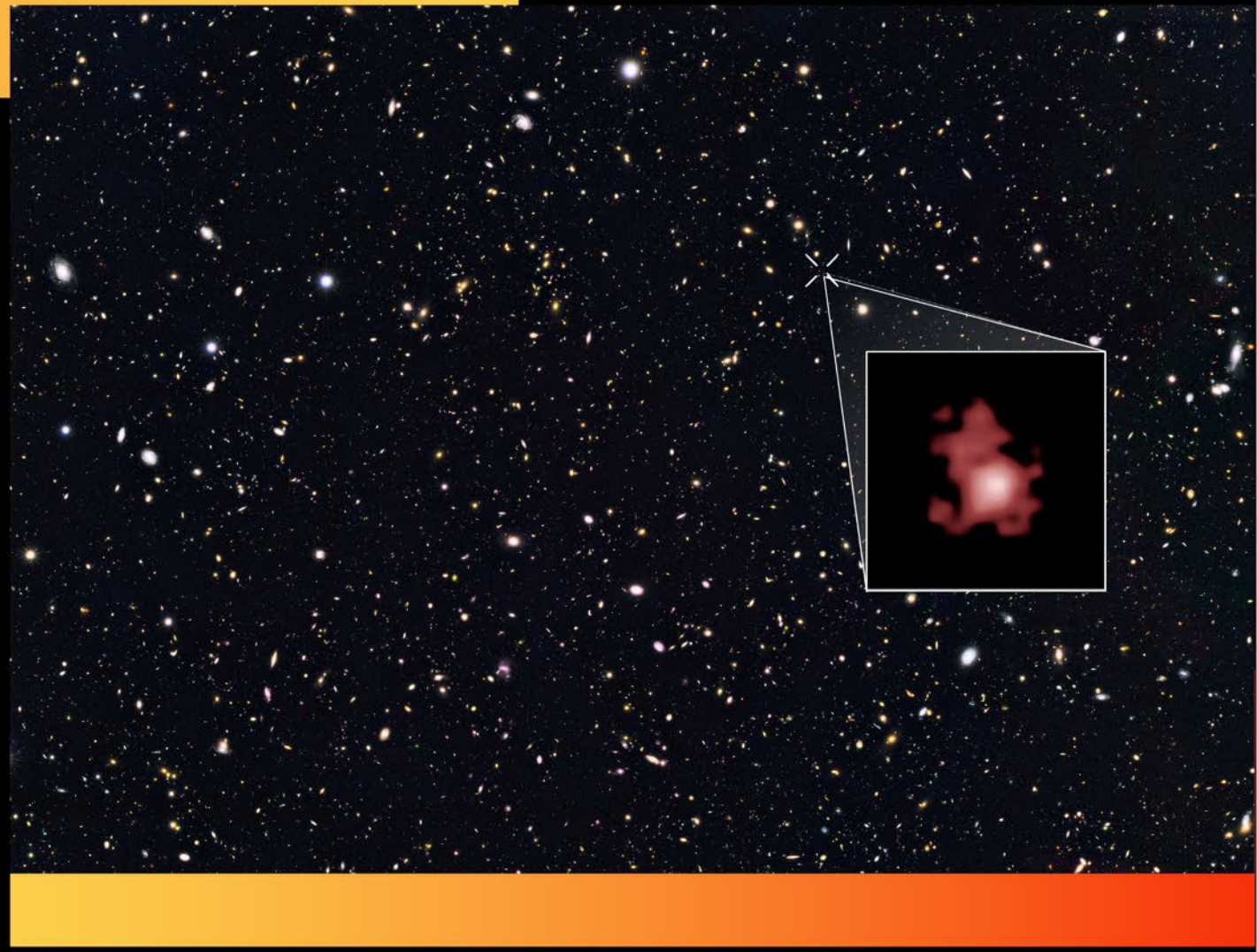
Galaxies become more massive



Clear universe, end of reionization

Present day

Seeking Some of the First Galaxies



A ‘Flip Book’ of Galaxies Over Time



Dissecting Black Holes



Illustration

Reexamining How Stars Form, Live, and Die

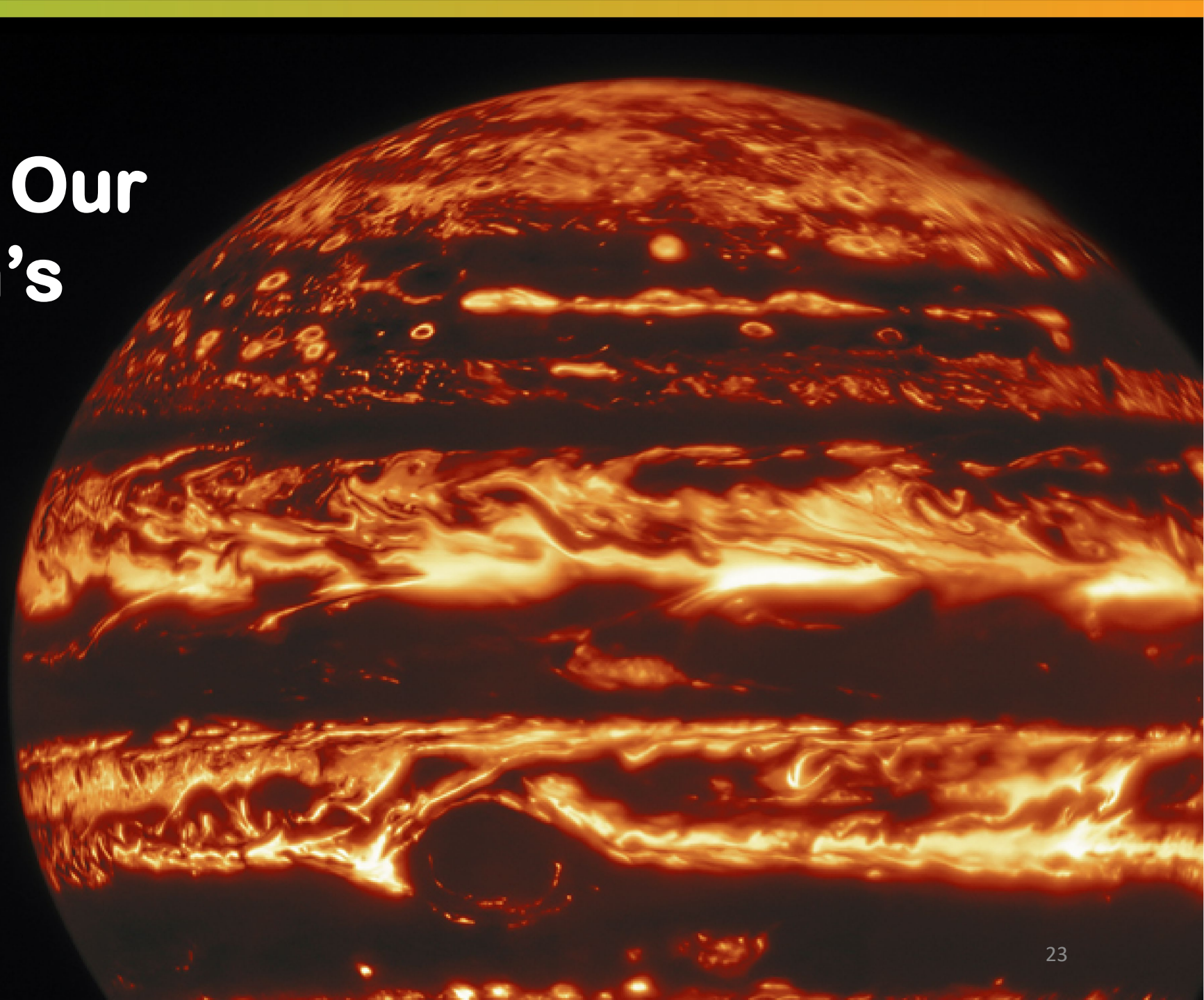




Detecting Molecules in Star-Forming Regions

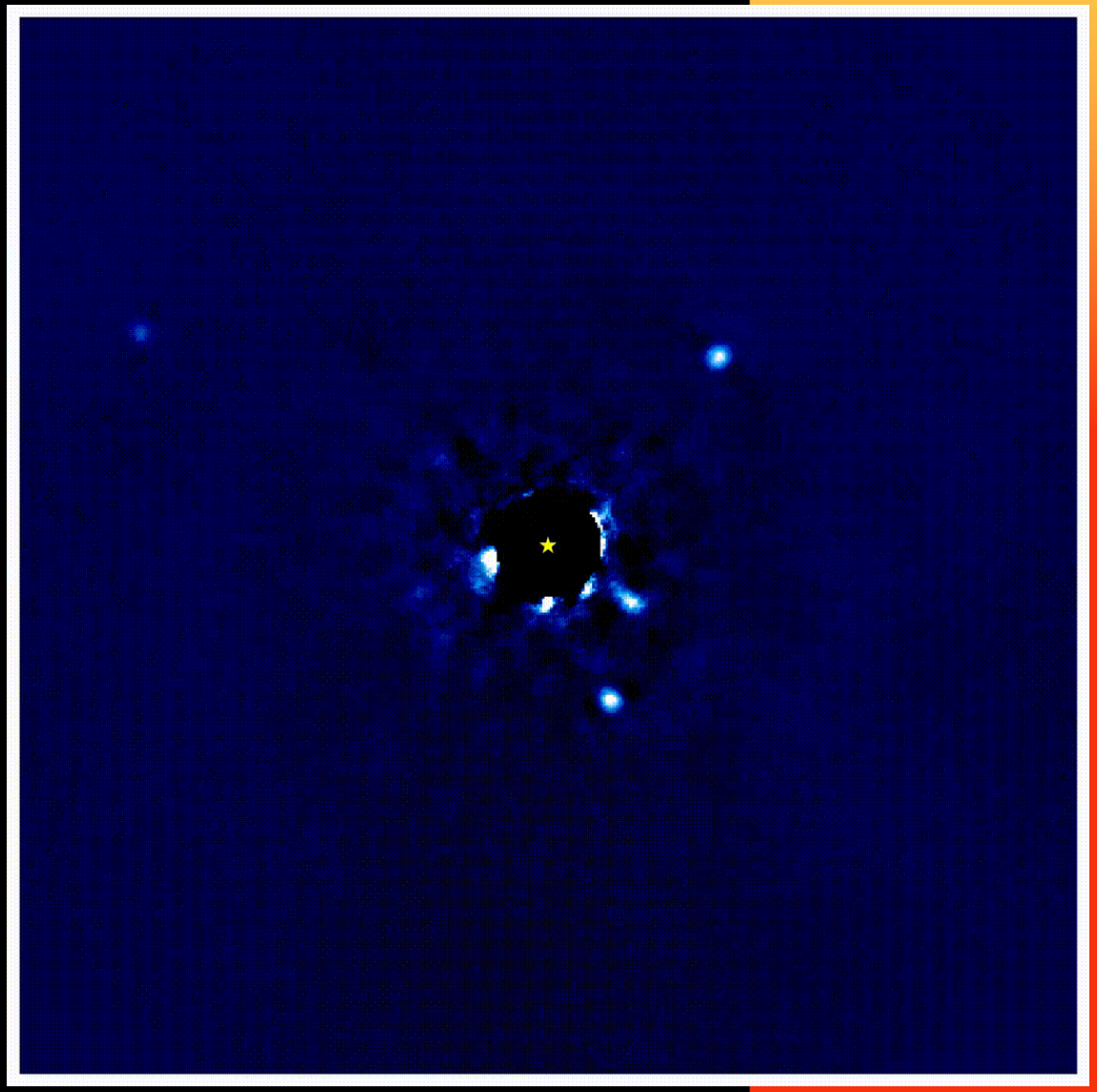


Reexamining Our Solar System's Planets

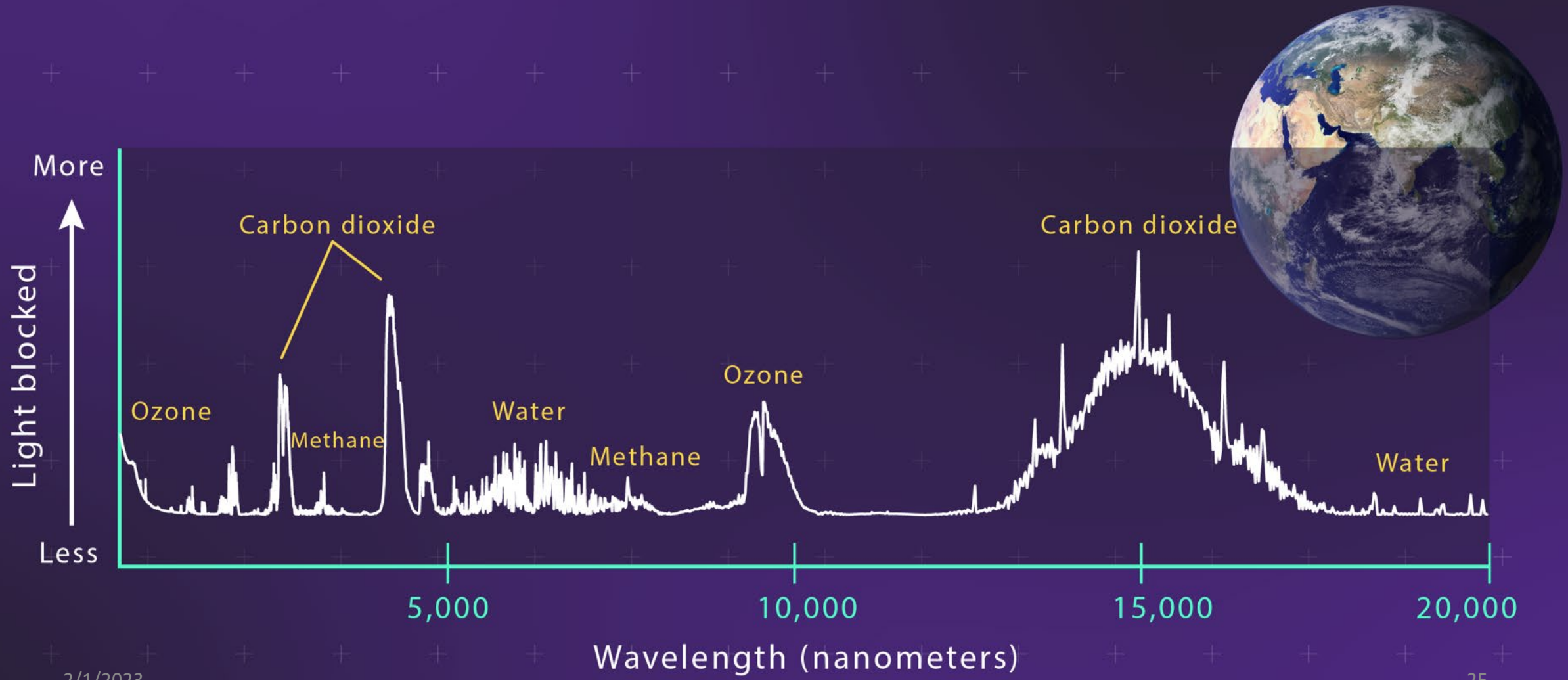


Jupiter in Near-Infrared Light
(Gemini North)

Infrared Light Helps Us Find Distant Planets



Decoding Planets' Atmospheres

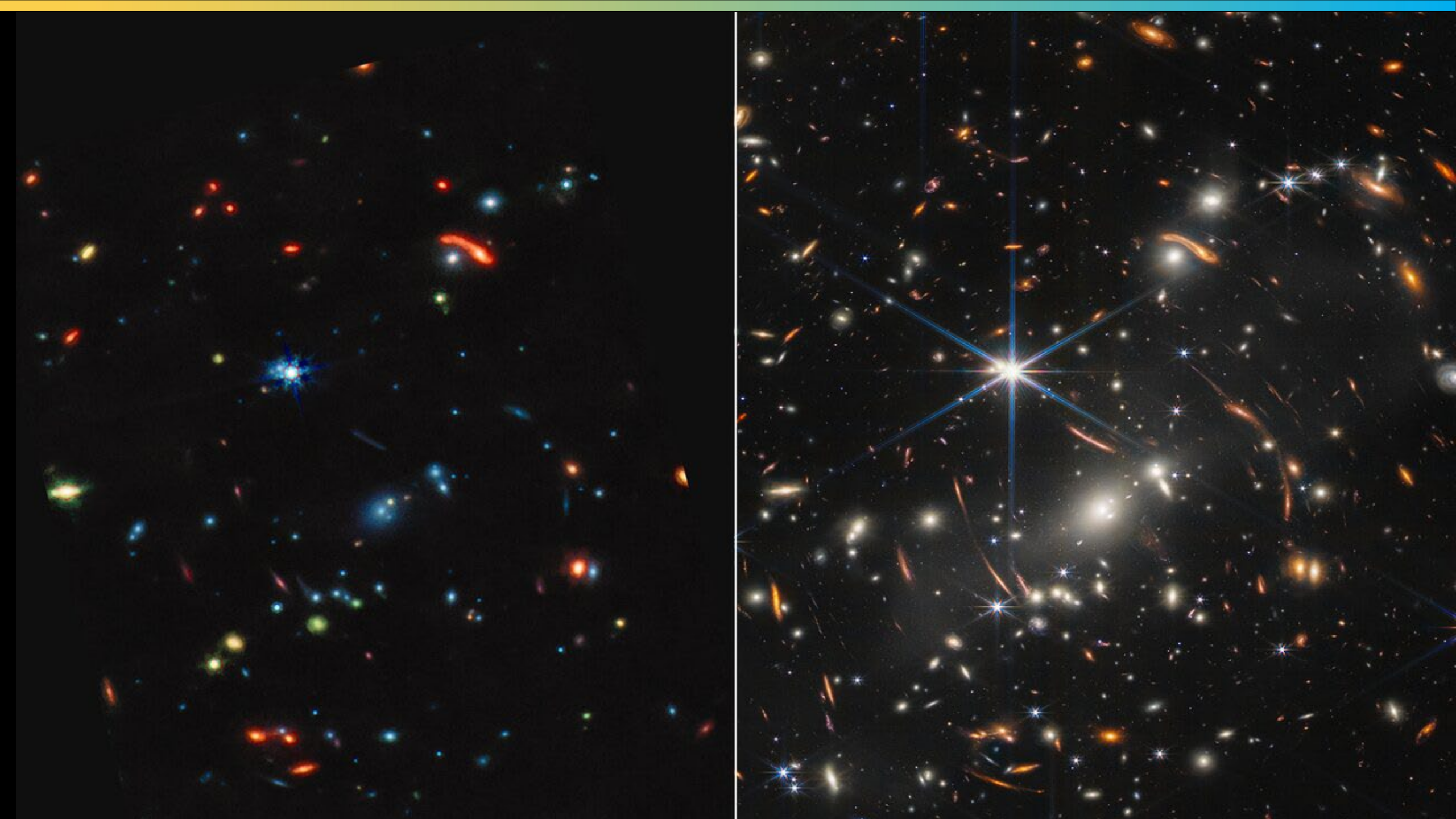


Webb's First Observations

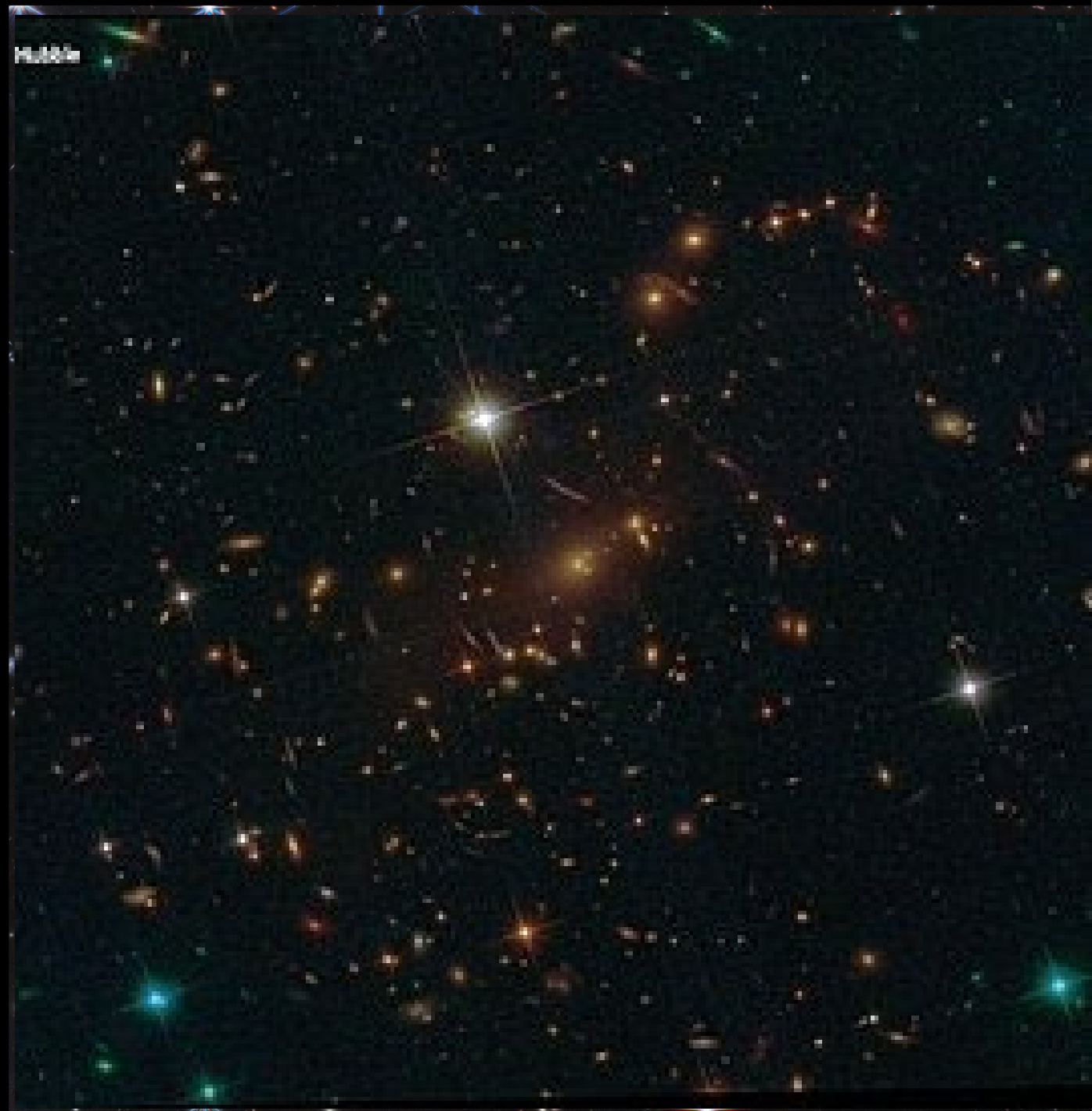
Webb's First Deep Field
SMACS 0723



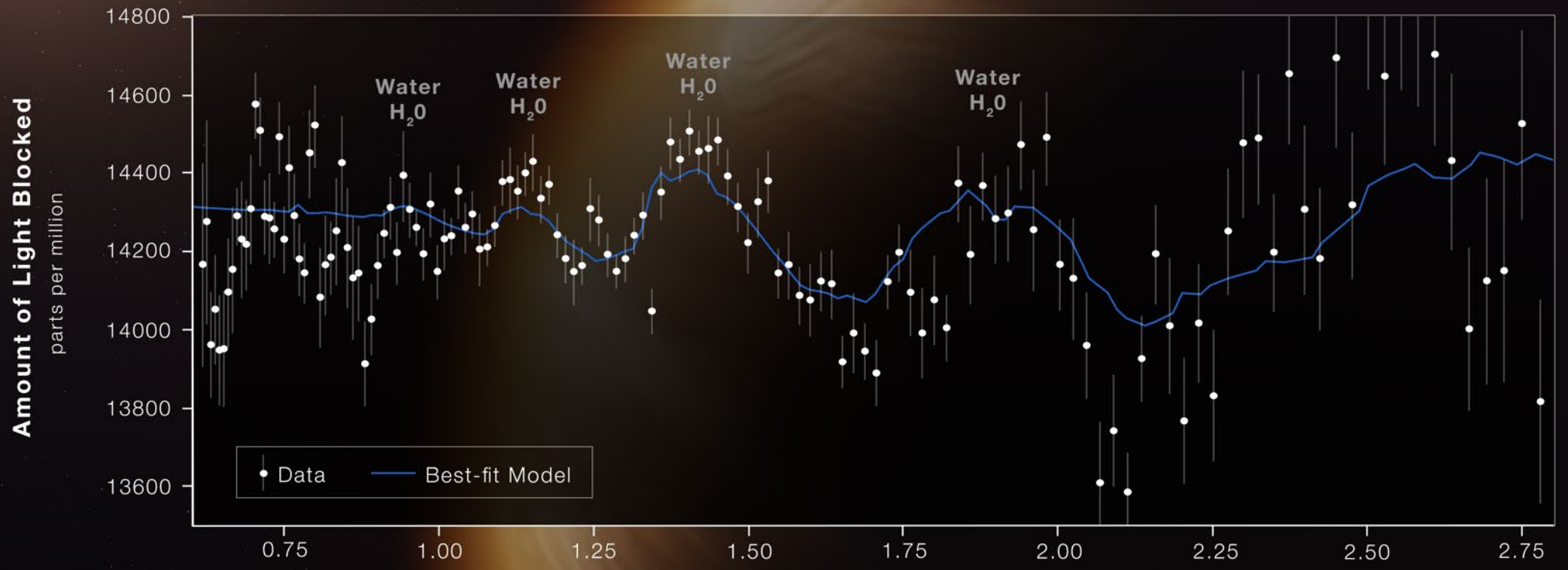
Near-Infrared Light
NIRCam Image



Hubble view of SMACS 0723



Exoplanet | WASP-96 b



Transmission Spectrum
NIRISS Single-Object Slitless Spectrum

Planetary Nebula | Southern Ring Nebula



Near-Infrared Light
NIRCam Image



Mid-Infrared Light
MIRI Image

Interacting Galaxies Stephan's Quintet



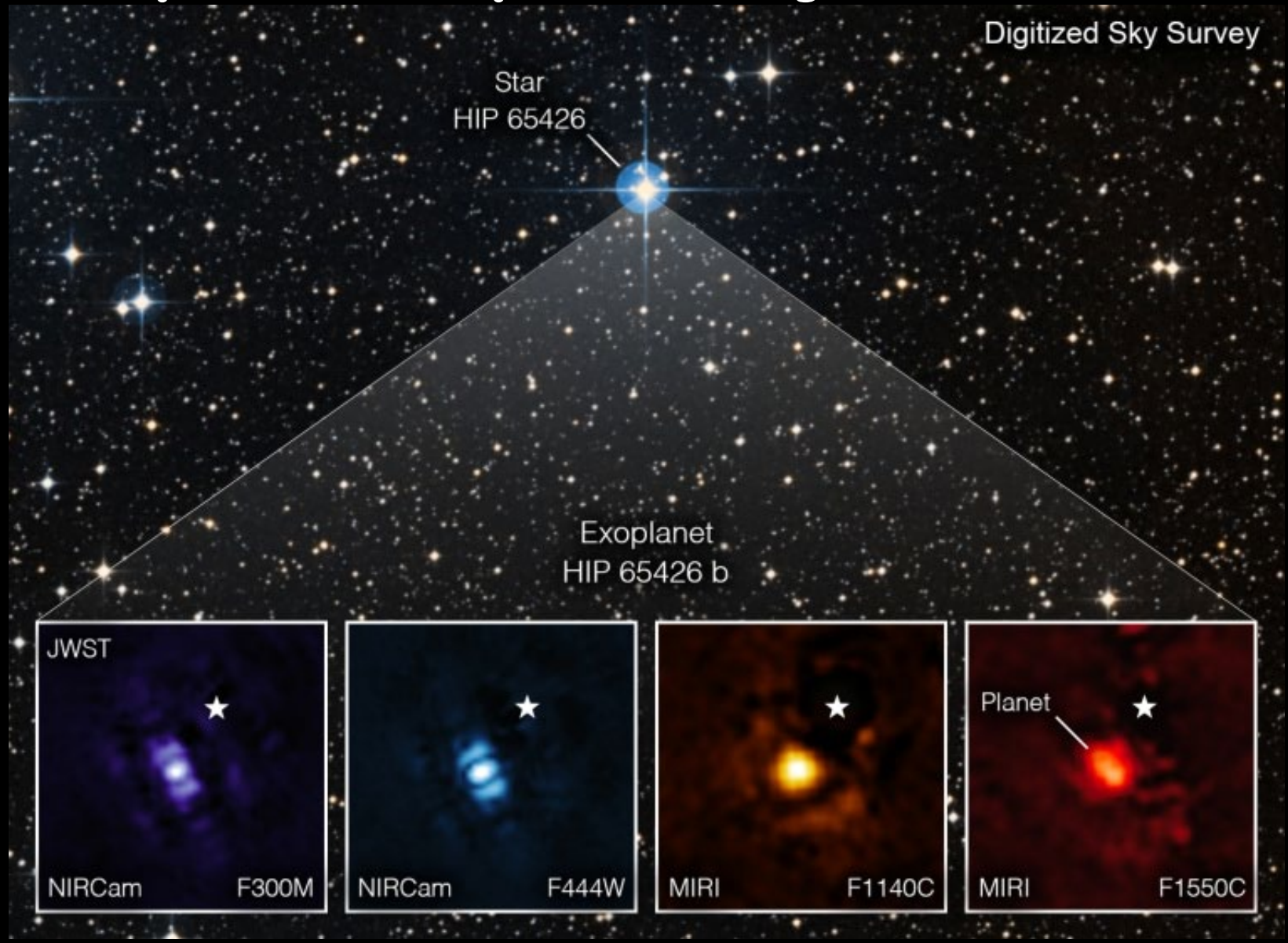
Near- and Mid-Infrared Light
Combined NIRCam and MIRI Image

Star-Forming Region I Carina Nebula

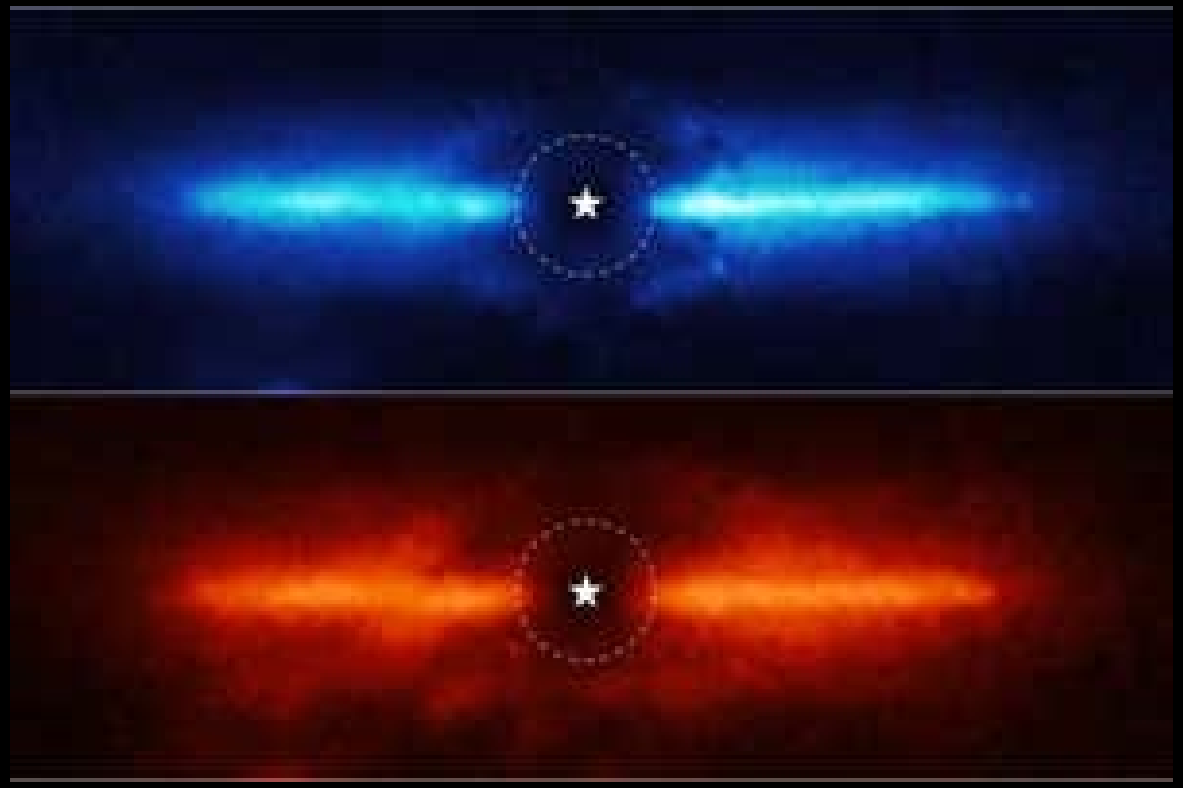


Near-Infrared Light
NIRCam Image

First Exoplanet captured by JWST!



AU Mic debris disk



Observations at two different wavelengths

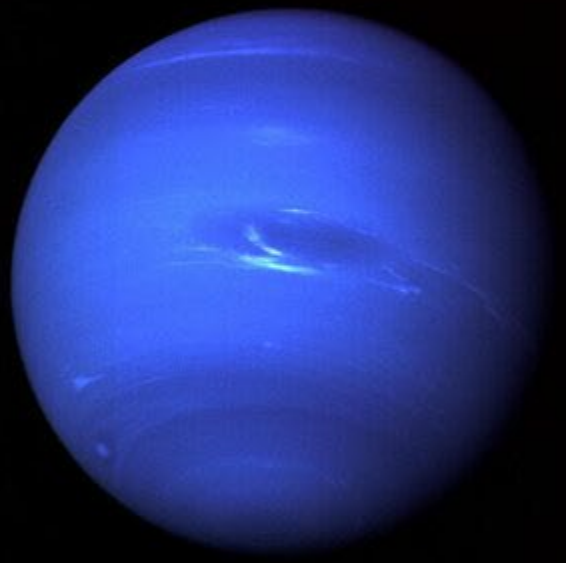
CEERS



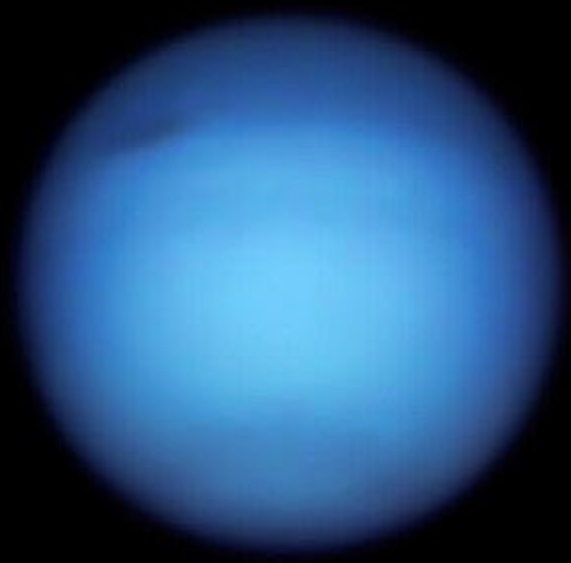
CEERS JWST/NIRCam F115W F150W F200W F277W F356W F410M F444W
NASA/STScI/CEERS/TACC/S. Finkelstein/M. Bagley/R. Larson/Z. Levay



Neptune



Voyager 2 (1989)

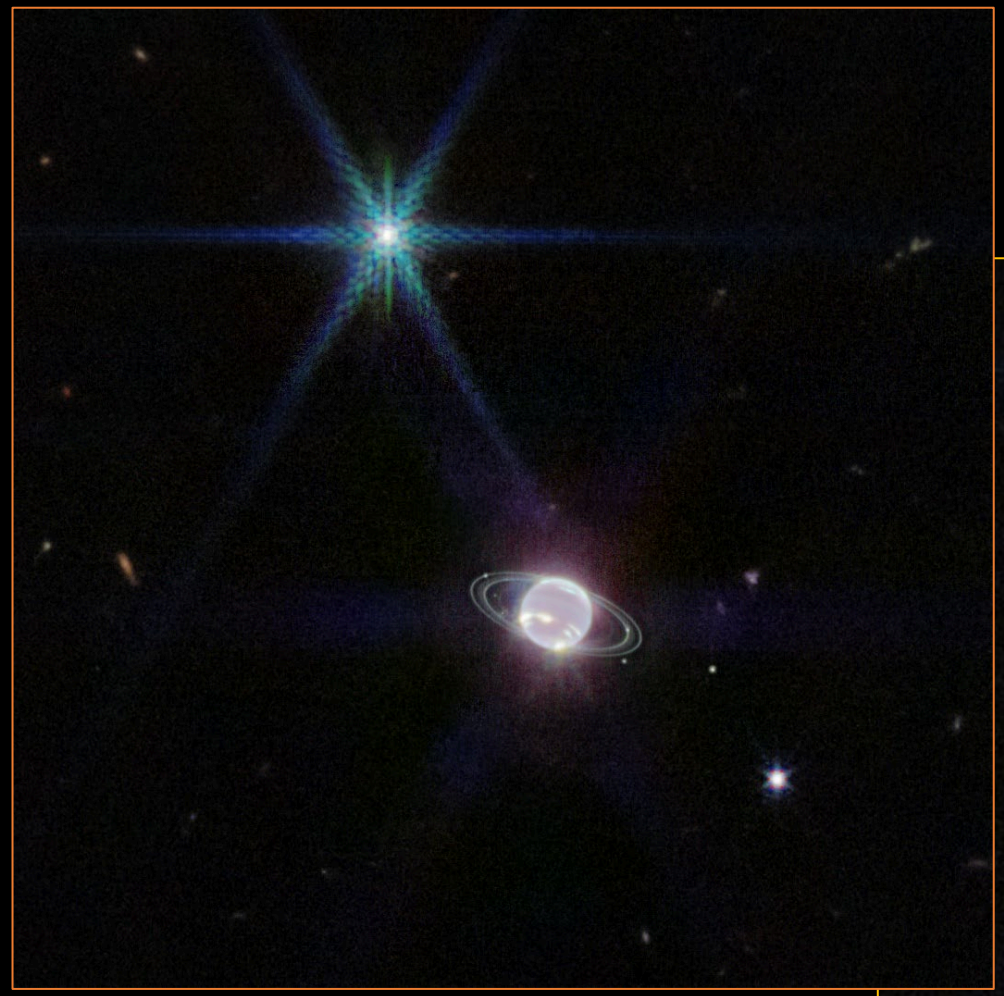


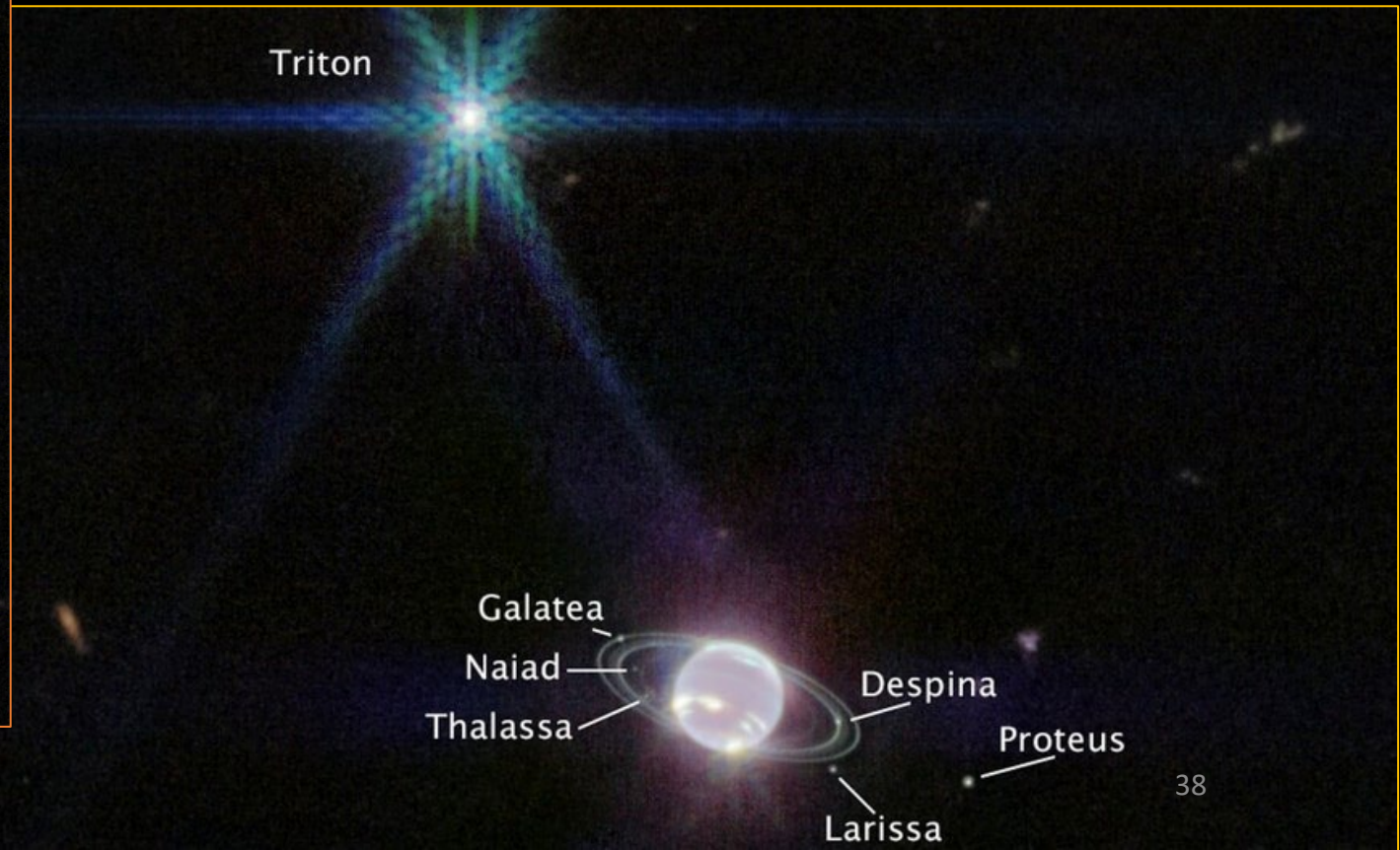
Hubble (2021)



Webb (2022)

Neptune



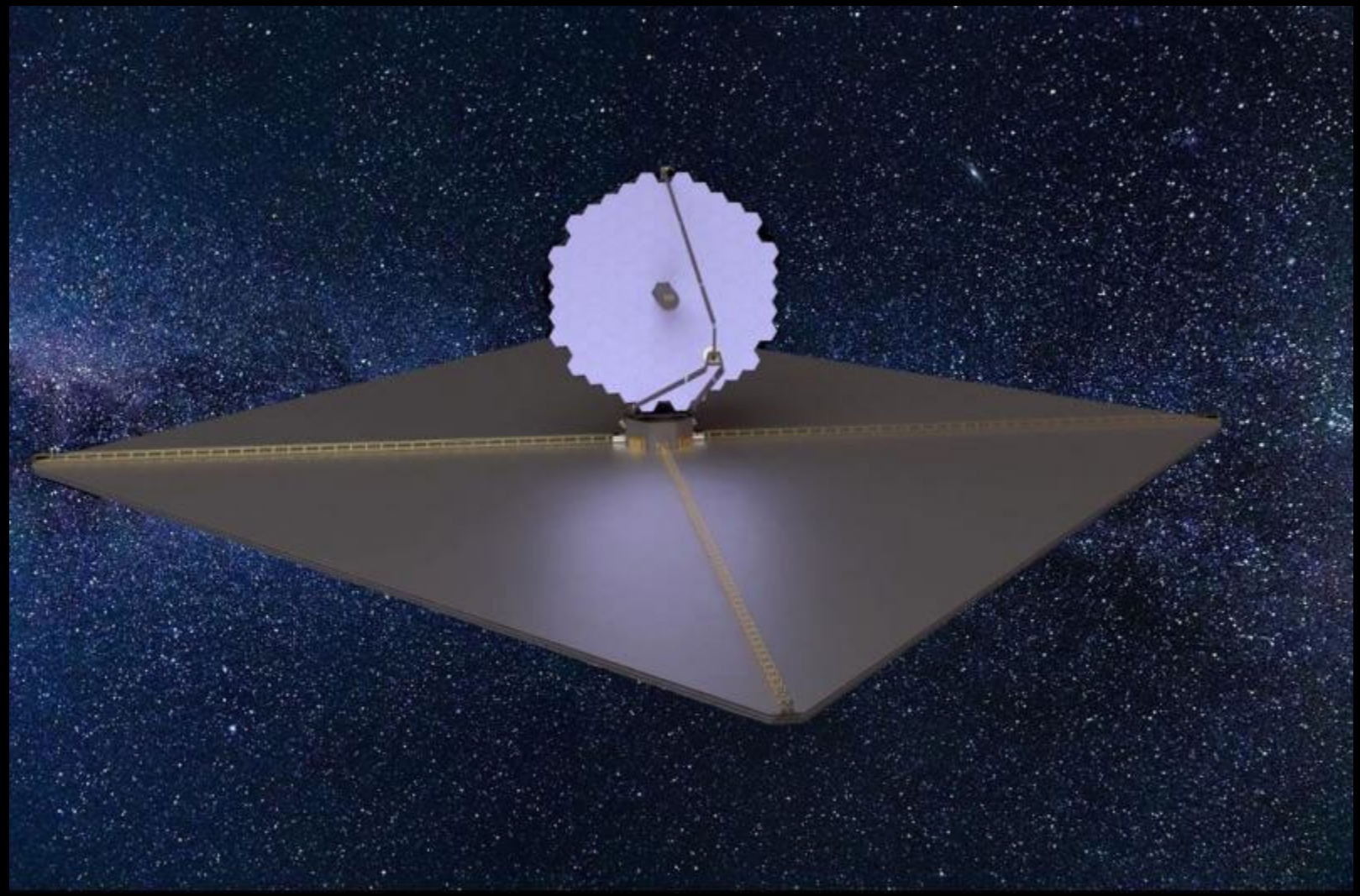


NEXT UP: Nancy Grace Roman Telescope



Named after NASA's first female Chief of Astronomy – same sized mirror as Hubble, with 100x the field of view.

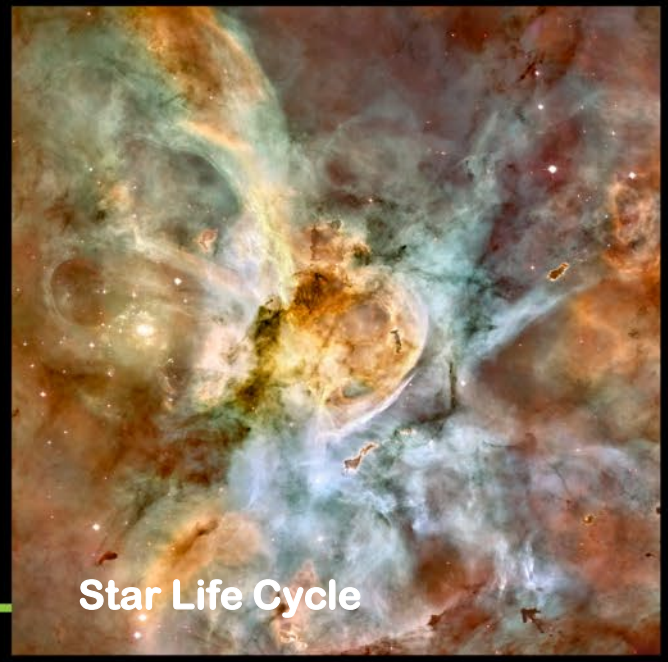
Habitable Worlds Observatory

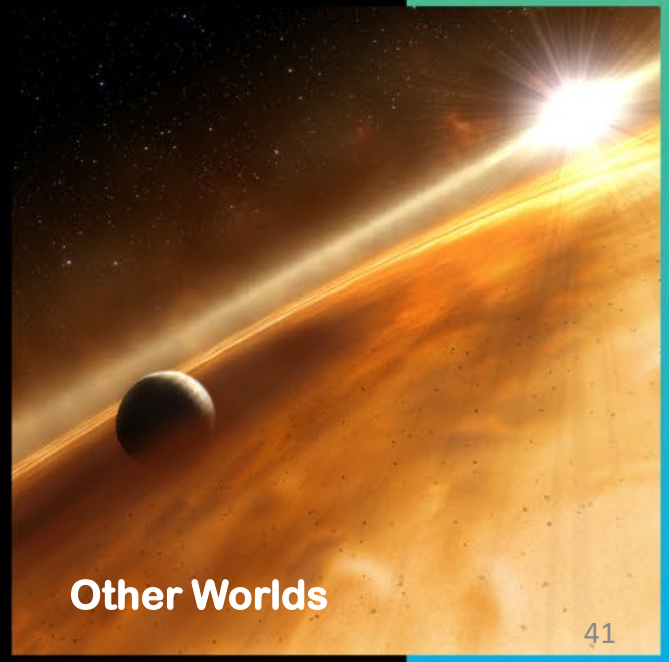


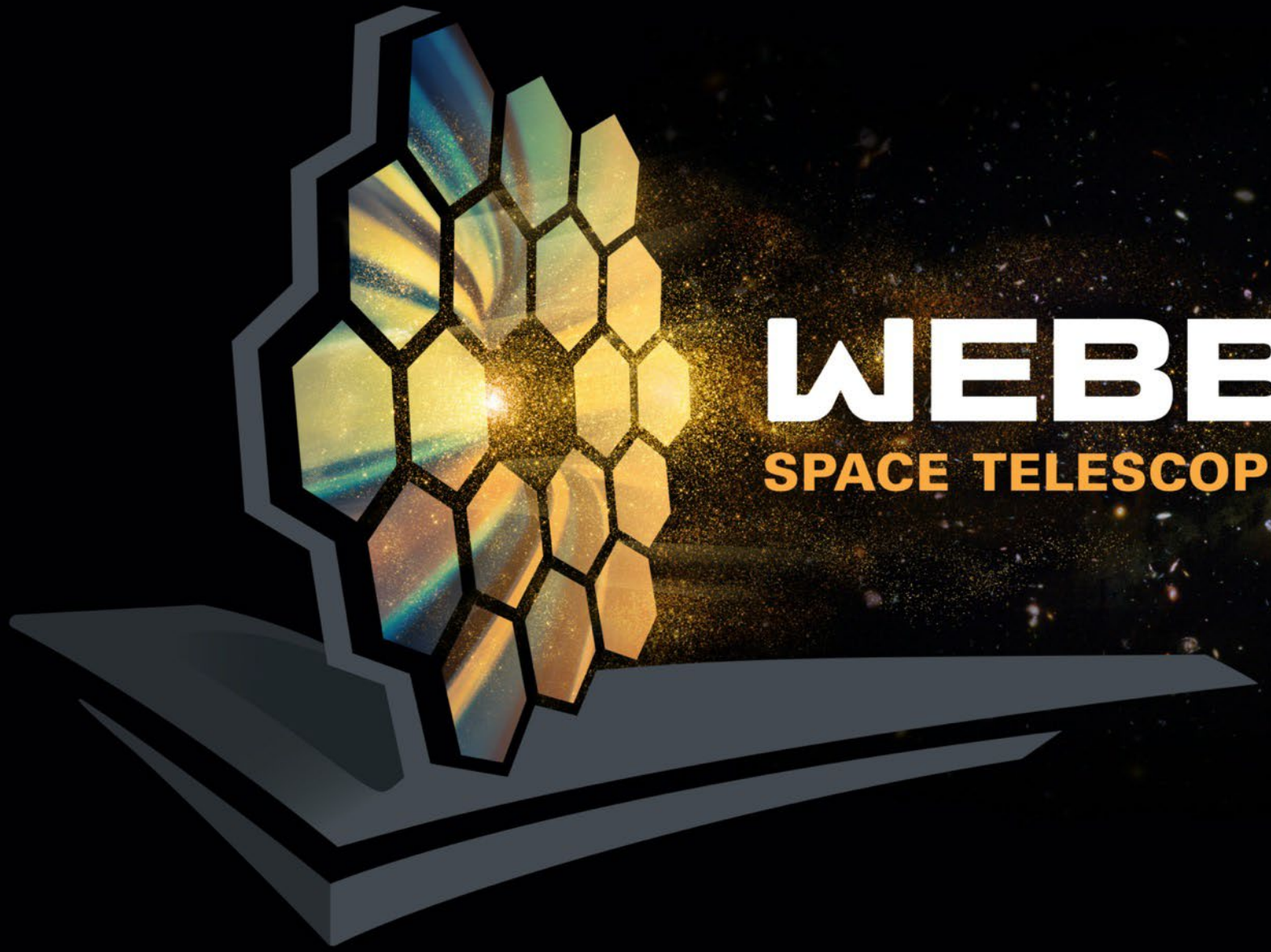
Webb's Exciting Discoveries









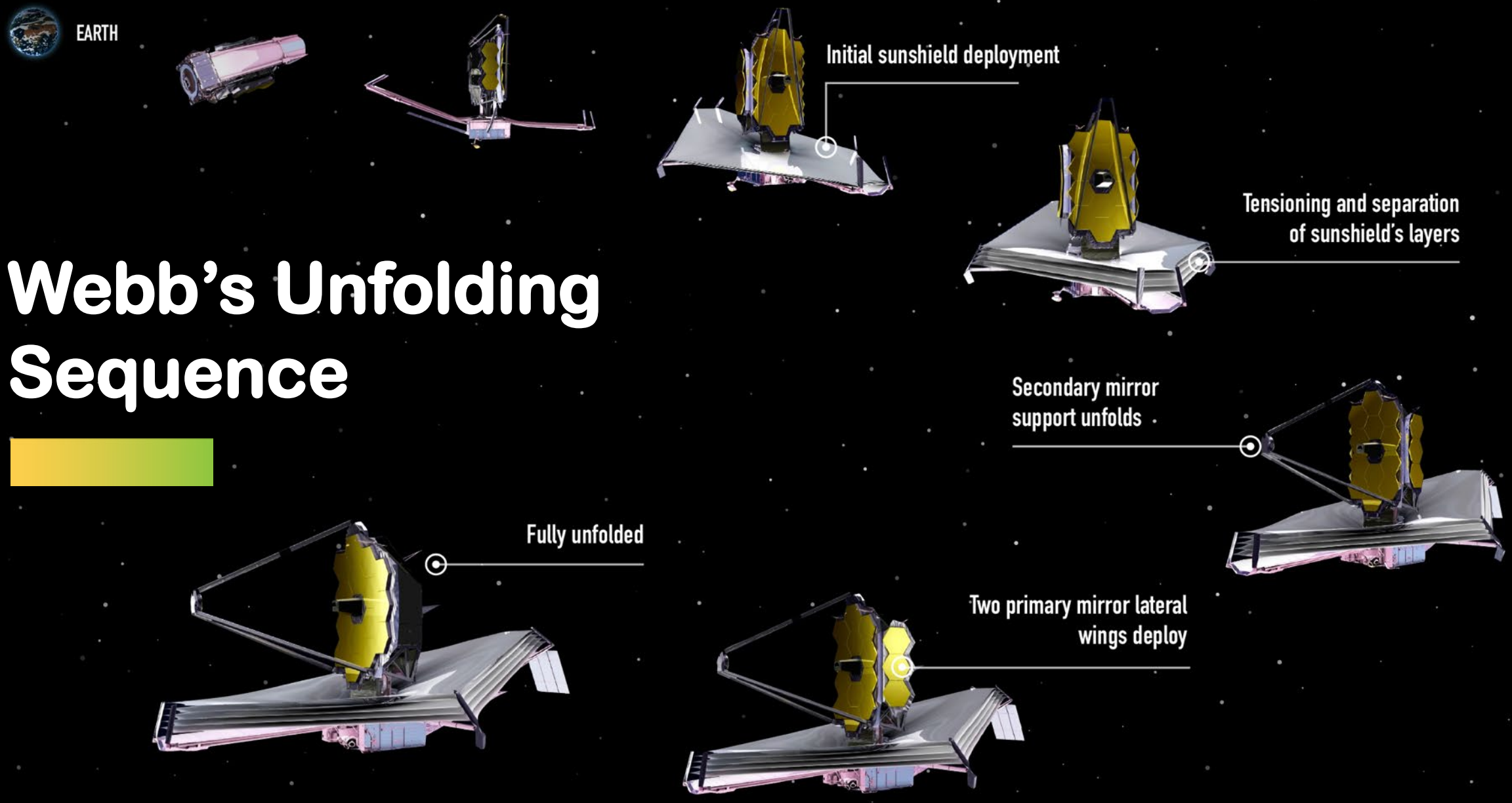


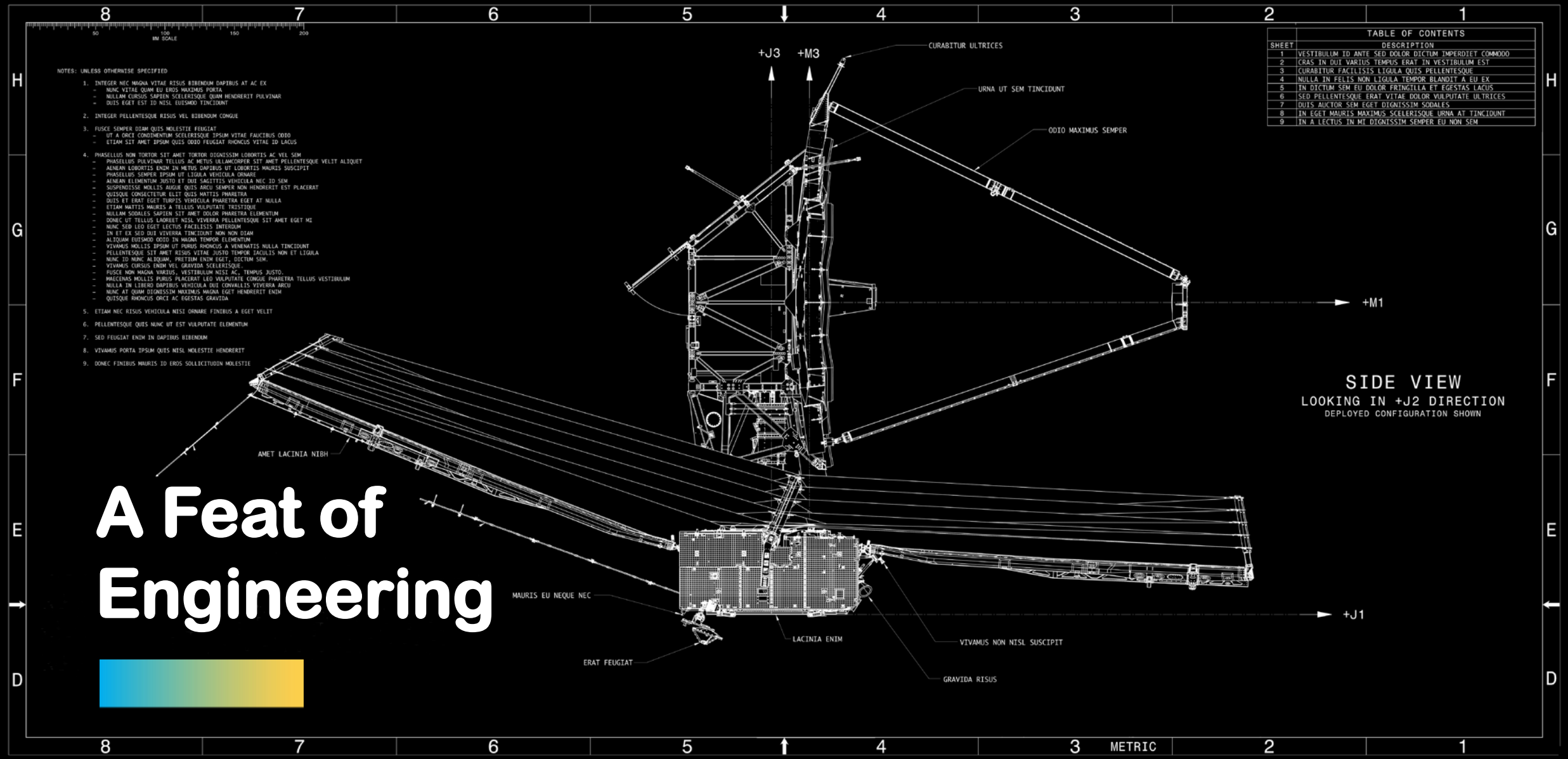
Questions?

Backup Slides

Sample Label Text

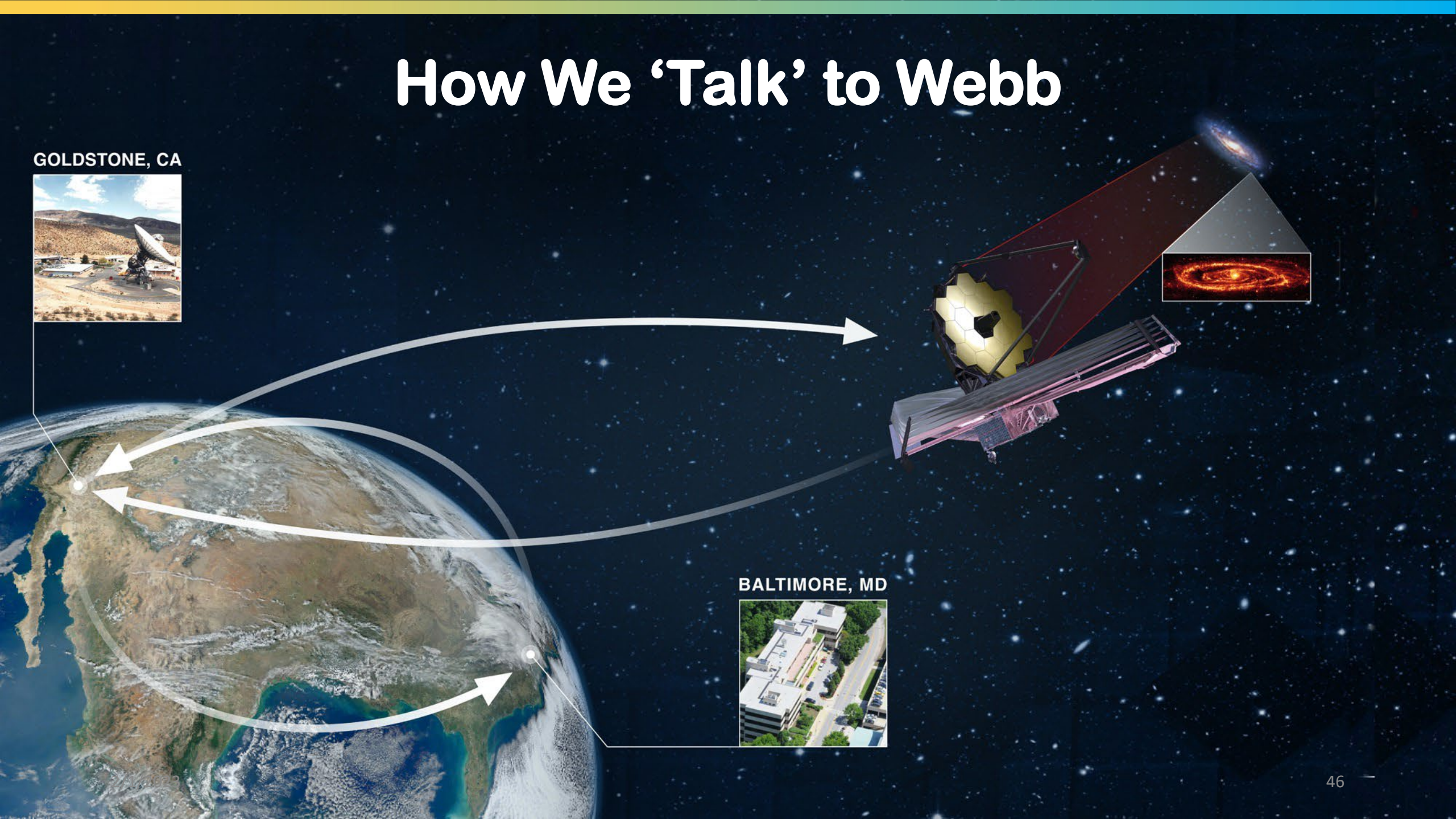
Webb's Unfolding Sequence





A Feat of Engineering

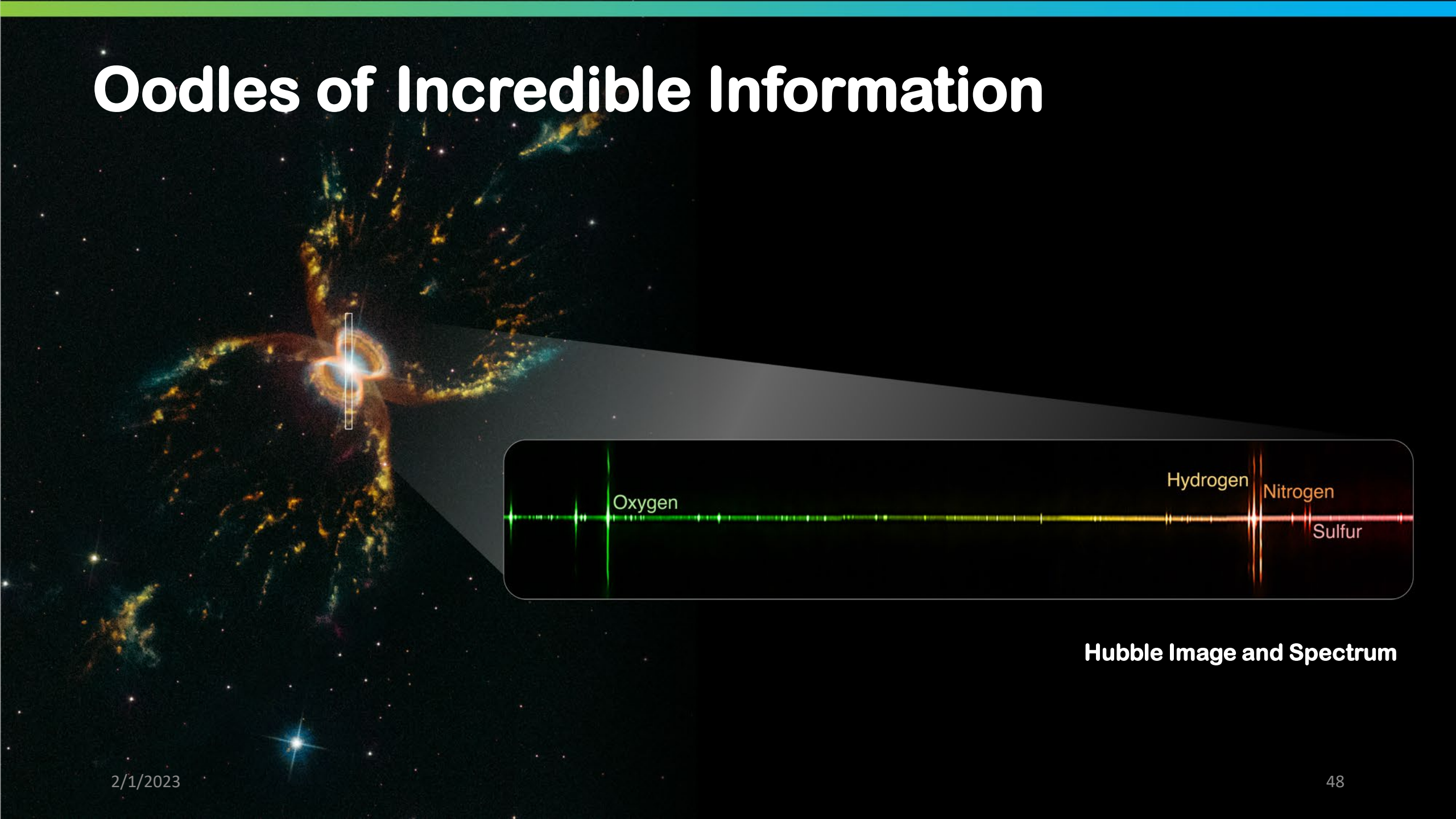
How We ‘Talk’ to Webb



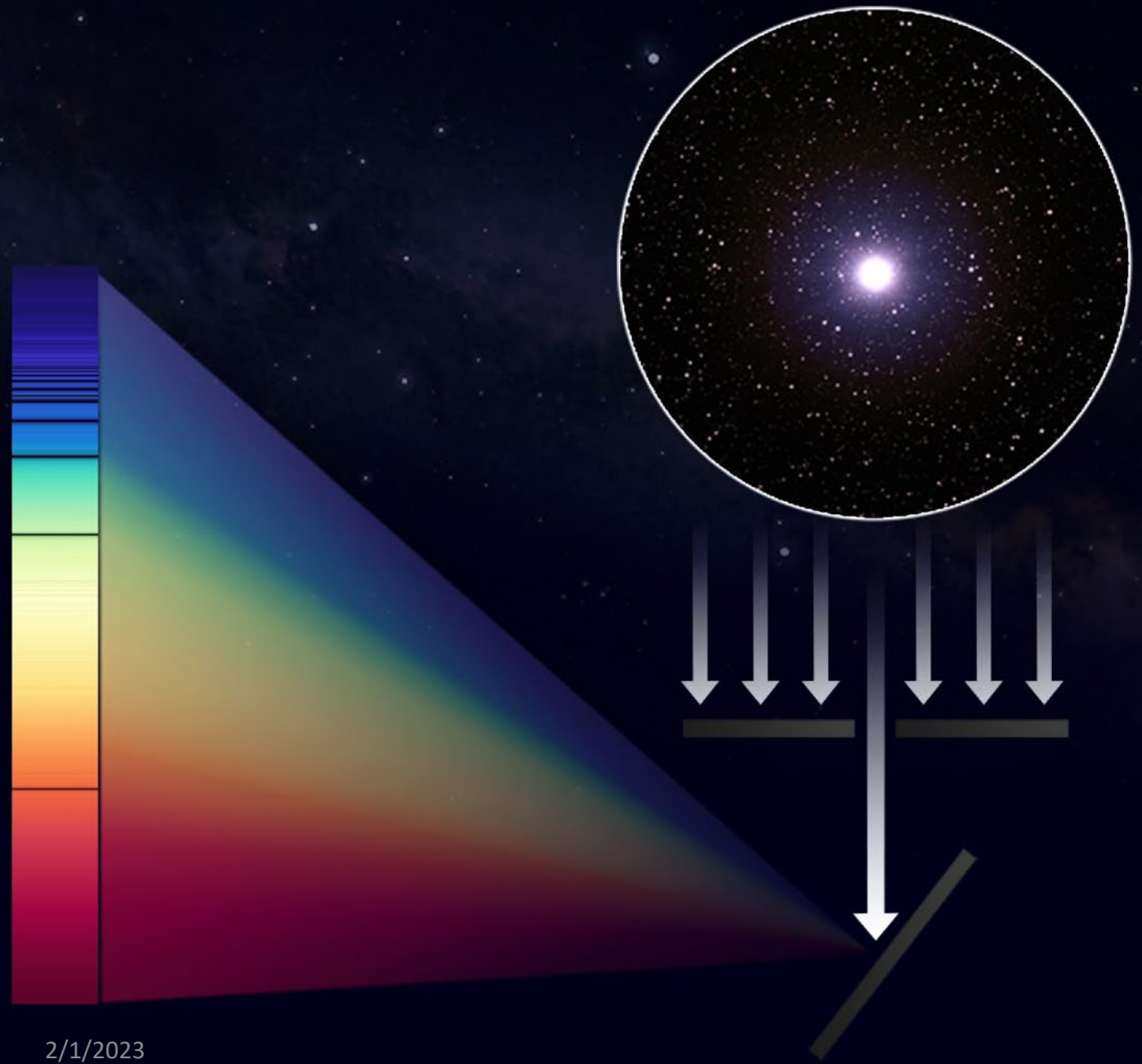


Commanding Webb from Baltimore, Maryland

Oodles of Incredible Information



Hubble Image and Spectrum



Splitting Light with Webb