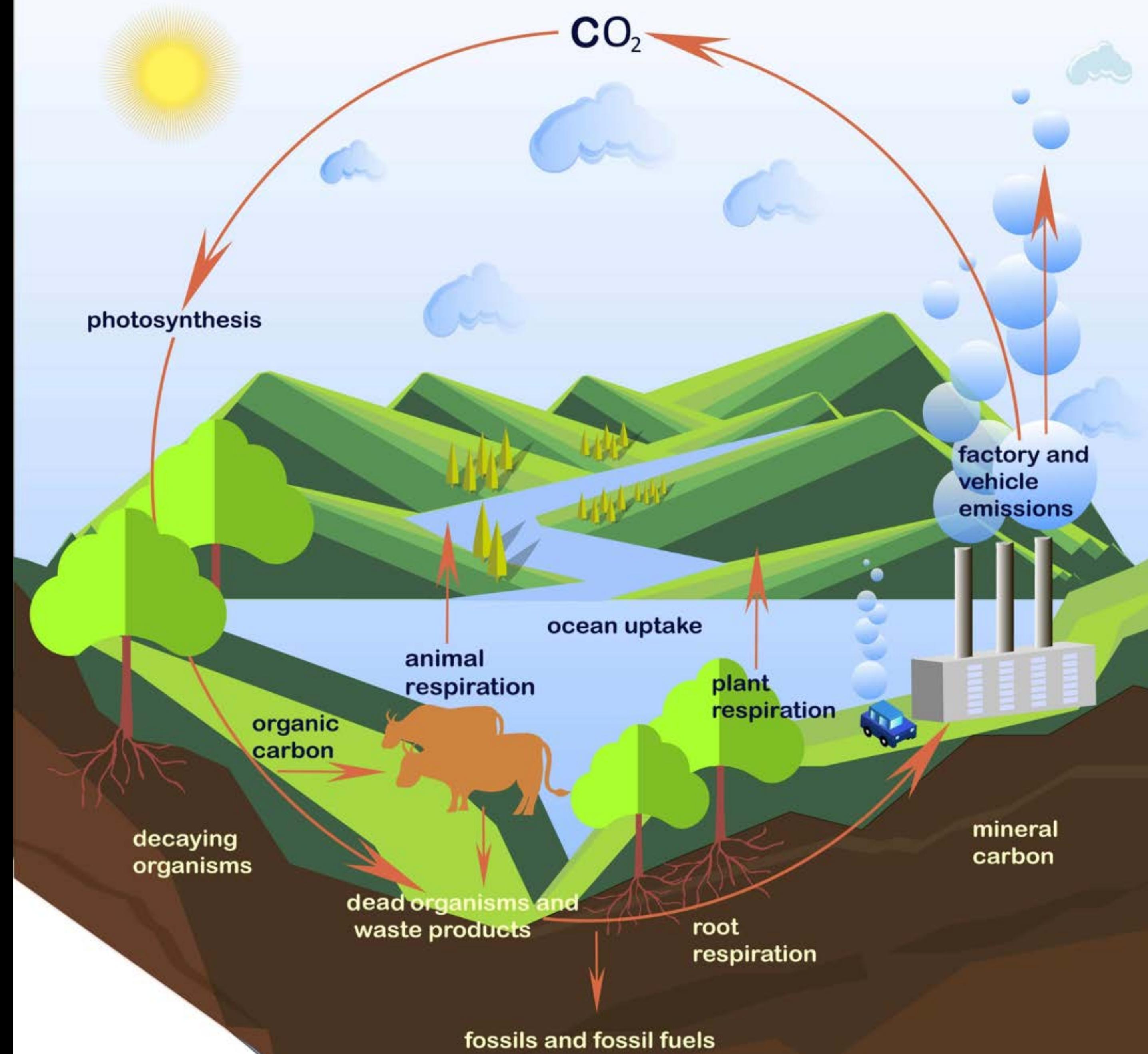
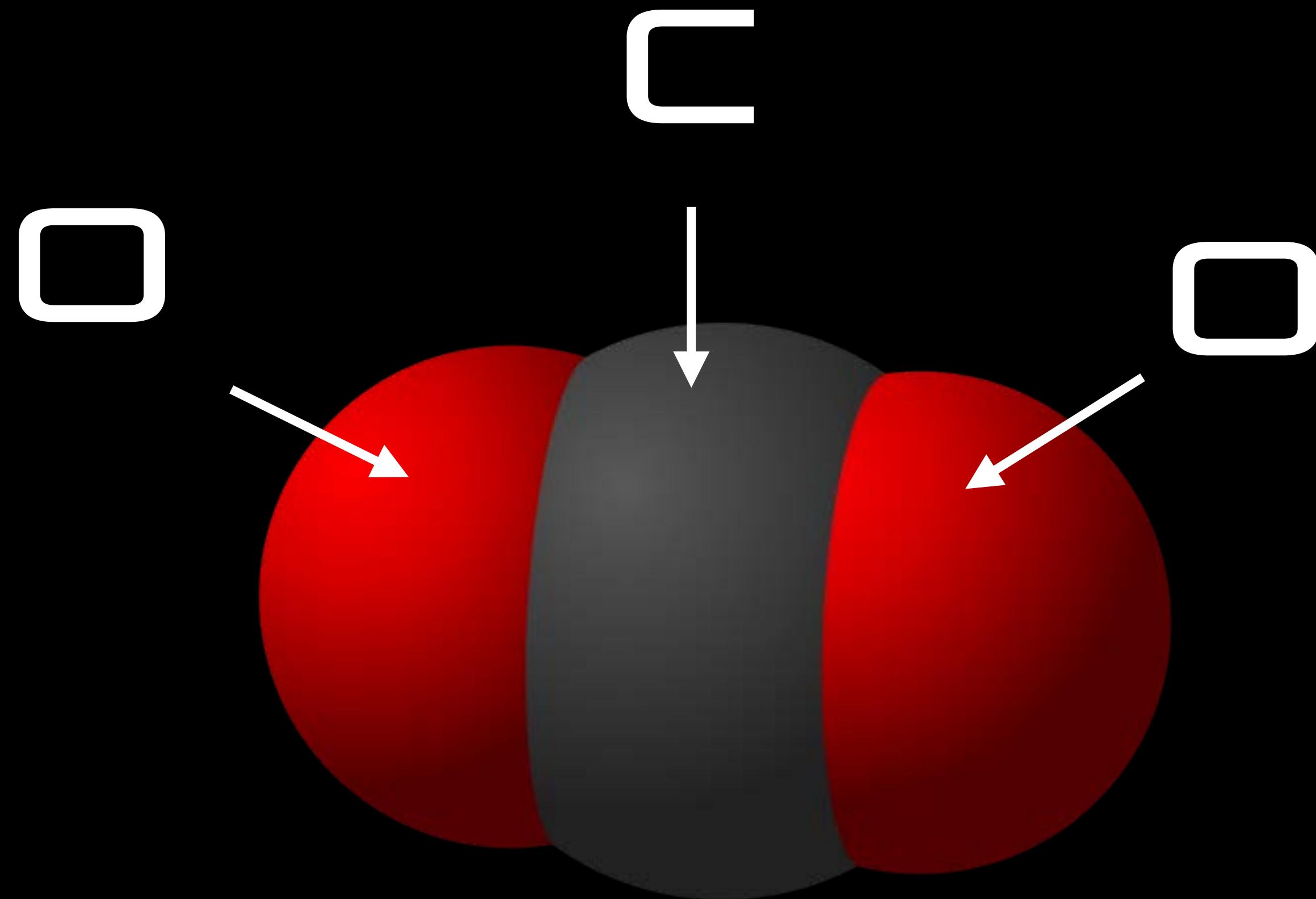




CARBON CYCLE



[HTTPS://WWW.BGS.AC.UK/](https://www.bgs.ac.uk/discovering-gEOLOGY/climate-change/the-carbon-story/)
[DISCOVERING-GEOLOGY/](https://www.bgs.ac.uk/discovering-gEOLOGY/climate-change/the-carbon-story/)
[CLIMATE-CHANGE/THE-](https://www.bgs.ac.uk/discovering-gEOLOGY/climate-change/the-carbon-story/)
[CARBON-STORY/](https://www.bgs.ac.uk/discovering-gEOLOGY/climate-change/the-carbon-story/)



CARBON DIOXIDE (C O₂)

CO₂ IS A NORMAL PART OF THE ATMOSPHERE, THAT LAYER OF GASES AROUND THE PLANET THAT'S LIKE A WARM BLANKET, KEEPING US COZY.



BUT ADDING MORE CO₂ FROM FOSSIL FUELS IS LIKE MAKING THAT BLANKET THICKER, WHICH RAISES THE TEMPERATURE ON THE GROUND.





A man wearing a plaid shirt and a white apron is standing at a long wooden counter. He is focused on his work, which involves handling dough or bread rolls. There are several white bowls and a bottle on the counter in front of him.

A woman wearing an orange shirt and a white apron is also working at the same wooden counter. She is engaged in the same task as the man, likely preparing bread rolls. A large metal tray is visible behind her.





my Coke Rewards



MY APP IS REQUIRED. OPEN COKE.COM
ON PHONE. SCAN QR CODE ON CAP.

ORIGINAL TASTE

Coca-Cola

16 FL OZ (1 PT) 473 mL

ORIGINAL TASTE

Coca-Cola

16 FL OZ (1 PT) 473 mL

100%

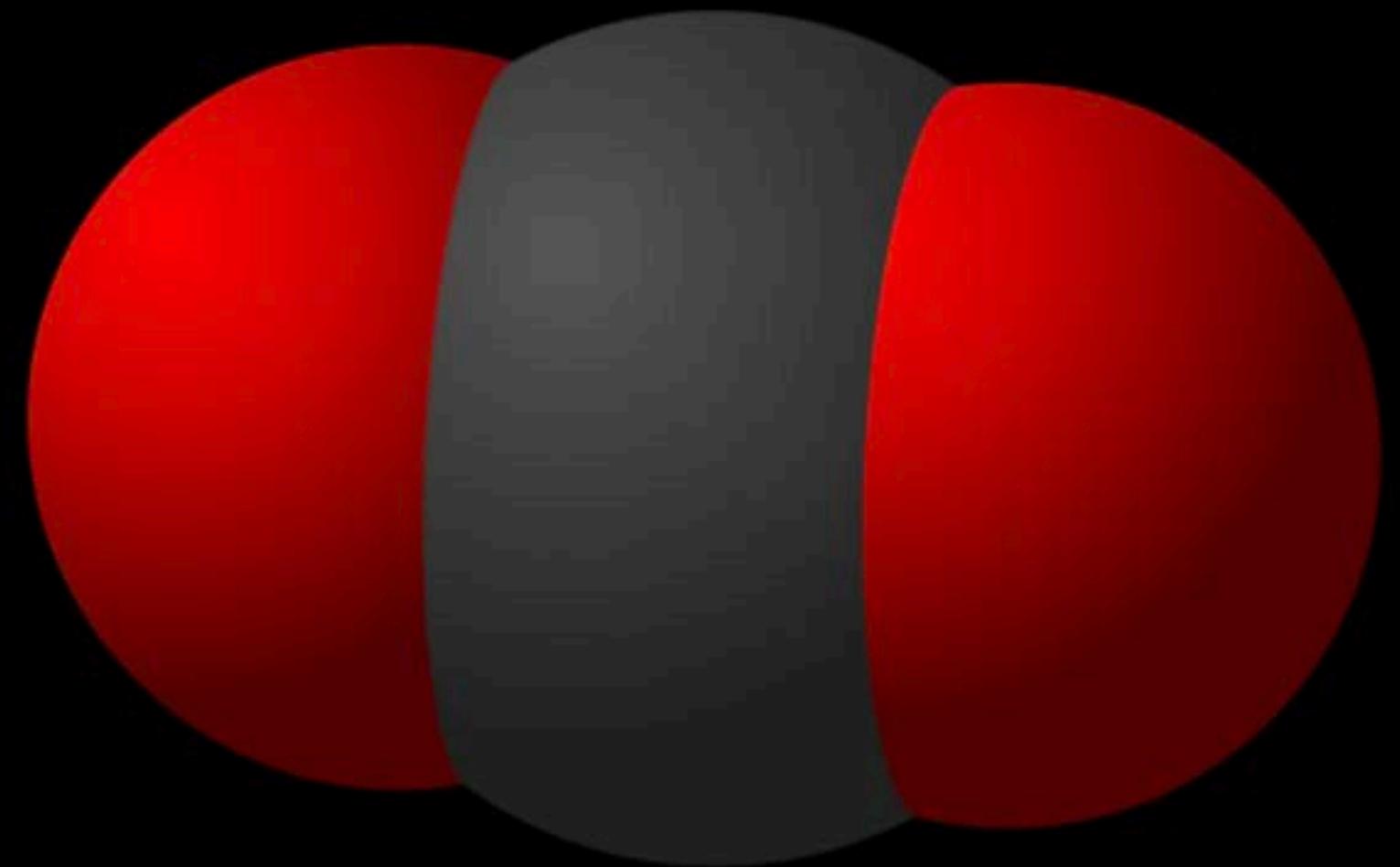
LEMON-LIME

LEMON-LIME
100% NATURAL FLA
NO CAFFEINE

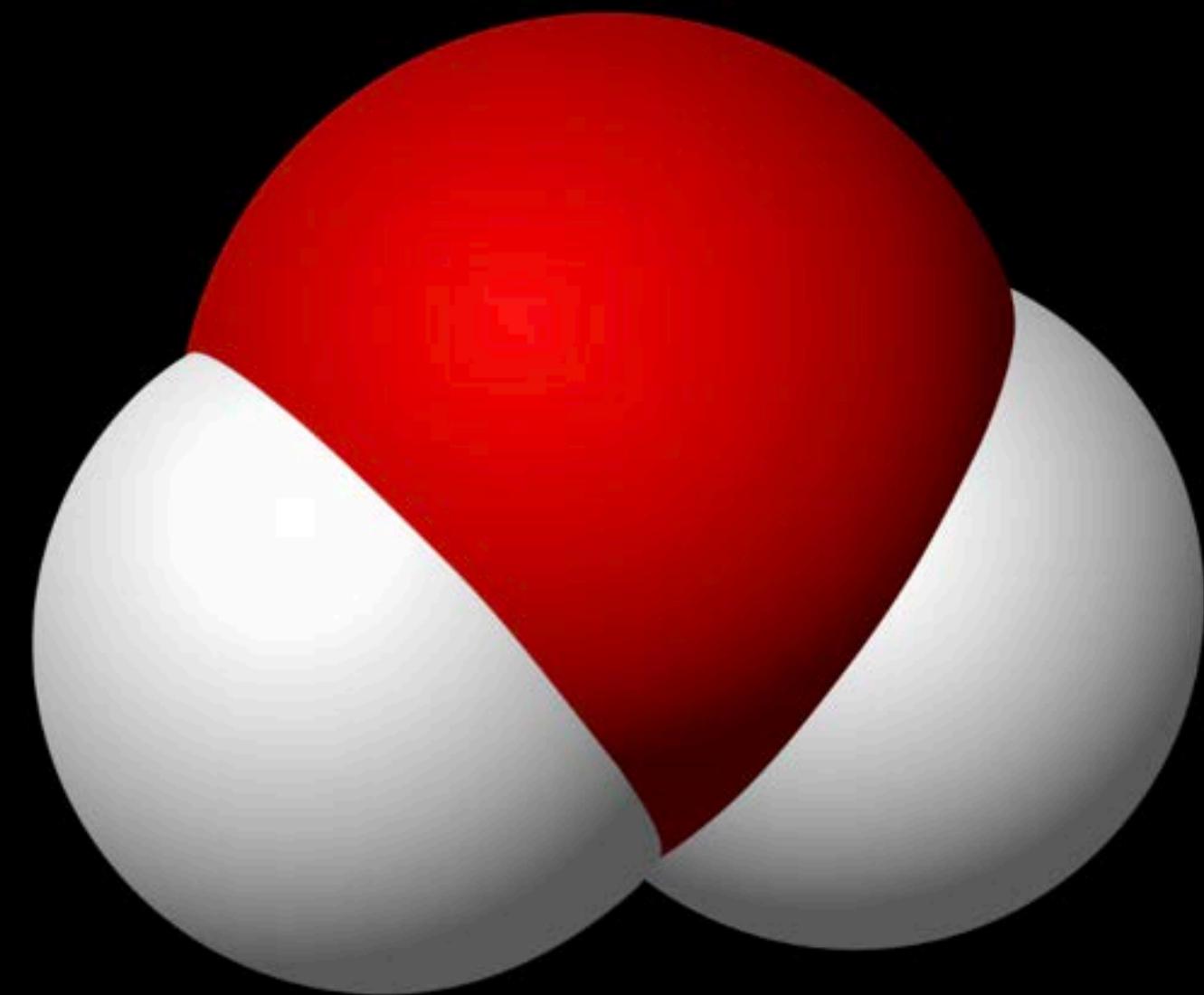
CODE UNDER CAP.
ENTER ONLINE.
SEE RULES ONLINE.

mycoke
rewards
.com

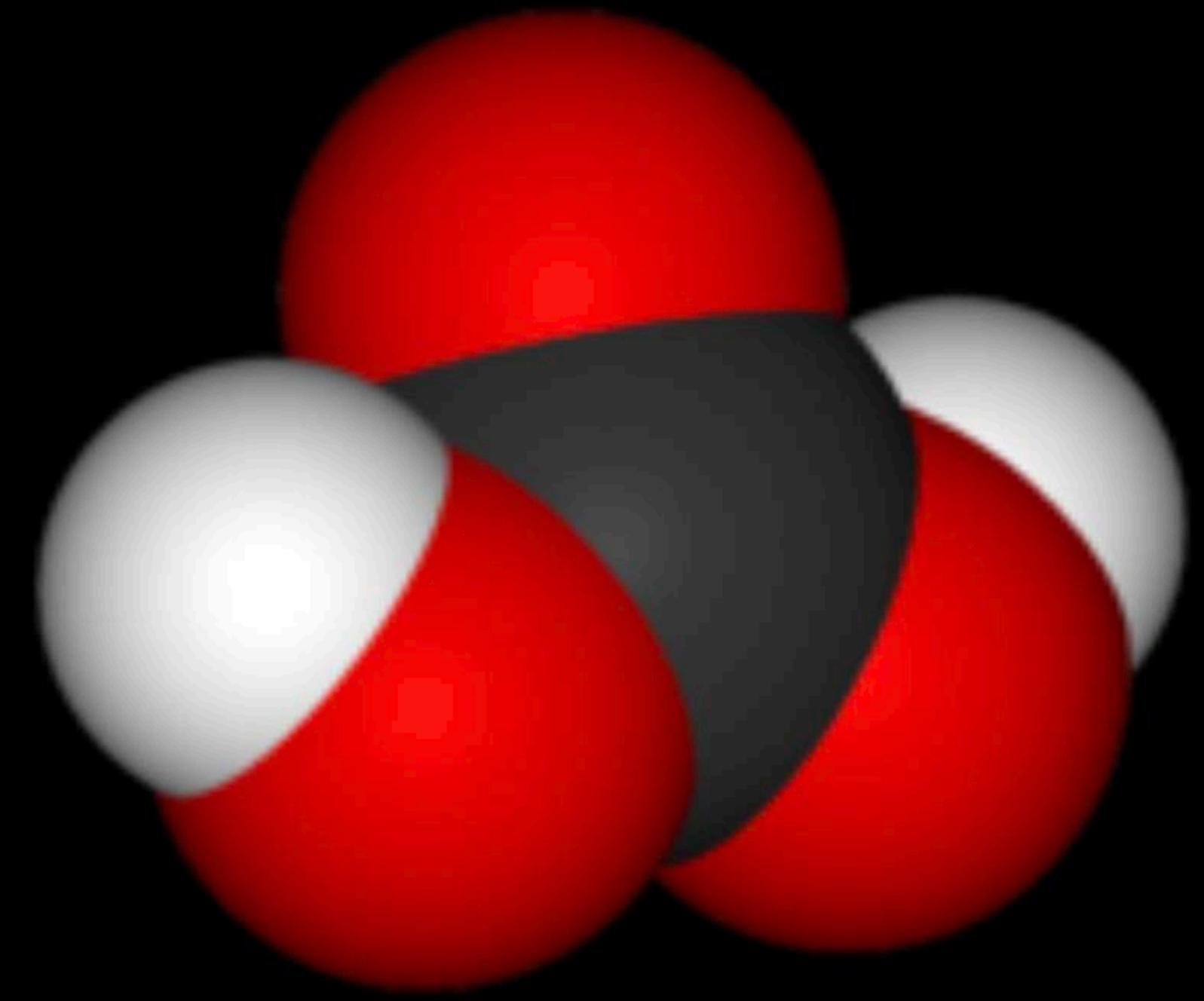




CARBON DIOXIDE (C O₂)



WATER (H₂ O)



CARBONIC ACID (H₂CO₃)



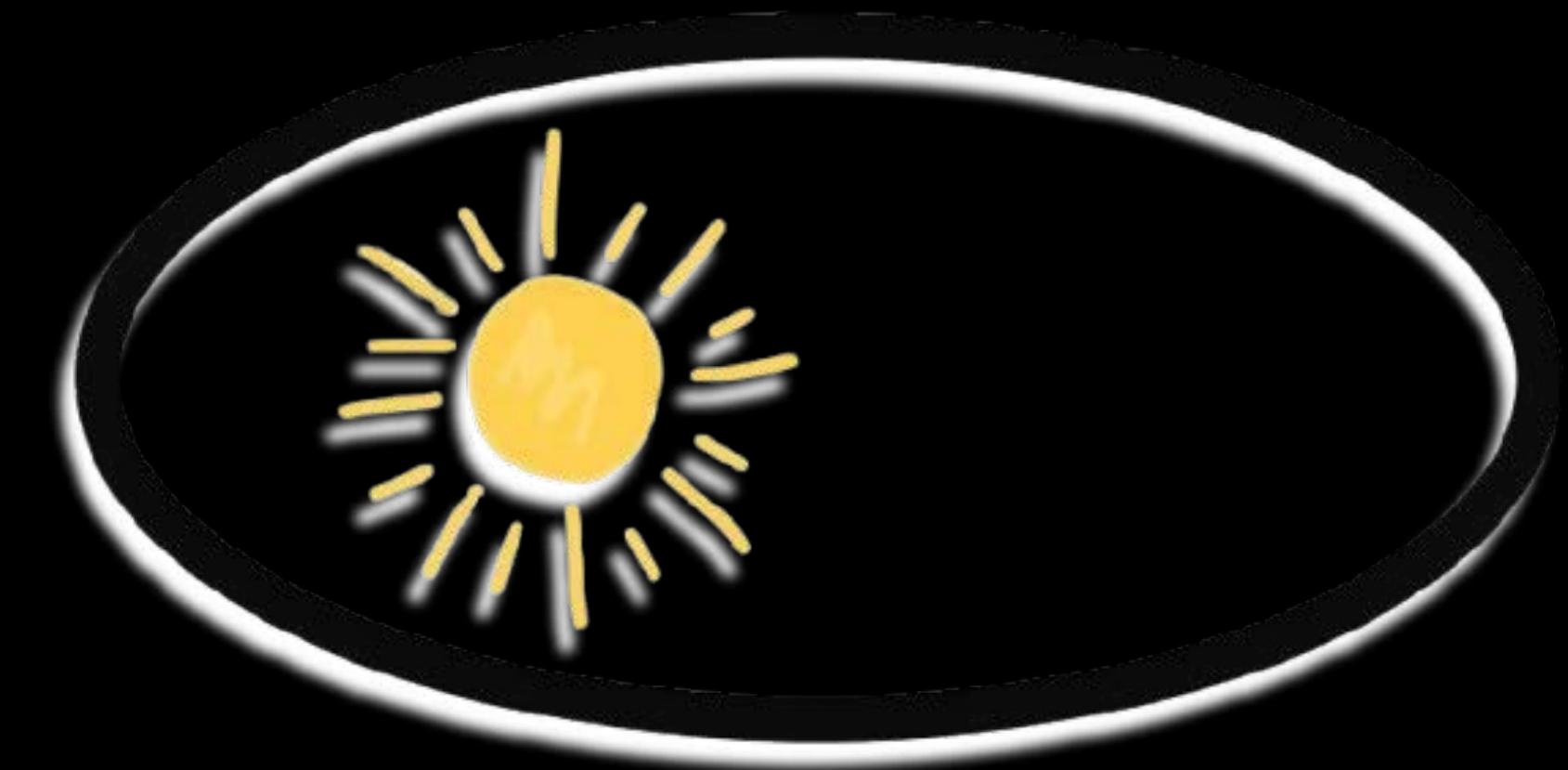


SUPER SOAKER

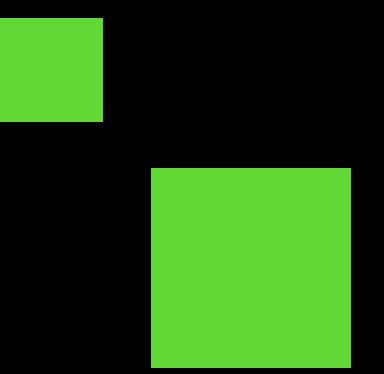




FROM SPACE TO CODE: USING NASA'S OPEN DATA APIs WITH



K E P L E R



<CodeLab>



Connect with me via LinkedIn



ABOUT KO TURK

Software Architect, Java Engineer, and Community Builder

Green Software Champion
JUGLeader @CodeLabJUG
Conference speaker





VOXXED DAYS
AMSTERDAM



WHAT DO YOU EXPECT?



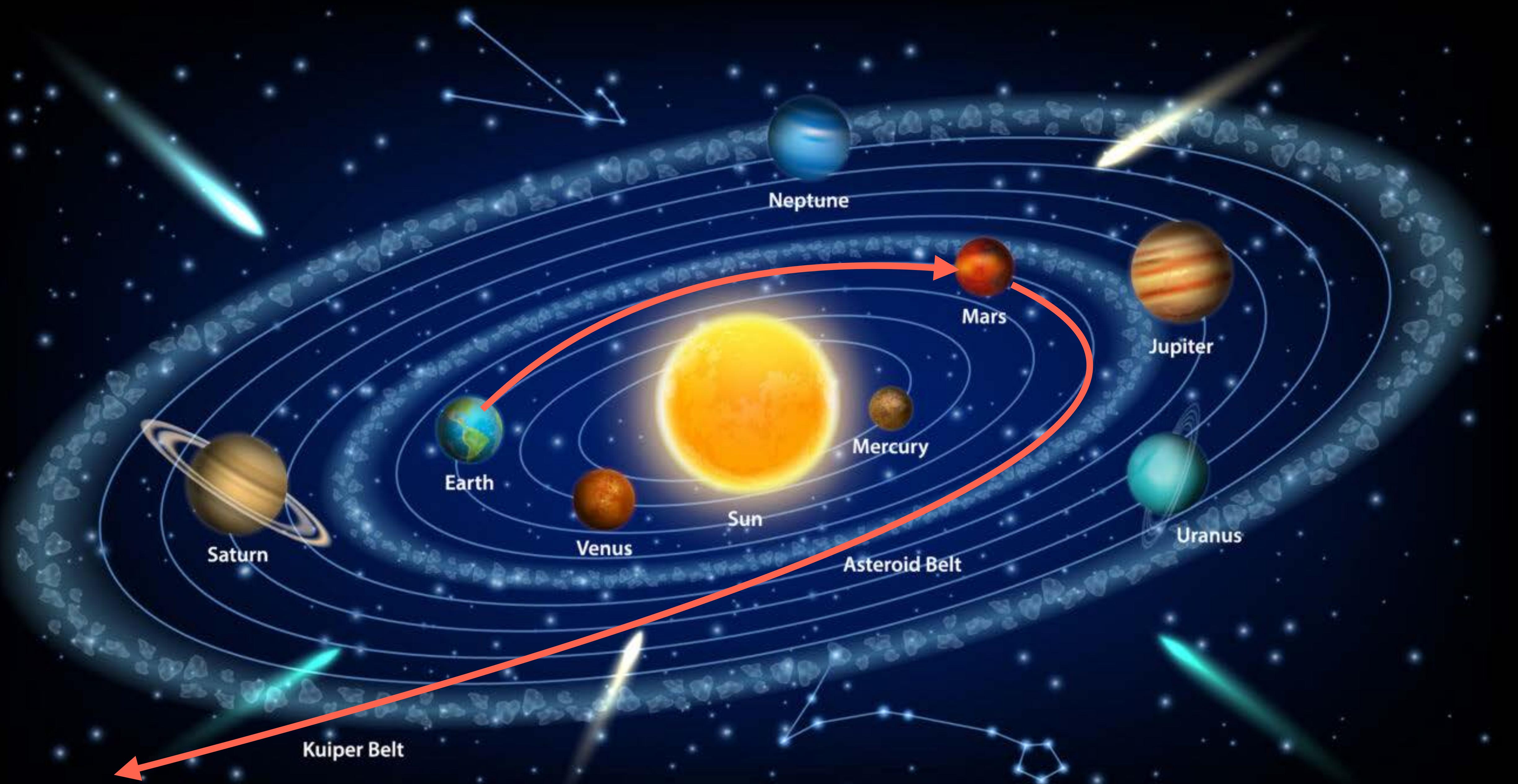
Join at [slido.com](https://www.slido.com)
#1833 625

WHAT WILL YOU LEARN

FROM THE PRACTICAL DEVELOPER VIEW

- Creating a Spring Boot Application
 - That calls the NASA Data API's
- Creating a docker imager with JReleaser
- And monitor it's energy / carbon with Kepler





OUR MISSIONS

LOOK INTO SPACE

MOON

MARS

ASTROIDS

EXOPLANETS



IS THERE LIFE ON
OTHER PLANETS?



ARE WE THE ONLY
ONE?



OUR MISSIONS

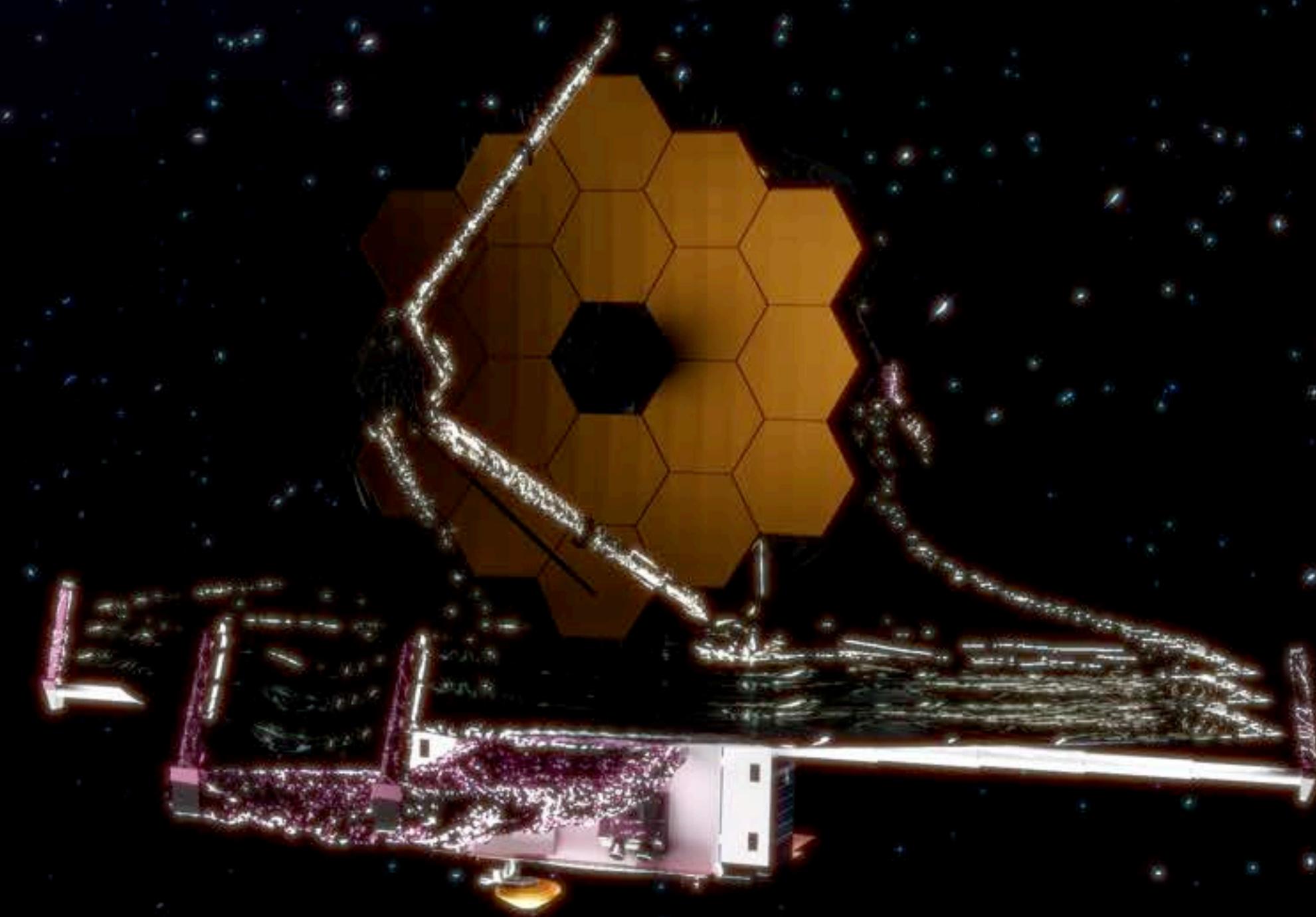
→ LOOK INTO SPACE

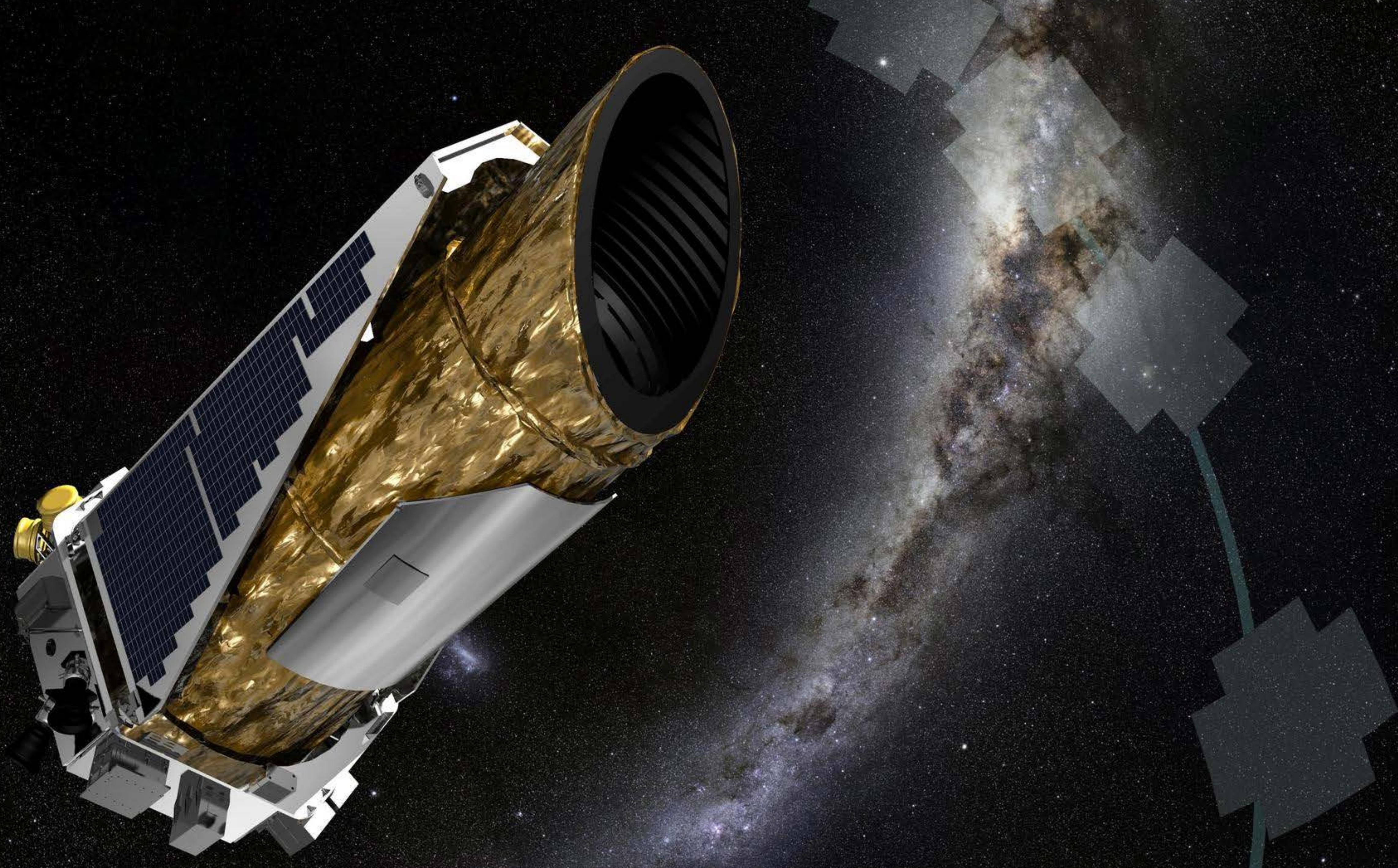
MOON

MARS

ASTROIDS

EXOPLANETS



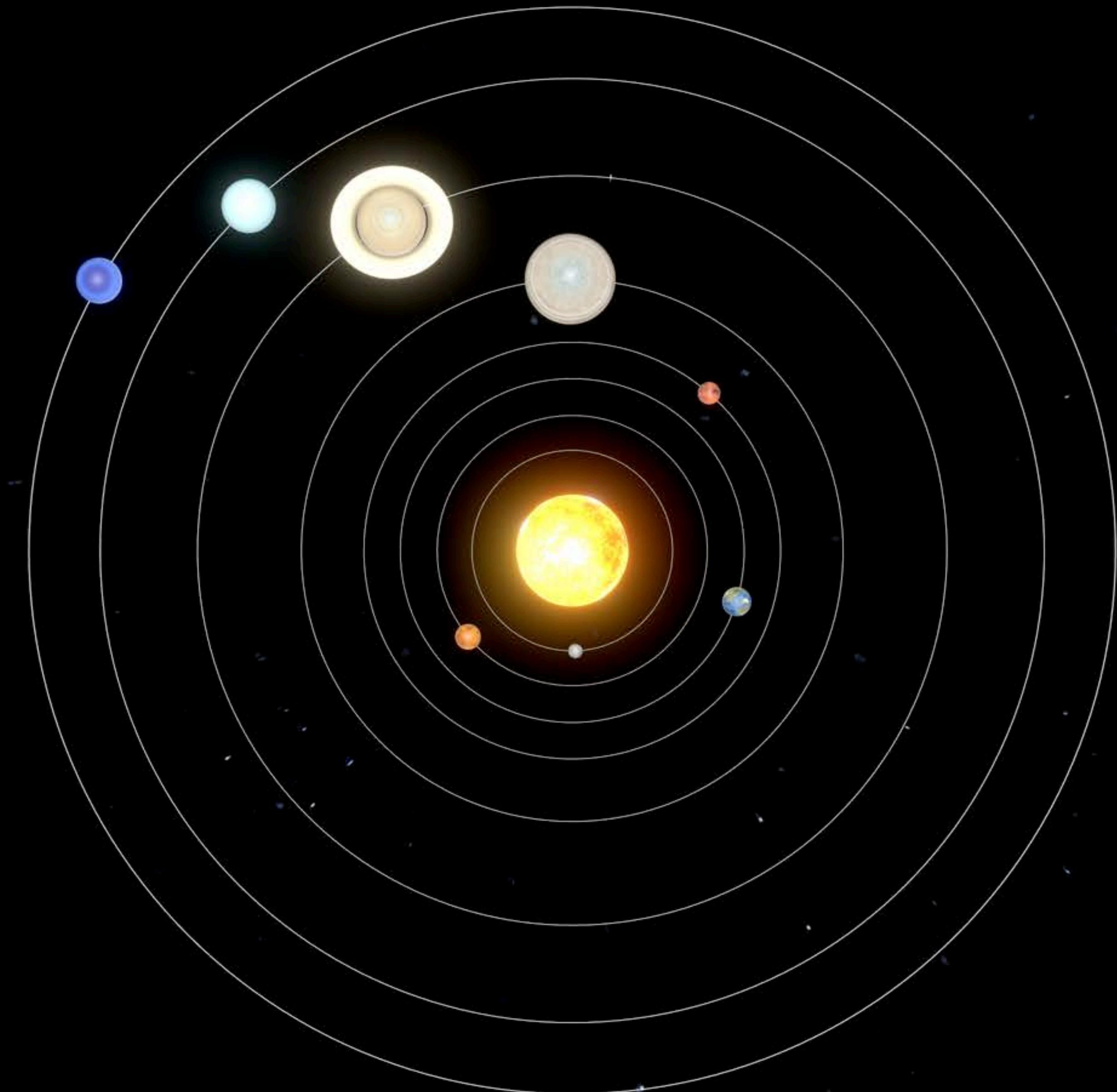


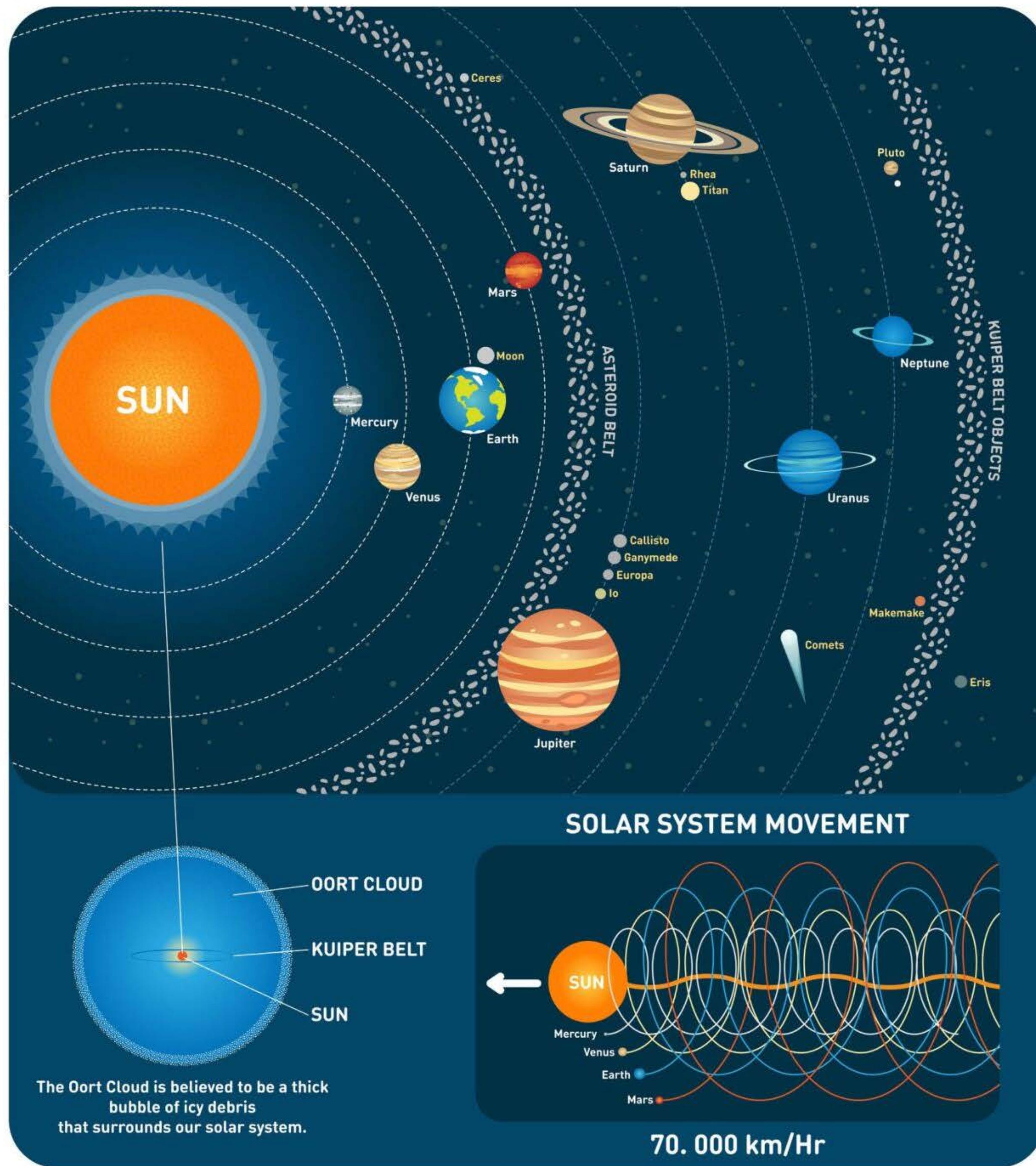
WHO WAS KEPLER?





JOHANNES KEPLER

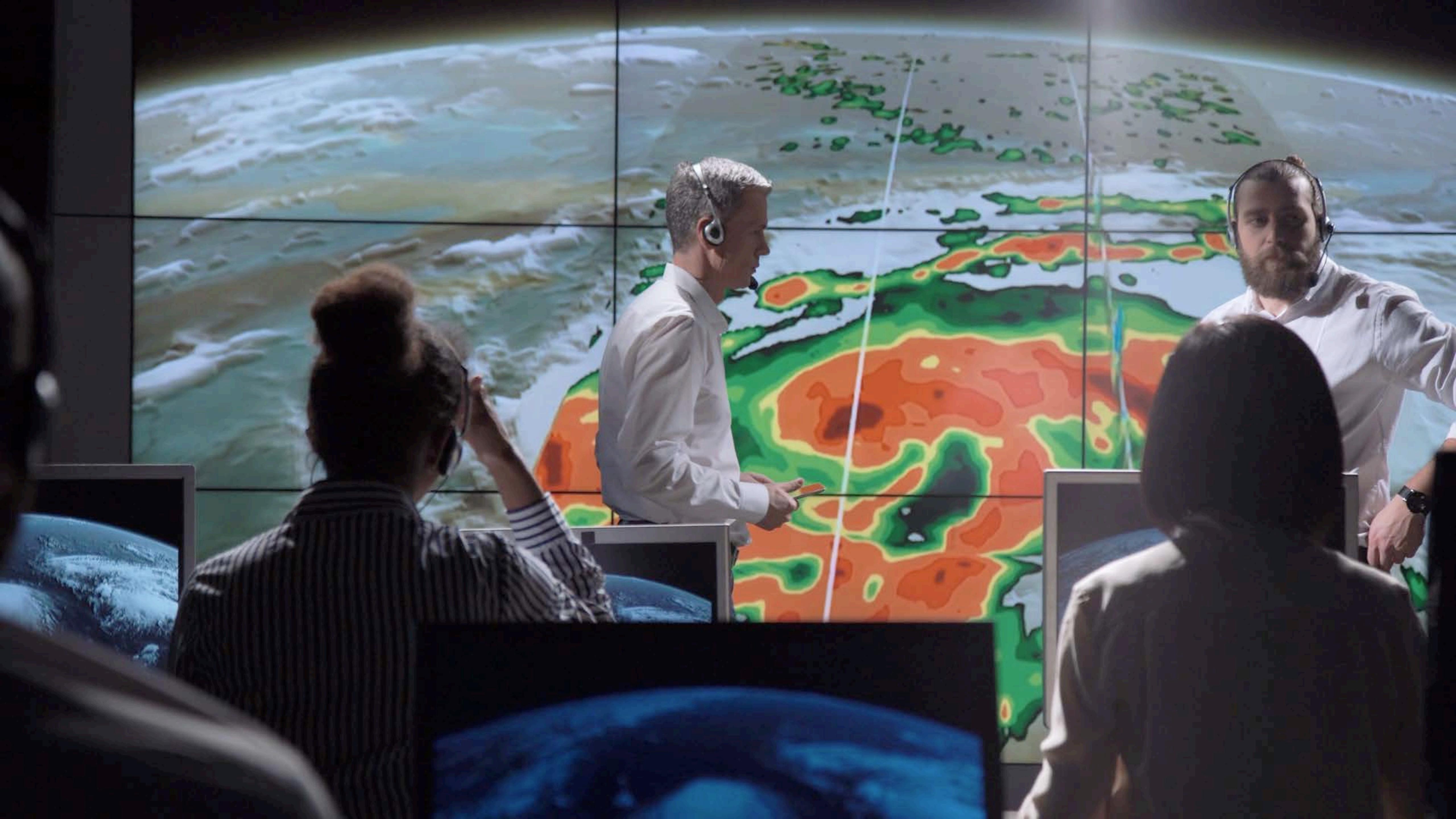




[australianenvironmentaleducation
.com.au/education-resources/
the-solar-system/](http://australianenvironmentaleducation.com.au/education-resources/the-solar-system/)







NASA API:

ASTRONOMY PICTURE
OF THE DAY

OUR MISSIONS

LOOK INTO SPACE

→ MOON

MARS

ASTROIDS

EXOPLANETS



Apollo 11

Real-Time Mission Experience

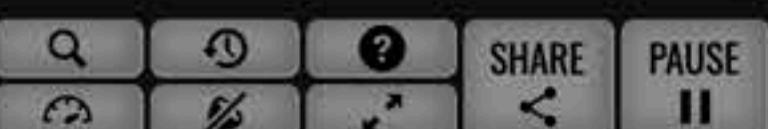
Wed Jul 16 1969 | 03:30:57 PM +200

Ground Elapsed Time (GET): -00:01:03

GO



TRANSCRIPT MISSION MILESTONES COMMENTARY



-00:02:07 Public The target for the Apollo 11 astronauts, the Moon, at liftoff Affairs we'll be at a distance of 218,096 miles away. Just passed the 2-minute mark in the countdown. T-minus 1 minute, 54 seconds and counting. Our status board indicates that the oxidizer tanks in the second and third stages now have pressurized. We continue to build up pressure in all three stages here at the last minute to prepare it for liftoff. T-minus 1 minute, 35 seconds on the Apollo mission, the flight to land the first men on the Moon. All indications are coming in to the Control Center at this time indicate we are GO. One minute, 25 seconds and counting. Our status board indicates the third stage completely

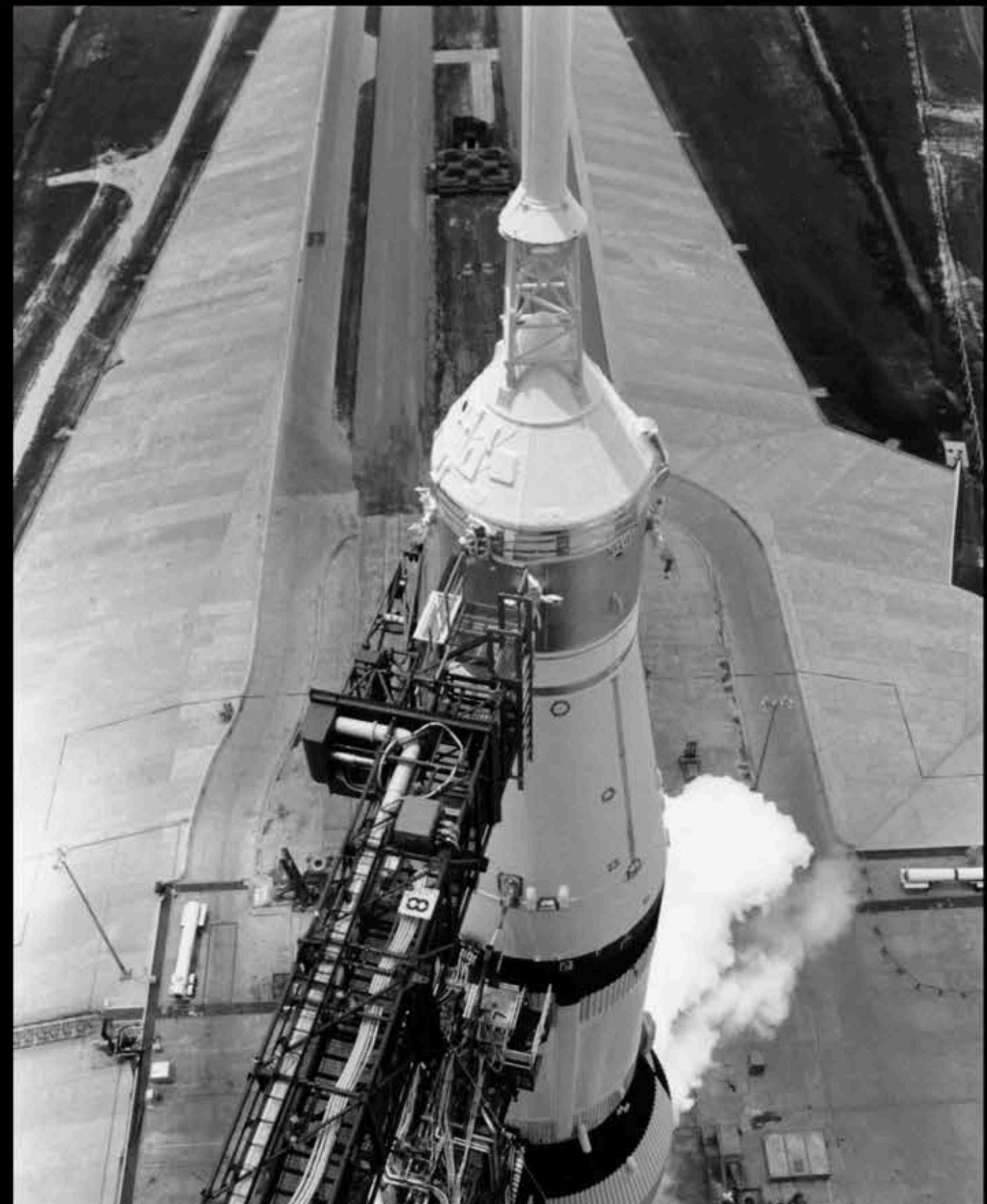
Mission Control Channels

- FOD
- MSN DIR
- FLIGHT
- FLIGHT-L
- FLIGHT-R
- CAPCOM
- CAPCOM-R
- BOOSTER
- BOOSTER-C
- BOOSTER-R
- RETRO
- FIDO
- GUIDO
- GUIDO-R
- SURGEON
- SURGEON-R
- ECCOM
- GNC
- TELCOM
- CONTROL
- INCO
- OPS & PRO
- FAO
- ASST FD
- NETWORK
- COMM TECH
- COMM CTRL
- TRACK
- TRACK-R
- RECOVERY
- RCVY ASST
- RCVY STUS
- CONF LOOP
- GOSS 2
- EASEP
- MOCR DYN

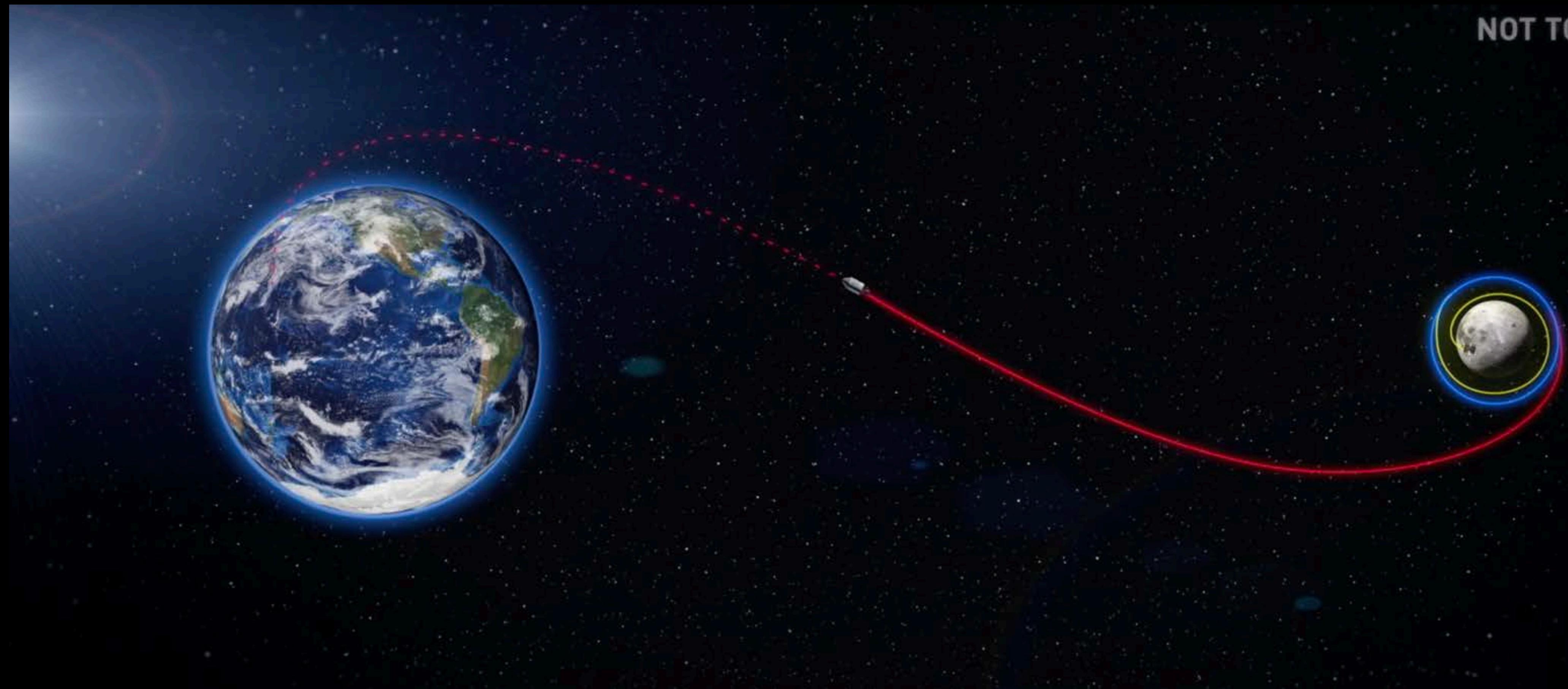
PHOTOGRAPHY

MISSION CONTROL AUDIO

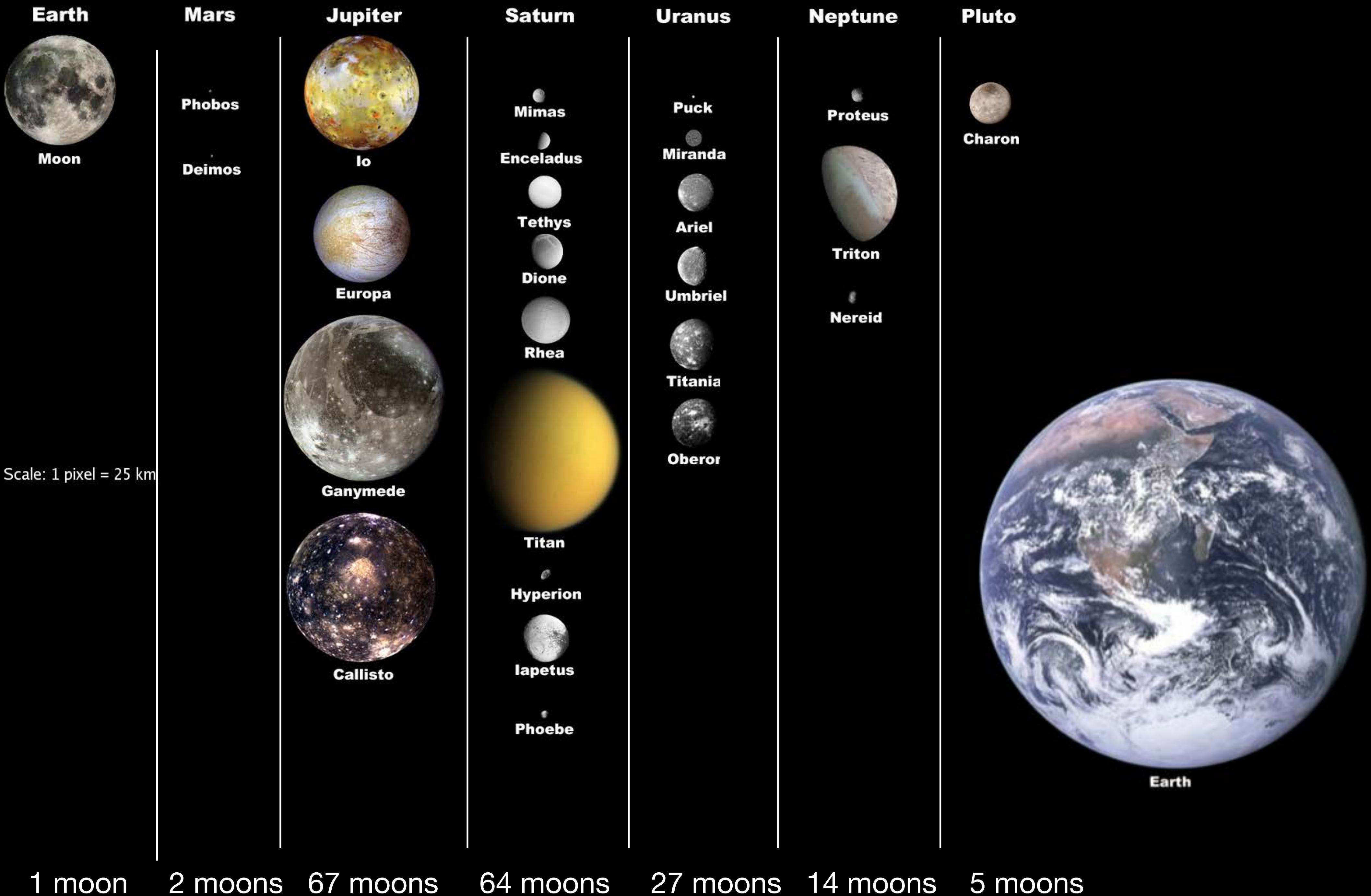
ASTROMATERIAL SAMPLES



NOT TO SCALE



Planetary Moons





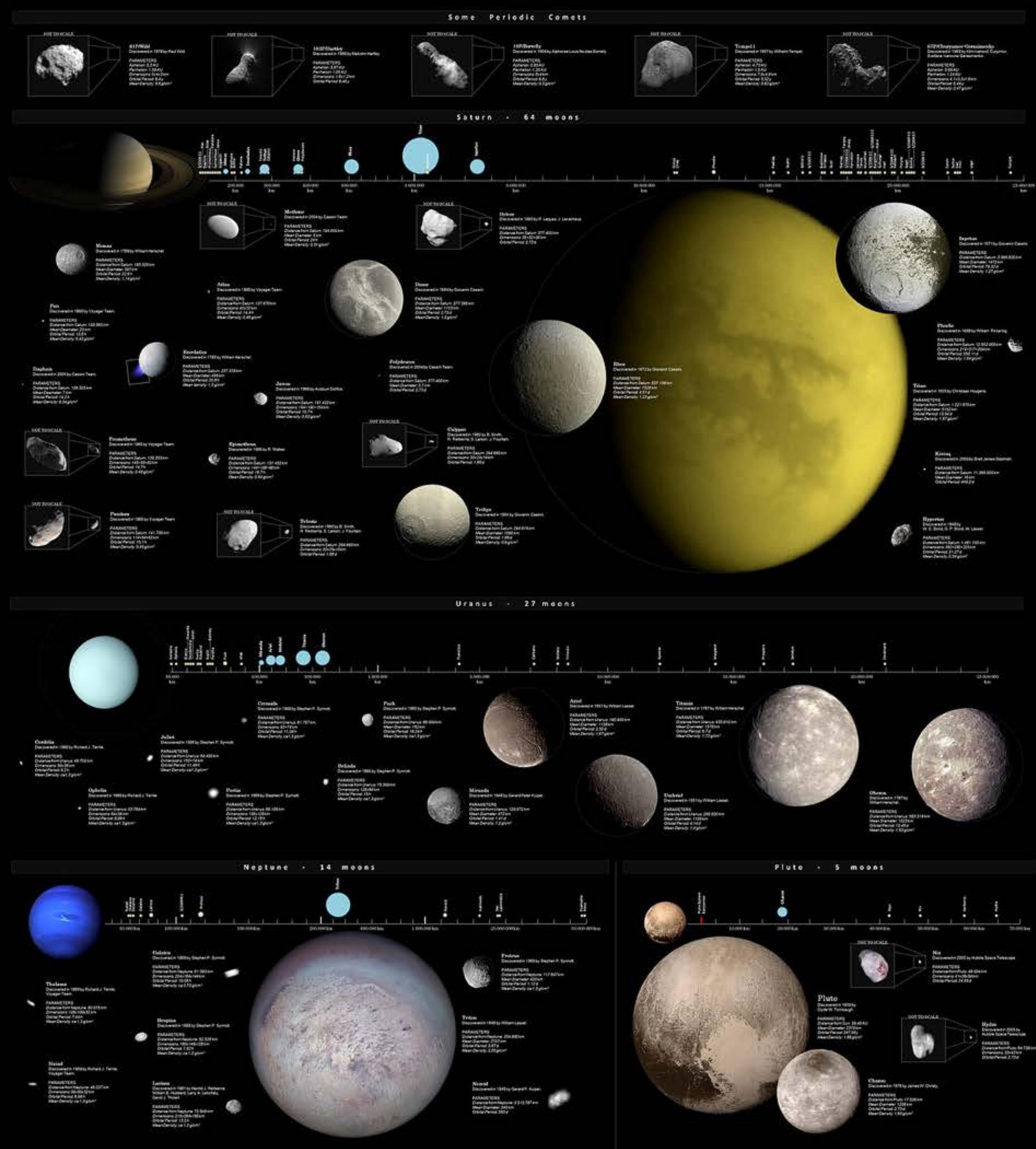
Non-Planet of the Solar System to scale

Dwarf Planets (Ceres & Pluto) – Moons of Planets and Dwarf Planets – Asteroids – Comets

Images from Missions:

Voyager 1 – 2, Hubble Space Telescope, Mars Reconnaissance Orbiter, Deep Impact-EPOXI, Stardust, Galileo, Near-Shoemaker, Cassini, Rosetta, Dawn, New Horizons

THE REPRESENTATION BETWEEN MOONS & PLANET ON DISTANCE LINE AND PLANET & PLANET OF DISTANCE LINE IS NOT TO SCALE



OUR MISSIONS

LOOK INTO SPACE

MOON

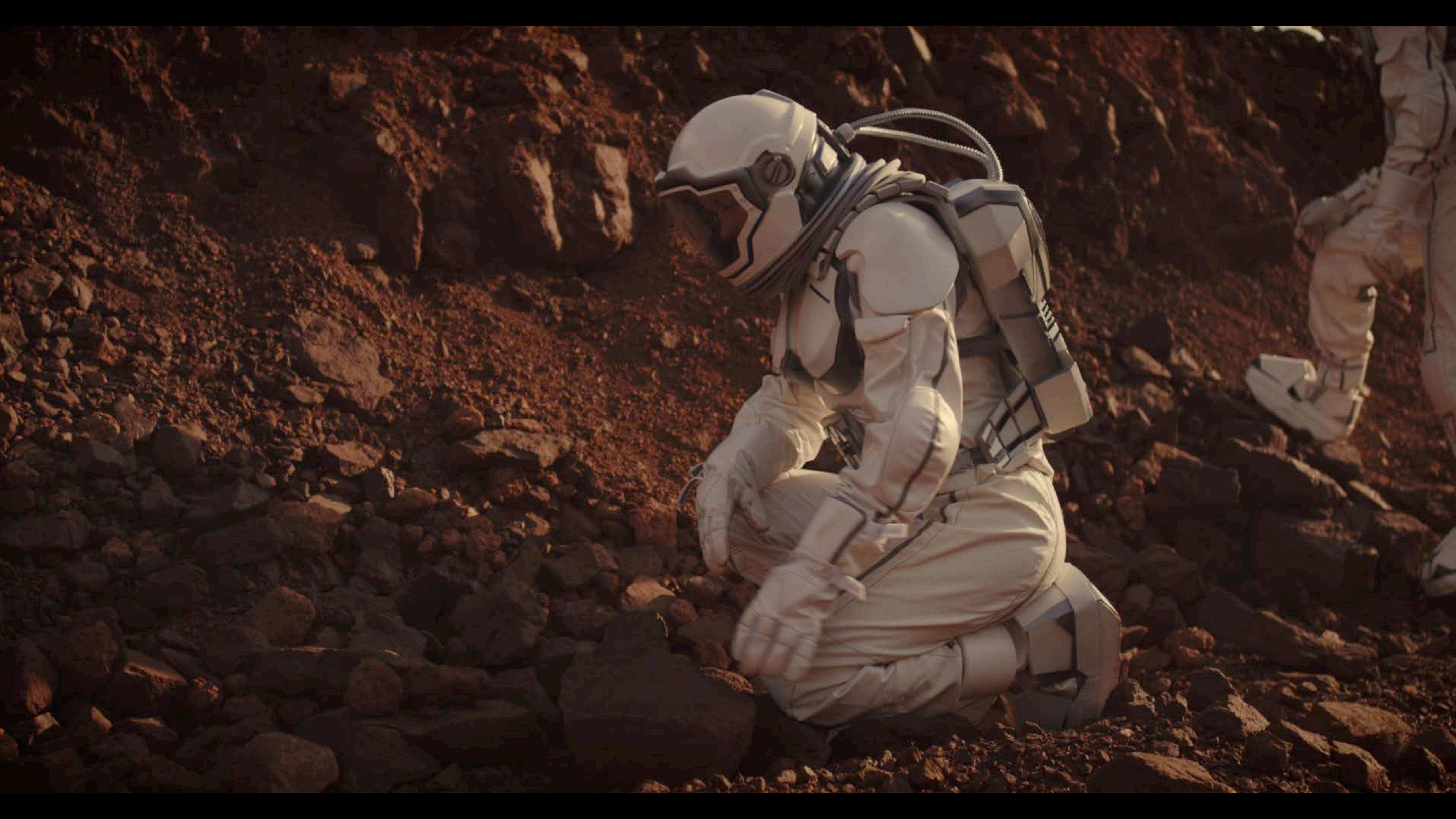
→ MARS

ASTROIDS

EXOPLANETS







NASA API:

MARS ROVER

OUR MISSIONS

LOOK INTO SPACE

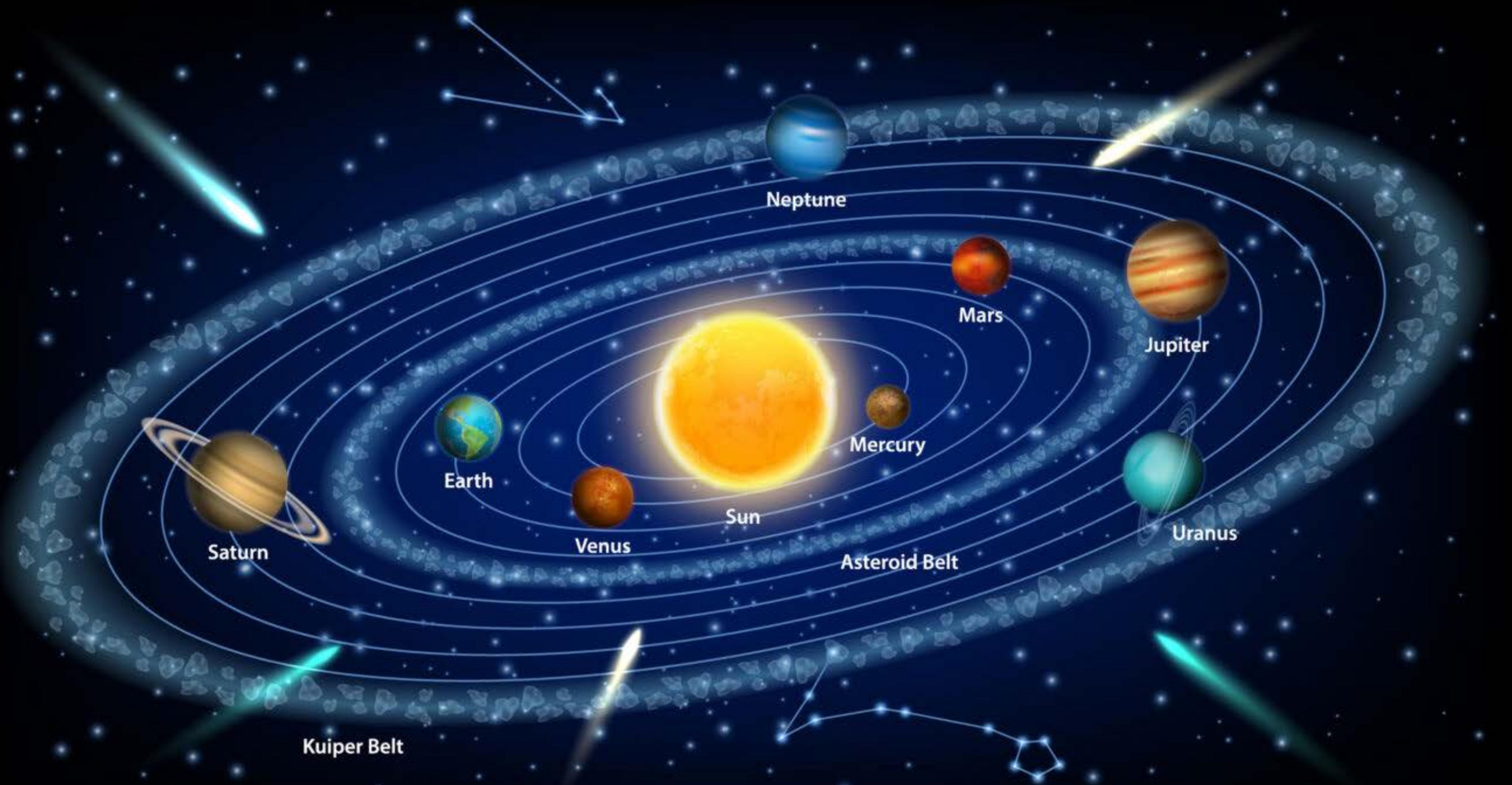
MOON

MARS

-> ASTROIDS

EXOPLANETS





NASA API:

ASTEROIDS

OUR MISSIONS

LOOK INTO SPACE

MOON

MARS

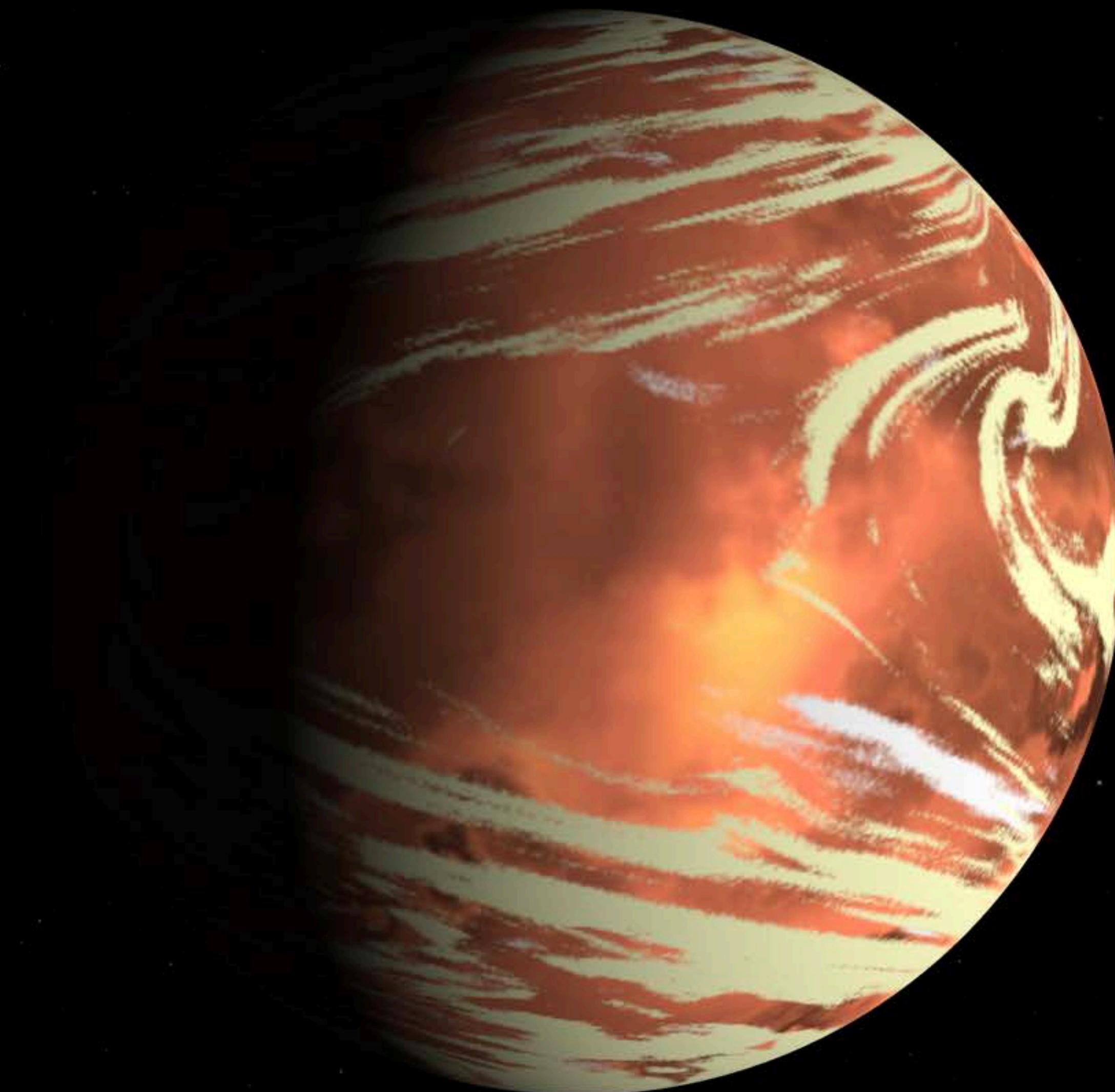
ASTROIDS

→ EXOPLANETS

IS THERE LIFE?



LET'S TRAVEL
124 LIGHTYEARS

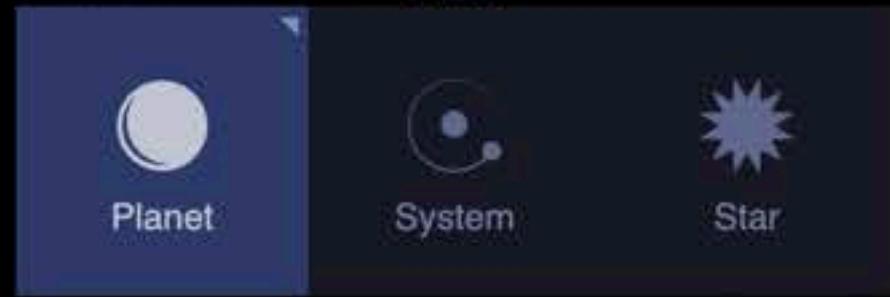


You are
124 light-years
from Earth

K2-18 b

A potentially rocky world, larger than Earth

VIEW



Planet

System

Star

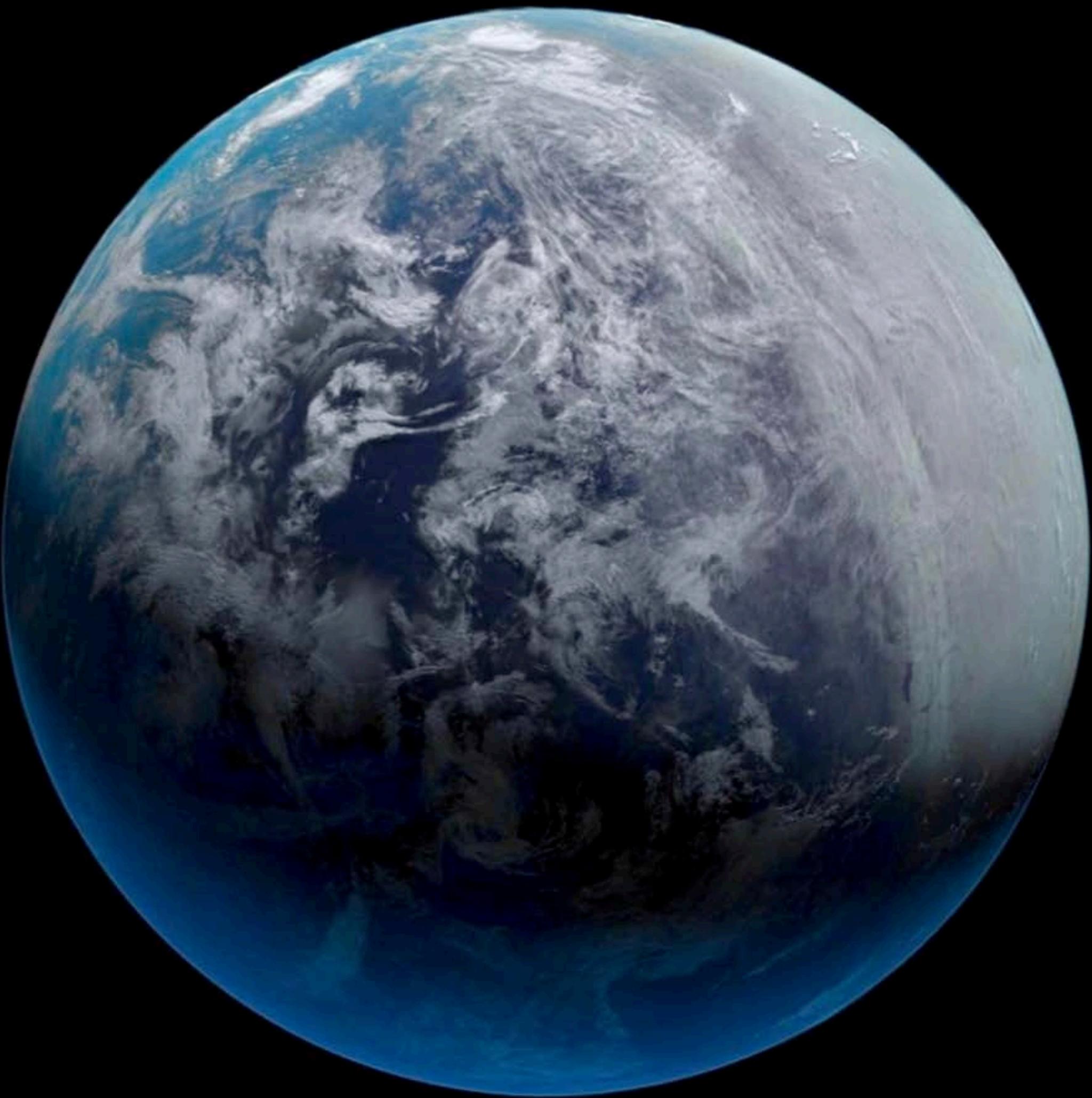
COMPARE



Illustration: NASA, CSA, ESA, J. Olmsted (STScI), Science: N. Madhusudhan (Cambridge University)

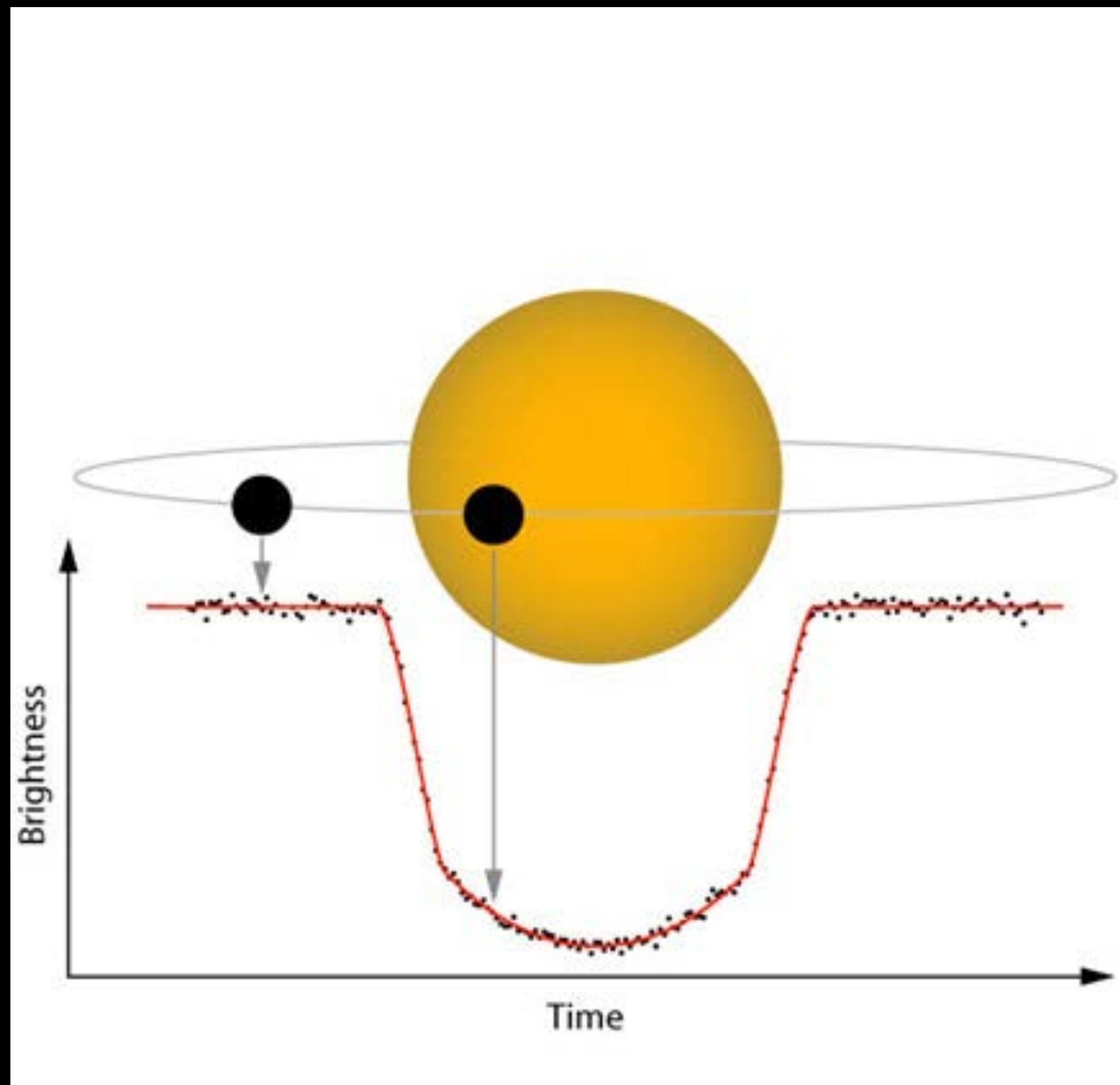
K2-18 B

EARTH



DID WE FOUND LIFE?

On Earth, dimethyl sulphide (DMDS) is “only produced by life,” primarily by marine phytoplankton.



LET'S FIND K2-18B WITHIN NASA?
HTTPS://
WWW.EXOPLANETKYOTO.ORG/
EXOHTML/K2-18_B.HTML

NASA API:

EXOPLANET EXPLORATION

([LINK](#))



SO WE NEED TO BE
CAREFUL

[Images](#)[Global Maps](#)[Articles](#)[Blogs](#)

earth
observatory

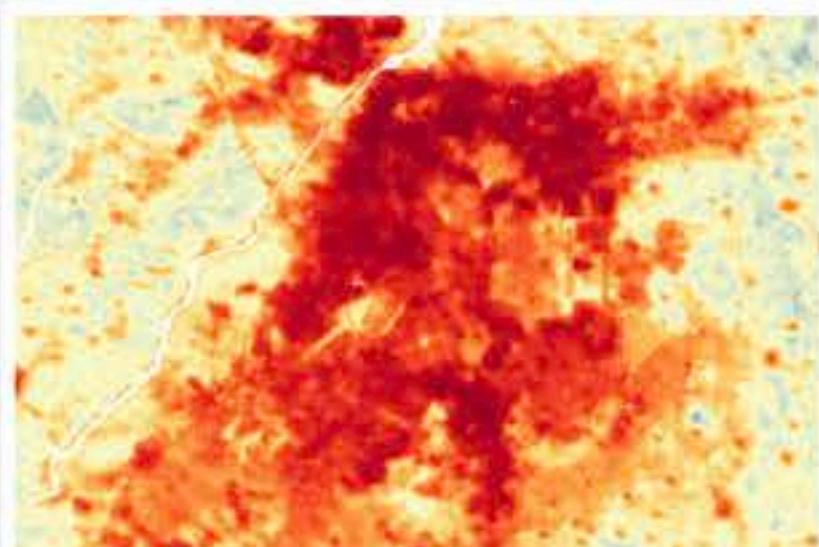
EO Explorer

Topics



Temperature Extremes 2024

Warmer-than-average temperatures are showing up locally and globally, with consequences for people, landscapes, and ecosystems.

[Image](#)

Beating the Heat in Pakistan

Greening projects in Lahore could help cool the city as climate change and rapid urbanization intensifies the urban heat island effect.

Published Jul 16, 2024

[Image of the Day](#)[Heat](#)[Temperature Extremes](#)[Image](#)

Extreme Heat Hammers U.S. Coasts

As summer heat hit the western and eastern U.S. in July 2024, temperatures have been especially high in the Southwest.

Published Jul 11, 2024

[Image of the Day](#)[Heat](#)[Temperature Extremes](#)[Image](#)

In the Grip of Global Heat

Heat waves rolled through parts of Europe, the Middle East, and South Asia, leaving vulnerable populations at risk.

Published Jun 27, 2024

[Image of the Day](#)[Atmosphere](#)[Human Presence](#)[Image](#)

A Blast of Heat in the East

A heat dome broke temperature records in the U.S. Midwest and Northeast.

Published Jun 20, 2024

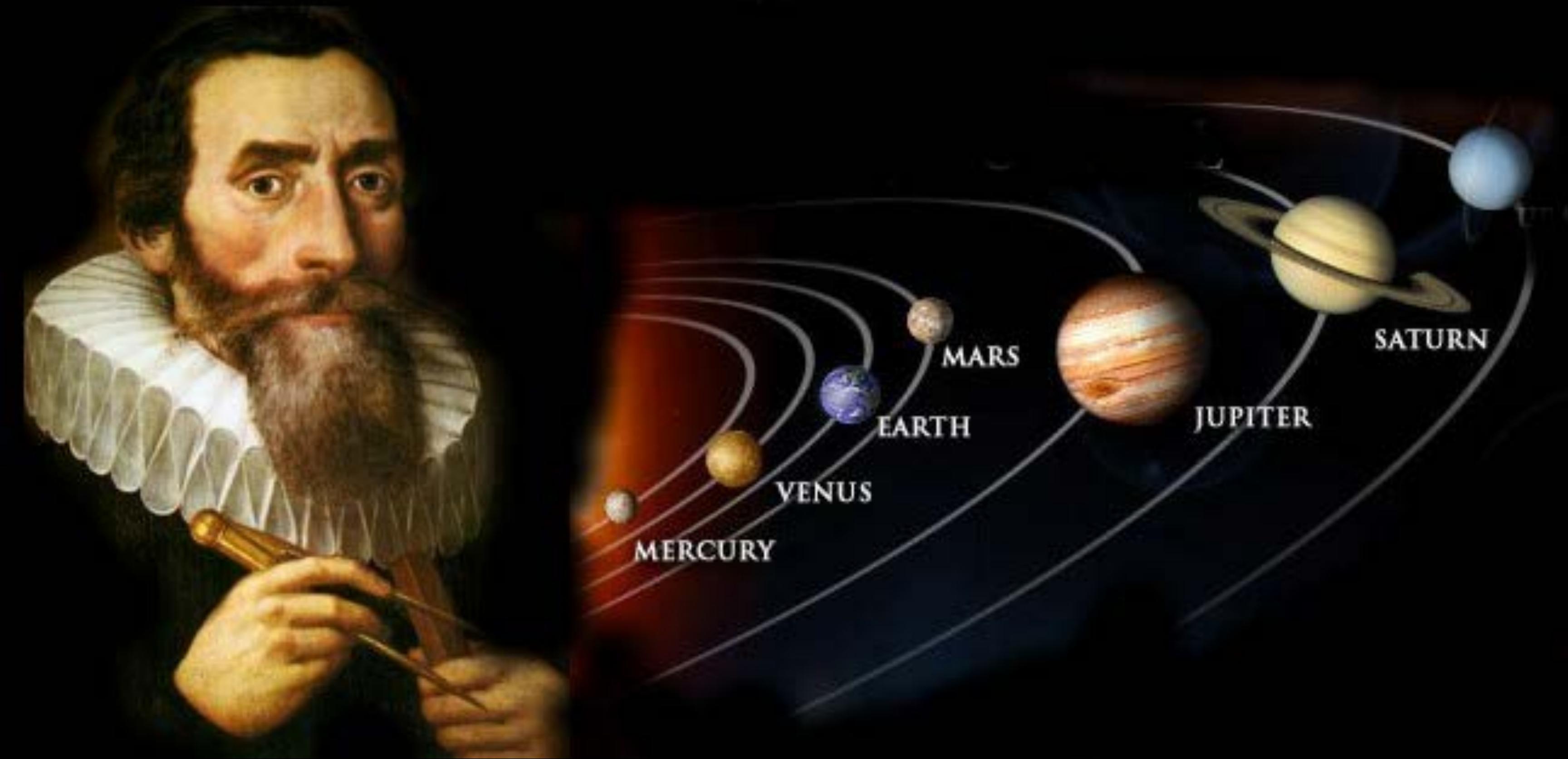
[Image of the Day](#)[Heat](#)[Temperature Extremes](#)

LET'S MEASURE OUR
APPLICATION

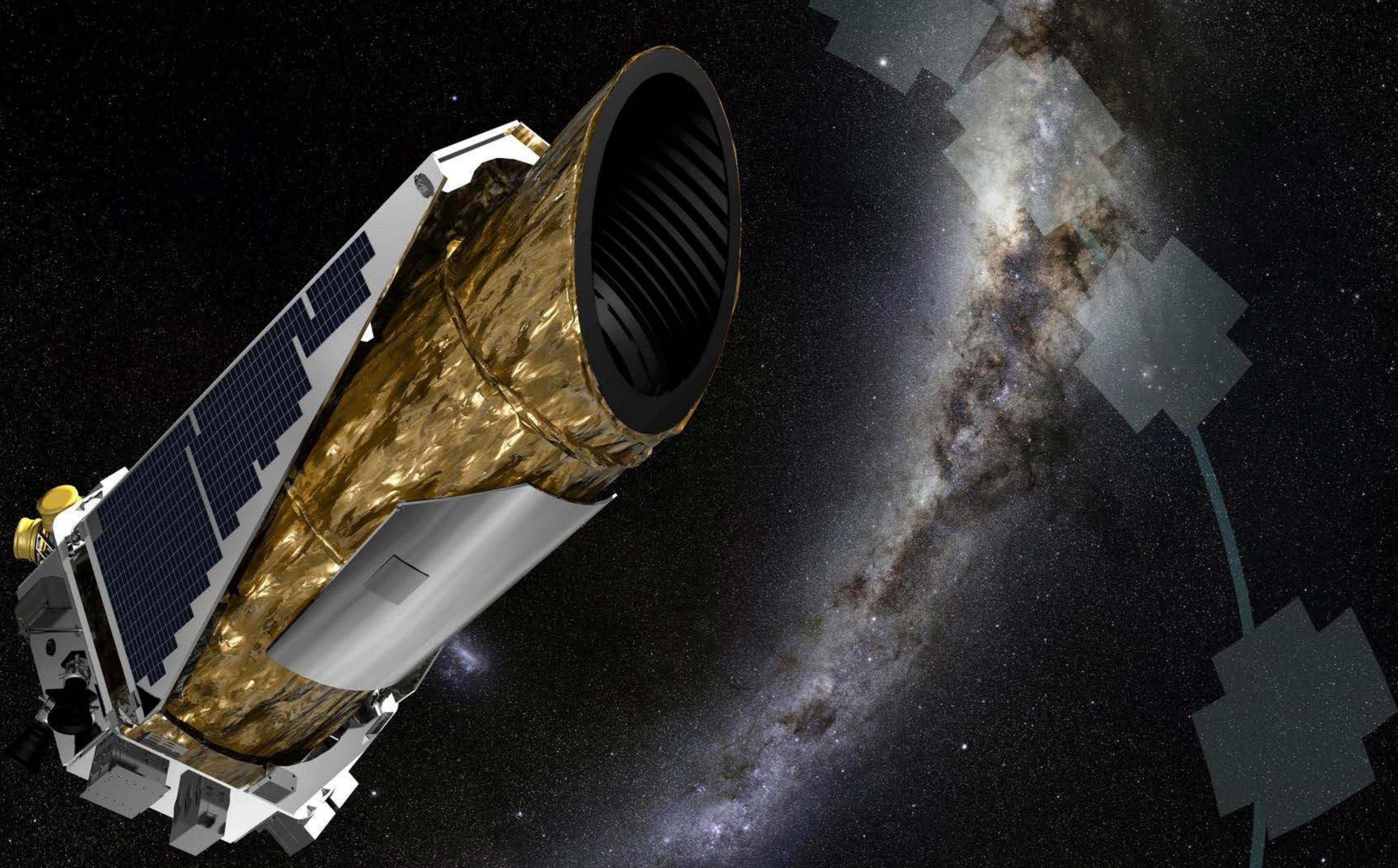
ON ENERGY CONSUMPTION

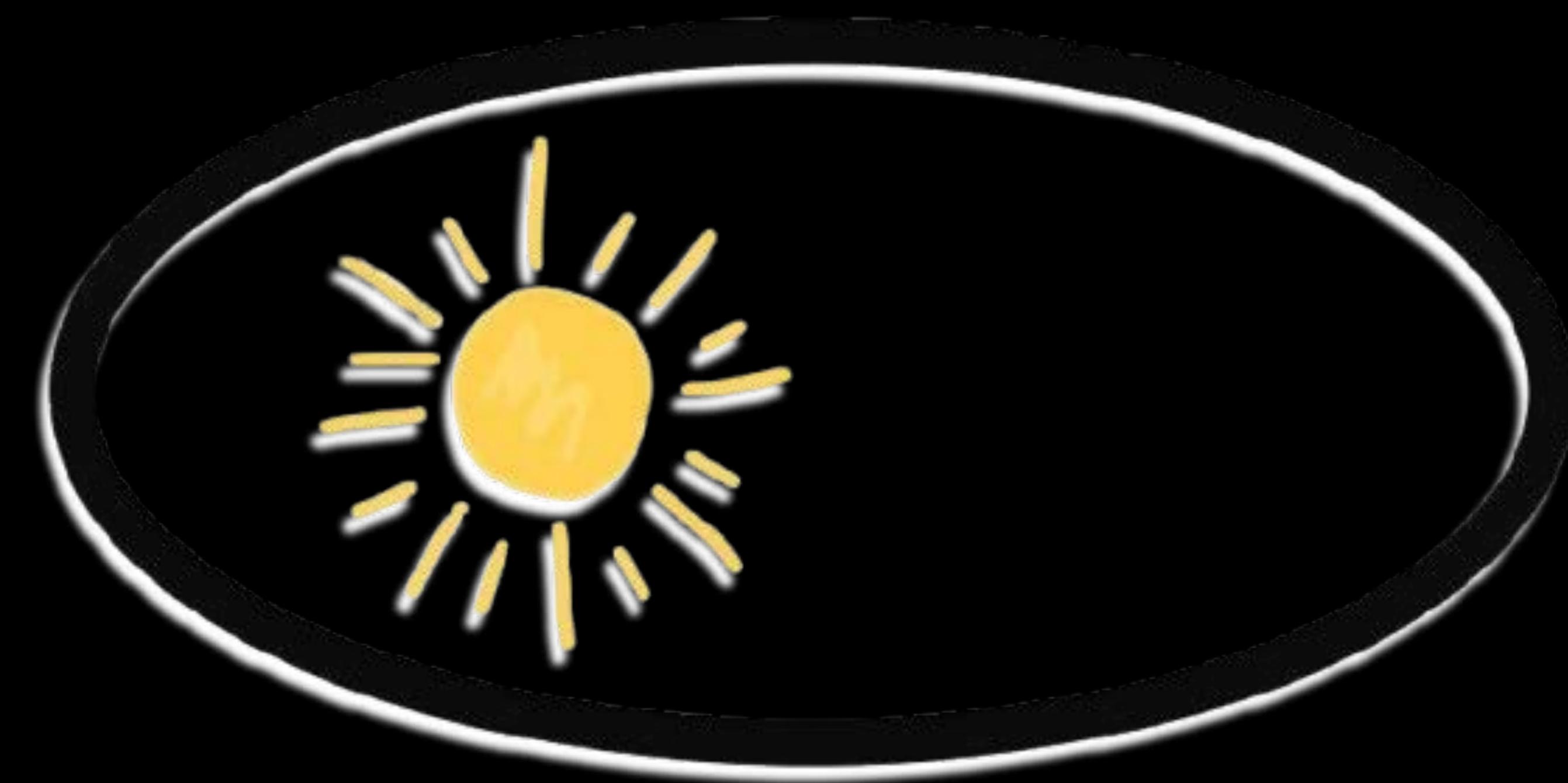
WITH KEPLER





JOHANNES KEPLER

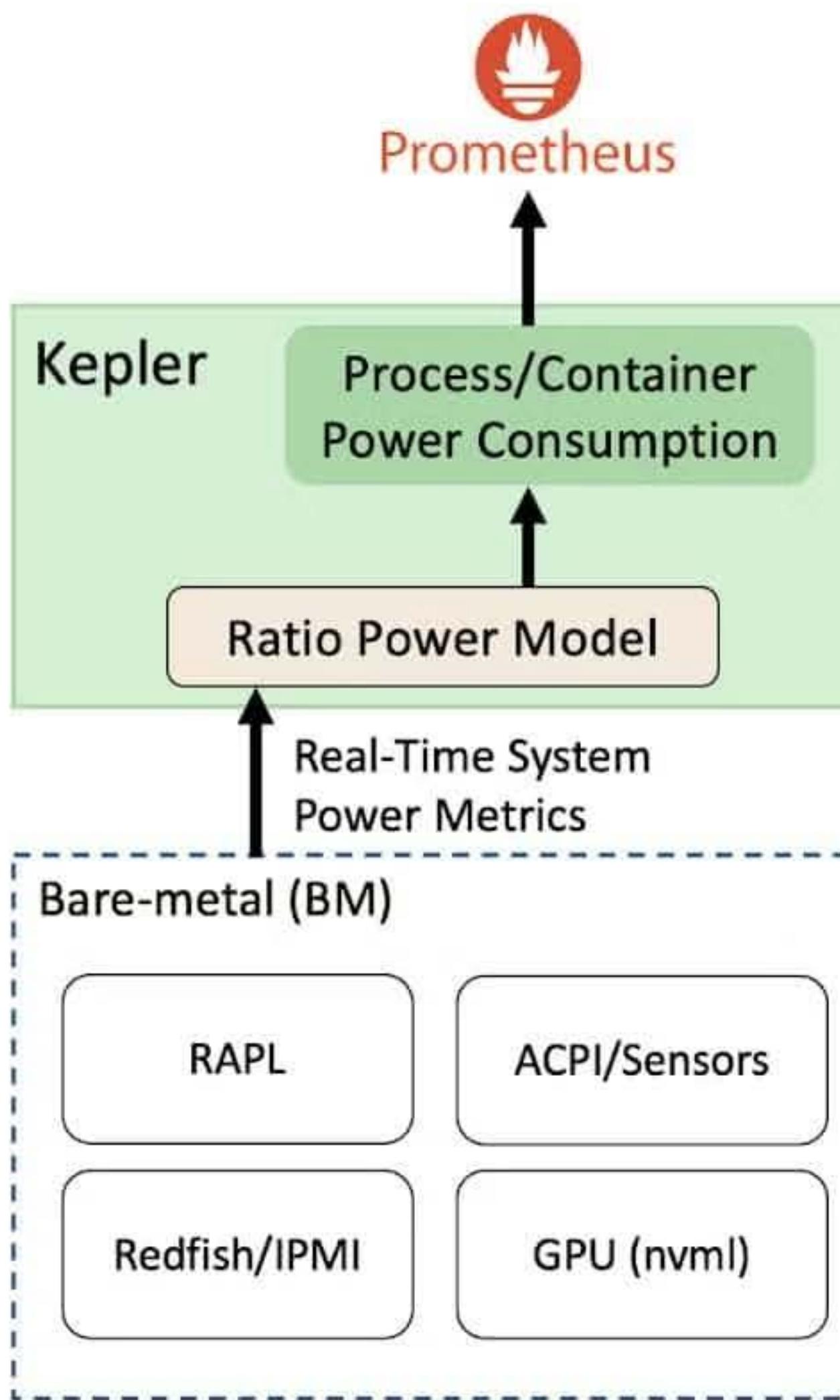




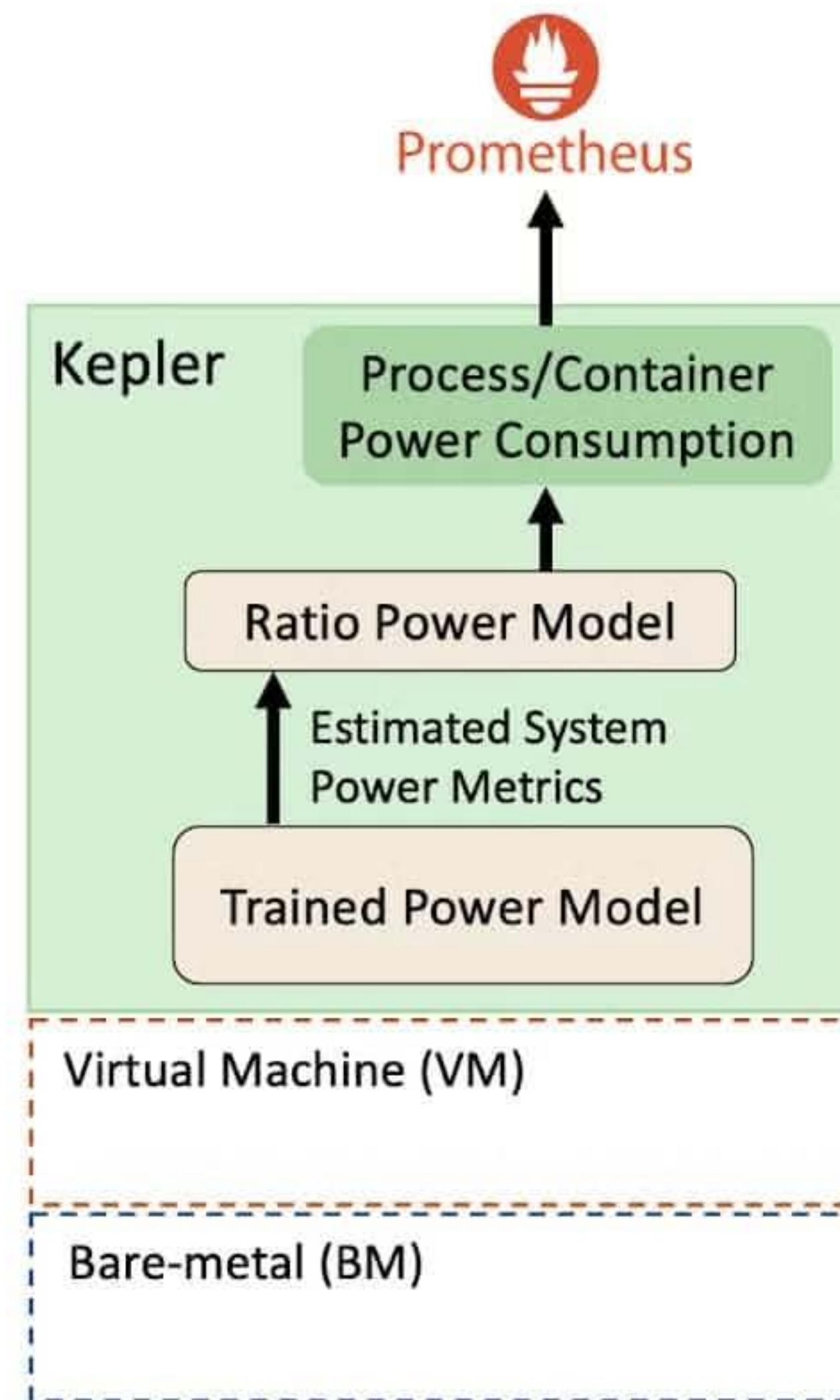
K E P L E R



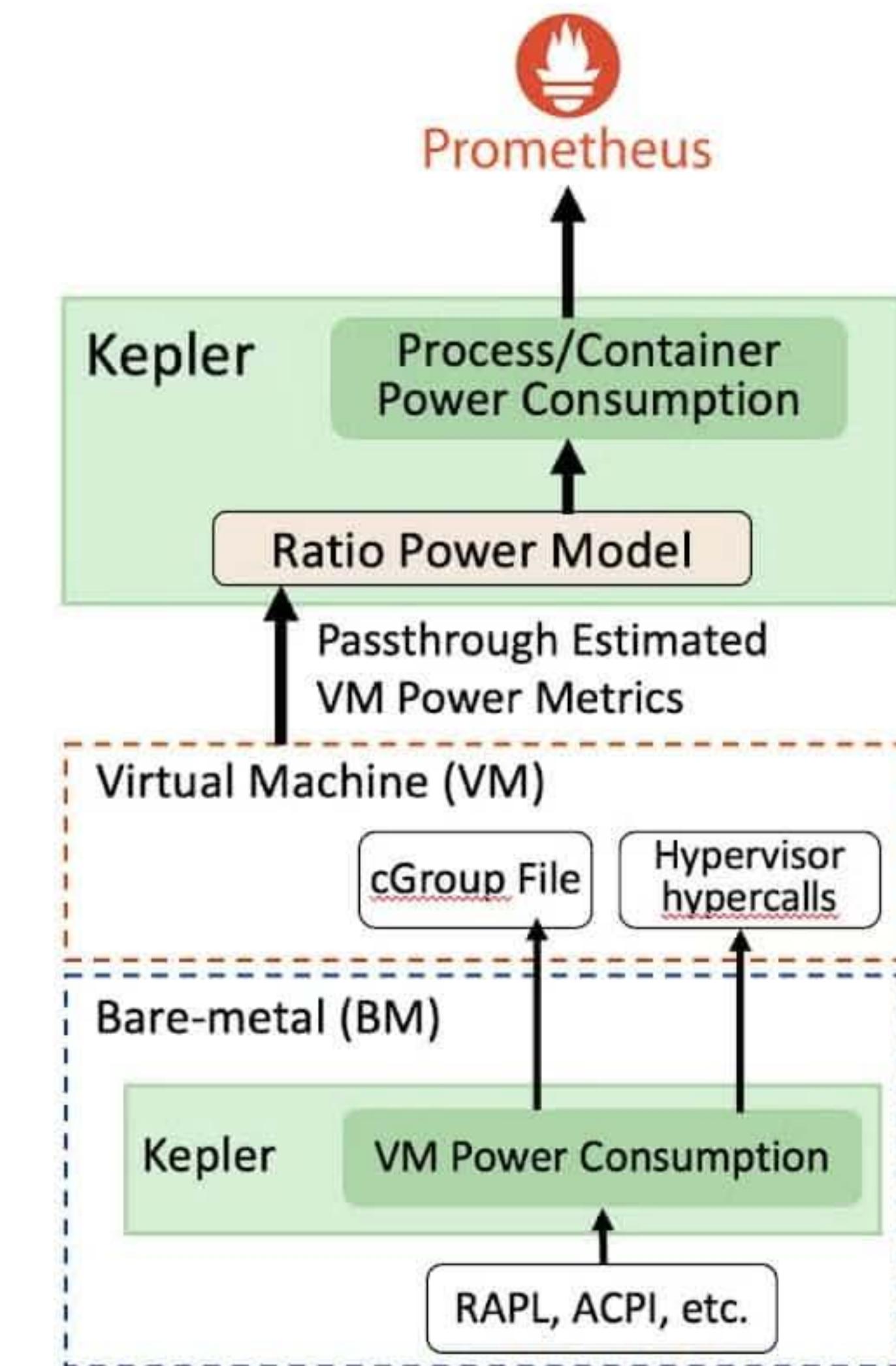
1) Direct Real-Time System Power Metrics



2) Estimated System Power Metrics for a VM

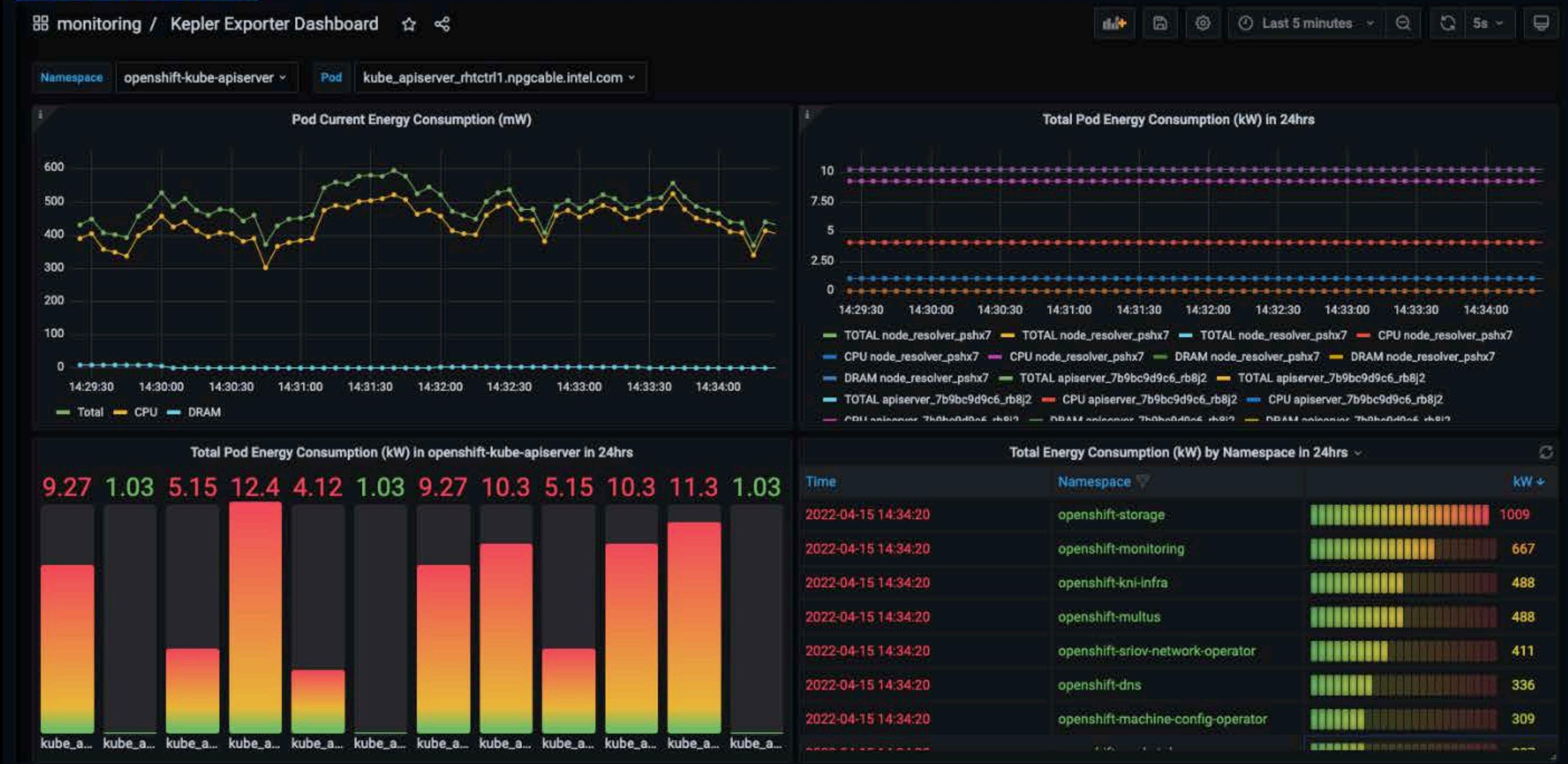


3) Passthrough Estimated VM Power Metrics



Visualise Kepler metrics with Grafana

To visualise the power consumption metrics made available by the Kepler Exporter, import the pre-generated [Kepler Dashboard](#) into Grafana:



REQUIREMENTS

WHAT YOU NEED

- Kernel 4.18+
- Kubectl v1.21.0+
- docker installed non-root by default

BUT FIRST

CREATE A DOCKER IMAGE WITH

SDKMAN!





KEY TAKEAWAYS

WHAT YOU TAKE HOME

Kepler tracks our apps' carbon footprint.

JReleaser + SDKMAN! simplify Java deployment.

NASA Open Data fuels space insights.

STICKERS

FOR FREE





THANK YOU FOR LISTENING

DON'T FORGET YOUR
STICKERS / STROOPWAFELS