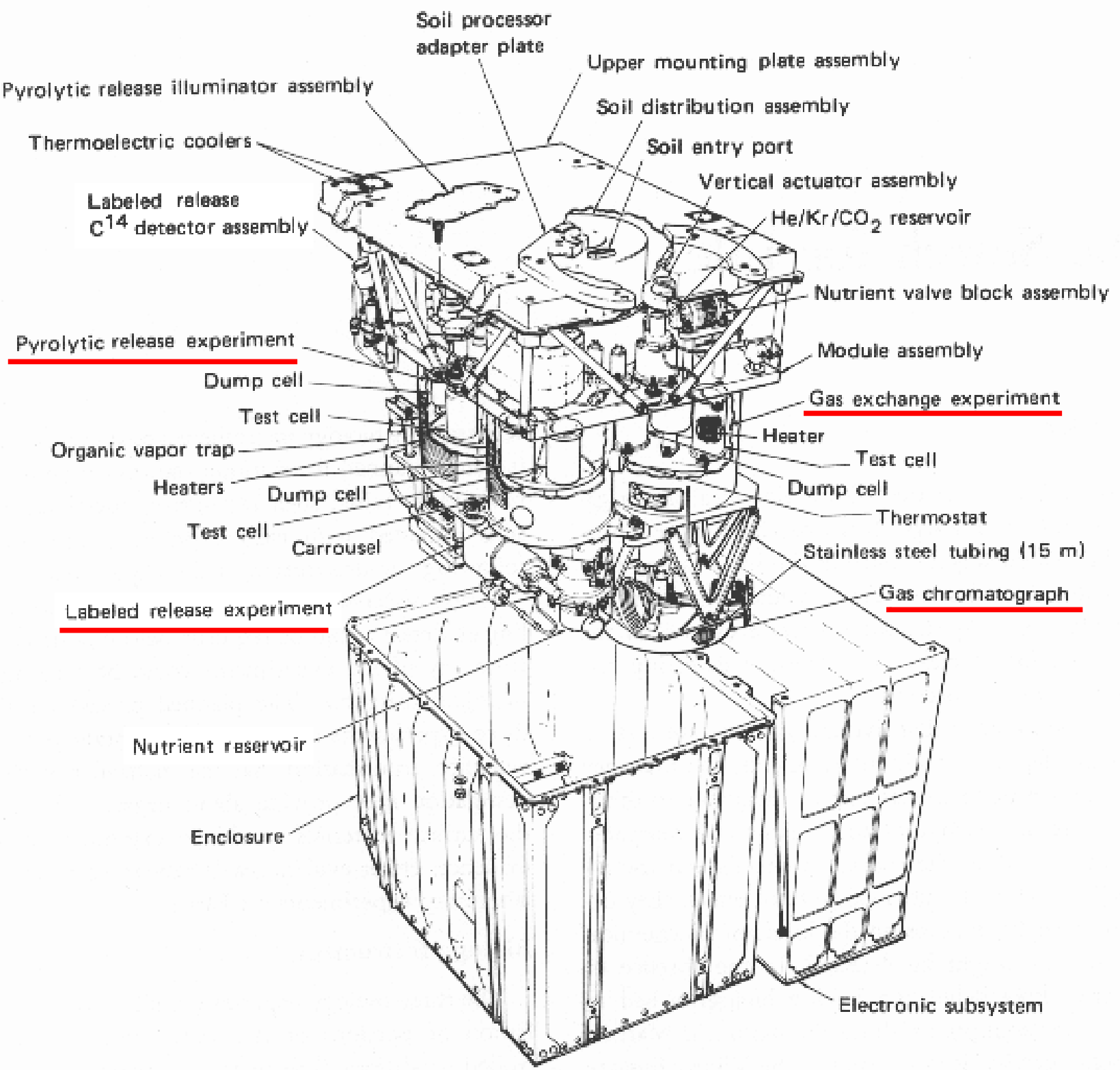
La ricerca di vita su Marte e la colonizzazione umana

Interreg
Fondo Europeo di Sviluppo Regionale
UNIONE EUROPEA
ITALIA SVIZZERA - ITALIE SUISSE - ITALIEN SCHWEIZ
ASTRONETILO

ASTROBIOLOGIA

Viking 1 e 2

Viking Lander Biological Experiments



ASTROBIOLOGIA

NASA Astrobiology Institute

LIFE IN THE UNIVERSE

Solar System and Beyond:
Our Journey of Discovery

Exoplanet
Biosignatures

Icy Worlds:
Habitability
and Life
Detection

Mars: *NASA's Journey to Mars*
Habitability
of Early Mars

Technology: *Technology Drives Exploration*
Global Partnerships Employing
Collaborative Technologies

Origin and
Nature of Life,
Co-evolution
with Planet Earth

NAI: the Community

ASTROBIOLOGIA
Meteorite ALH84001

Formazione: circa 4,5 miliardi di anni fa

16 milioni di anni fa scagliato nello spazio

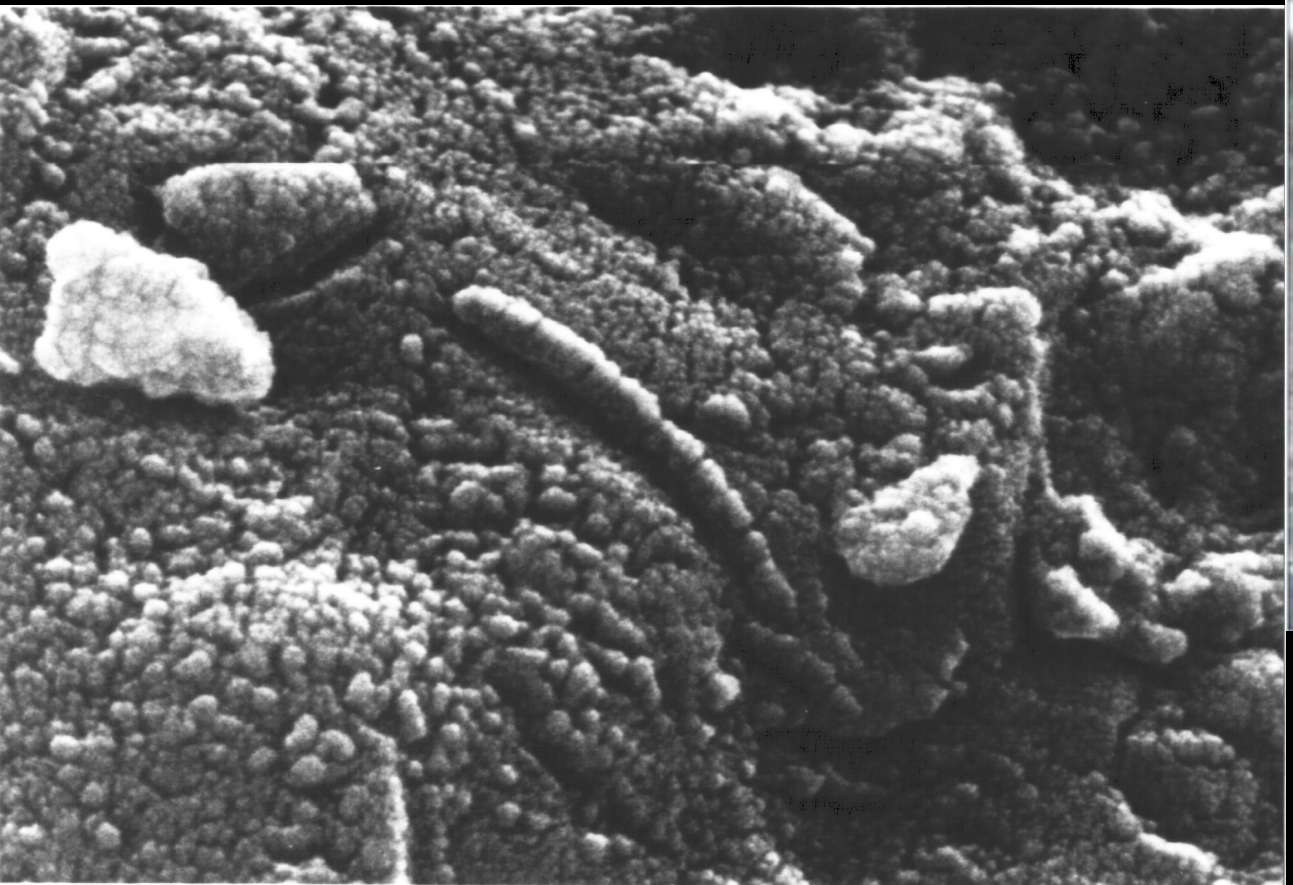
13000 anni fa caduta sulla Terra

1984 trovato da geologi in Antartide

ASTROBIOLOGIA
Meteorite ALH84001

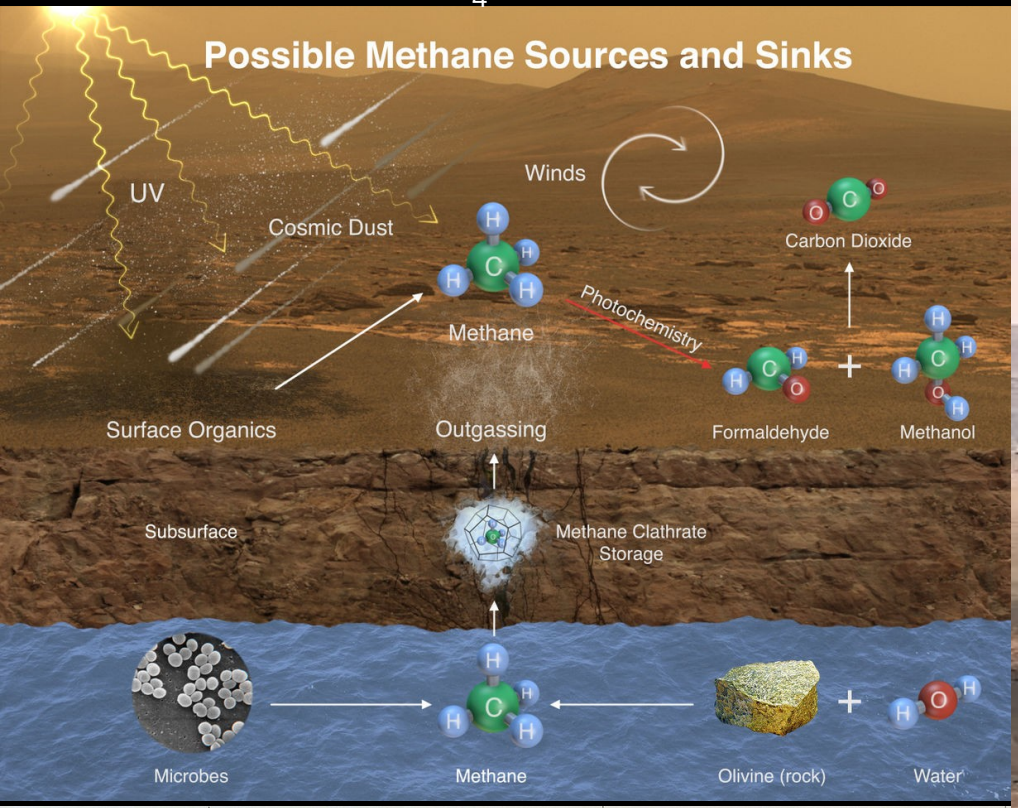
Composizione chimica peculiare

Microfossili marziani?

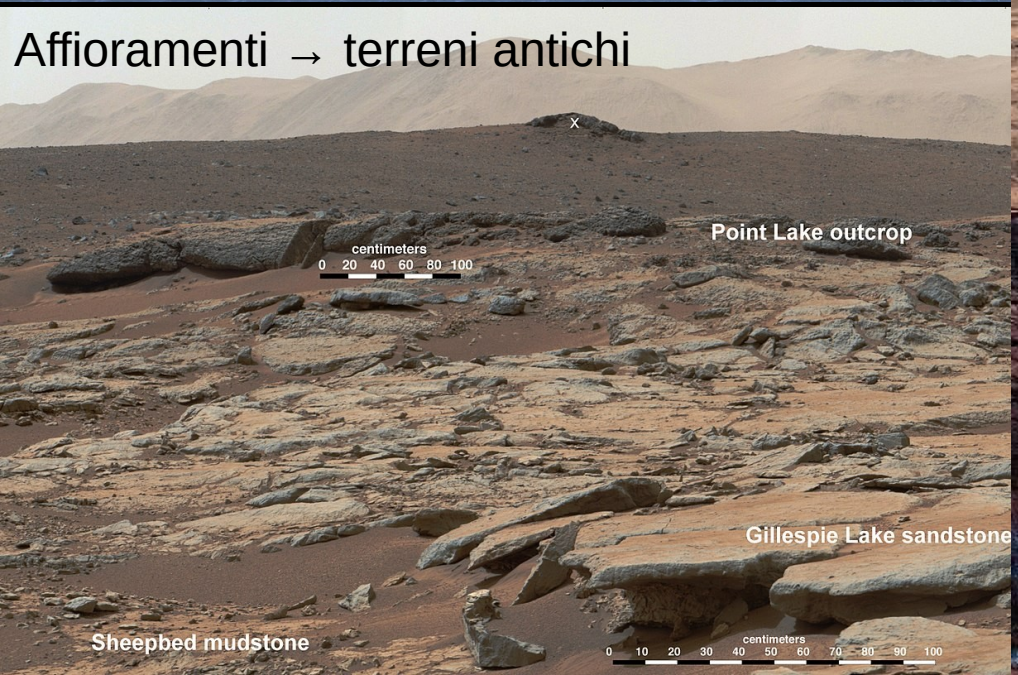


ASTROBIOLOGIA Come cercare la vita?

Marcatori biologici CH_4, formaldeide

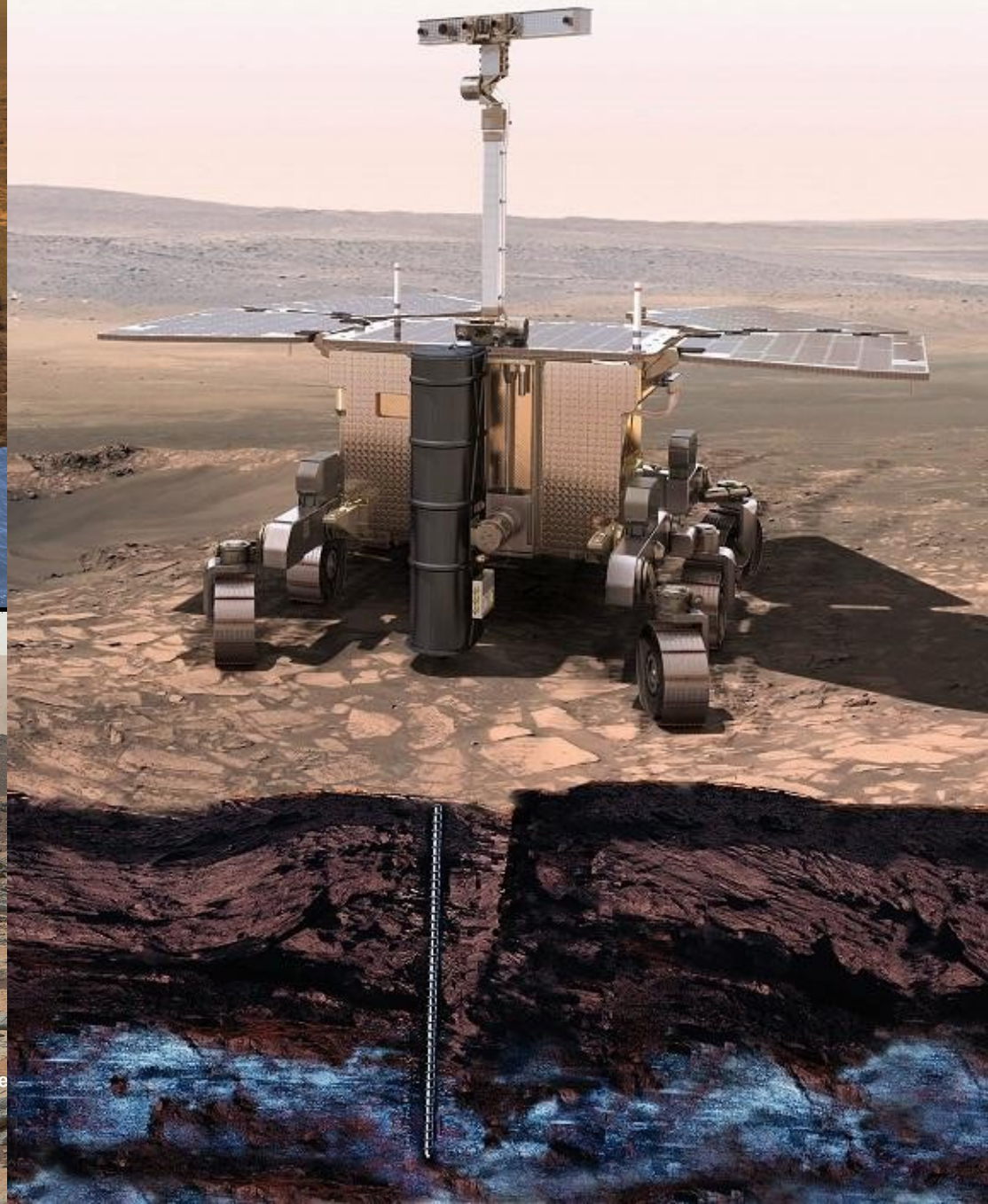


Affioramenti → terreni antichi



Perforare terreno e prelevare campioni direttamente da sotto la superficie

→ Rosalind Franklin

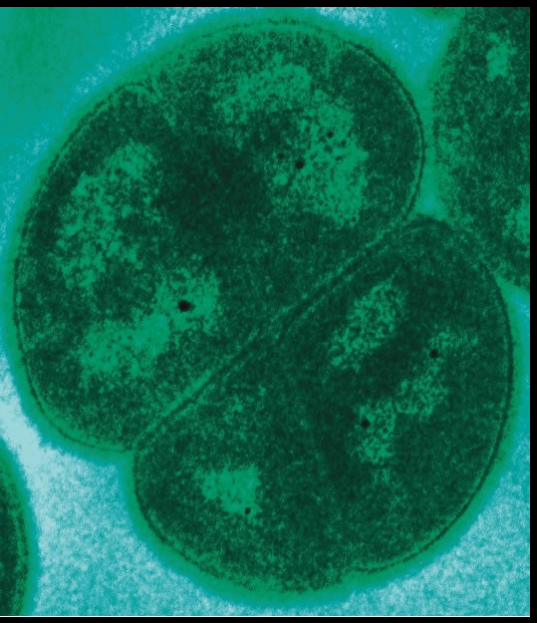


ASTROBIOLOGIA Rischio di contaminare Marte con forme di vita terrestri

Transpermia

Esperimento LIFE

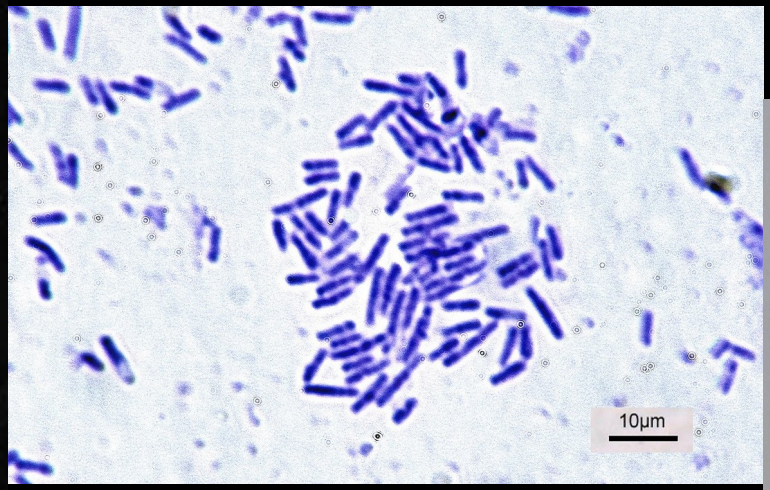
Deinococcus Radiodurans



Pyrococcus Furiosus

Haloarcula Marismortui

Bacillus Subtilis

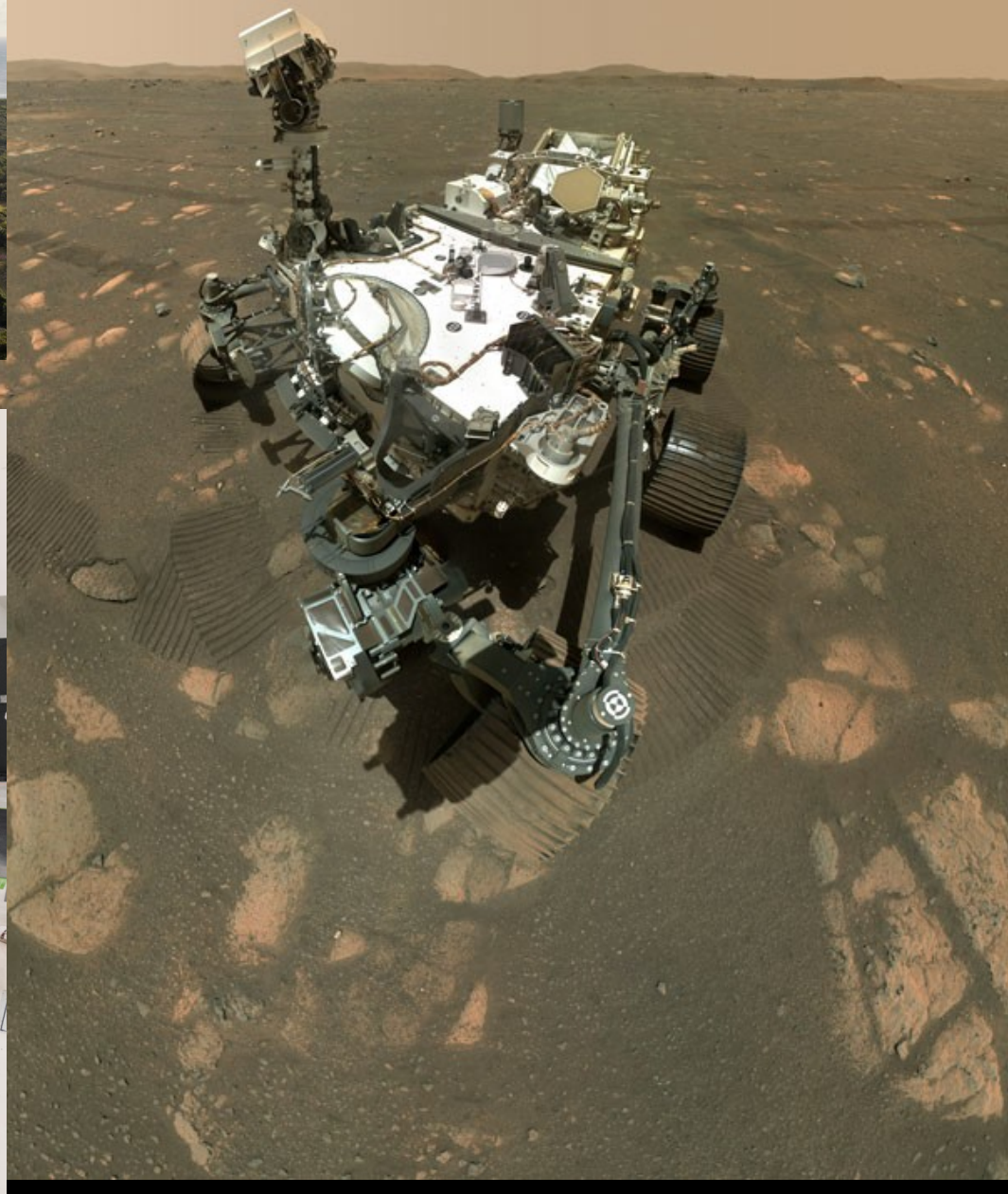


Tardigradi


STAR TREK
DISCOVERY

ASTROBIOLOGIA Perseverance e Ingenuity

Lancio 30 luglio 2020 Atlas V-541 Cape Canaveral



ASTROBIOLOGIA
Perseverance e Ingenuity
Atterraggio
18 febbraio 2021
Cratere Jezero
45 km

ASTROBIOLOGIA

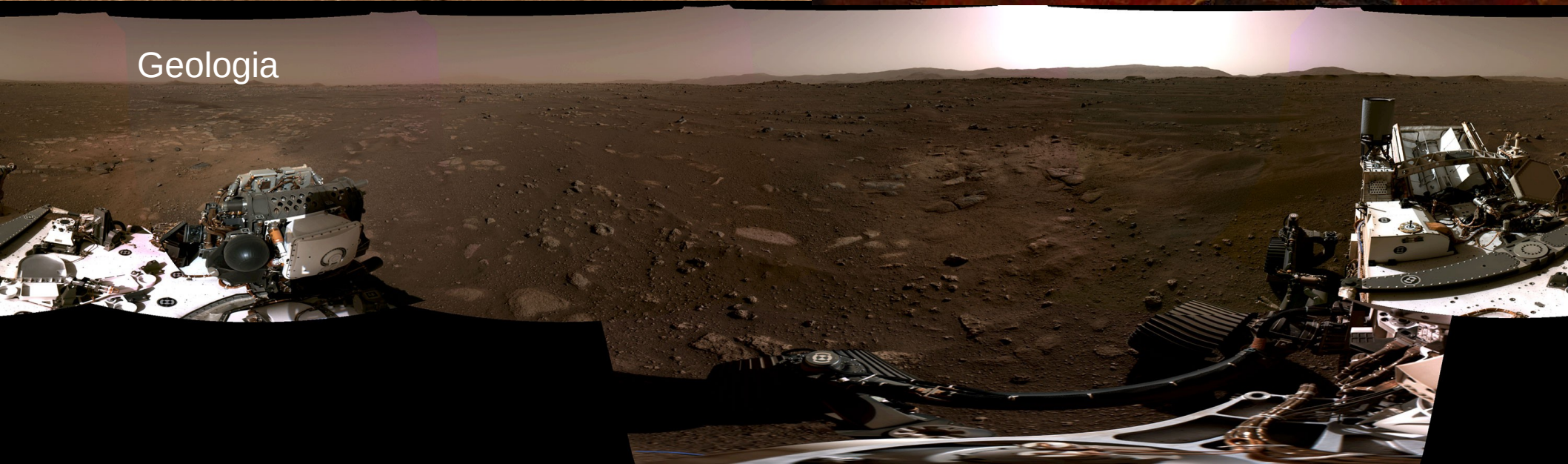
Perseverance e Ingenuity

Obiettivi scientifici

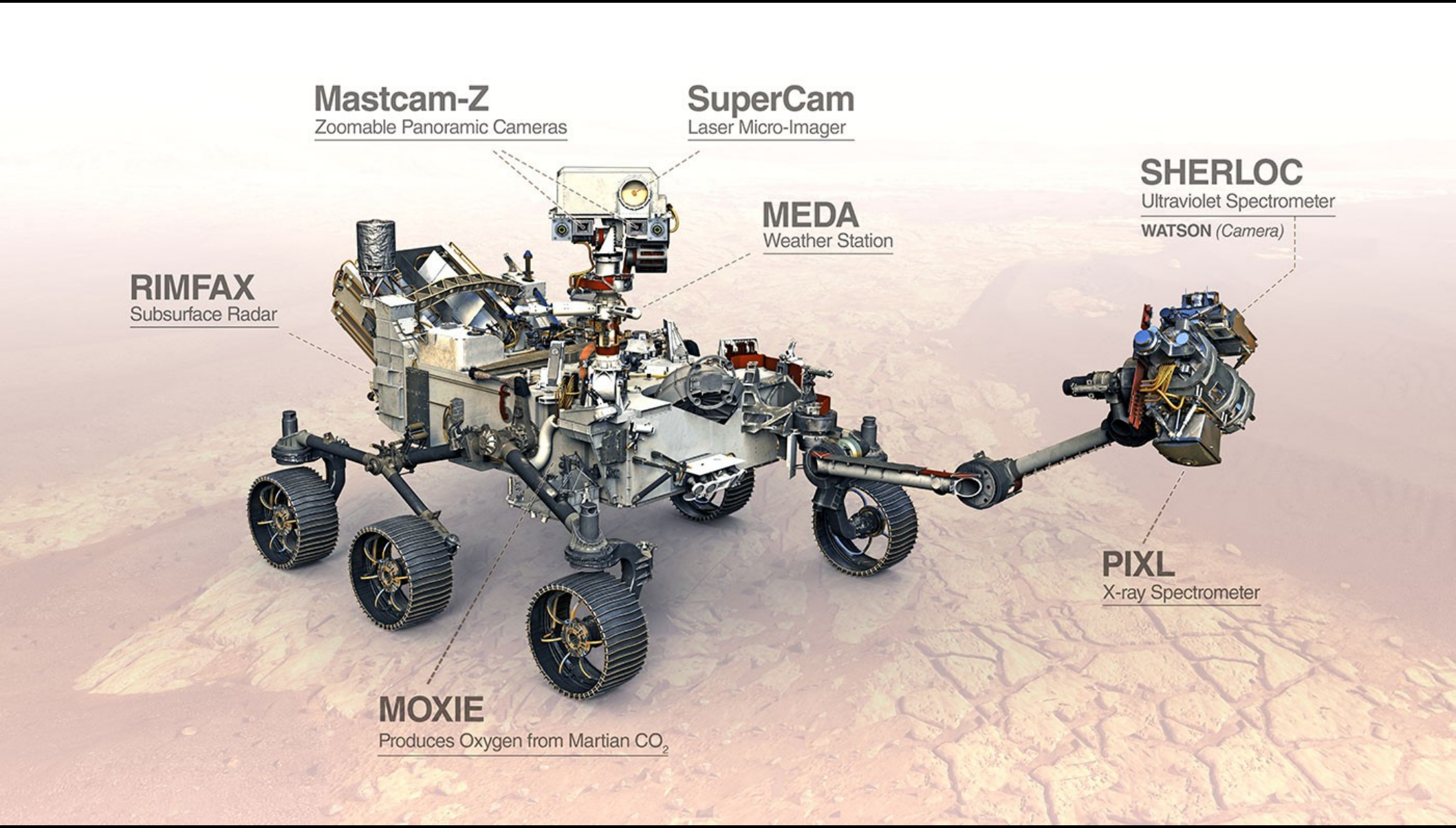
Banco di prova per nuove tecnologie

Immagazzinamento di campioni geologici

Geologia

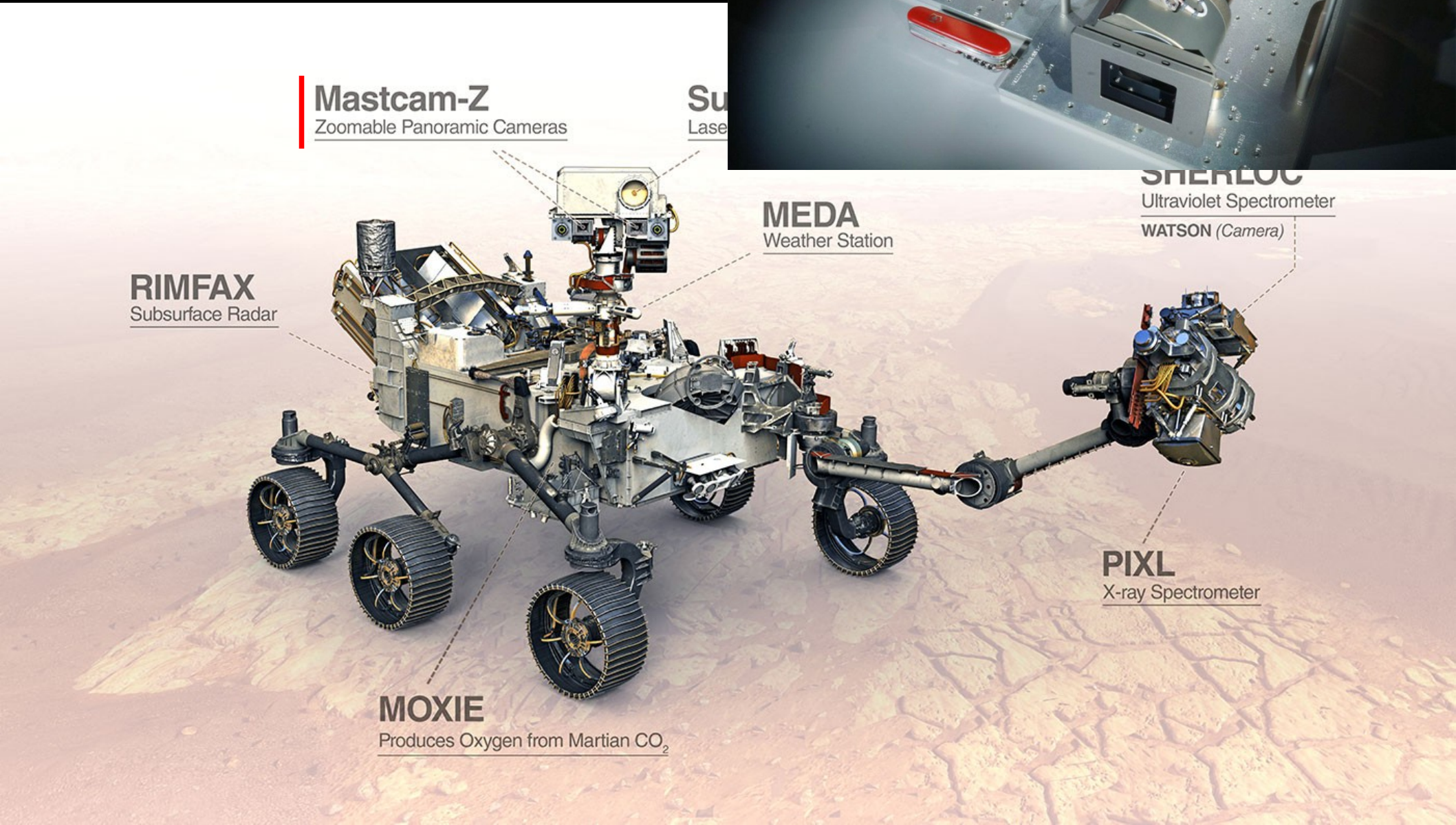


ASTROBIOLOGIA Perseverance e Ingenuity
Carico scientifico



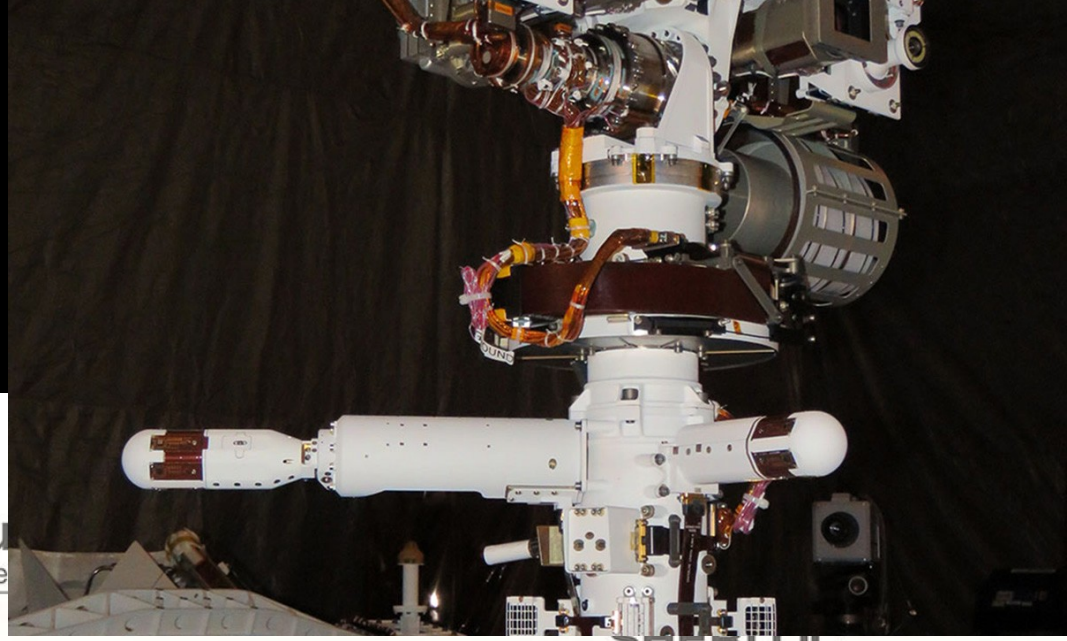
ASTROBIOLOGIA Perseverance e Ingenuity

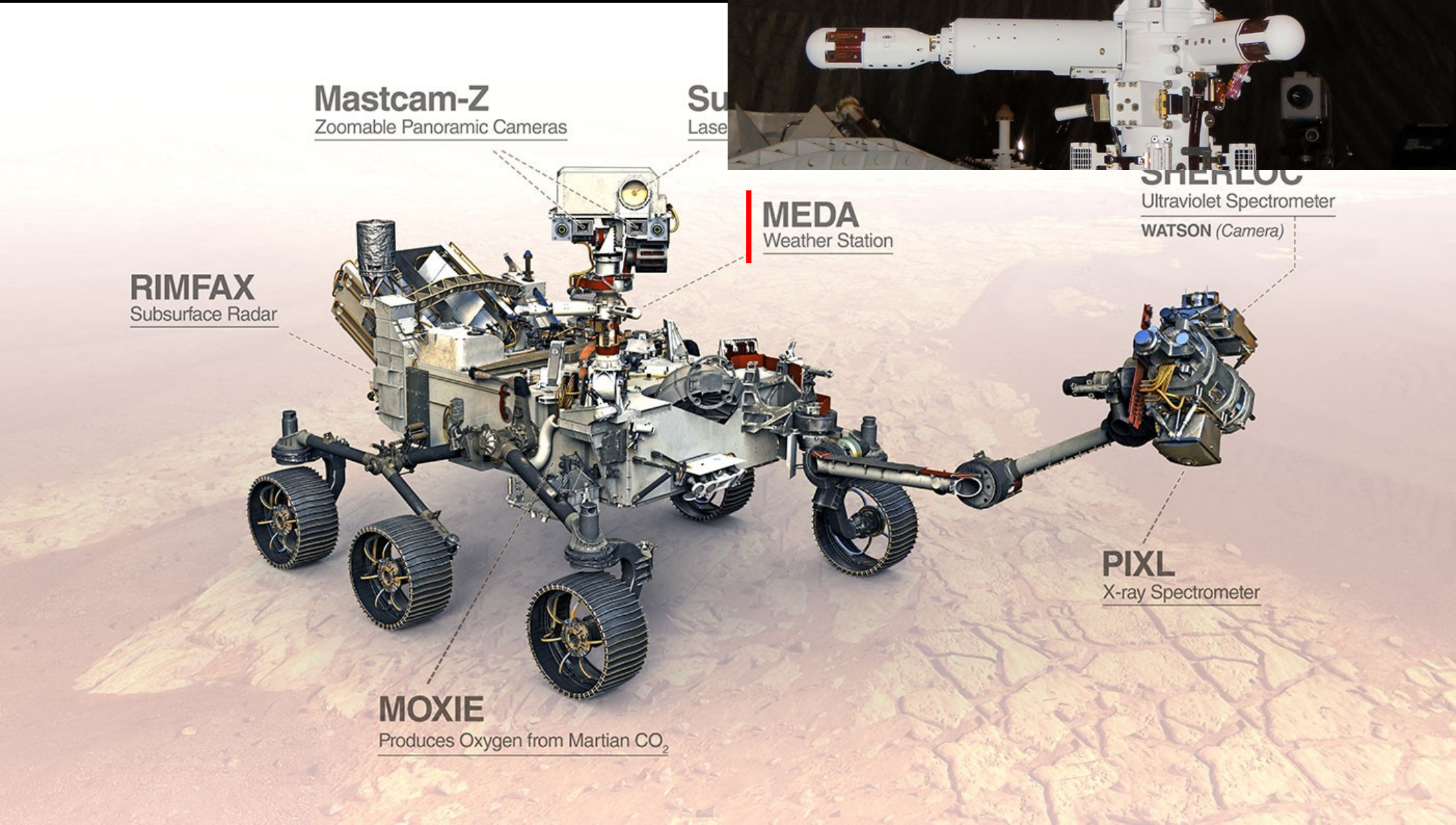
Carico scientifico



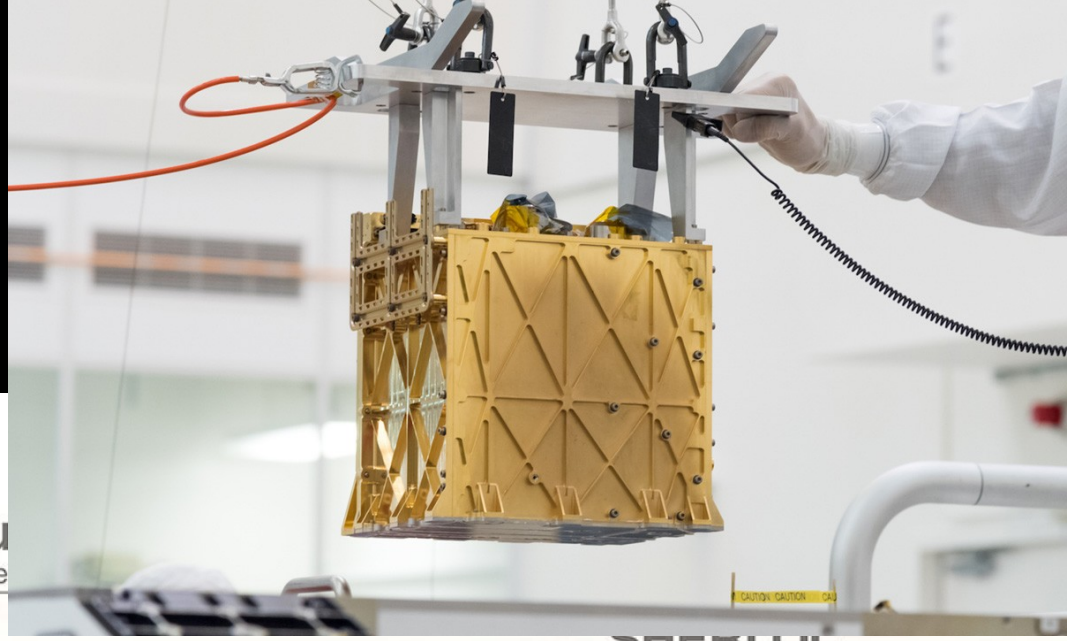
ASTROBIOLOGIA Perseverance e Ingenuity

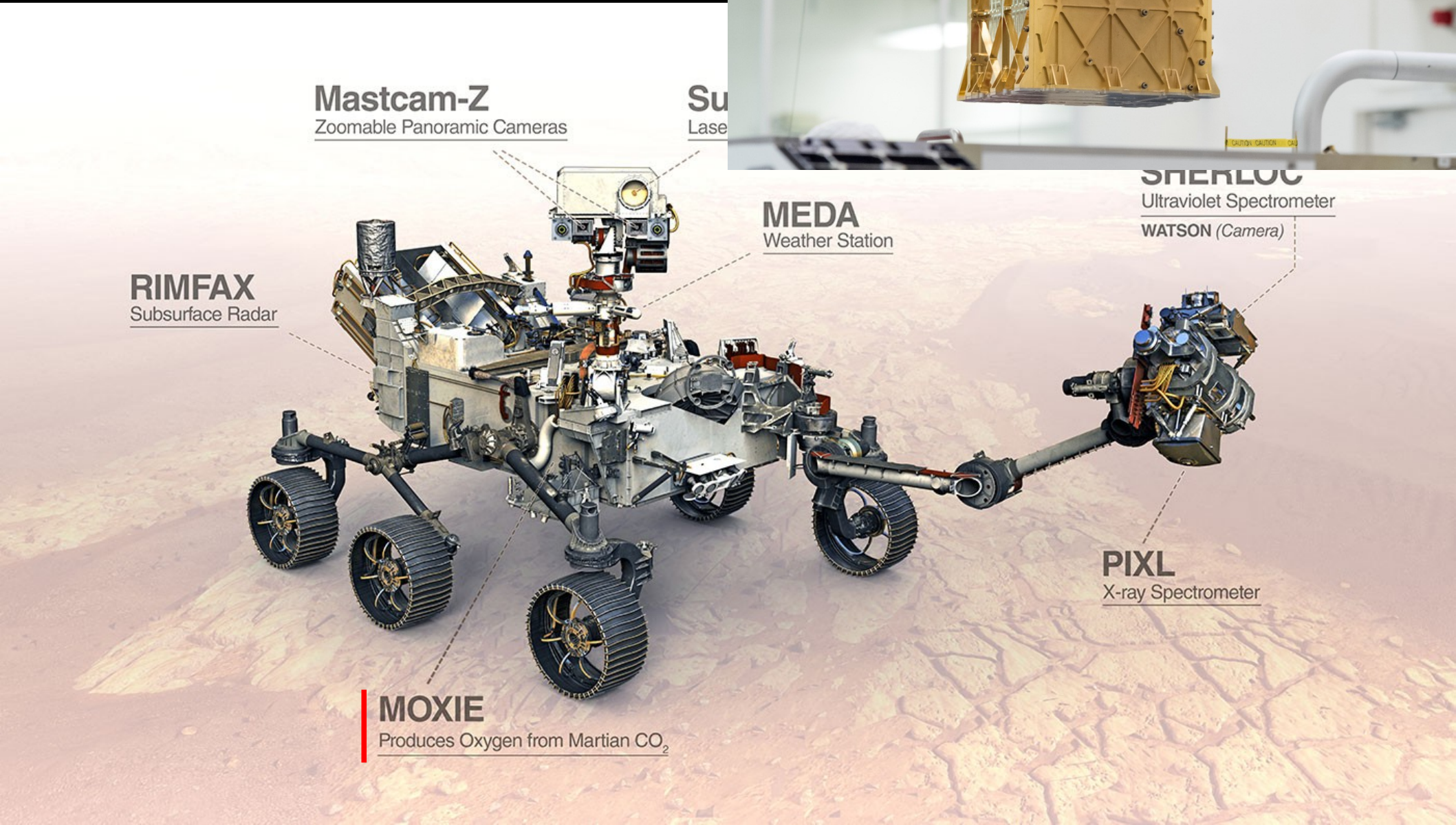
Carico scientifico





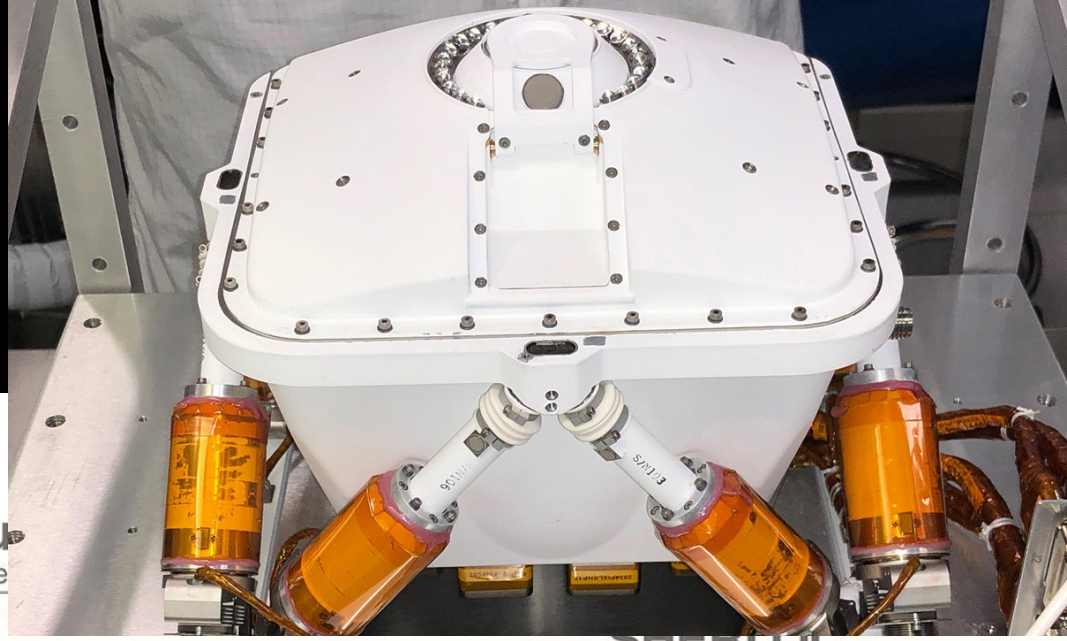
ASTROBIOLOGIA Perseverance e Ingenuity
Carico scientifico

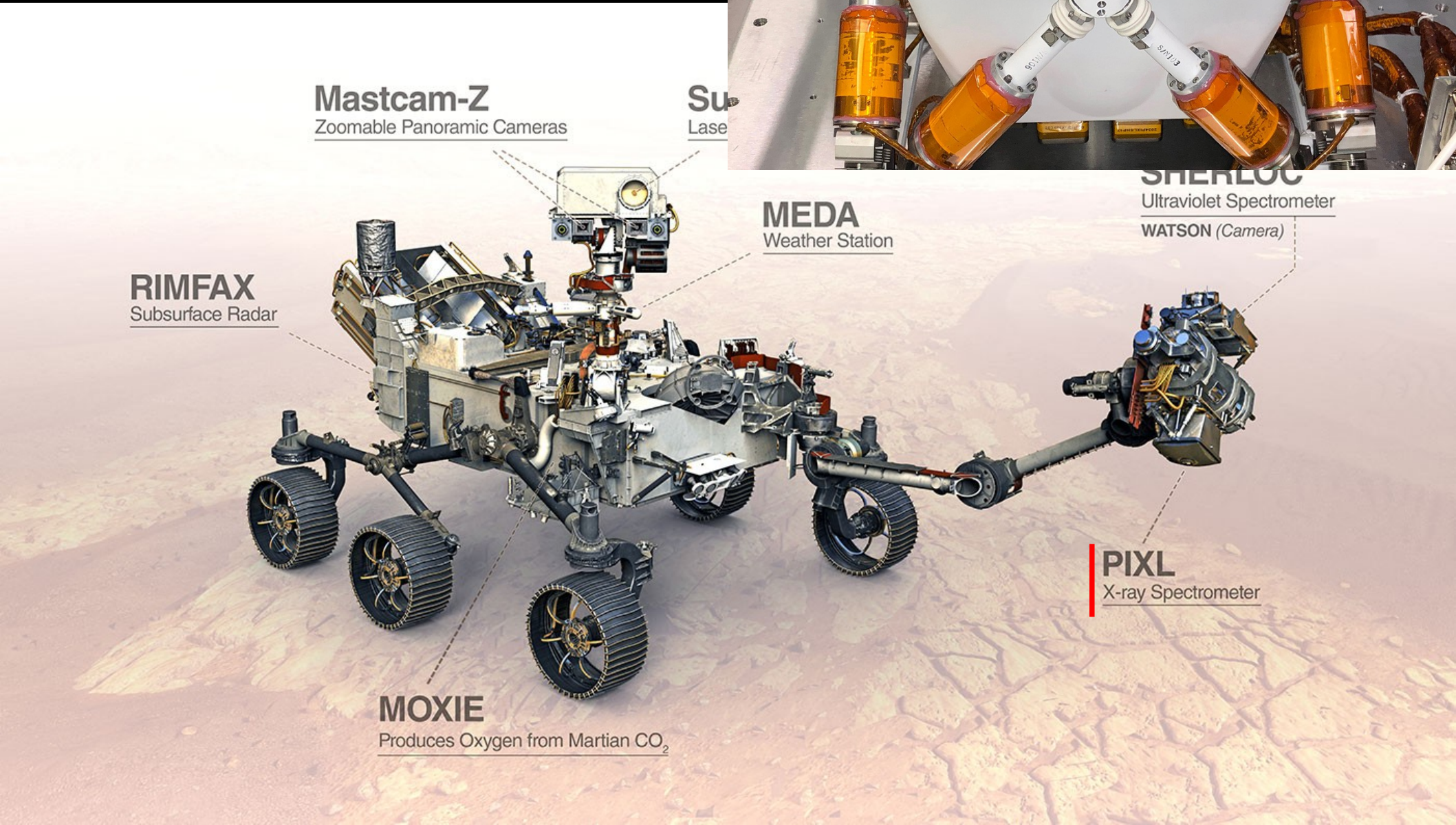




ASTROBIOLOGIA Perseverance e Ingenuity

Carico scientifico





ASTROBIOLOGIA Perseverance e Ingenuity
Carico scientifico

Mastcam-Z
Zoomable Panoramic Cameras

MEDA
Weather Station

SHERLOC
Ultraviolet Spectrometer
WATSON *(Camera)*

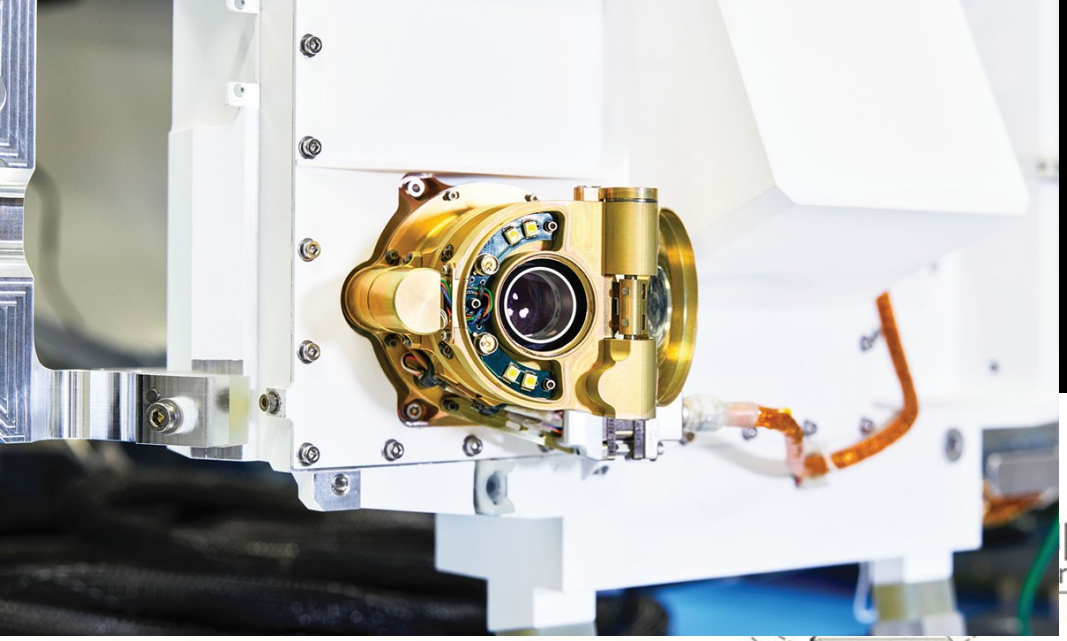
RIMFAX
Subsurface Radar

PIXL
X-ray Spectrometer

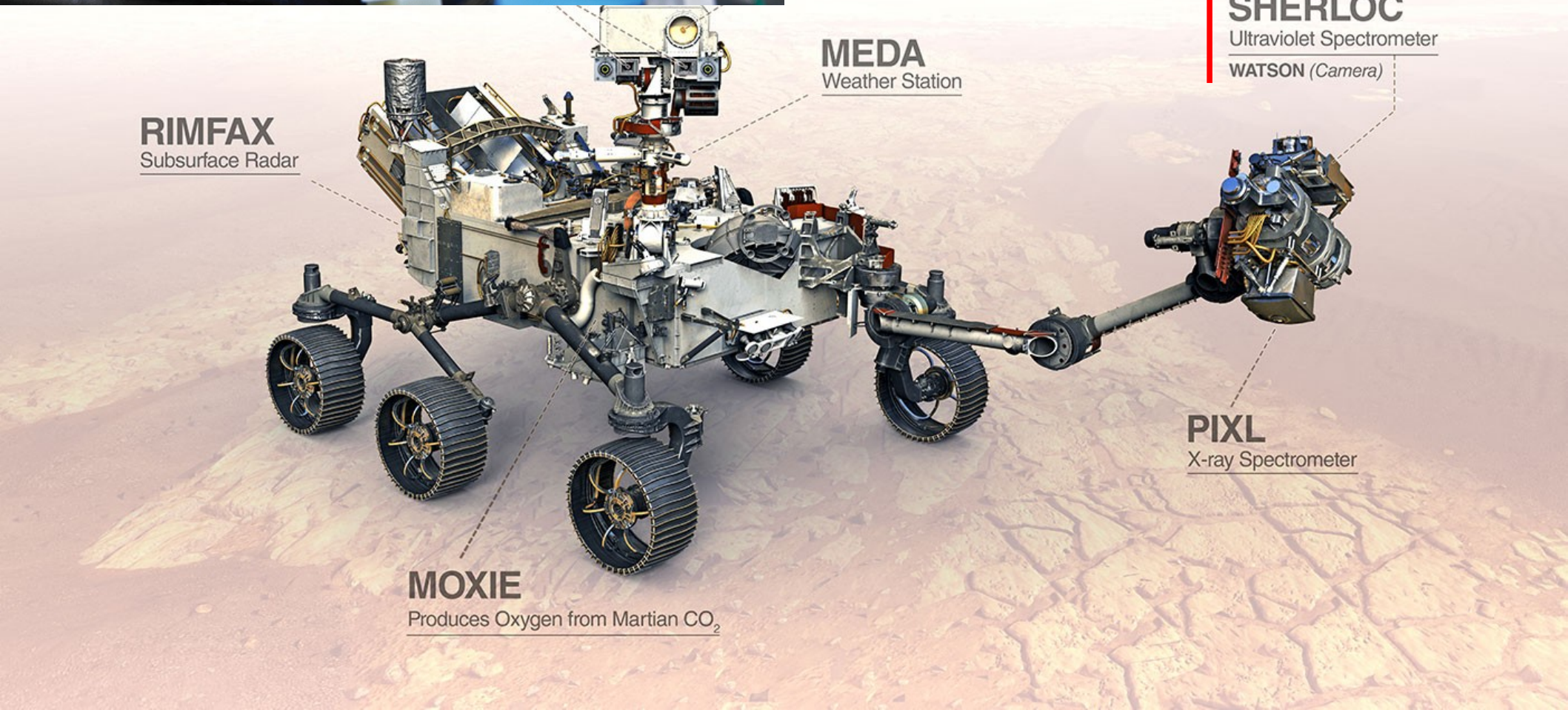
MOXIE
Produces Oxygen from Martian CO_2

ASTROBIOLOGIA Perseverance e Ingenuity

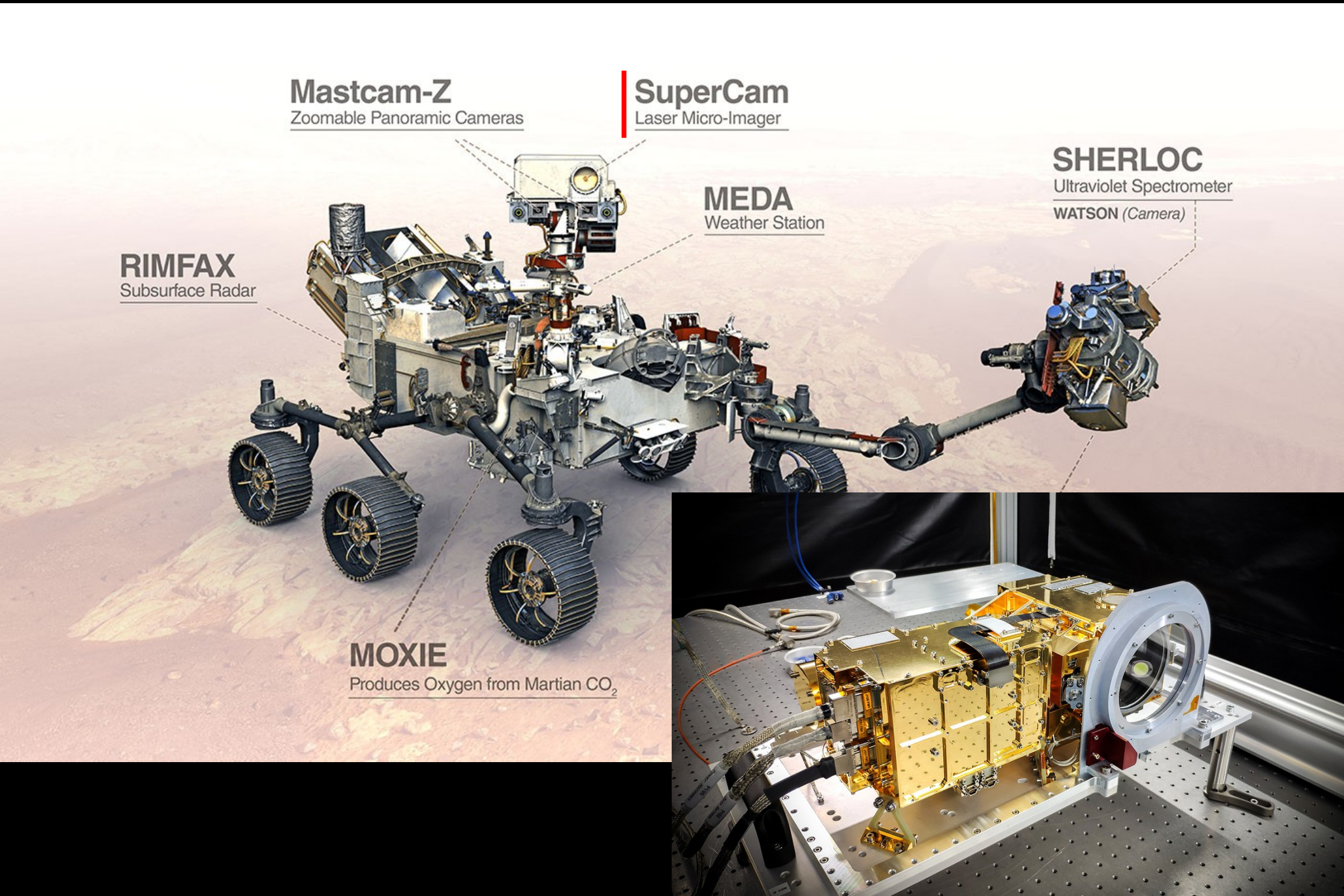
Carico scientifico



perCam
r Micro-Imager



ASTROBIOLOGIA Perseverance e Ingenuity
Carico scientifico



ASTROBIOLOGIA Ingenuity

3 aprile 2021 sgancio dal rover

ASTROBIOLOGIA Ingenuity

19 aprile 2021 primo volo su Marte

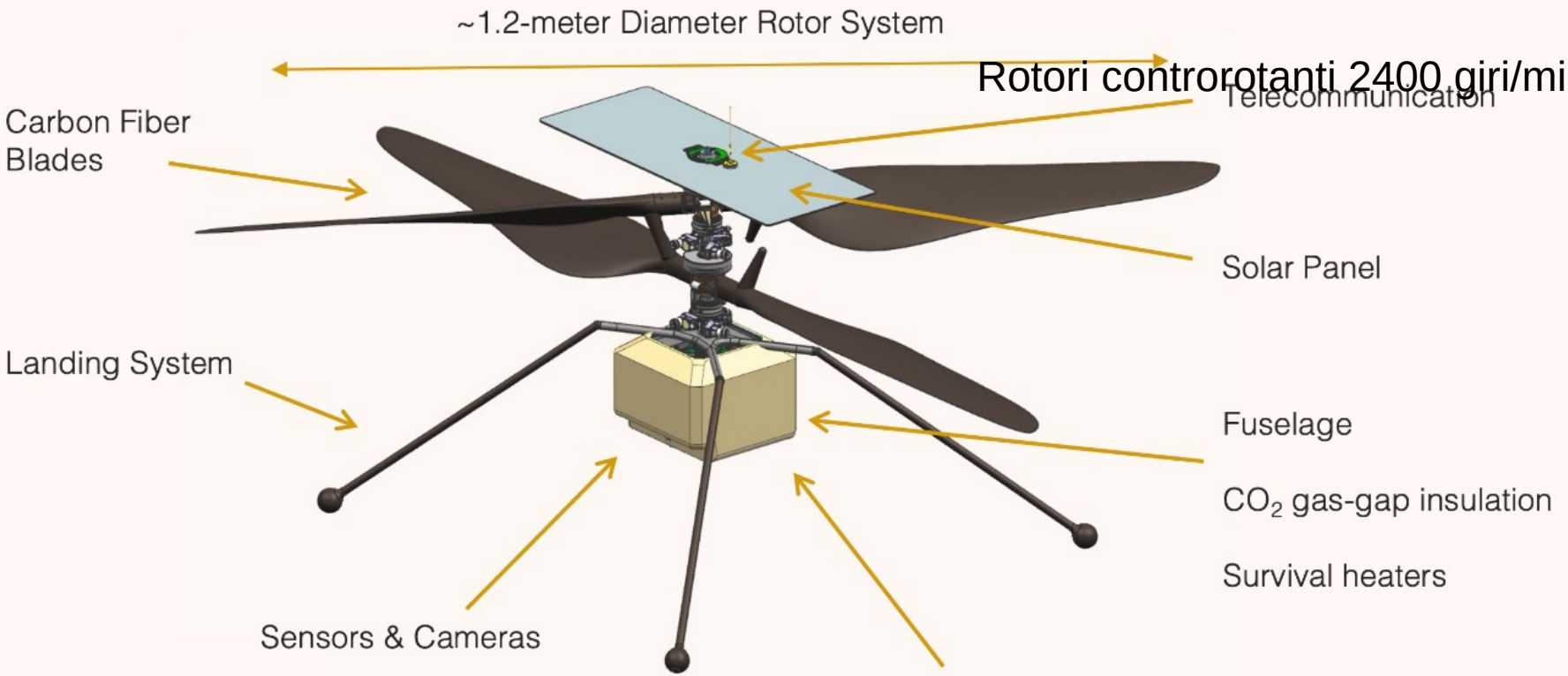
Altezza massima 3 m, volo sospeso 39 s

Link al video Youtube

Link al video NASA


ASTROBIOLOGIA Ingenuity
24° volo! 3 aprile 2022 Link a mappa interattiva posizione Ingenuity
Link al log di volo
Missione estesa fino a settembre 2022

ASTROBIOLOGIA Ingenuity Peso 1,8 kg sulla Terra, 0,68 kg su Marte



Rotori controrotanti 2400 giri/min

ASTROBIOLOGIA Ingenuity

COLONIZZAZIONE UMANA

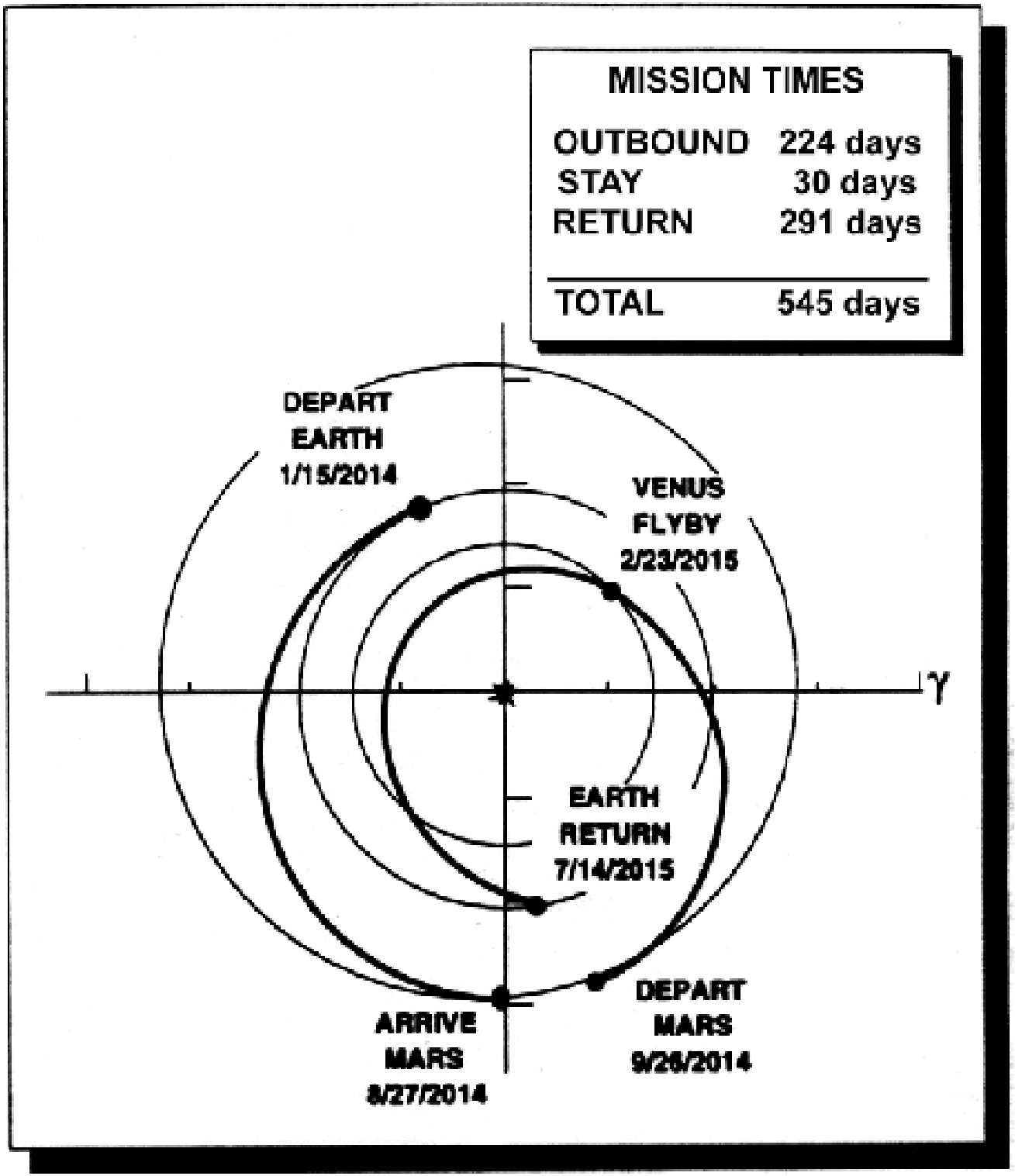
COLONIZZAZIONE UMANA

3 profili di missione

1) Missione di breve durata

Permanenza su Marte:
30 – 90 giorni

Periodo di trasferimento:
400 – 650 giorni



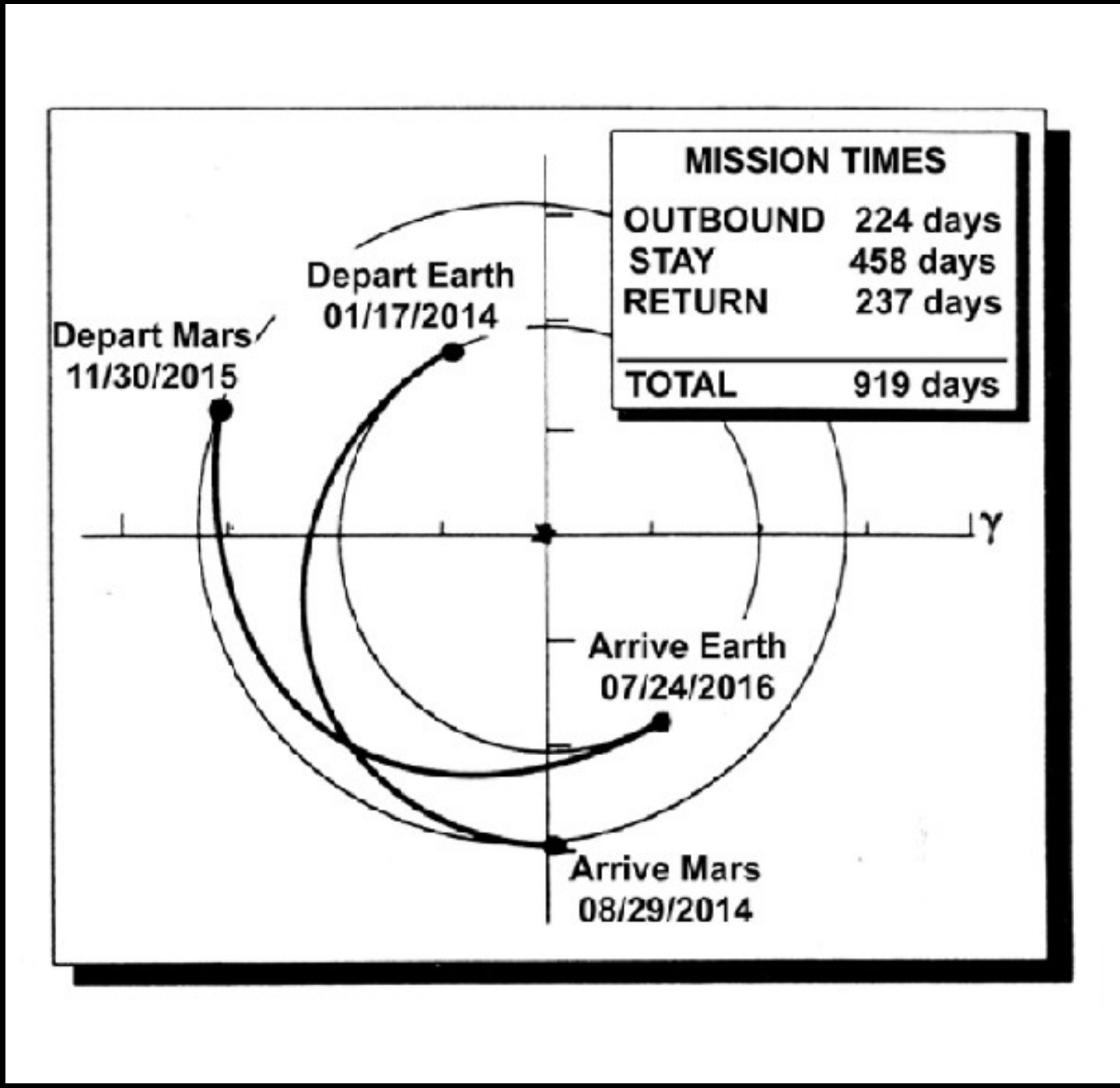
COLONIZZAZIONE UMANA

3 profili di missione

2) Missione
di lunga durata,
tempi di percorrenza
lunghi

Permanenza su Marte:
500 giorni

Periodo di trasferimento:
400 – 650 giorni



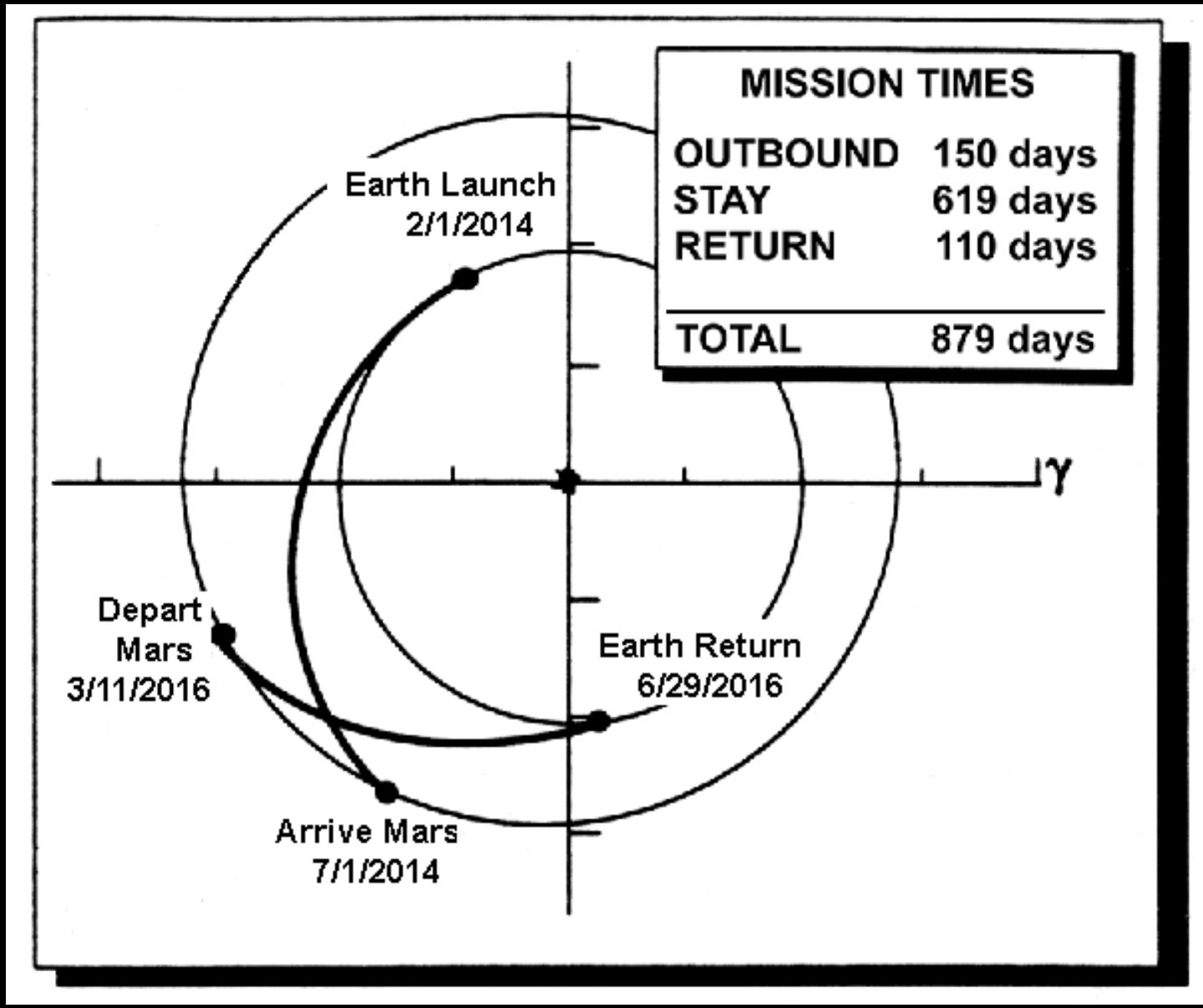
COLONIZZAZIONE UMANA

3 profili di missione

3) Missione
di lunga durata,
tempi di percorrenza
brevi

Permanenza su Marte:
500 giorni

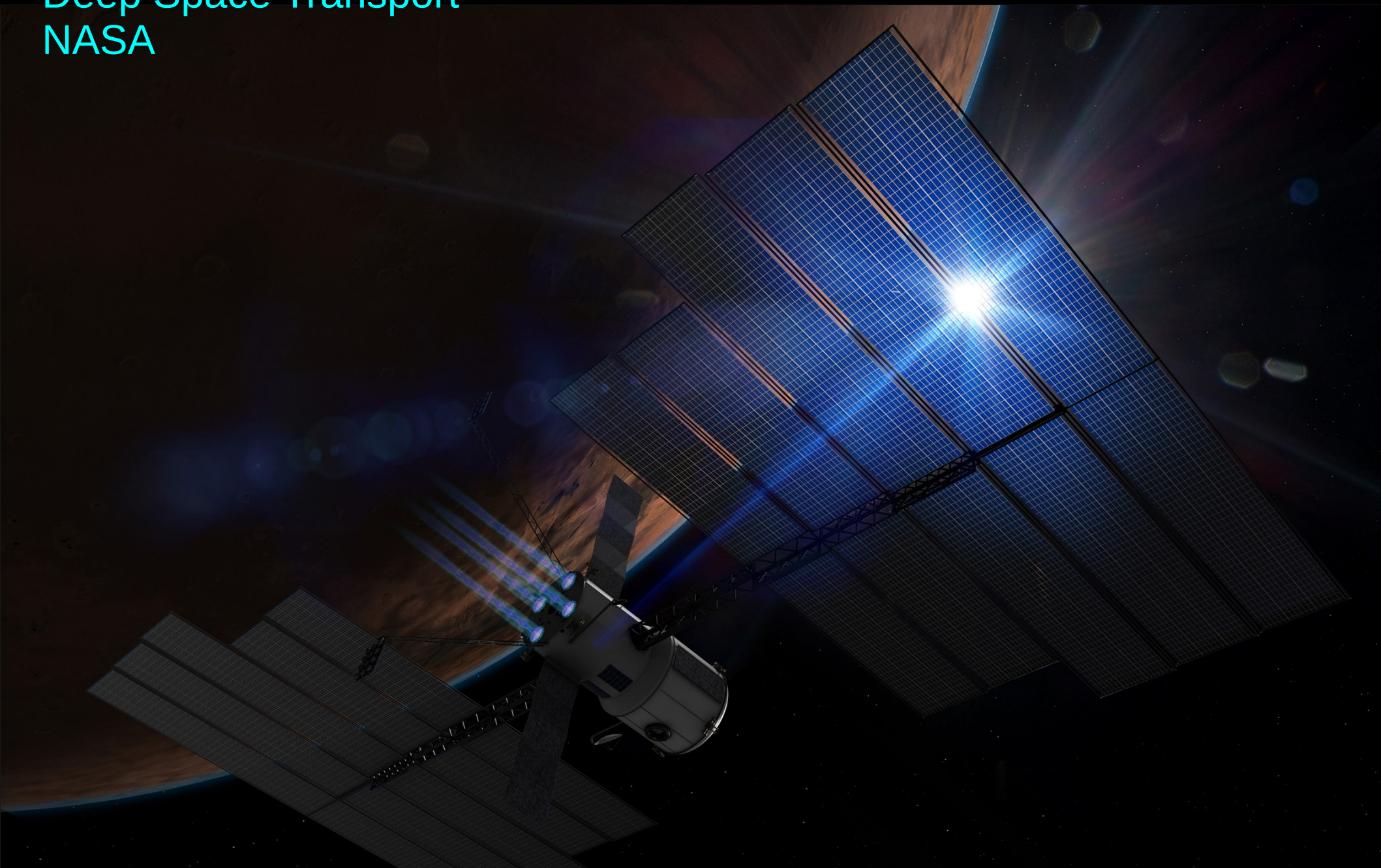
Periodo di trasferimento:
200 – 325 giorni



COLONIZZAZIONE UMANA

Deep Space Transport

NASA



Human Space Exploration Phases From ISS to the Surface of Mars

COLONIZZAZIONE UMANA

Deep Space Transport NASA

Today

Phase 0: Exploration Systems ***Testing on ISS***

Ends with testing, research and demos complete*

Asteroid Redirect-Crewed Mission Marks Move from Phase 1 to Phase 2

Phase 1: ***Cislunar Flight Testing*** of Exploration Systems

Ends with one year crewed Mars-class shakedown cruise

Phase 2: ***Cislunar Validation*** of Exploration Capability

Phase 3: Crewed Missions Beyond Earth-Moon System

Planning for the details and specific objectives will be needed in ~2020

Phase 4a: Development and robotic preparatory missions

Phase 4b: Mars Human Landing Missions

* There are several other considerations for ISS end-of-life

Mid-2020s

2030

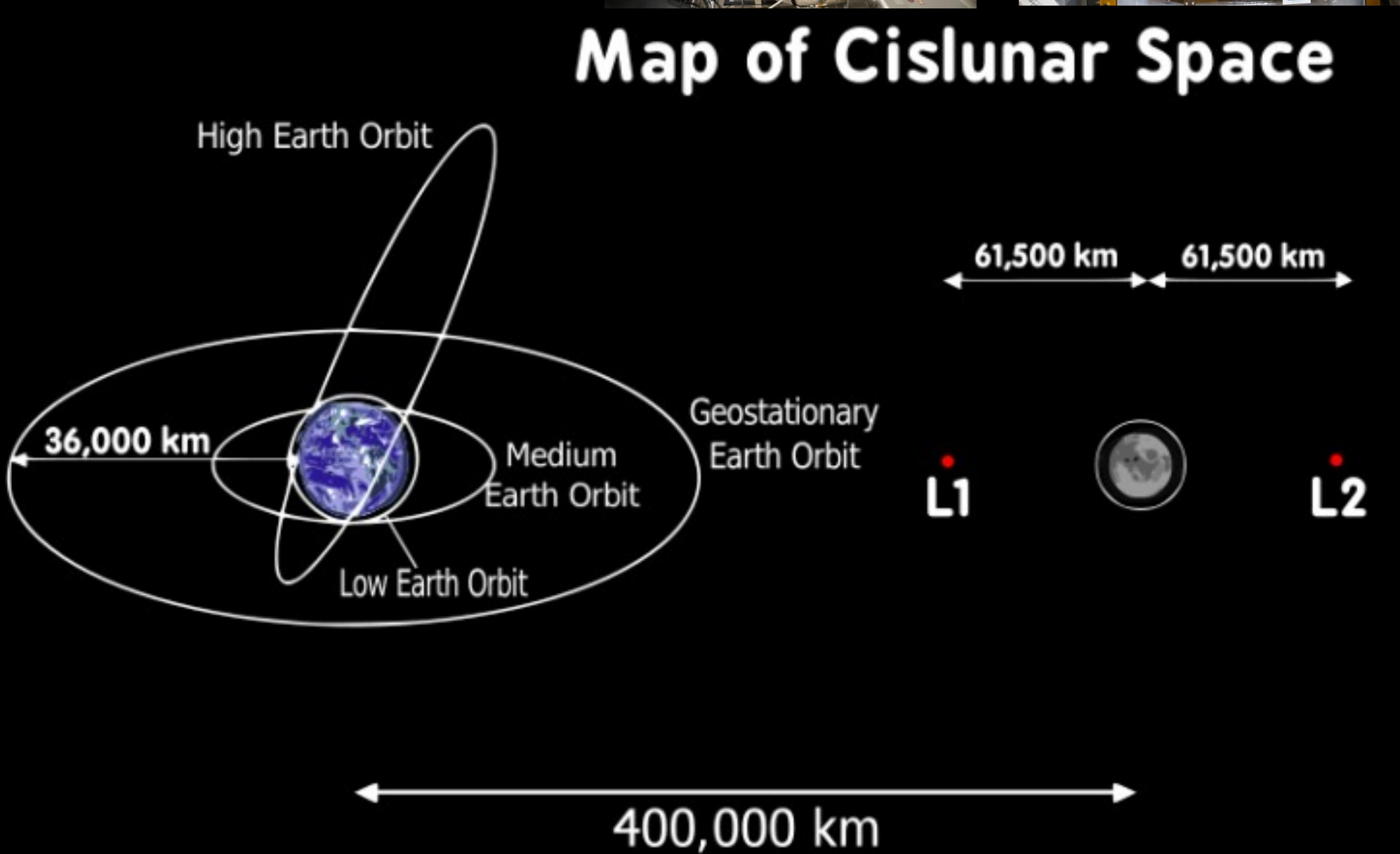
COLONIZZAZIONE UMANA

Fase 0 Problematiche: cibo – acqua - ossigeno

Vegetable Production System (Veggie)

COLONIZZAZIONE UMANA

Fase 1 Come Fase 0 ma in orbita cislunare



COLONIZZAZIONE UMANA

Fase 2

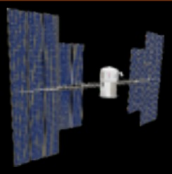
Equipaggi di 4 persone per missioni di 1000 giorni

Phase 2 Mission Elements

Space Launch System

Deliver payloads to cislunar space

Deep Space Transport

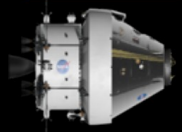


Deep Space Gateway

Earth

Moon

Orion



Transfer crew and cargo from Earth to cis Lunar space and back to Earth

Cislunar Space is used for Deep Space Gateway Deployment and Deep Space Transport Checkout

COLONIZZAZIONE UMANA

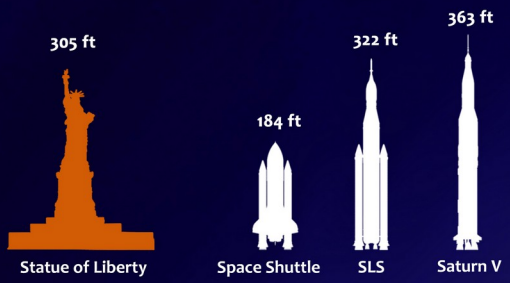
National Aeronautics and Space Administration

Fase 2

Space Launch System Link al video

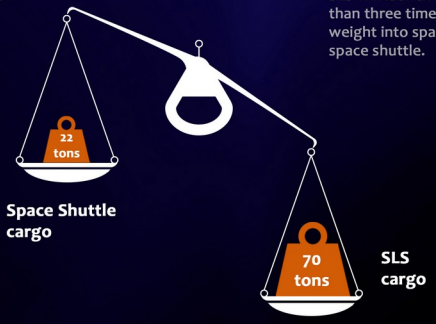
M E E T T H E R O C K E T

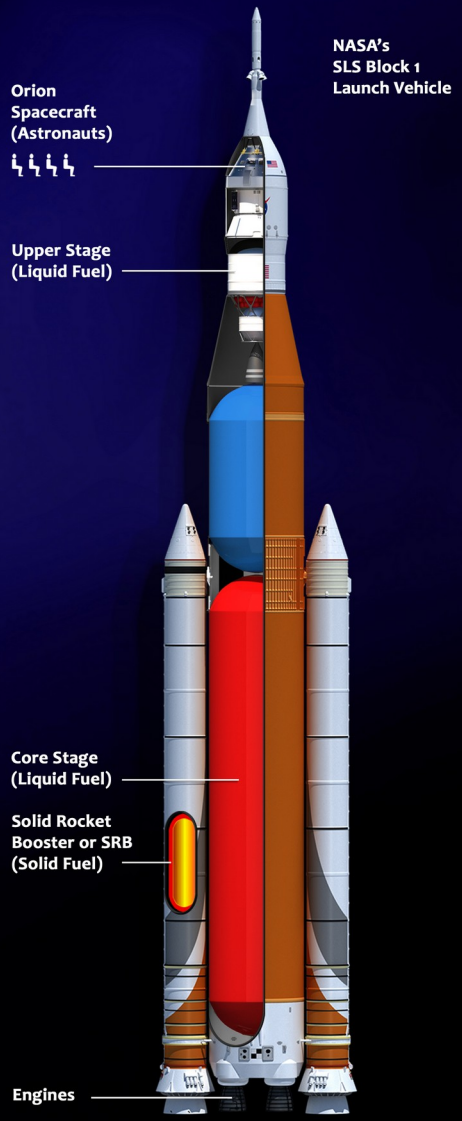
If you wonder how NASA's Space Launch System, or SLS, compares to earlier generations of NASA launch vehicles...



SLS will produce 13% more thrust at launch than the space shuttle and 17% more than the Saturn V.

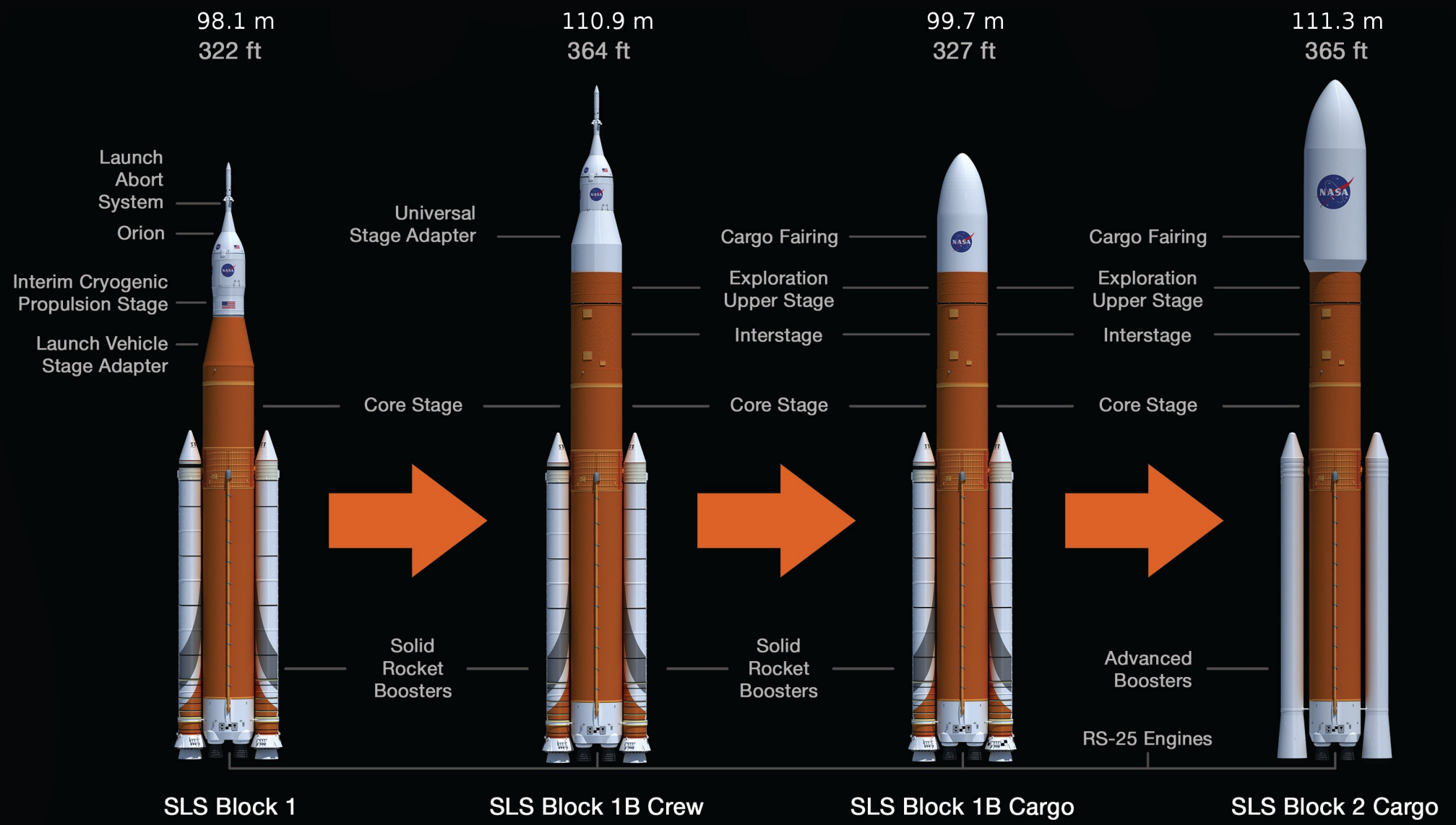
SLS will launch more than three times as much weight into space as the space shuttle.





www.nasa.gov/sls #SLSinspires

Fase 2
Space Launch System



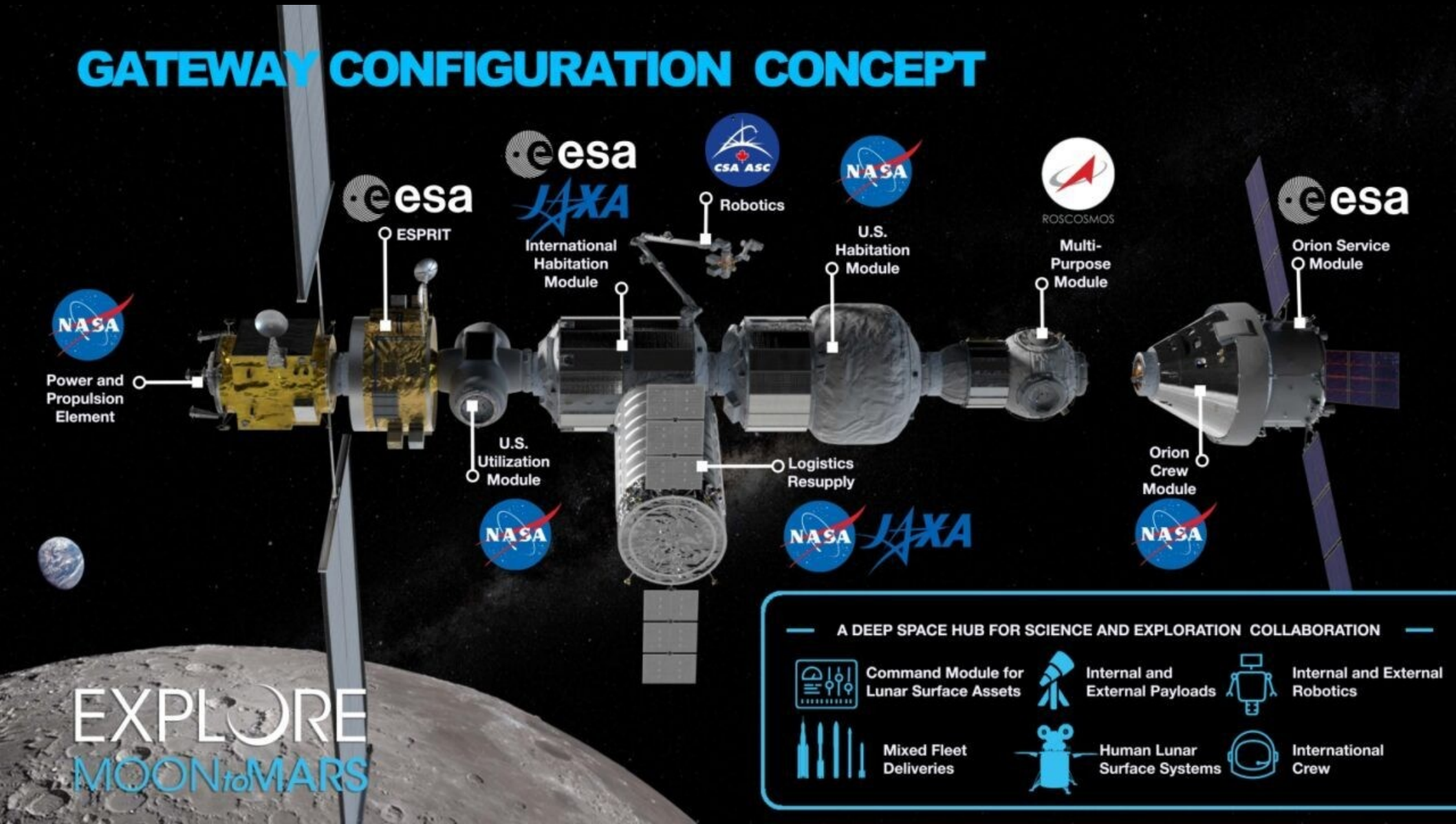
COLONIZZAZIONE UMANA

Fase 2
Orion

COLONIZZAZIONE UMANA

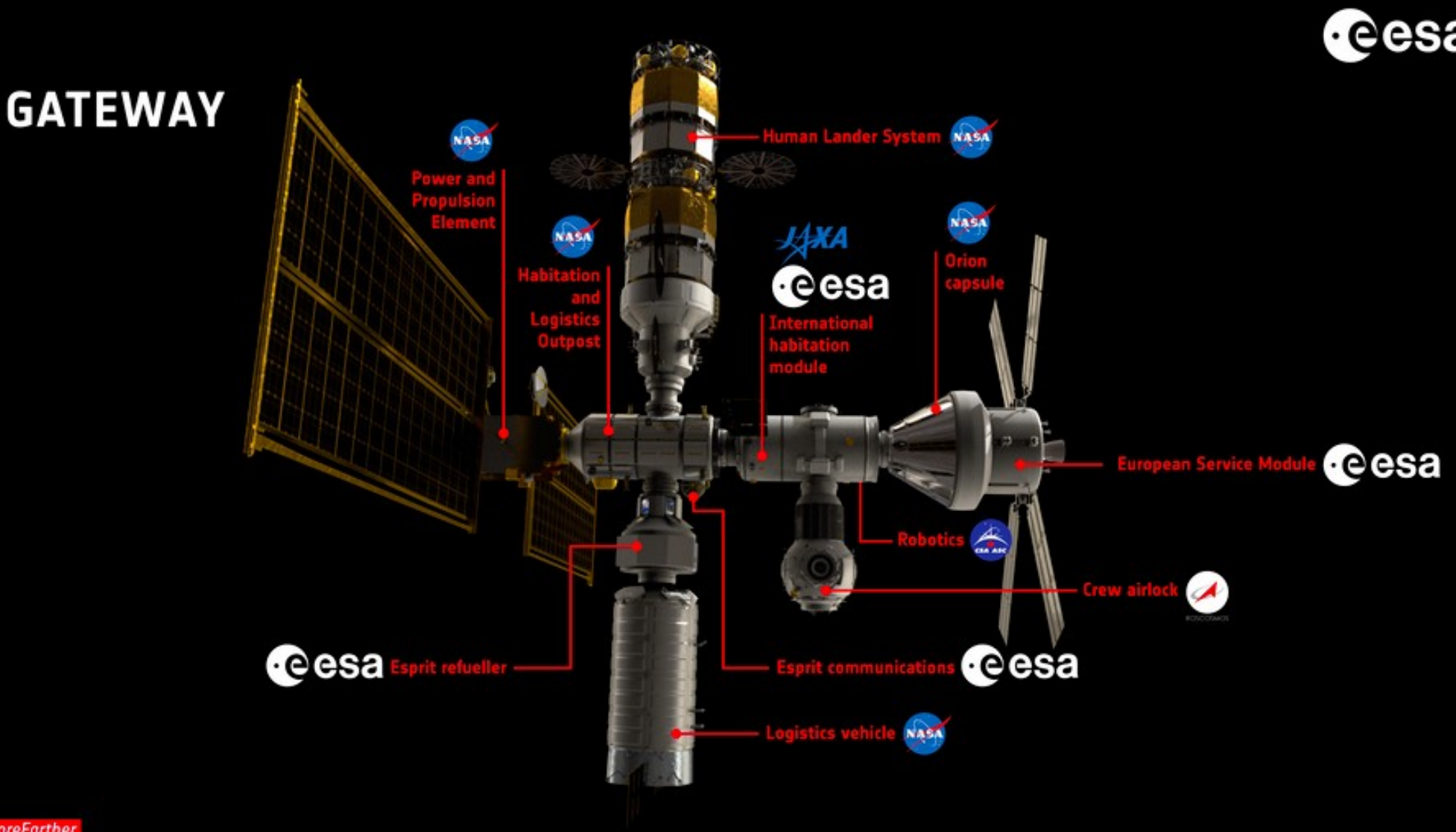
Fase 2

Deep Space Gateway/Lunar Gateway



COLONIZZAZIONE UMANA

Fase 2
Deep Space Gateway/Lunar Gateway



Interior Layout Features

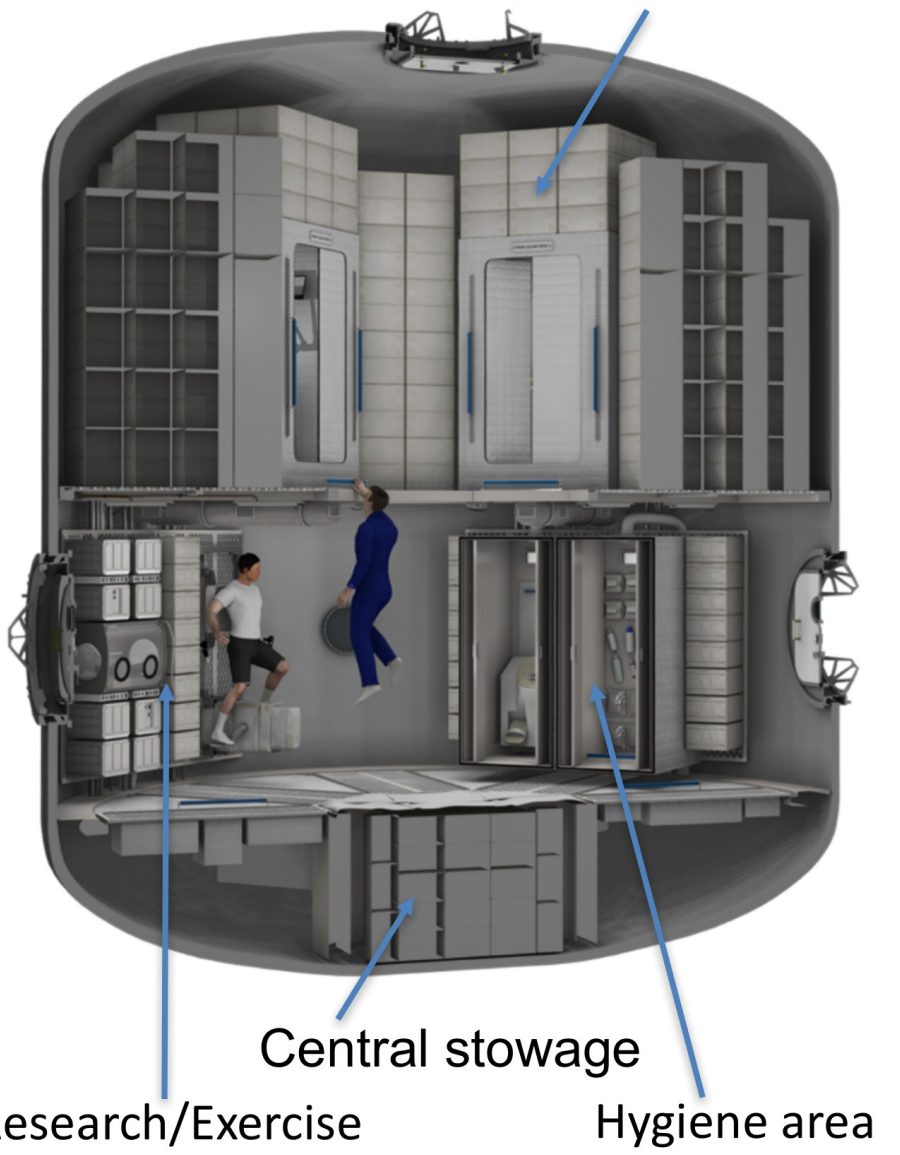


Image credit: NASA

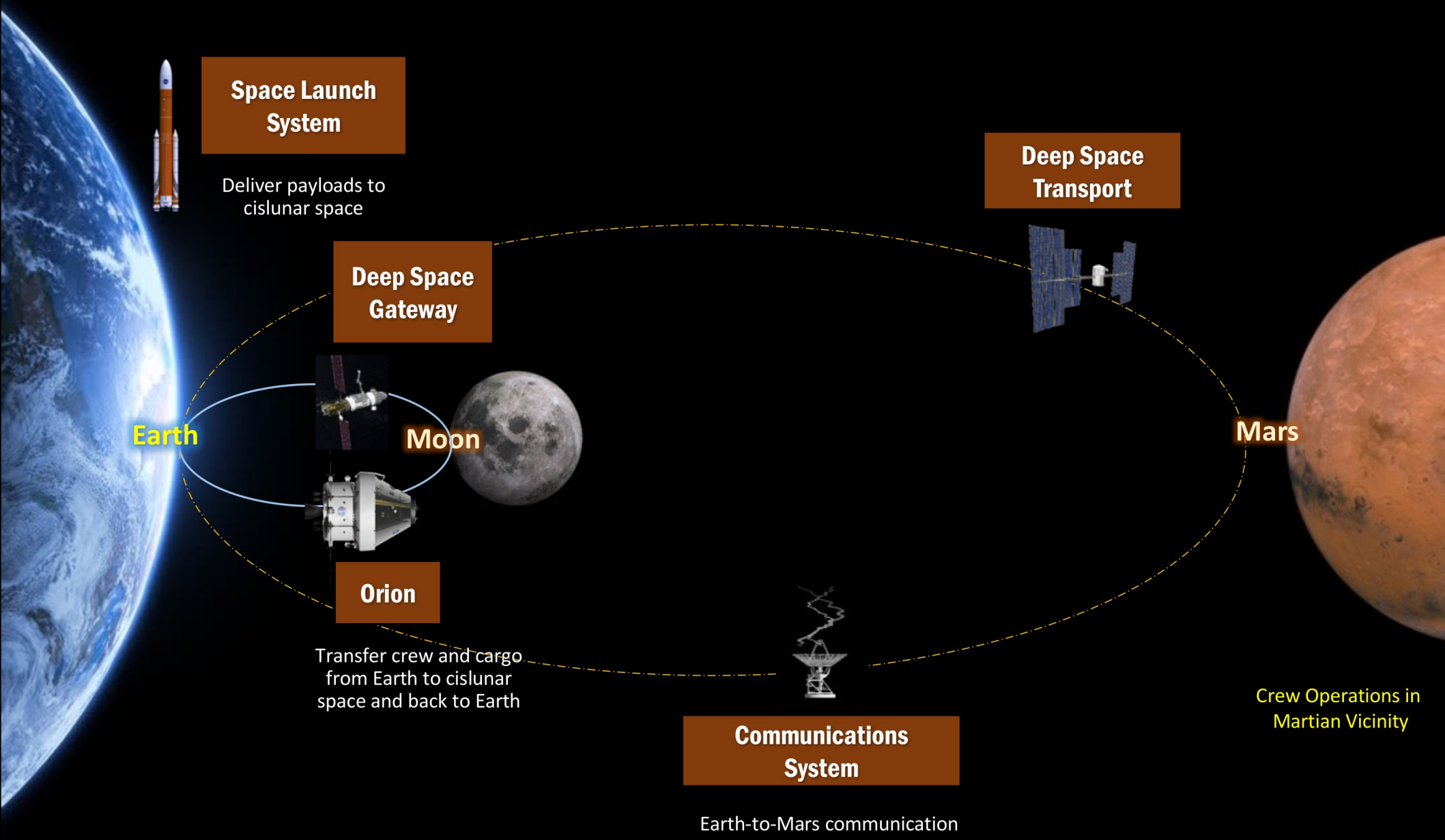
COLONIZZAZIONE UMANA

Fase 2 Deep Space Gateway/Lunar Gateway

COLONIZZAZIONE UMANA

Example Phase 3 Mission Elements

Fase 3 Deep Space Transport

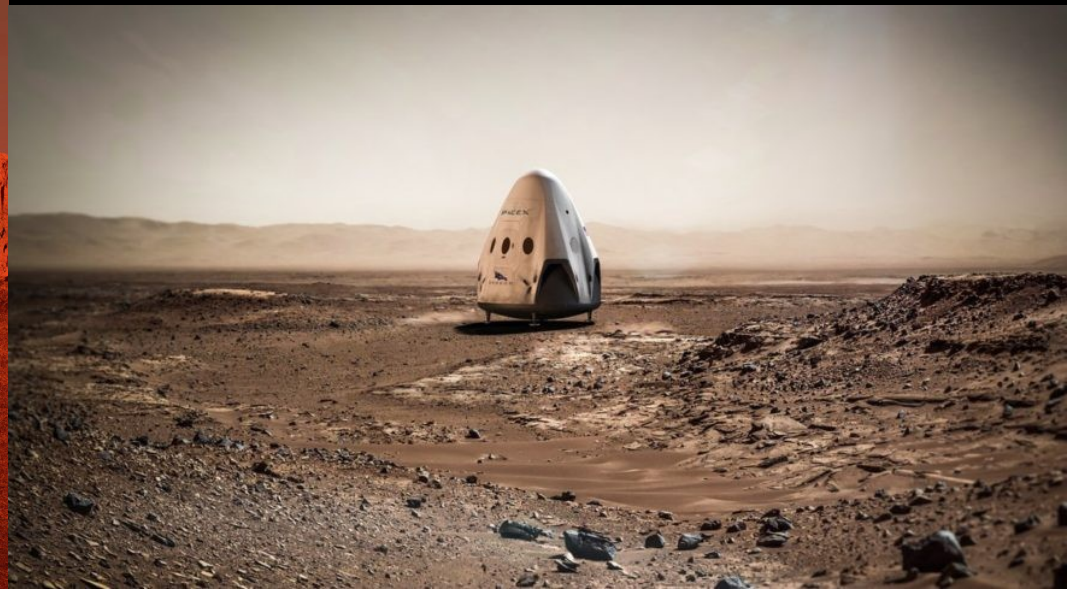


COLONIZZAZIONE UMANA

Fase 3 Deep Space Transport

COLONIZZAZIONE UMANA

Fase 4 Missione di superficie

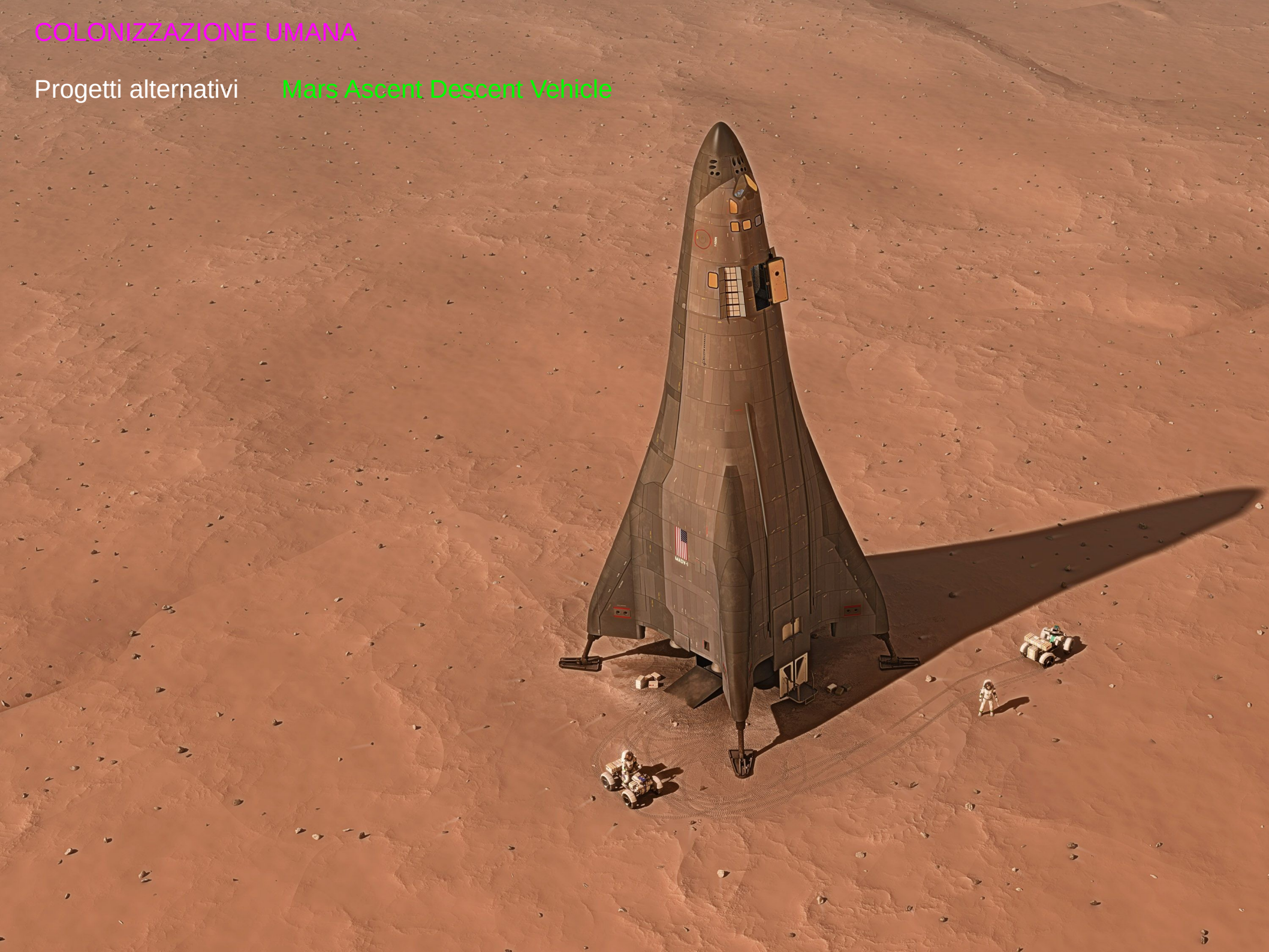


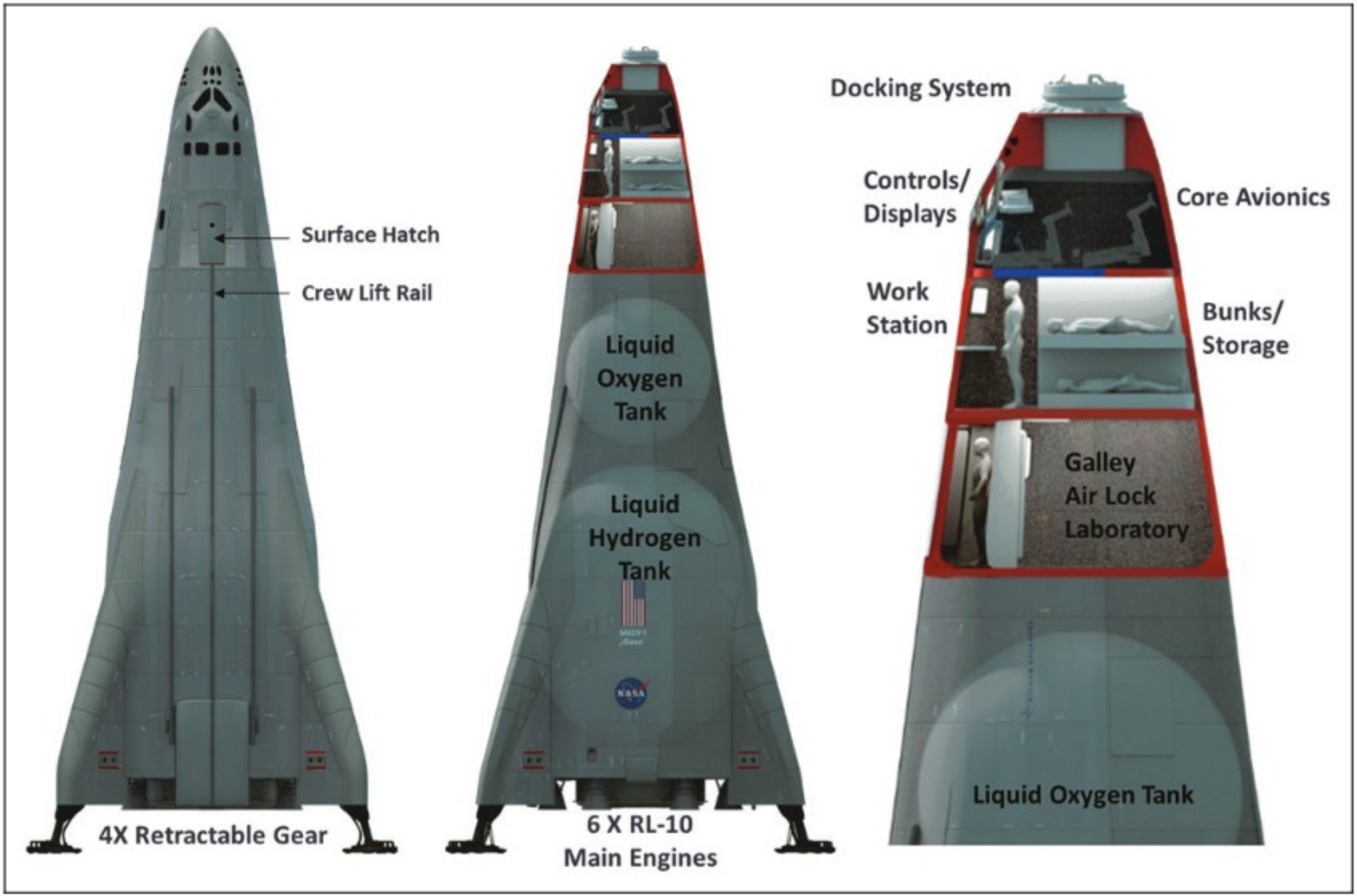
COLONIZZAZIONE UMANA

Progetti alternativi Mars Base Camp

COLONIZZAZIONE UMANA

Progetti alternativi Mars Ascent Descent Vehicle




Surface Hatch
Crew Lift Rail
4X Retractable Gear
Liquid Oxygen Tank
Liquid Hydrogen Tank
6 X RL-10 Main Engines
Docking System
Controls/ Displays
Core Avionics
Work Station
Bunks/ Storage
Galley
Air Lock
Laboratory
Liquid Oxygen Tank