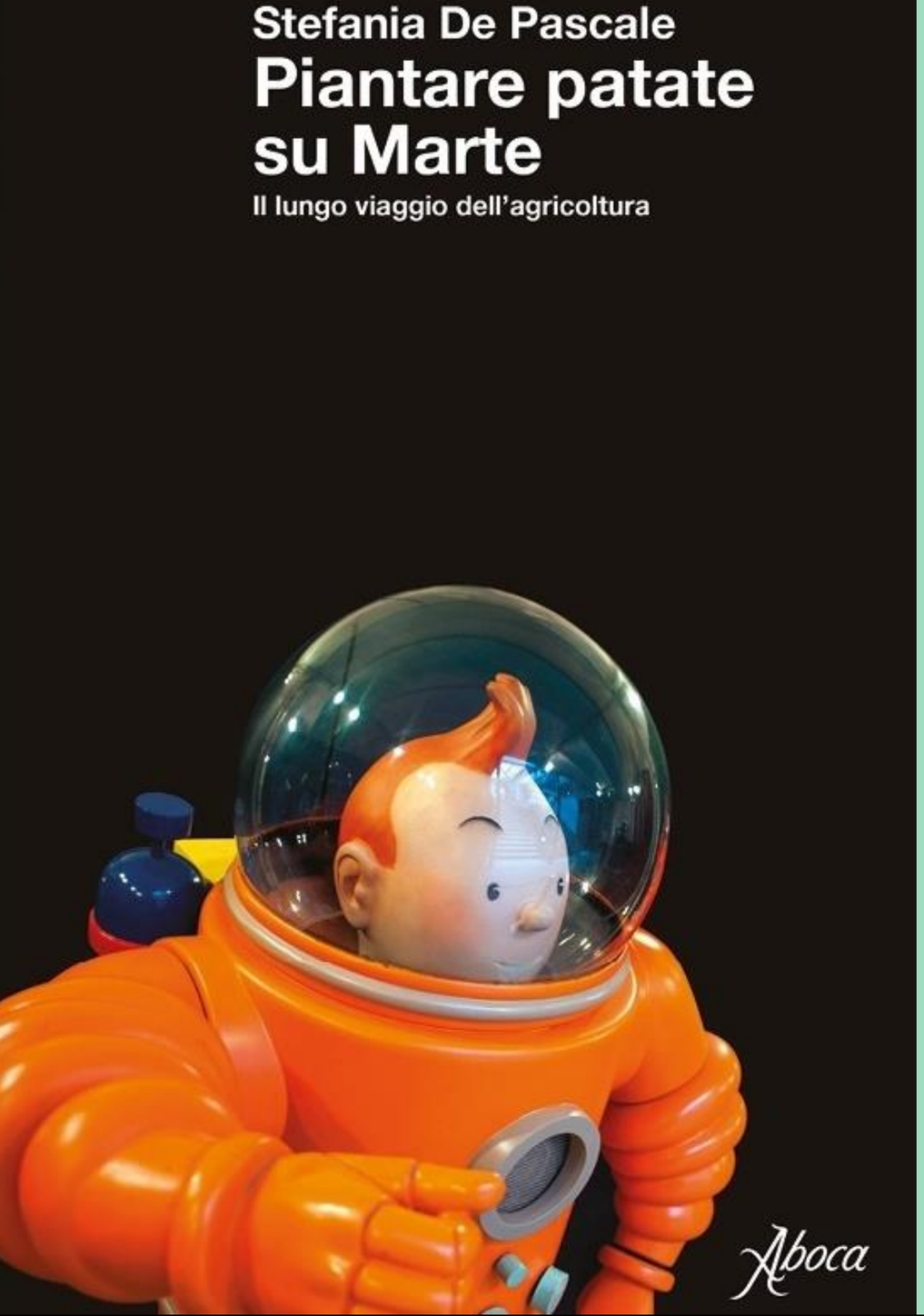


COMPAG

FEDERCHIMICA
AGROFARMA
Associazione nazionale imprese agrofarmaci

CONVEGNO NAZIONALE, 4.12.2024

Spazio: una nuova frontiera per l'agricoltura

Prof. Stefania De Pascale
Dipartimento di Agraria
Università degli Studi di Napoli Federico II

DIPARTIMENTO DI AGRARIA
UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

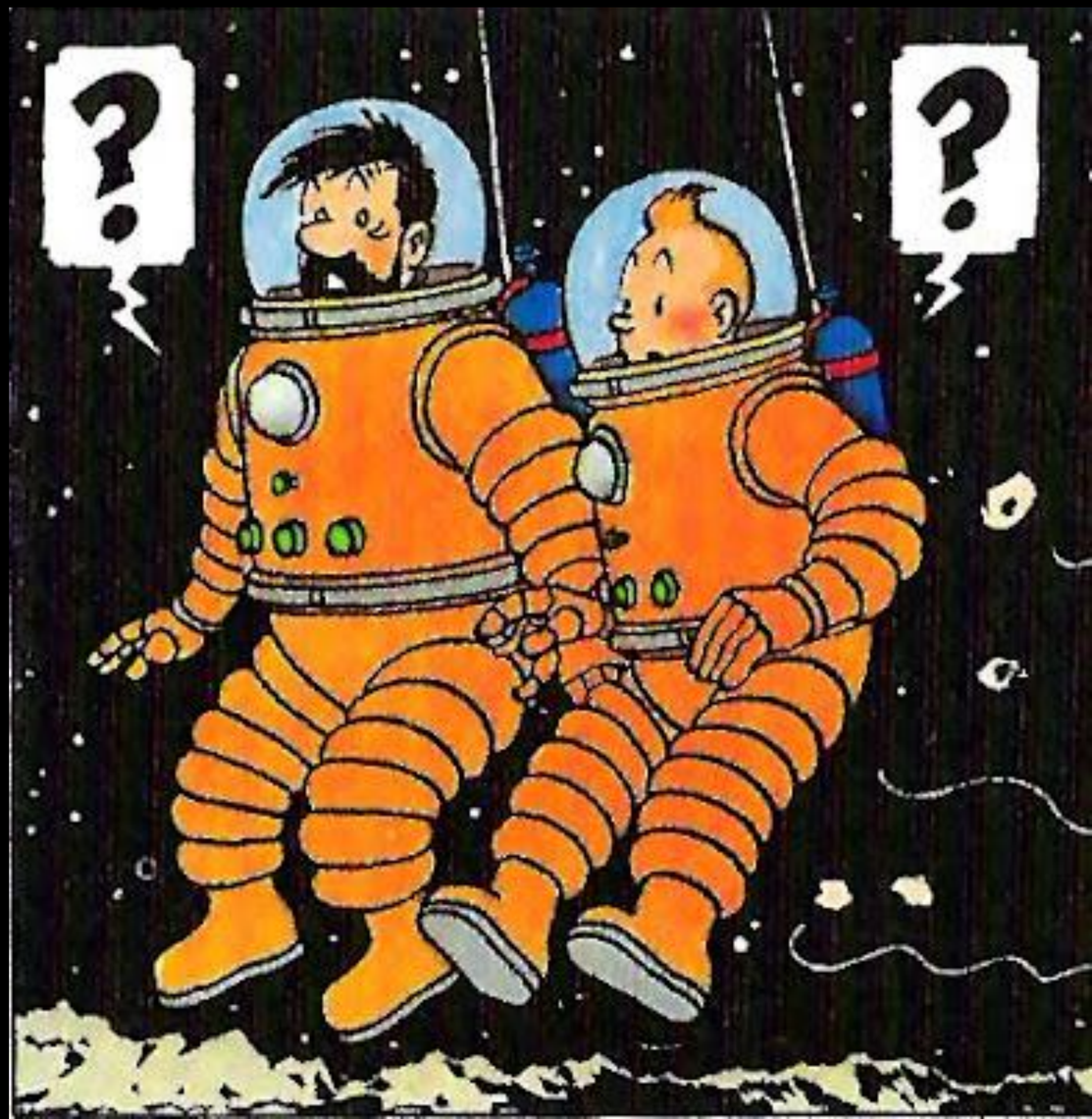
ACCADEMIA DEI GEORGOFILI

Sala Auditorium c/o Savoia Hotel Regency, Via del Pilastro 2, Bologna

≈8.000-
10.000 a.C.

Agricoltura spaziale

«La pratica di coltivare piante in ambienti extraterrestri per sostenere la vita dell'uomo»



~400 km < 6 ore

OGGI

L'approccio: rifornimento dalla terra

Sistemi di rigenerazione fisico-chimici

+

Space food

Apollo food (1968-1972)

Skylab food and tray (1973)

Shuttle food tray (1981-2011)

Samantha Cristoforetti's party menu - ISS Expedition 42/43 Futura (2014 – 2015)

INTERVISTA A SAMANTHA CRISTOFORETTI SULL'ISS DA SANREMO 2015

«C'è qualcosa che ti manca davvero?»

«Una bella insalata di fresca con qualche pomodoro, che è al momento impossibile avere…»

COFFEE IN SPACE?
A COSMIC ADVENTURE

LAVAZZA - ISSPRESSO

Astronaut Scott Kelly will drink 730 liters of recycled sweat and urine during his #YearInSpace.

“Yesterday’s coffee”

DAILY INPUTS - NOMINAL

	kg
Oxygen	0.84
Food Solids	0.62
Water in Food	1.15
Food Prep Water	0.79
Drink	1.62
Hand/Face Wash Water	1.82
Shower Water	2.45
Clothes Wash Water	2.50
Dish Wash Water	2.45
Flush Water	0.50
TOTAL	14.74

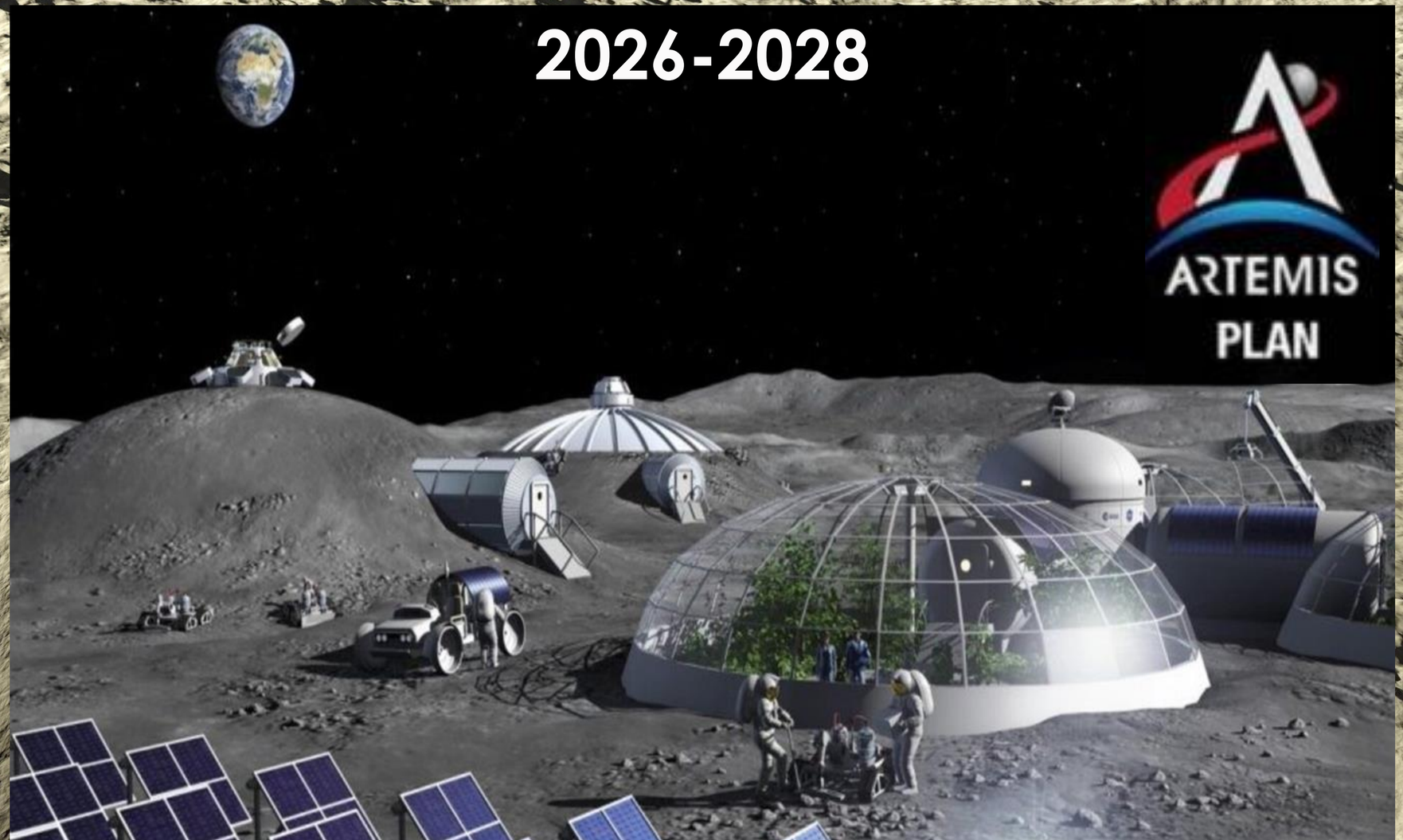
~ 5.0 - 15.0 kg per person-day

~2,0 – 5,5 t per persona per anno!

DAILY OUTPUTS - NOMINAL

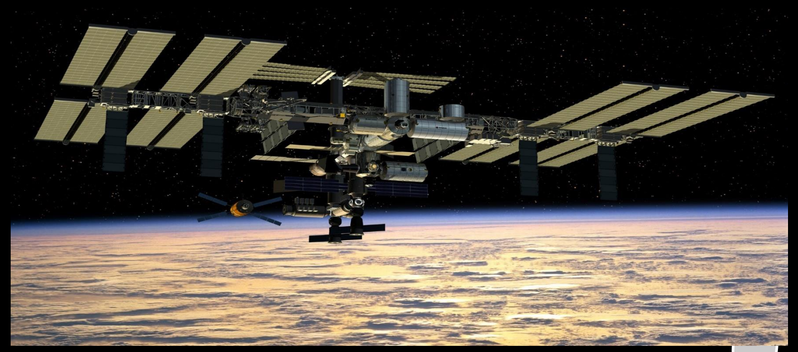
	kg
Carbon Dioxide	1.00
Respiration and Perspiration Water	2.28
Urine	1.50
Feces Water	0.09
Sweat Solids	0.02
Urine Solids	0.06
Feces Solids	0.03
Hygiene Water	3.68
Clothes Wash Water	1.90
Clothes Wash Latent Water	0.60
Other Latent Water	0.65
Dish Wash Water	2.43
Flush Water	0.50
TOTAL	14.74

«Un piccolo passo per un uomo, un grande balzo per l'umanità»
Neil A. Armstrong

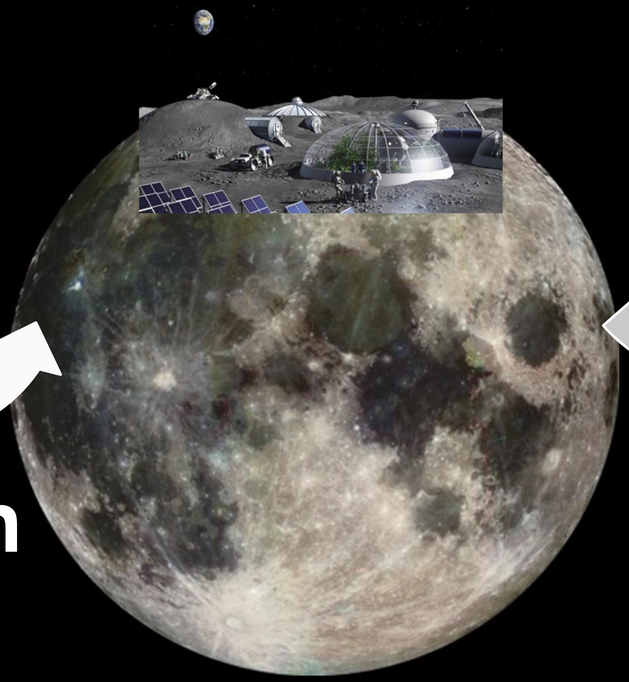


DOMANI

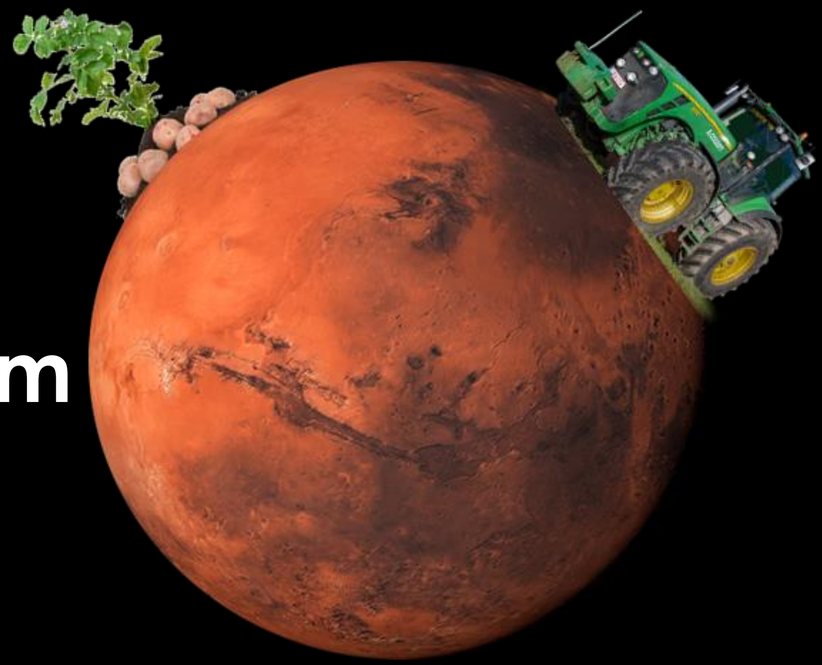
~400 km



~360.000 – 405.000 km



~ 55.000.000 – 400.000.000 km



500 giorni

Mars

Earth

2,5 – 7,5 t per persona

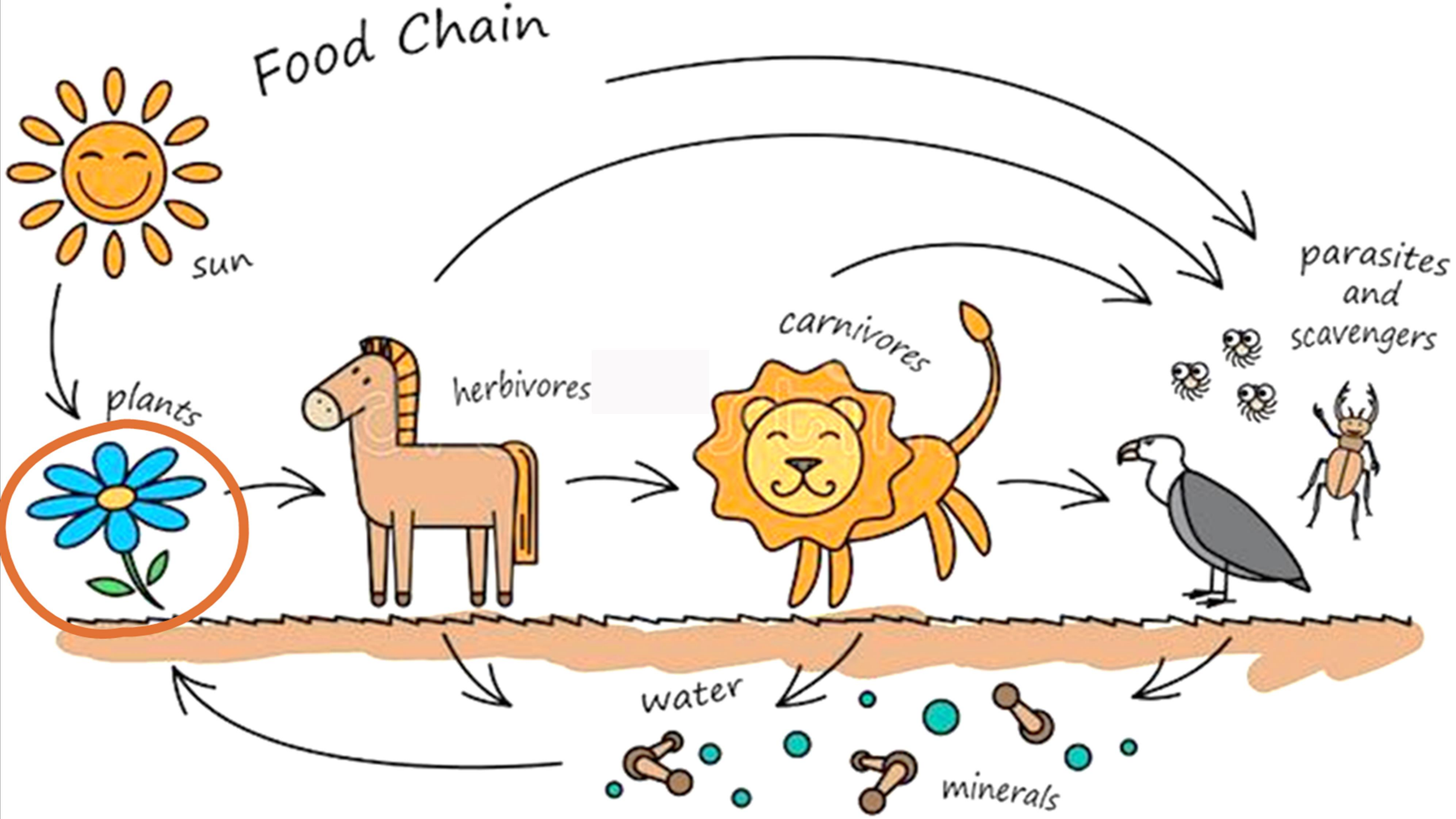
“NON CI SONO TAVERNE”

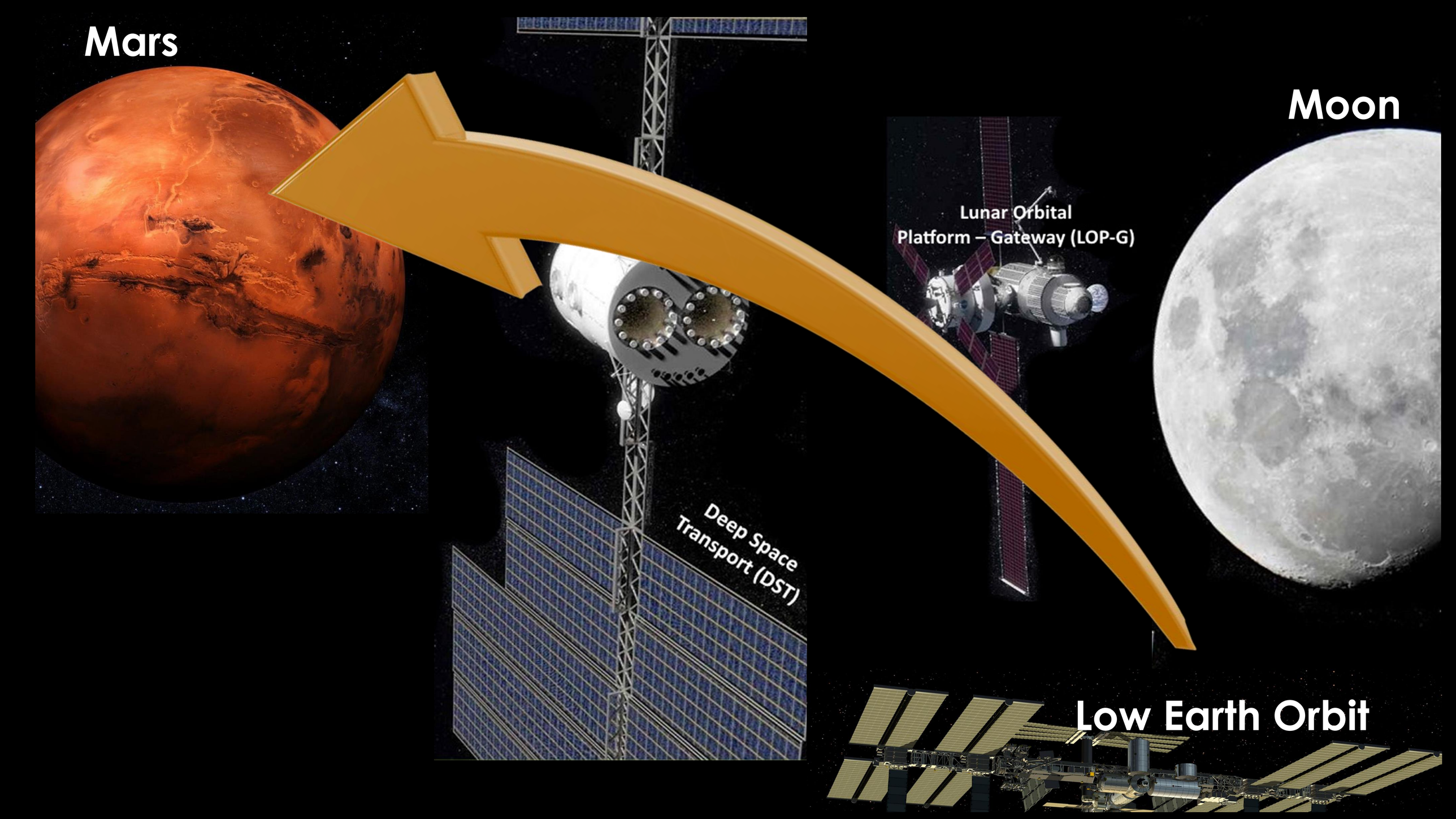
NELLO SPAZIO

IL VERDE NON È SOLO UN COLORE

PLANTS CAN SURVIVE
WITHOUT HUMANS

BUT HUMANS CANNOT
SURVIVE WITHOUT PLANTS


Food Chain
sun
plants
herbivores
carnivores
parasites
and
scavengers
water
minerals

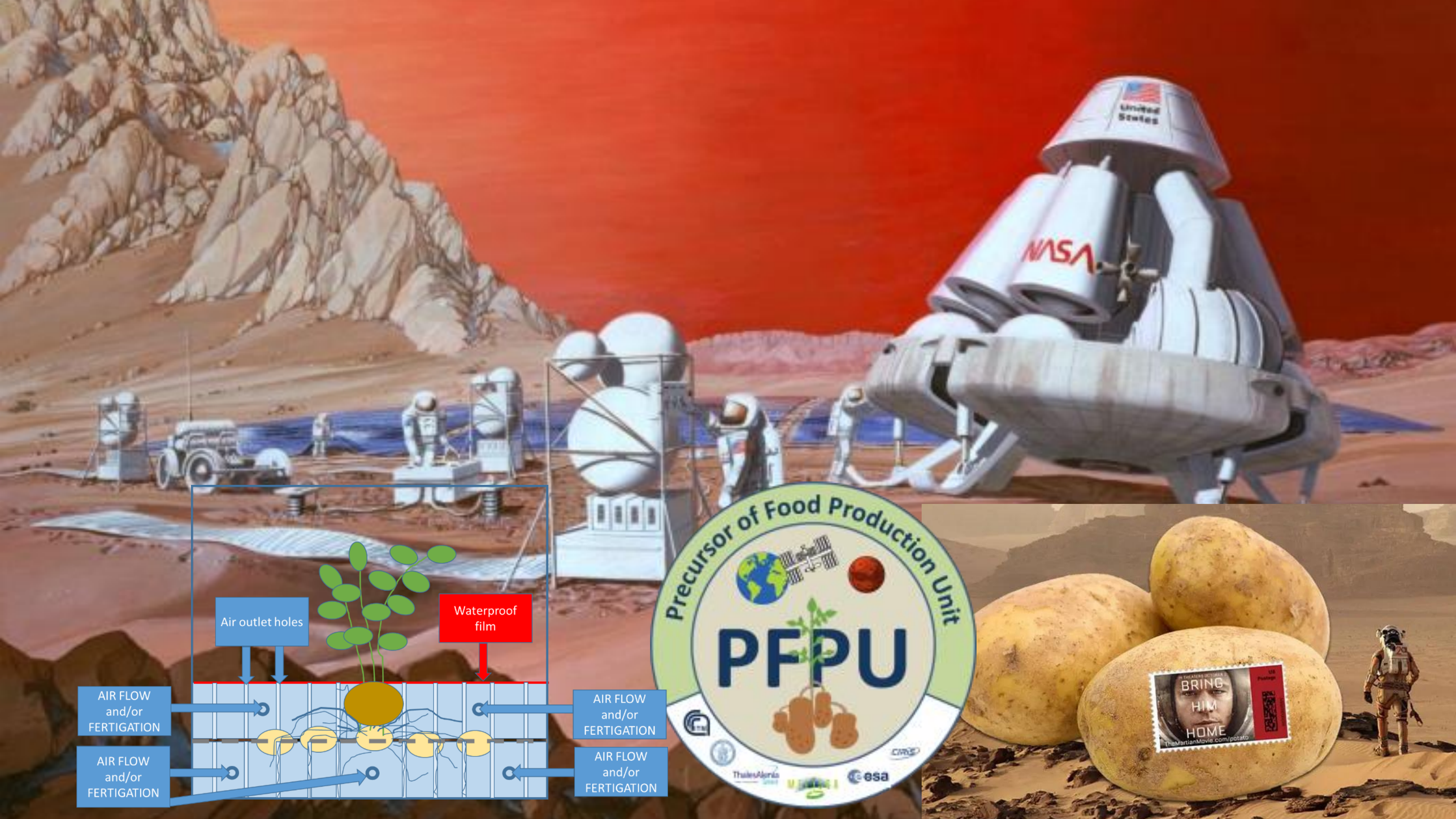

Mars
Moon
Lunar Orbital
Platform – Gateway (LOP-G)
Deep Space
Transport (DST)
Low Earth Orbit


WATER IN SPACE
?
SPACE PLANT BIOLOGY
Veggie
Food Production and Astronaut Nutrition

«Un piccolo morso per un uomo, un grande balzo per l’umanità».

August 10, 2015


Microgreens in Microgravity
MICROx2
ENEA
ASI
ThalesAlenia Space
KAYSER ITALIA
Cherry Belle radish microgreens

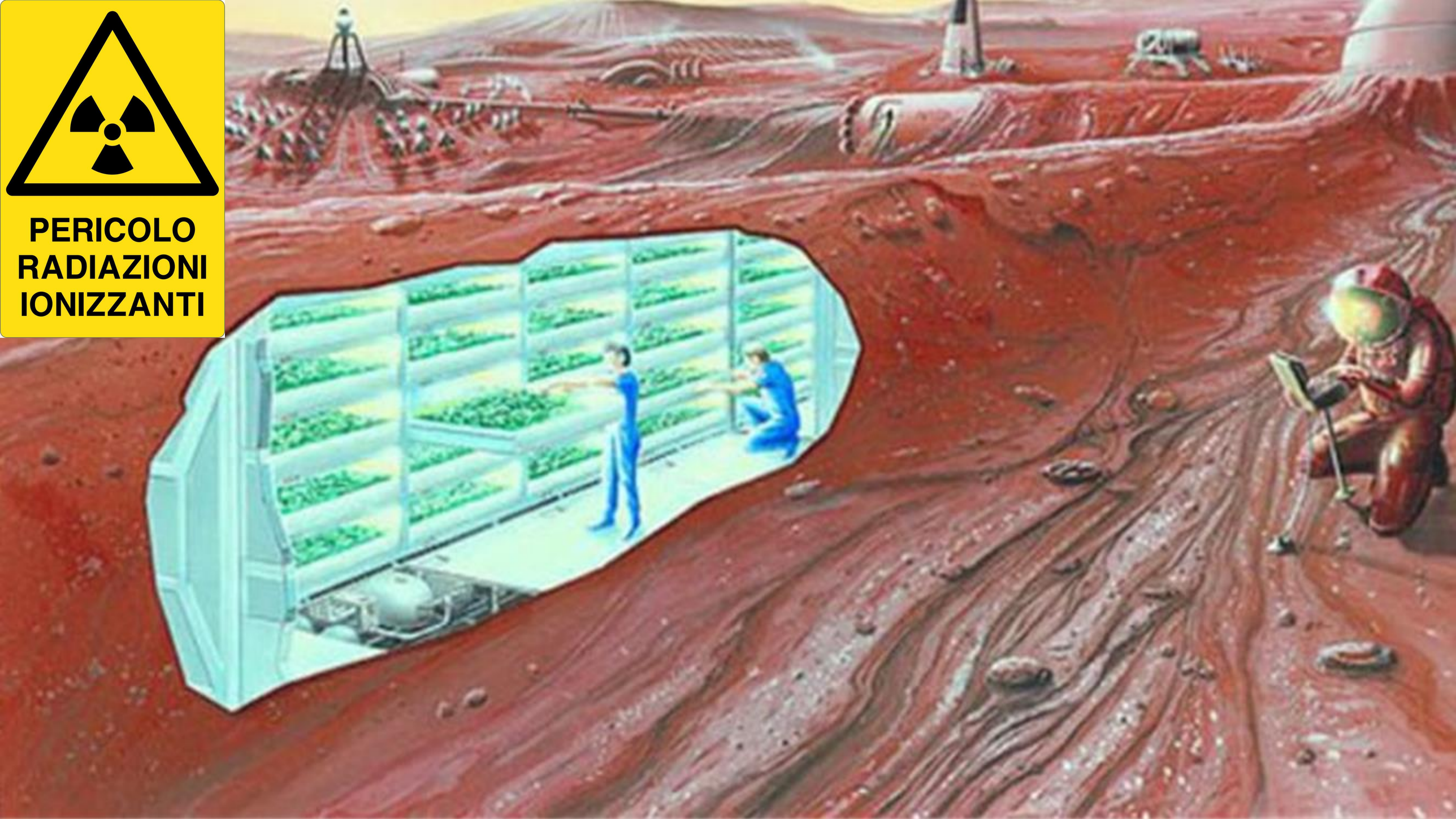

Air outlet holes
Waterproof film
AIR FLOW and/or FERTIGATION
AIR FLOW and/or FERTIGATION
AIR FLOW and/or FERTIGATION
AIR FLOW and/or FERTIGATION
Precursor of Food Production Unit
PFPU
BRING HIM HOME
TheMartianMovie.com/potato
NASA

Farm

Terra 9,81 m/s²

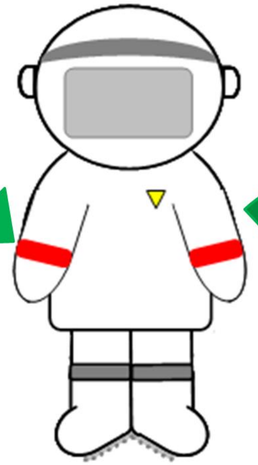
Luna 1,63 m/s²

Marte 3,71 m/s²


PERICOLO
RADIAZIONI
IONIZZANTI

MELISSA
MICRO-ECOLOGICAL LIFE SUPPORT SYSTEM ALTERNATIVE

Equipaggio



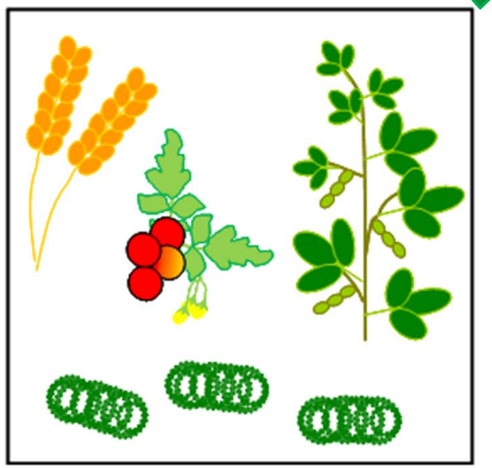
Acqua, Cibo, Ossigeno

Reflui (Urine, Feci)

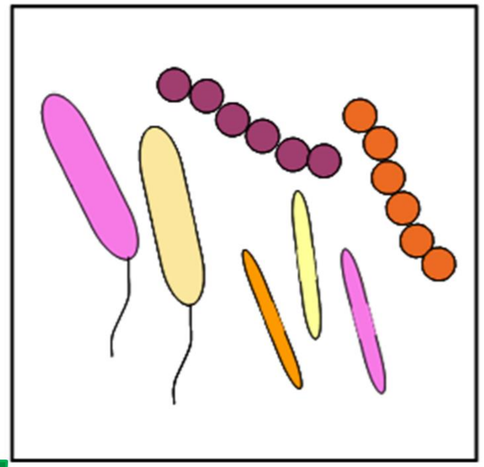
CO_2

Sistema bio-rigenerativo di supporto alla vita

Materiali non edibili e O_2



Organismi autotrofi
(alghe, piante superiori)



Decompositori
(batteri)

Elementi minerali e CO_2

Grano

Carboidrati

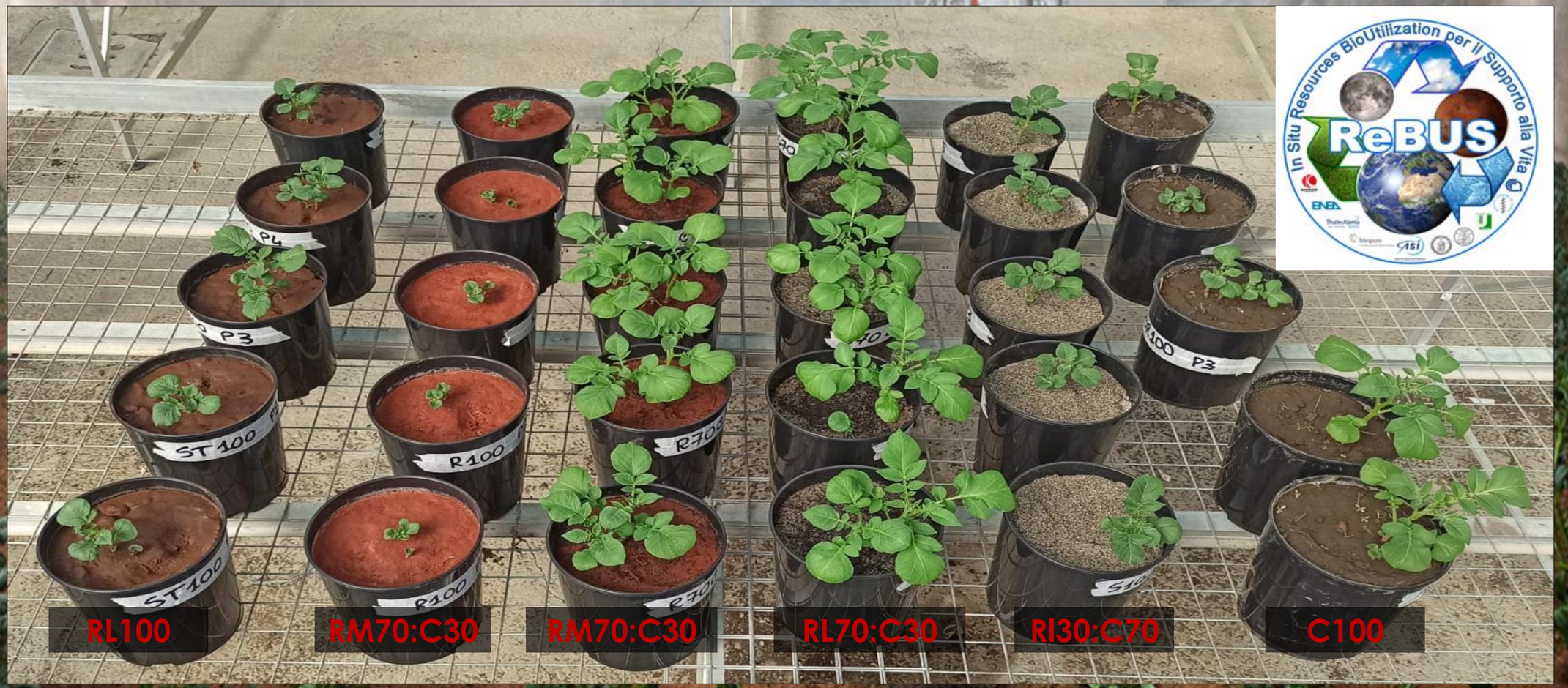
Patata

Carboidrati

Soia

Riso

Carboidrati


RL100
RM70:C30
RM70:C30
RL70:C30
RI30:C70
C100

Laboratory of Crop research for Space

IN COOPERATION WITH

Università degli Studi di Napoli Federico II · Dipartimento di Agraria · esa European Space Agency · MELiSSA Micro-Ecological Life Support System Alternative

"PaCMAN" Plant Characterization Unit

IN COOPERATION WITH

Università degli Studi di Napoli Federico II · Dipartimento di Agraria · esa European Space Agency · MELiSSA Micro-Ecological Life Support System Alternative

ENGINSOFT · HOSOKAWA MICRON LTD · ODYS Advanced Controls & Communication · NTNU Social Research

Popolazione 2019

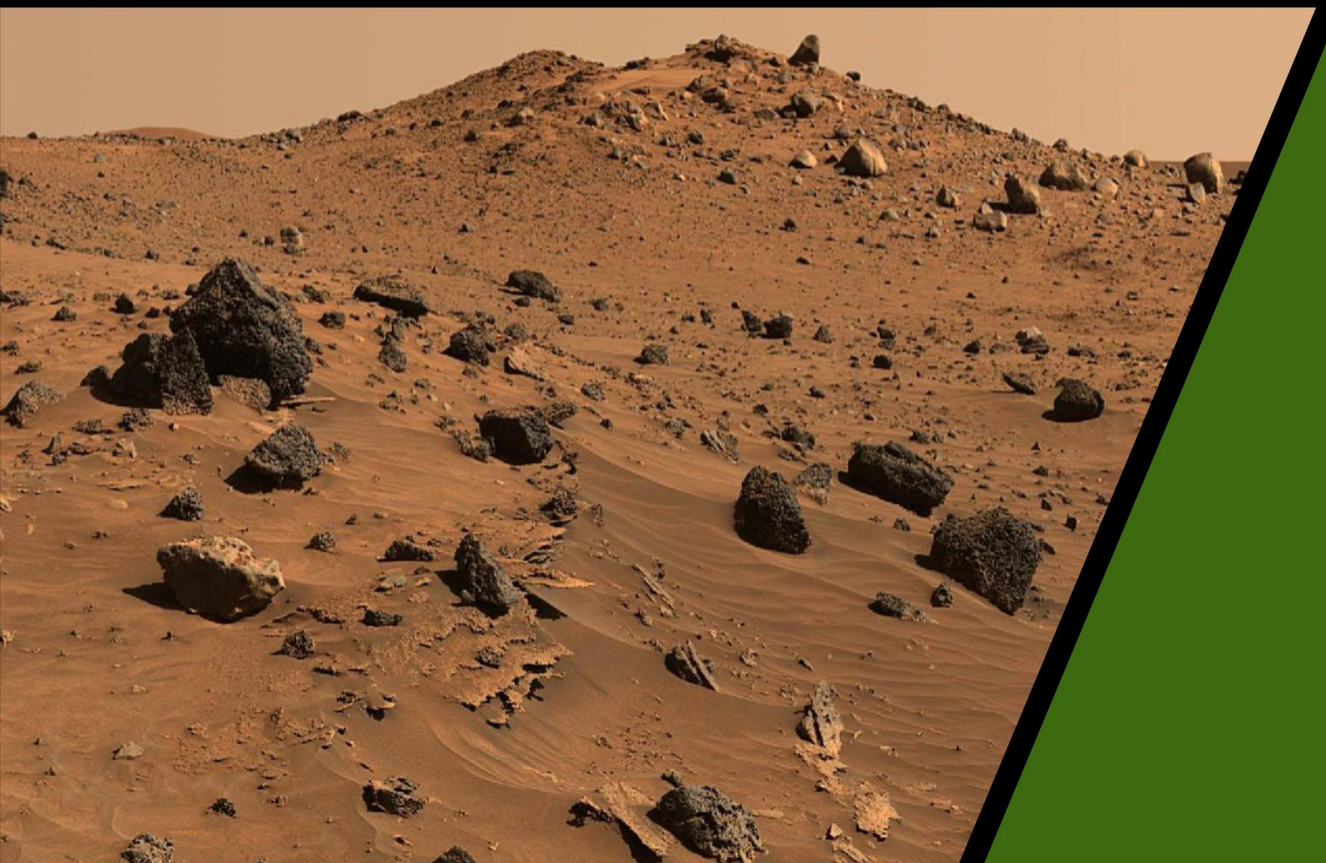
7,7 Miliardi

di cui 54% vive in aree urbane

Popolazione 2050

9,7 Miliardi

di cui 66% vivrà in aree urbane



Più spazio alle piante

Impareremo???


THERE IS NO
PLANET B


HEY LOOK, SATURN!
NOPE. THAT'S JUST EARTH WITH A RING OF NON-BIODEGRADABLE WASTE AROUND IT.

gronomi e vegetariani

Grazie

stefania.depascale@unina.it