Growing Plants in Space

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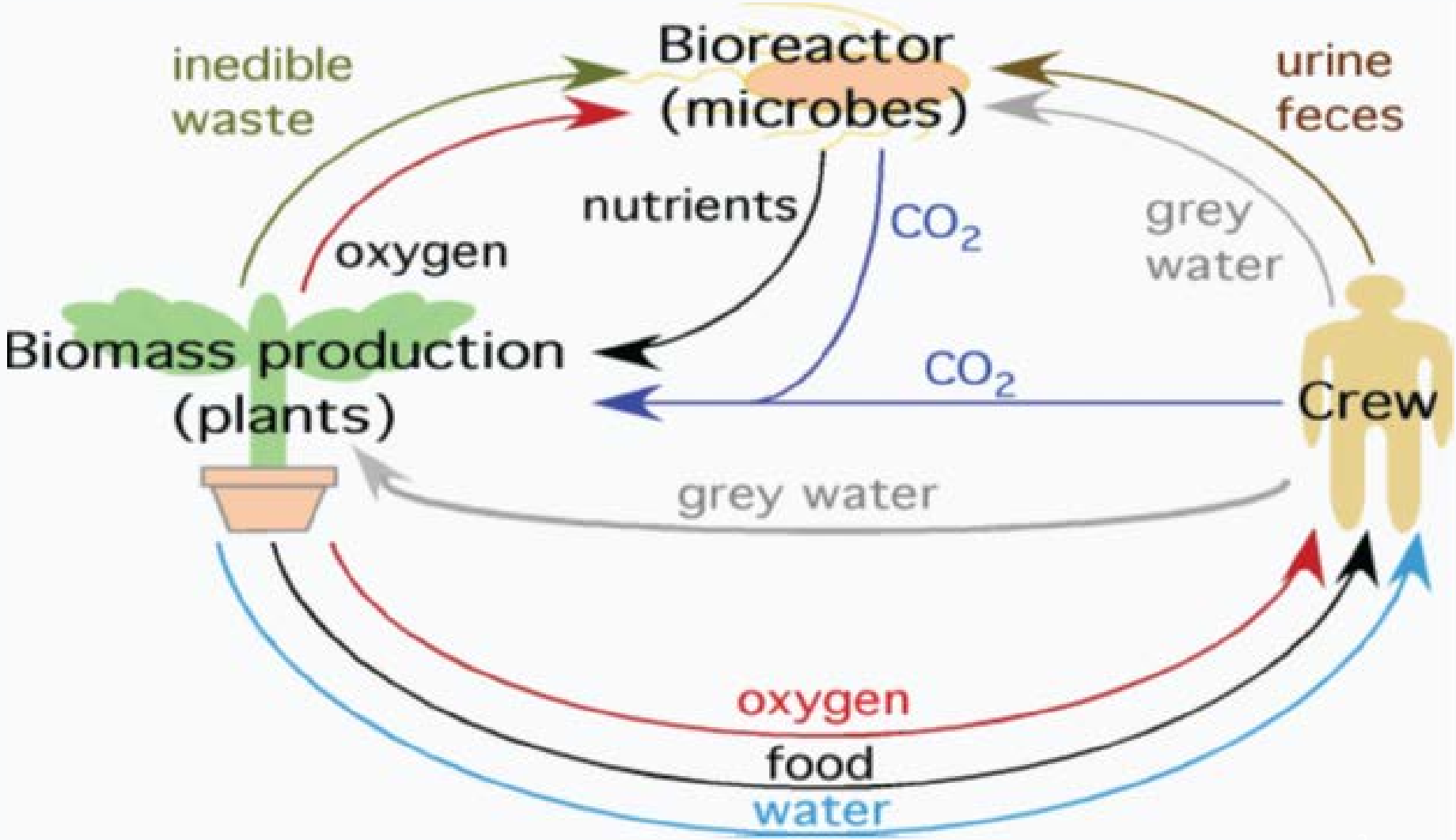
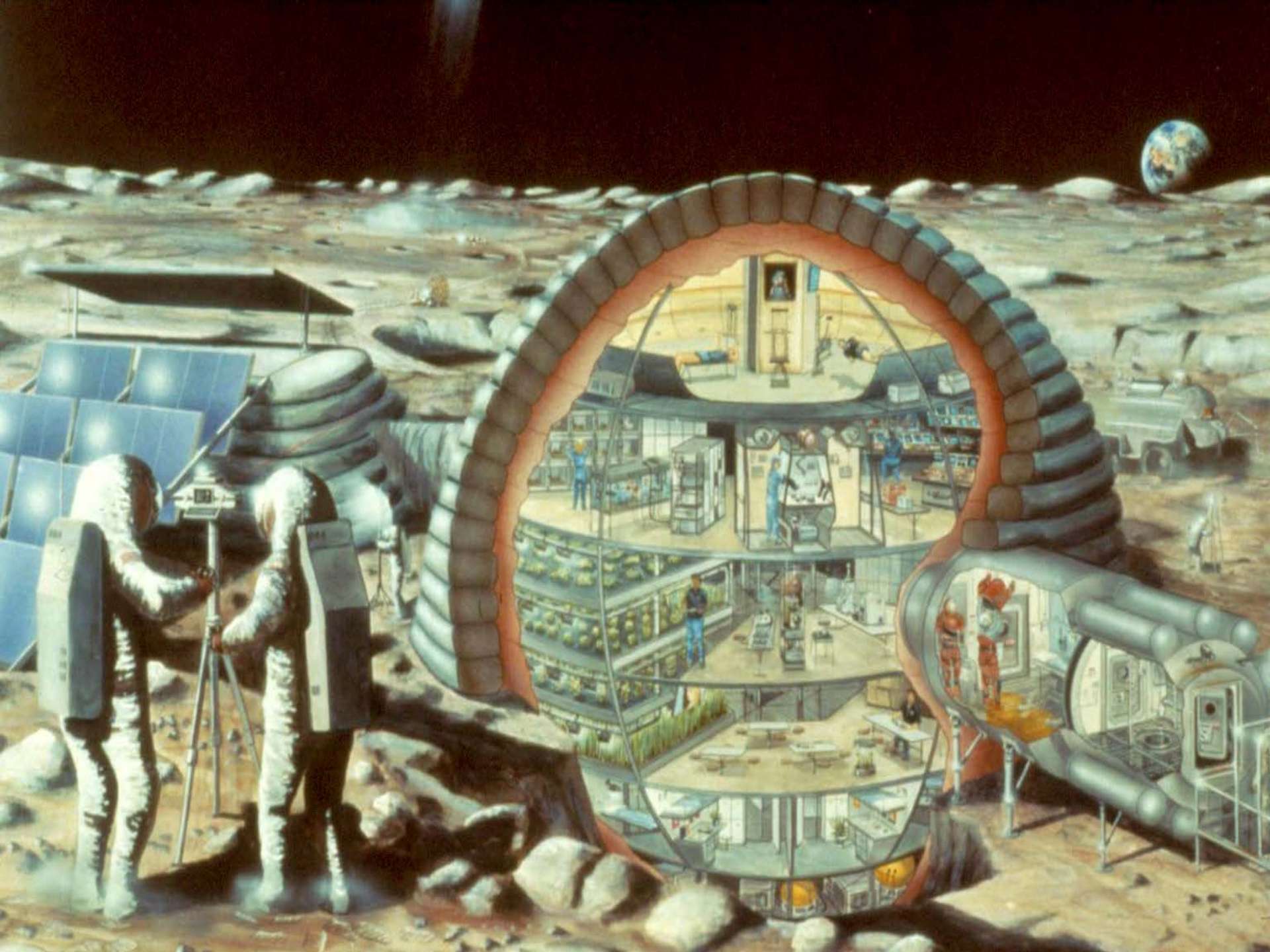
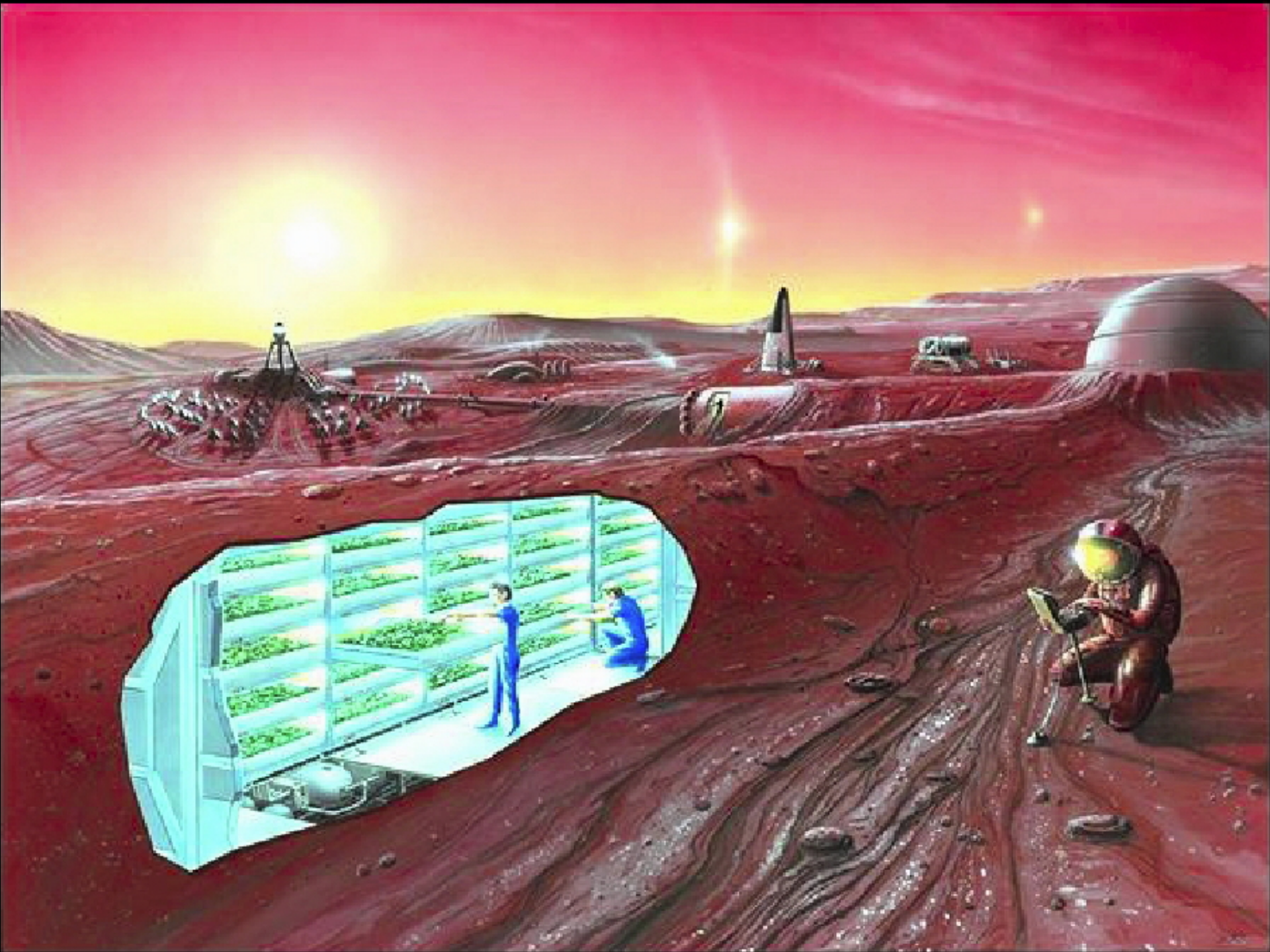
Why grow plants in space?

- Food
- Atmosphere
- Water
- Psychological well being

Bioregenerative Life Support



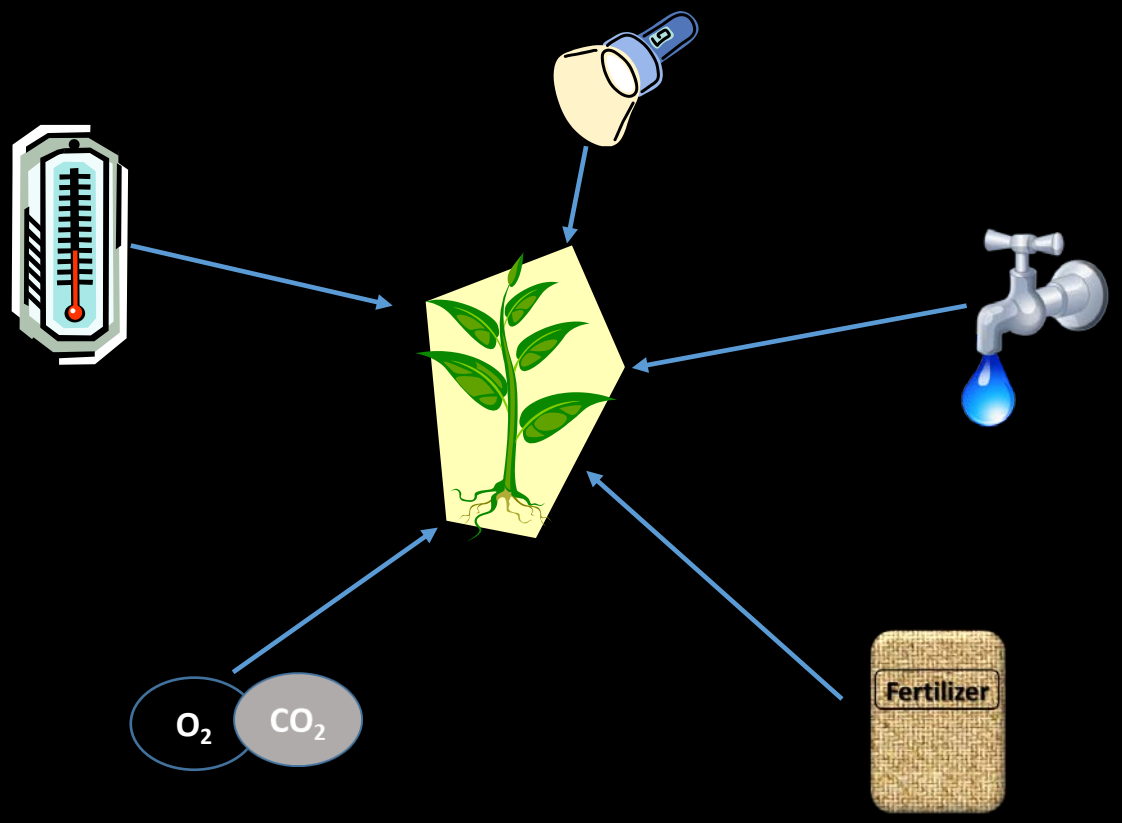




Plant Factories

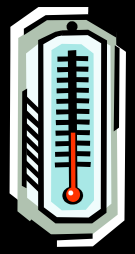
Plant Growth and the Environment

5 Cardinal Factors of Plant Growth…..

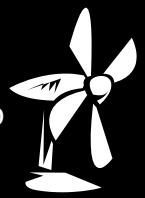


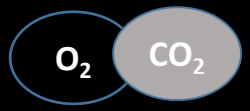
The Space Environment

….and how these work with and without <u>Gravity!</u>

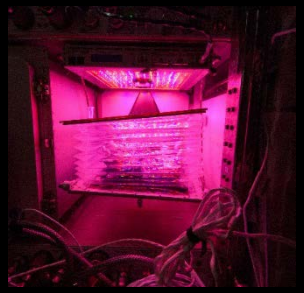


No convection in space so need to mix the air

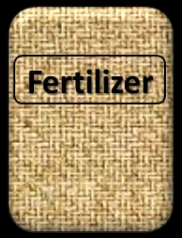




Humans like white light, but plants are fine with red and blue



Water forms a ball, and water and air don't mix well, a problem for roots which need both!



Fertilizer is heavy to launch so we need to learn how to recycle plant waste

The Space Environment

….and how these work with and without <u>Gravity!</u>

Please Play Video 1

The Space Environment

….and how these work with and without <u>Gravity!</u>

Please Play Video 2

Candidate Plants

Salad
Leafy Greens
Tomato
Pepper
Radish
Strawberry
Green Onion
Pea
Carrot

Lettuce, Chinese cabbage, Swiss chard, Mizuna, Spinach

CONSUMED FRESH WITHOUT PROCESSING

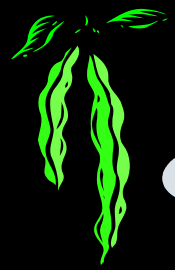
Spice
Basil
Mint
Chives
Dill

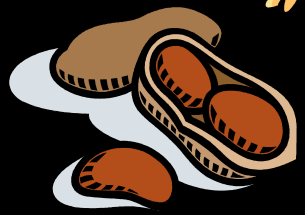
Staple Crops
White Potato
Sweet Potato

MINIMAL PREPARATION / COOKING

Rice
Wheat
Dried Bean
Soybean
Peanut

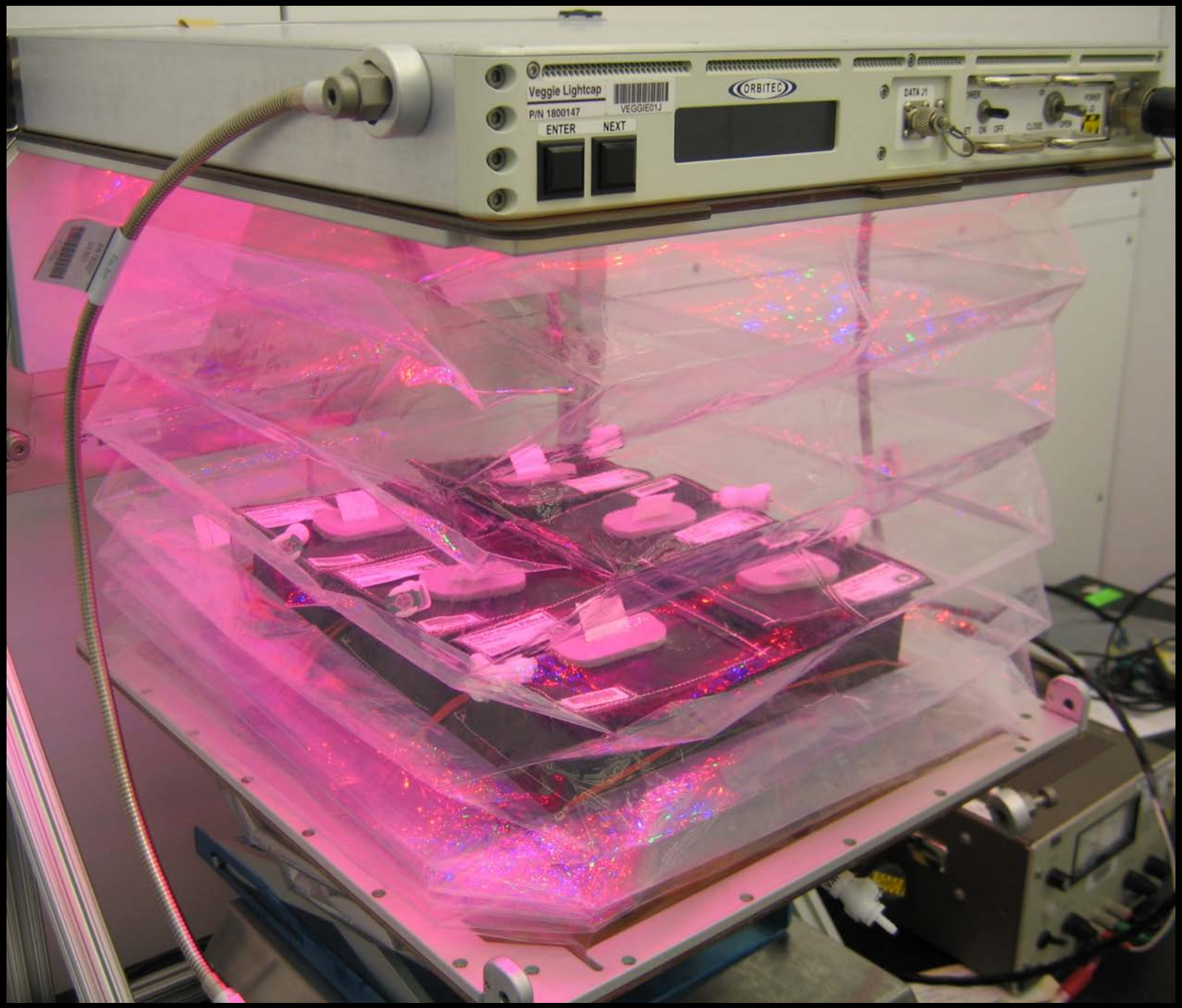
SIGNIFICANT PREPARATION / COOKING



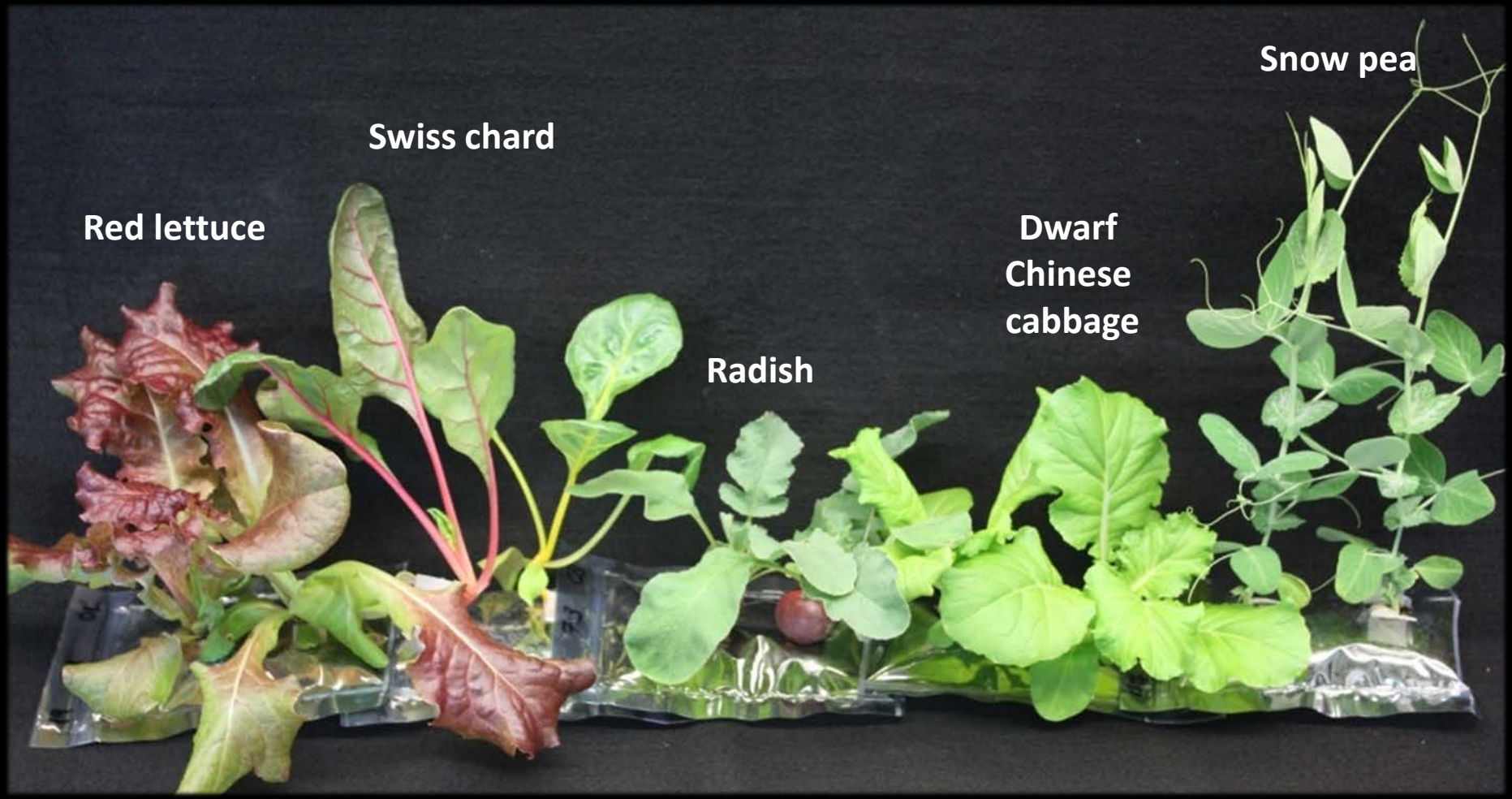


The International Space Station

Designed and built by Orbital Technologies Corporation (ORBITEC)



Example crops tested in plant pillows



Veg-01 initiation

Veg-01 experiment was initiated on 5/8/2014 by Astronaut Steve Swanson

Please Play Video 3

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Please Play Video 5

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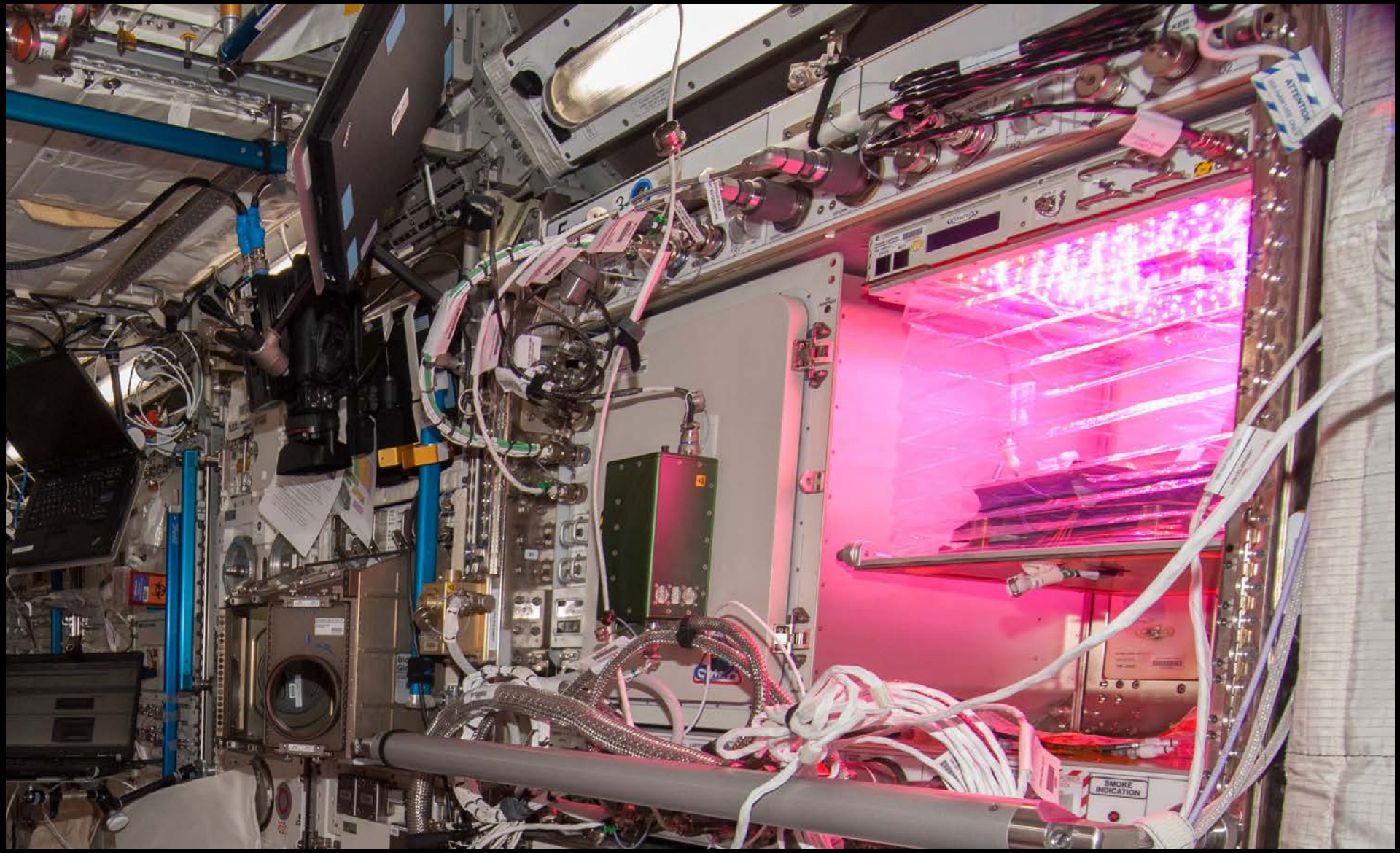

Veg-01 plant thinning (7 DAI)

Veg-01 on-orbit plant thinning operation eliminated competition for resources

Veg-01 Harvest (33 DAI)

Plant Harvest with audience– “I have my overalls on, I’m all set”

Veg-01 Harvest (33 DAI)

Plant Harvest with audience– “I have my overalls on, I’m all set”

Please Play Video 6

Veg-01 First Harvest

Please Play Video 7