Parastronaut – Fly!

Feasibility Study Project

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4th March, 2021


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„Ich dachte, Astronauten müssten Supermänner sein“

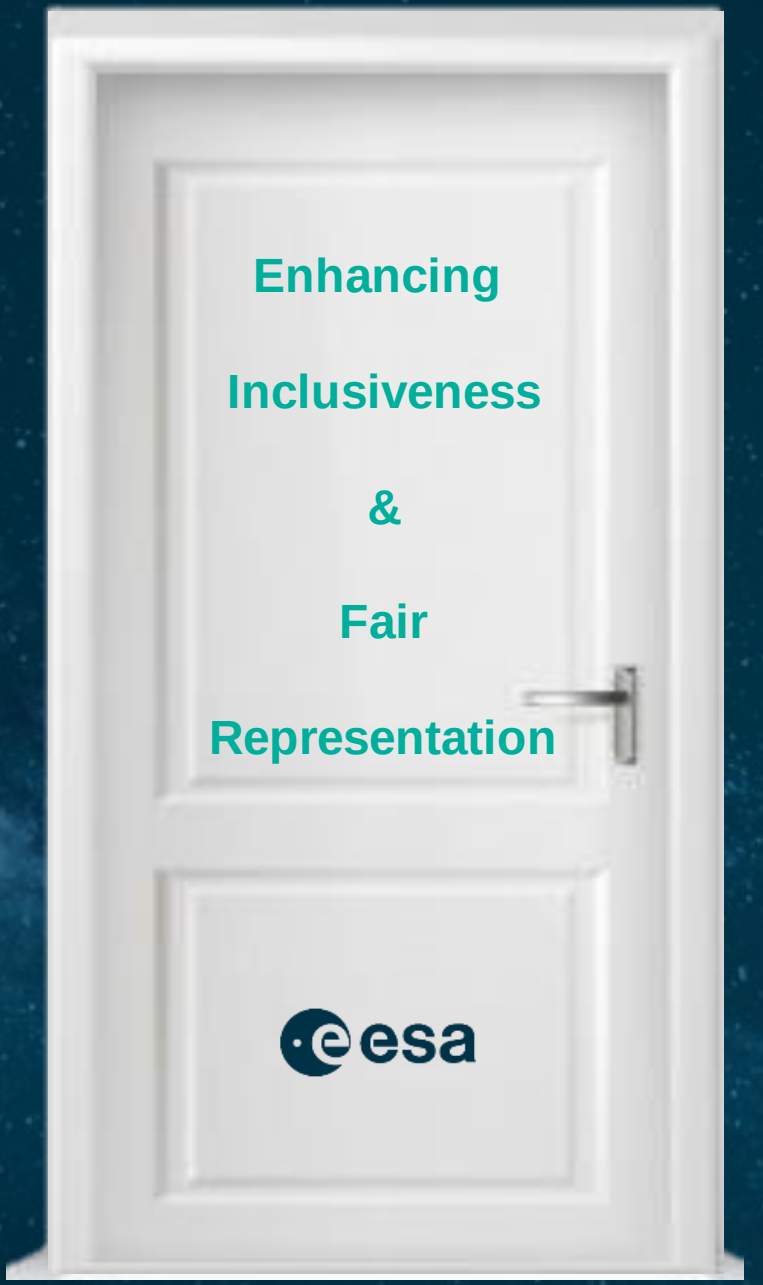
Samantha Cristoforetti tornerà nello spazio: in orbita nel 2022

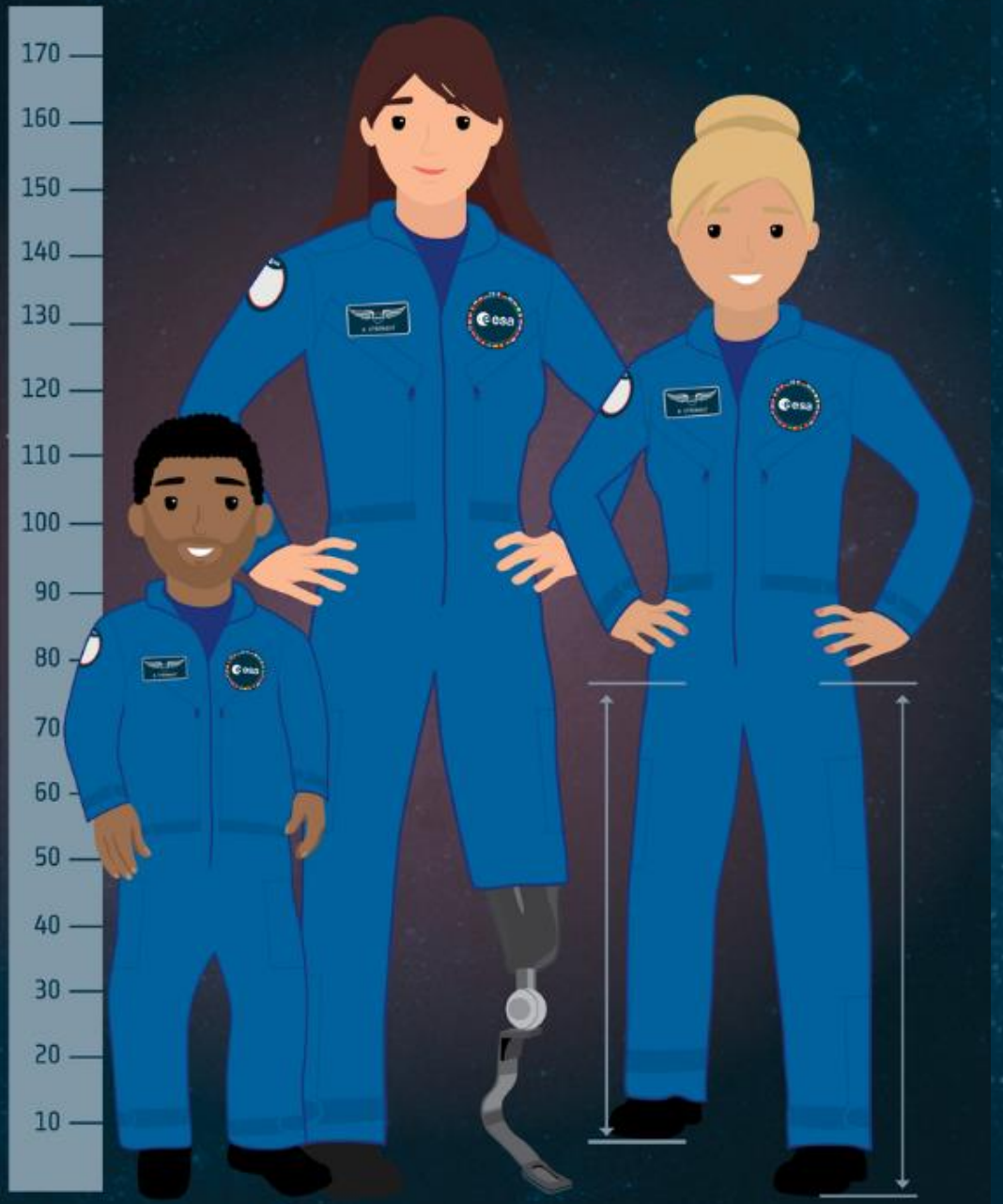
Italy's first female astronaut heads to ISS in Russian craft

Denmark’s first astronaut back on Earth

Tim Peake on historic spacewalk

Espace : Thomas Pesquet va devenir le premier Français commandant de bord d’un vaisseau spatial


Enhancing
Inclusiveness
&
Fair
Representation
esa



Fly!

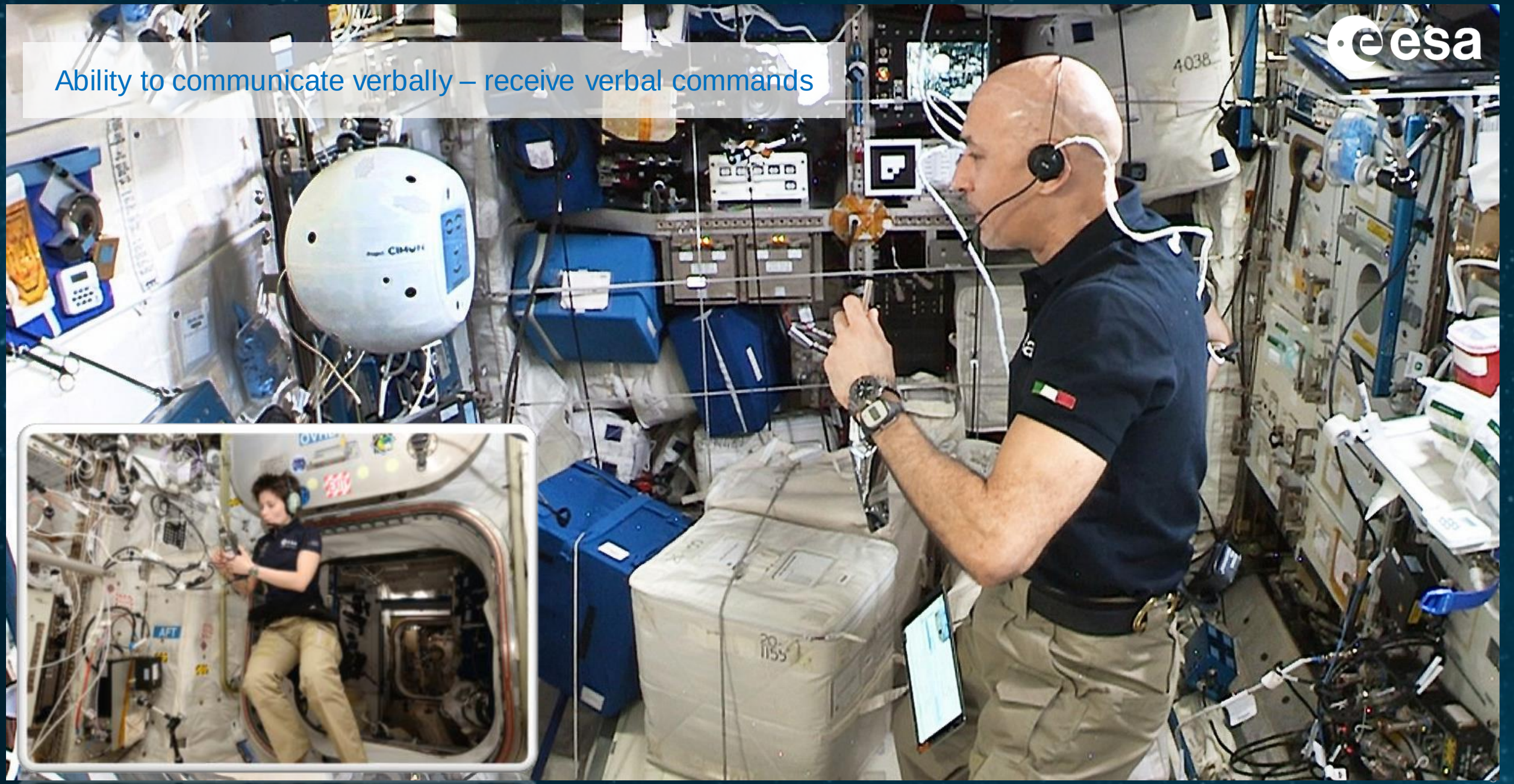
→ THE EUROPEAN SPACE AGENCY

Ability to perform manual tasks

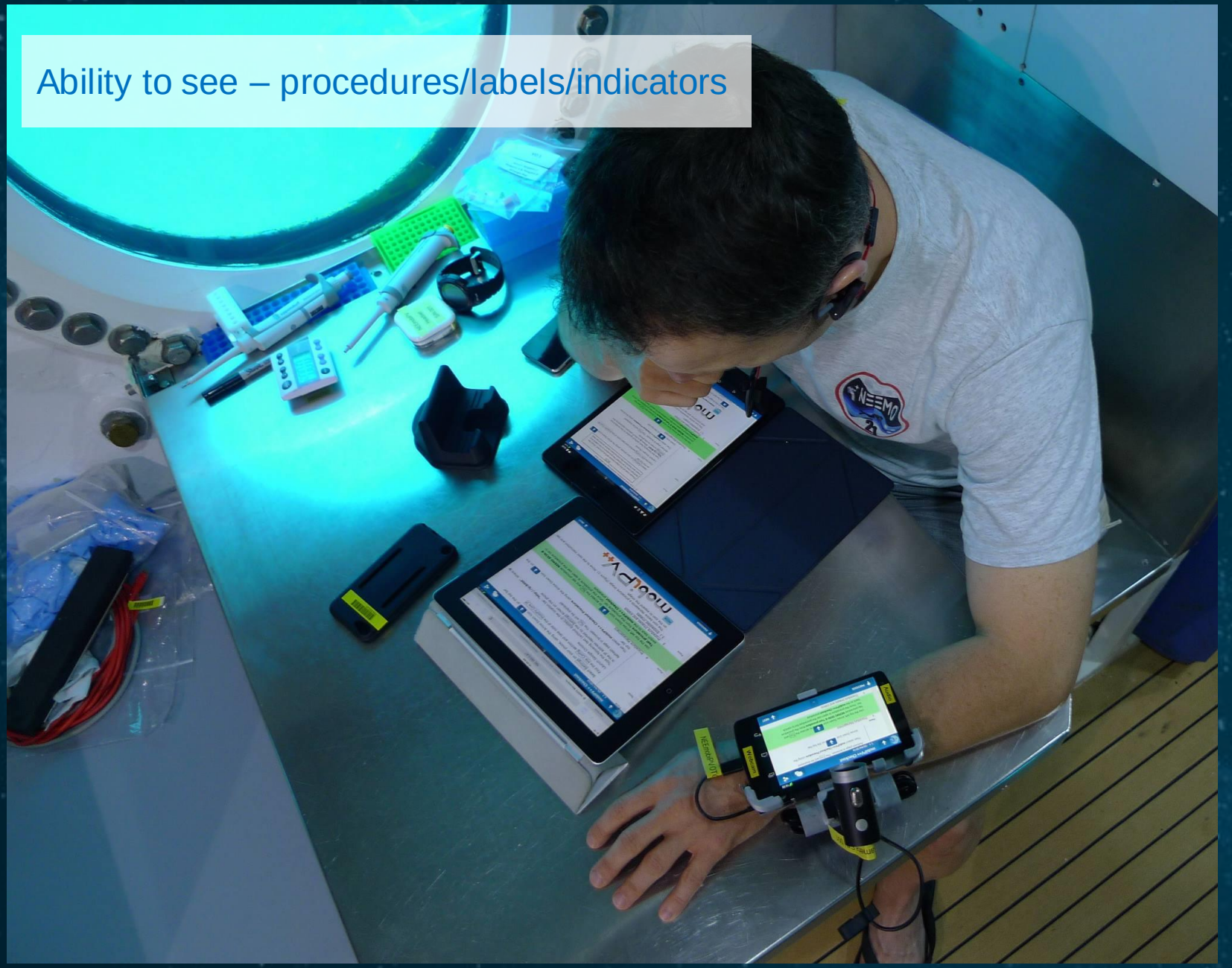
Experiments Setup

Repair & Maintenance

Ability to communicate verbally – receive verbal commands



Ability to see – procedures/labels/indicators



Ability to implement emergency procedures

Autonomy to move or stand

Autonomy to move or stand

Autonomy to move or stand

Fly!

Professional

Safe mission

Useful mission

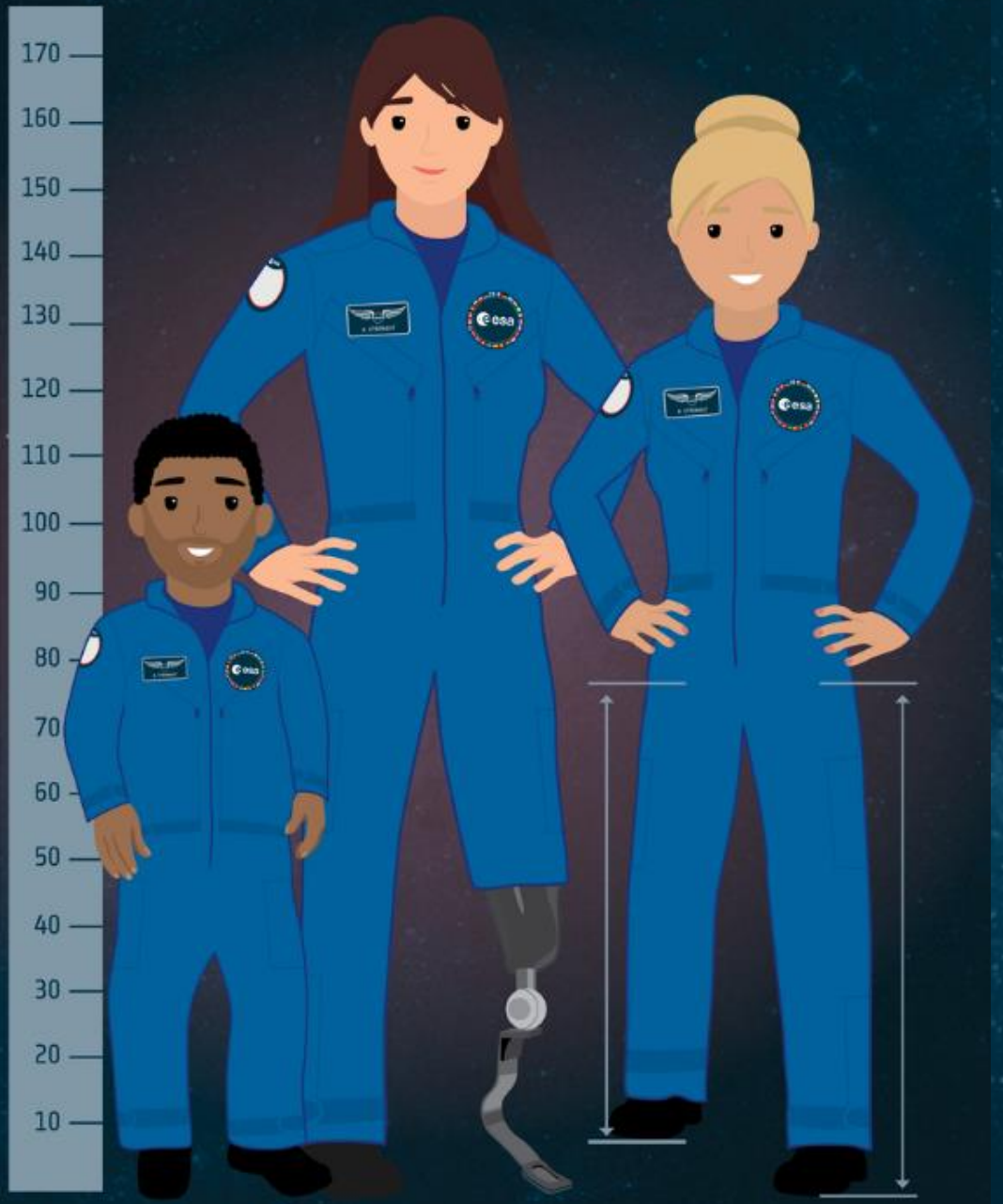
Considering

Requirements for being a professional astronaut

Current technology

ESA will to achieve a flight opportunity in short/medium time frame

Four types of disabilities identified …



Single or double foot deficiency through angle

Single or double leg deficiency below the knee

Pronounced leg length difference

Short stature (<130 cm)

Educational, cognitive & psychological requirements are the same as for ESA Astronaut Selection

Fly!

Crew Operation Loads

Access emergency equipment

Personal protective equipment

Habitable space sizing

Unassisted vehicle egress

Window for Crew tasks

Crew controls for vehicle

Crew Restraints and Mobility Aids

Pressure suit

Protection from cabin depressurisation

Crew survival kit

Countermeasure systems

Pad & ascent abort

Human interface design

Operability of controls

Health stabilisation

Fly!

Exposition to microgravity environment

Cardiovascular system deficiency | Diziness | Confusion | Loss of consciousness

Inability to operate controls

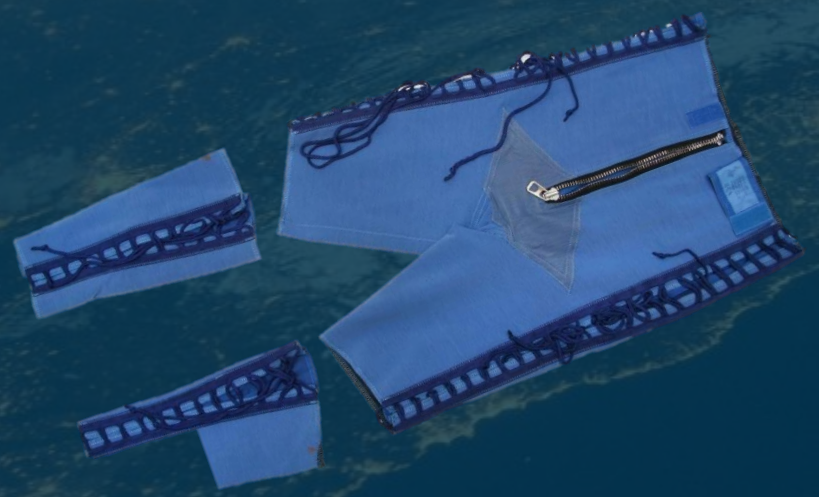
Inability to complete mission critical tasks

Countermeasure systems

Inability to exit the spacecraft

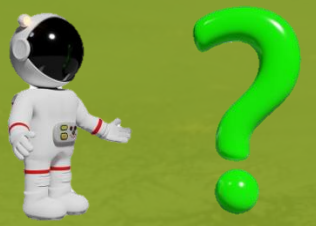
Mitigate negative health effects upon return on Earth

Compression garments



Lower body compression garment from the ankle to the top of the waist, which is considered the part of the abdomen between the bottom of the ribcage and the hips. The minimum pressure applied shall be 40 mmHg and the maximum pressure applied shall be 80 mmHg.

On-orbit exercise devices



What's the impact of a specific disability on the countermeasure systems and how to mitigate it?

Emergency system to protect against cabin depressurisation

Life threatening impact

Mitigate consequences of depressurisation

Pressure suit

Pressure suit to protect astronaut from a depressurised cabin during ascent and entry.

a. The pressure suit shall operate at a minimum pressure of 3.5 psia.
b. The pressure suit shall provide nominal 100% O2 to prevent hypoxia and mitigate the risk of decompression sickness.
c. The pressure suit shall limit ppCO2 to less than 5 mm Hg to mitigate the effects of hypercapnia.

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What's the impact of a specific disability on the design of the pressure suit?


S. CRISTOFORETTI

Thank you!