
EPIC
CHALLENGE JNS

Fishbone Bullet Point Diagram

- People
  - Wrong execution
    - Bad understanding
    - Not enough knowledge
    - Wrong instructions because people on earth can't relate
    - Wrong calculations during simulations
  - Psychological issues
    - Feeling alone in Mars
    - Not being able to adapt into simulations
  - Health issues
    - Not enough medical equipment and medicine
    - Lack of healthcare/medicare person
- Equipment
  - Bad connection
    - Different angeles for satellite
    - Weather issues of planets
    - Video of problem cannot be send to earth
  - Broken seals
    - Doors cannot be opened and/or closed
    - “Opening doors” could lead to exposure of the whole facility
  - Barcode issues
    - Barcodes are worn out/not readable
    - wrong entry into archive
  - Hardware issues
    - Dysfunctional hardware after update
    - Worn out after hardware lifetime limit
    - Repair is impossible - total replacement
- Environment
  - Weather issues
    - Sandstorms on Mars
    - Weather problems on Earth (clouds, hurricane,...)
  - Resistance
    - Viruses/Bacteria develop resistance
  - Microbiological issues
    - Unknown microbiological organisms sticking to spacecraft
    - Unknown side effect of microbiological organisms

Concept

Video-Simulation for same situation-2d barcode alphanumeric-Xr/Vr instructions-Mars Environment

Concept Improvement

Wrong Execution

IDEA
Better training beforehand

Psychological issues

IDEA
- Mental support throughout the mission
-One member with psychological education

Health issues

IDEA
-Enough medical supplies
-Crew member with medicare knowledge

Bad connection

IDEA
-Technology improvement such as 6G
-Using one intermediate satellite for bridge between Earth and Mars

Broken seals

IDEA
-High level of redundancy

Barcode issues

IDEA
-Engraved barcodes
-Two barcodes per item
-Digital unique serial print for barcodes

Hardware issues

IDEA
-Using special softwares to calculate hardware lifetime
-Setting hardware usage capacity to average not maximum
-More testing with the same hardware component on Earth
-Producing easy repairable components

Weather issues

IDEA
-Stronger connections
-Multiple satellites, transmitters and receivers

Resistance

IDEA
-Constant microbiological tests
-Usage of multiple ways (chemicals in addition for example)

Microbiological issues

IDEA
-Constant surveillance and check-ups

Concept Document

Problem and Idea Title

Developing a system for solution of an unexpected issue - VR Instructions

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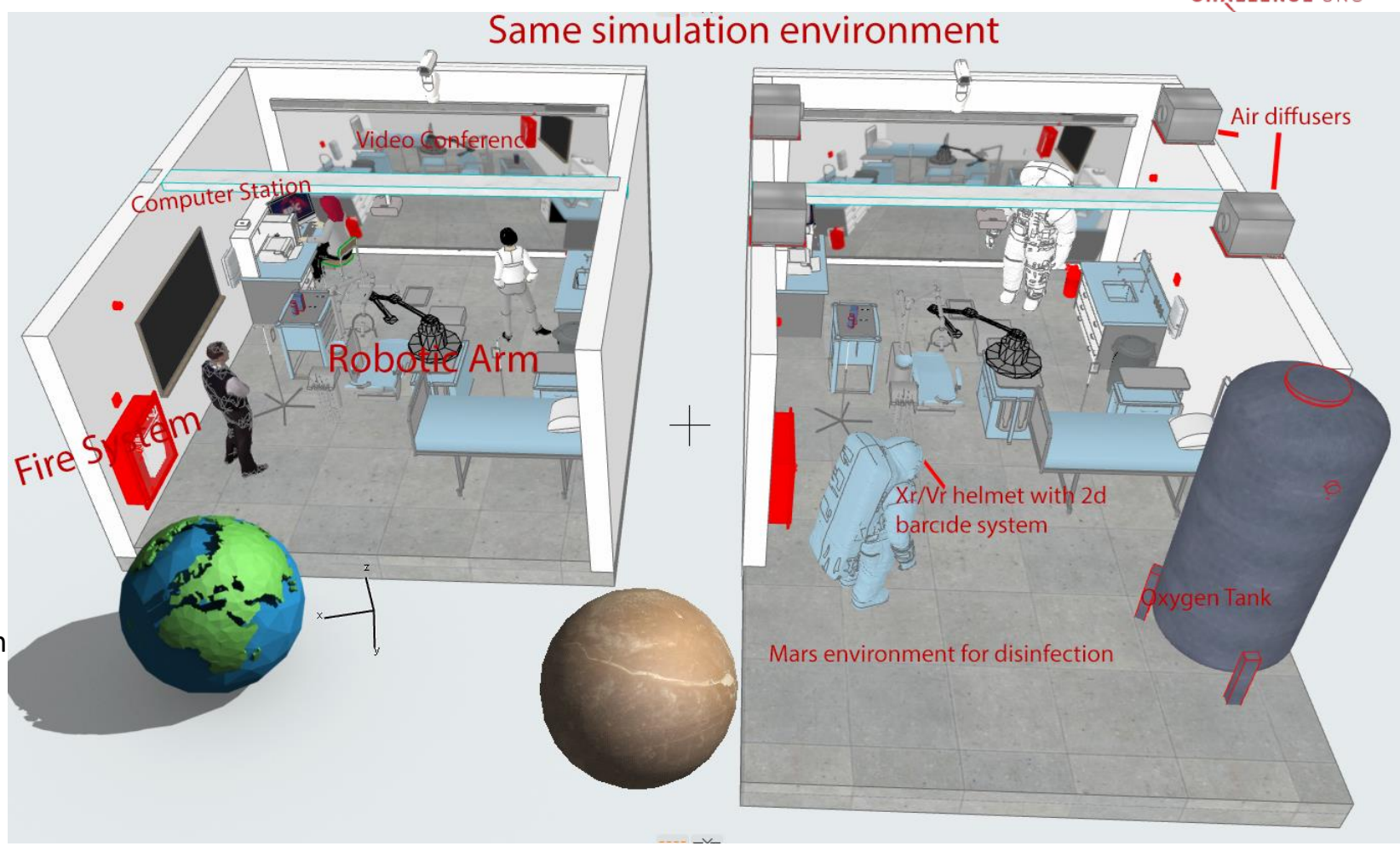
Description

After sending videos of the issues that occurred after using the surgical robot system to Earth, scientists on Earth develop a strategy to repair the robotic surgery system by doing simulations on computers or with proper duplicates of the robotic system on Earth. Then they create instructions for the crew on Mars that can be viewed with VR glasses so that even persons with not sufficient knowledge can understand it. All needed parts and tools for the repair will be labeled with barcodes. To avoid mix-ups every item has two barcodes that are, if possible, engraved. To ensure a safe environment for operations the robot and the OR get disinfected by using Mars´ cold temperatures. All viruses and bacteria will be killed when in contact with the cold (-80°C even during summer).

1.Sending video about emergency robotic surgery system
2.Using simulations to develop instructions for repairing the robotic surgery system
3.Connecting to VR glasses for applying the instructions
4.2d barcode system for identifying parts and tools
5.Using Mars's conditions to disinfect the equipment

Illustration with Keywords



PS: Own 3d creation using Archicad and Photoshop programs

PS: References and work file for 3d model are in the qr code.