

TBD

Scalable Metaverse Enabled Digital Twin Platform

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EXECUTIVE SUMMARY

Problem Statement: 1990's workstation-based architecture in the MCC/MER is outdated and not leveraging Industry 4.0 technologies, including immersive remote collaborative tools for monitoring and decision support.

Project Goal: Develop a prototype of a Metaverse Enabled Digital Twin platform and assess enhanced situational awareness through collaboration, visualization, and simulation.

Overall Project Results / Accomplishments:

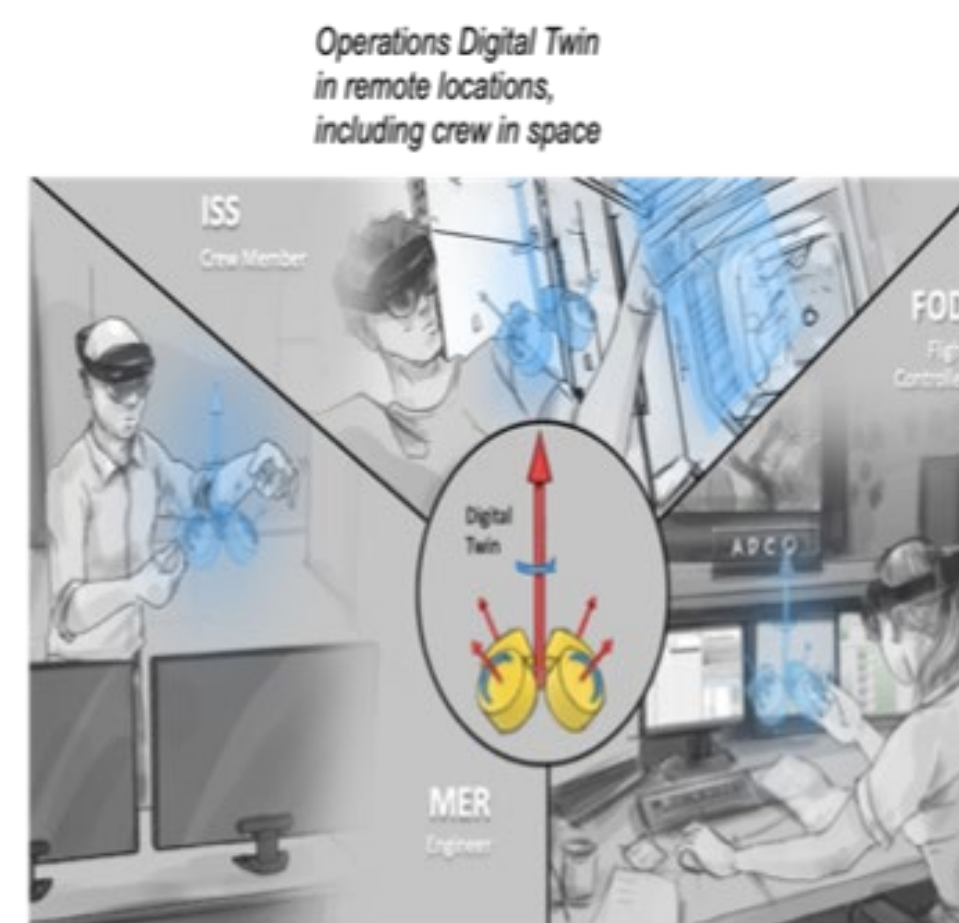
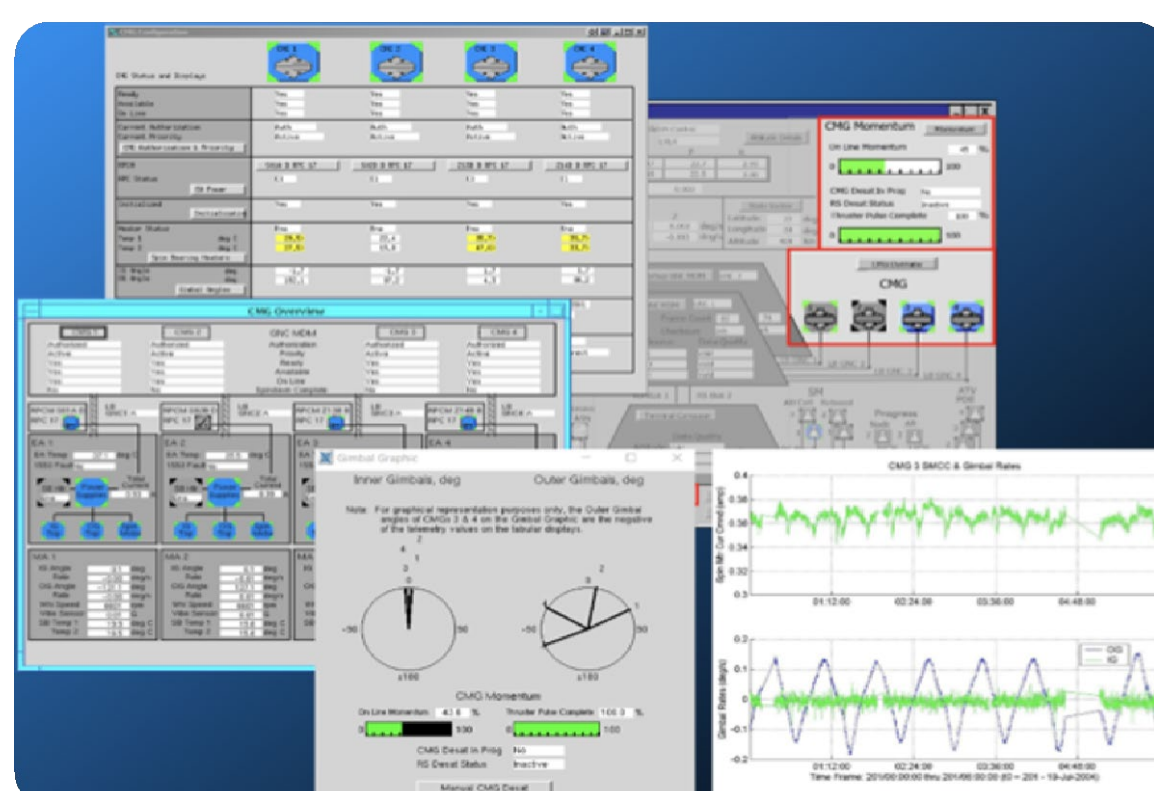
- Assessed Nvidia Omniverse platform for Digital Twin development
- Developed set of extension to customize the platform to specific needs
- Demonstrated the power of DT for visualizing actual system behavior
- Demonstrated the capability to aggregate any relevant information and provide simulation integration within the DT prototype.

INNOVATION

- Cutting-Edge CMG Digital Twin:** Monitors ISS CMG system, converting 2-D data into immersive 3D space.
- Seamless Collaboration:** Enables real-time interaction among controllers, engineers, and astronauts, using various XR devices.
- Space Tech Innovation:** Simplifies complexities, enhances cooperation, setting new standards for space exploration.
- Artemis Mission Support:** Designed to elevate support for upcoming Artemis missions, redefining collaborative exploration.

COLLABORATION

- JSC FOD - Mission Control Center Team
- Artemis Gateway Vehicle System Integration Office – MER Ops Support
- NASA HQ Digital Transformation Office ??



Operation Mission Control Center Digital Twins

OUTCOMES & INFUSION

- Demonstrated the current prototype to Flight Controller
- Potential connection of prototype to real time telemetry through MCC MQTT capability
- Planned to demonstrate DT prototype to Project Luna Team
- Planned to develop proposal to Gateway VSI Office for Gateway MER operations support

FUTURE WORK

- Demonstrate DT concept prototype to multiple disciplines
- Obtain feedback from SMEs to convert prototype to actual operational Digital Twin tool within the MCC
- Collect & curate additional operational artifacts such as PRACA, IFI, DR, QARC, MOD AR, SCR's MADS, to provide ops support including anomalies and trending analysis

