M.I.K.E.
Mixed-Reality Information Kit for Exploration
Embry-Riddle Aeronautical University

The Team

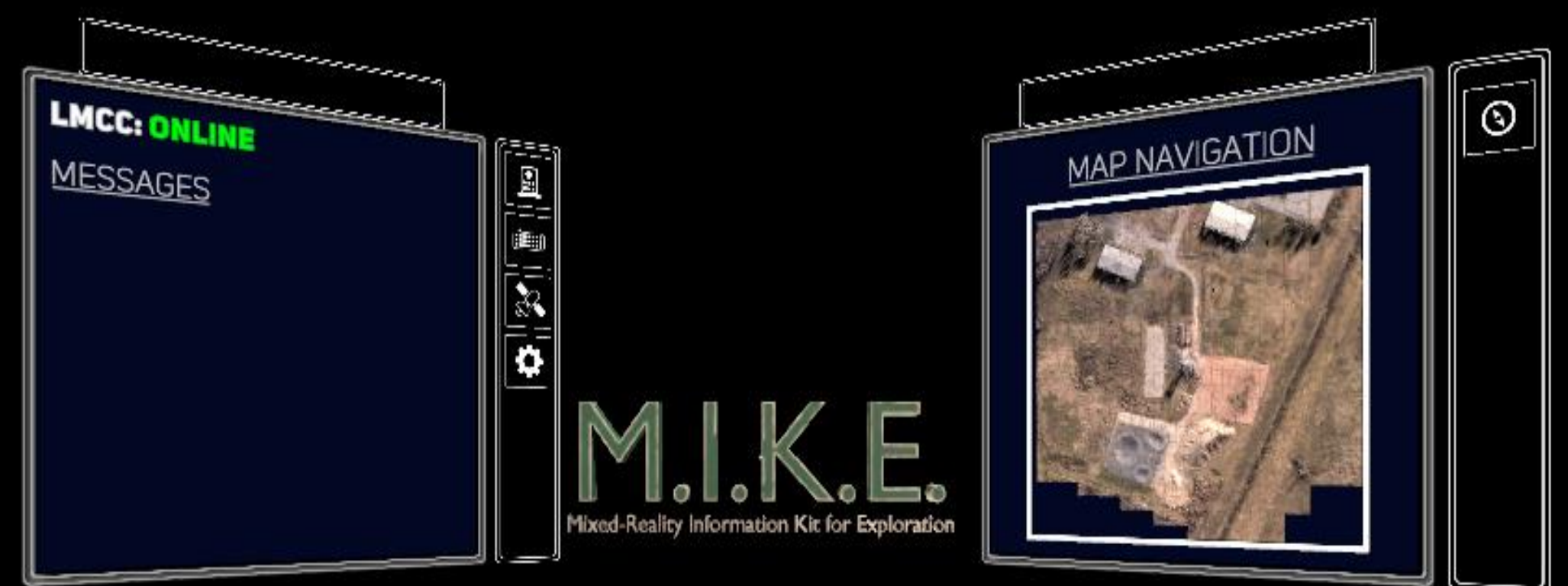| Miranda Young | Joseph DeMartini | Joyce Garcia | Cole Montrose |

Project Overview

MIKE, short for Mixed-Reality Information Kit for Exploration, is an augmented reality, heads-up display developed by students in the A.S.T.R.A. Laboratory at Embry-Riddle Aeronautical University as part of the 2024 NASA SUITS Design Challenge.

The design of MIKE is being built completely from the ground up, only taking inspiration from ALEXEI, the previous iteration of the project used in past years of the NASA SUITS Design Challenge. It utilizes peripheral real estate to display critical mission information to the user. Each window of the interface specializes in a different feature and includes a robust navigational aid, live spacesuit and personal vital signs, mission task objectives and instructions, scientific references, and audio/visual field notetaking capabilities.

Users can interact with the interface using a combination of custom-designed input devices. The controller is mounted in the center of the user's chest using an adapted GoPro Chestie harness. The harness is used to mimic NASA's xEMU. MIKE was constructed using the game engine Unity and is supported by a Magic Leap 2 headset.

Objectives

- Facilitate astronaut autonomy during EVA through guided navigation, task tracking, and access to scientific references
- Provide multi-layered navigational assistance through live projected ground path, overhead compass with waypoints, and aerial mini map system
- Assist in EVA tasks by providing instructions, field note-taking capabilities, galleries of protocols and scientific references, and tracking mission progress
- Aid in search and rescue efforts by providing crew vitals for the user and other crew members, utilizing navigation systems to guide users to each other, and providing emergency protocols and instructions

Design Methodology

MIKE consists of multiple windows that each support different functions of the interface. The **Main** screen contains a mission clock and local time. Emergency alerts will display in red when present. The **Vitals** screen displays live updates of the astronauts personal and spacesuit vital signs. The selection of the other screens are controlled using the custom input devices on the app bar menu. The **Tasks** screen contains a list of mission objectives for the EVA as well as instructions on how to complete EVA activities. The **Navigation** screen contains a mini map of the surrounding area and icons of target destinations. The **Science** screen contains imbedded folders with geological references, instructions and pictures of tool use, emergency protocols, and past EVA samples.

Outreach

- The team has demonstrated the MIKE system to Embry-Riddle Campus during multiple Astronomy Nights and also plan to have testing with the Embry-Riddle student body, both students who would automatically understand the system and students who have no experience with AR or VR.

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