Project INDIGO User Interface

Intelligent 5G "All-G" Networks Designed and Integrated for Globalized Operations

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Overview

INDIGO is an advanced system designed to rapidly recover and restore 5G communications in critical scenarios. It introduces a smart, automated framework that swiftly assesses and responds to combat situations or civilian disasters. Designed for First Responder and Military teams, INDIGO aims to guarantee quick action and access to stable communication links when they are needed most. This innovative solution enhances operational efficiency, promotes open industry standards, and accelerates decision-making capabilities in high-stakes environments where reliable connectivity is crucial.

User Stories

User

Mission Commander

1. As a User I want a simple means of developing a Mission Plan so I can have high confidence in the success of the mission.
2. As a User I want to be able to quickly review key metrics of Operator networks to understand the health of the overall system throughout mission execution.
3. As a Mission Commander I want to be quickly informed of significant network events so I can take immediate action to mitigate mission risk.
4. As a Mission Commander I want to understand at a high level the state of the Mission and Network to understand what risks are present.

Advantages

INDIGO has several advantages over existing frameworks due to its AI-enabled multi-operator approach:

1. Single operators are vulnerable to infrastructure damage, vendor lock-in and low extensibility.
2. AI Planner pools resources and coordinates between available networks.
3. Adaptable prioritization of specific user equipment.
4. Rapid modification to mission parameters as situation unfolds.
5. Fosters open industry standards for compatibility and fostering interoperability across diverse network infrastructures.

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Frontend Design

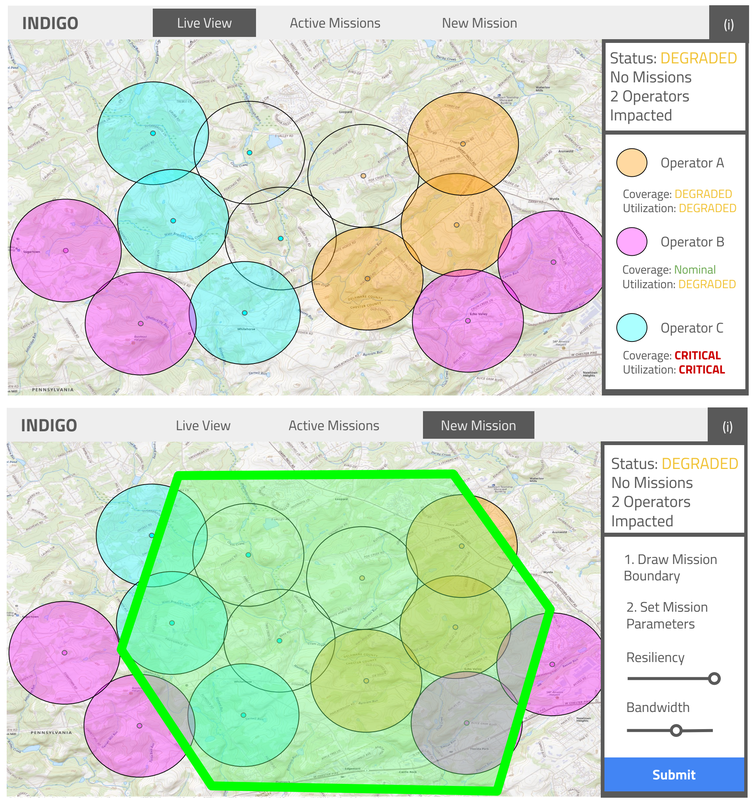


Figure 1: INDIGO User Interface Mockup.

Users are able to observe operator status, define geographic mission boundaries, and submit mission plans to the INDIGO system.

System Architecture

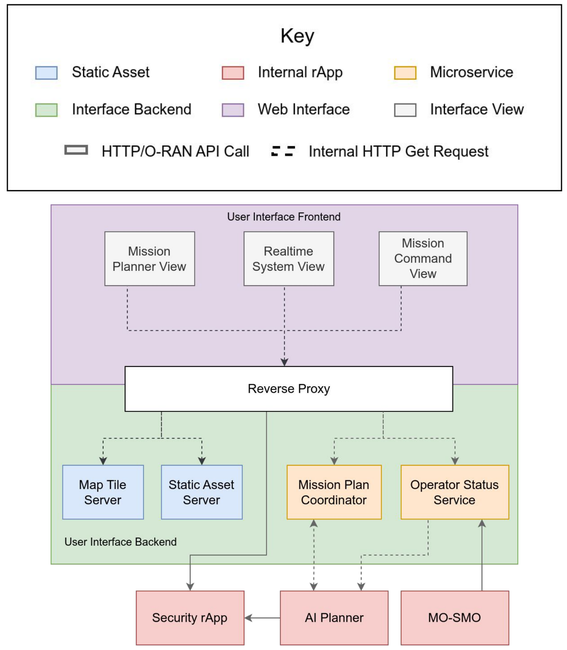


Figure 2: Map of System Architecture.

Progress

Frontend

Dockerized

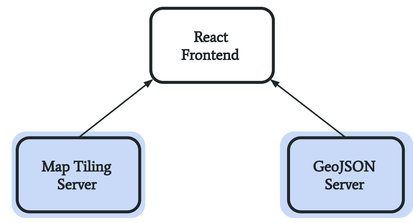
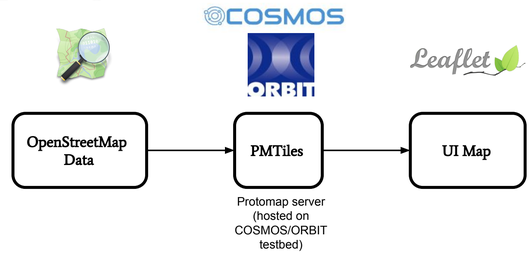


Figure 3: The implemented features of the the frontend architecture. Map tiling and GeoJSON servers feed static data that is rendered on the interactive map. Both services operate in Docker containers.

Backend

A. Map Tiling Server



B. External Integration

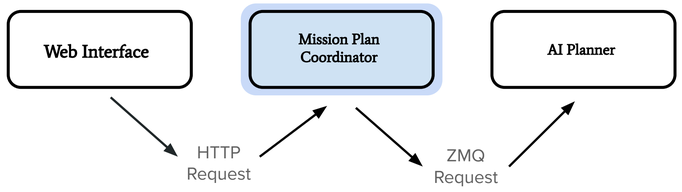


Figure 4: Depiction of the implemented backend architecture. (A) The pipeline for producing and hosting the map tiling server. Tiles are downloaded from OpenStreetMap, converted to PMTiles format and rendered using Leaflet JS. (B) Web Interface sends user requests to Mission Plan Coordinator and AI Planner for processing.

Discussion/ Future Work

The INDIGO project has potential to take advantage of emerging open industry standards and increased integration between network operators.

In the future, we plan to:

1. Bridge the connection between the UI and the AI Planner.
2. Host servers on COSMOS testbed servers.
3. Implement an nginx reverse proxy as an unified interface.

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