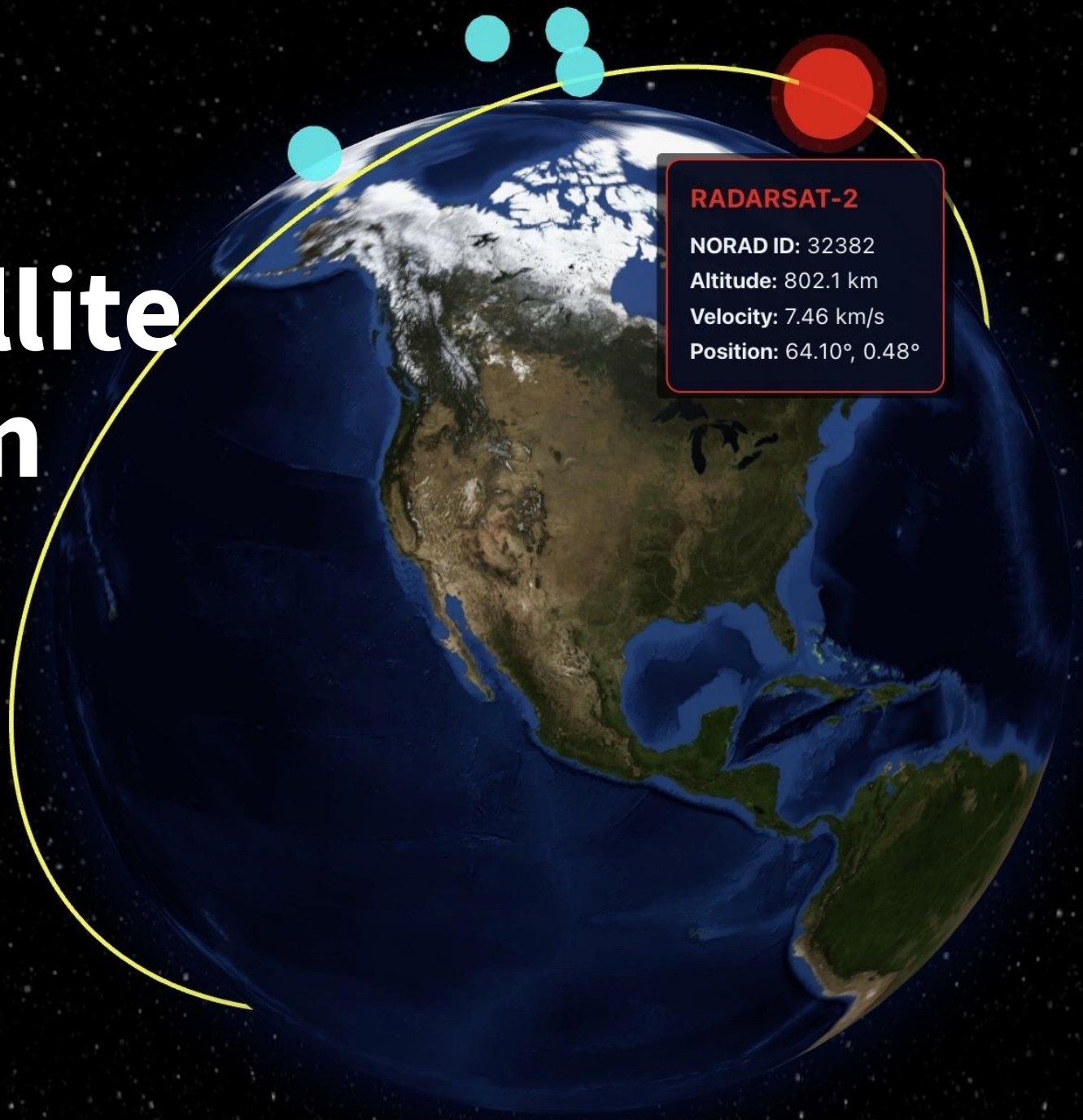
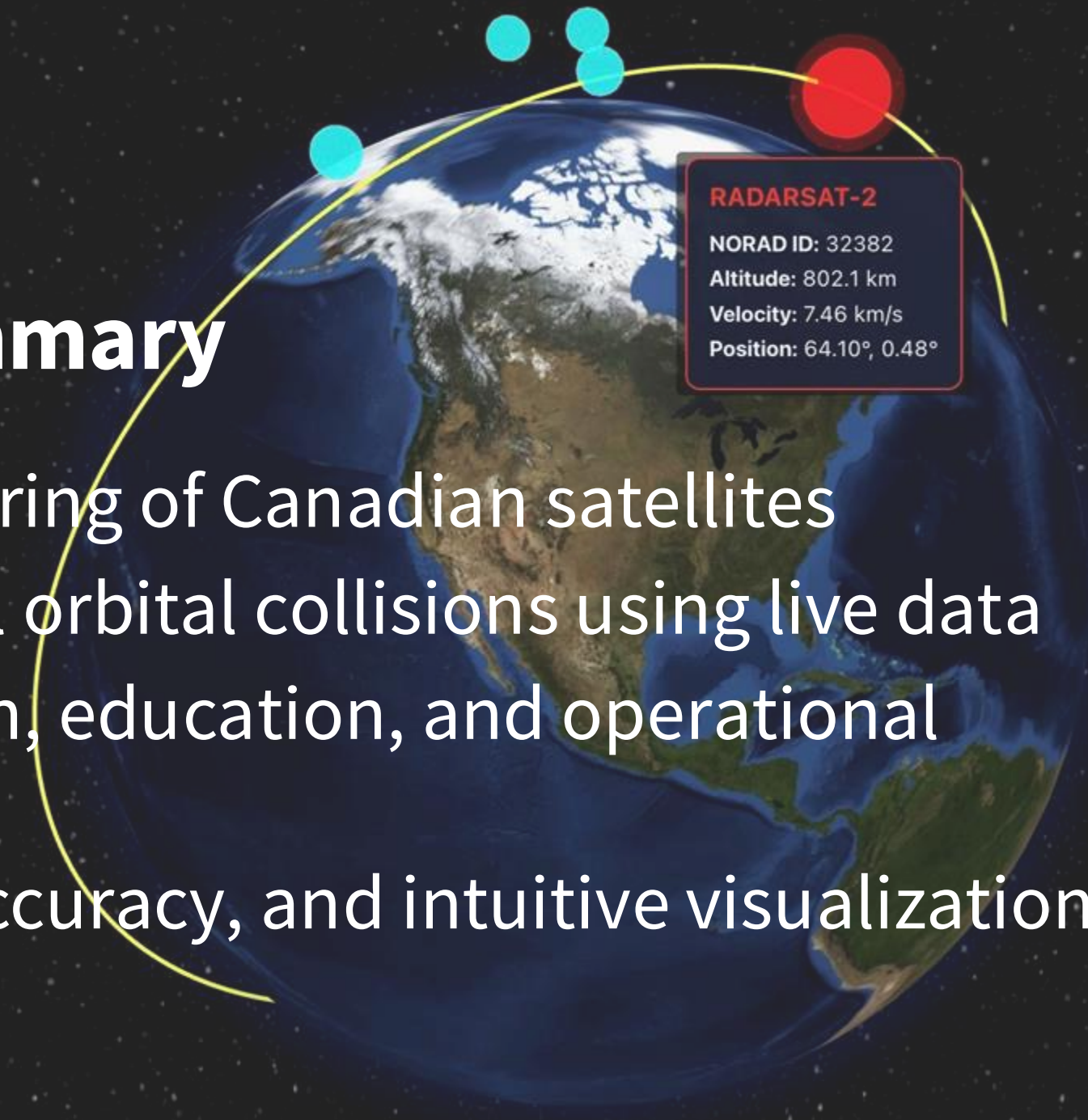
Canadian Satellite Visualization



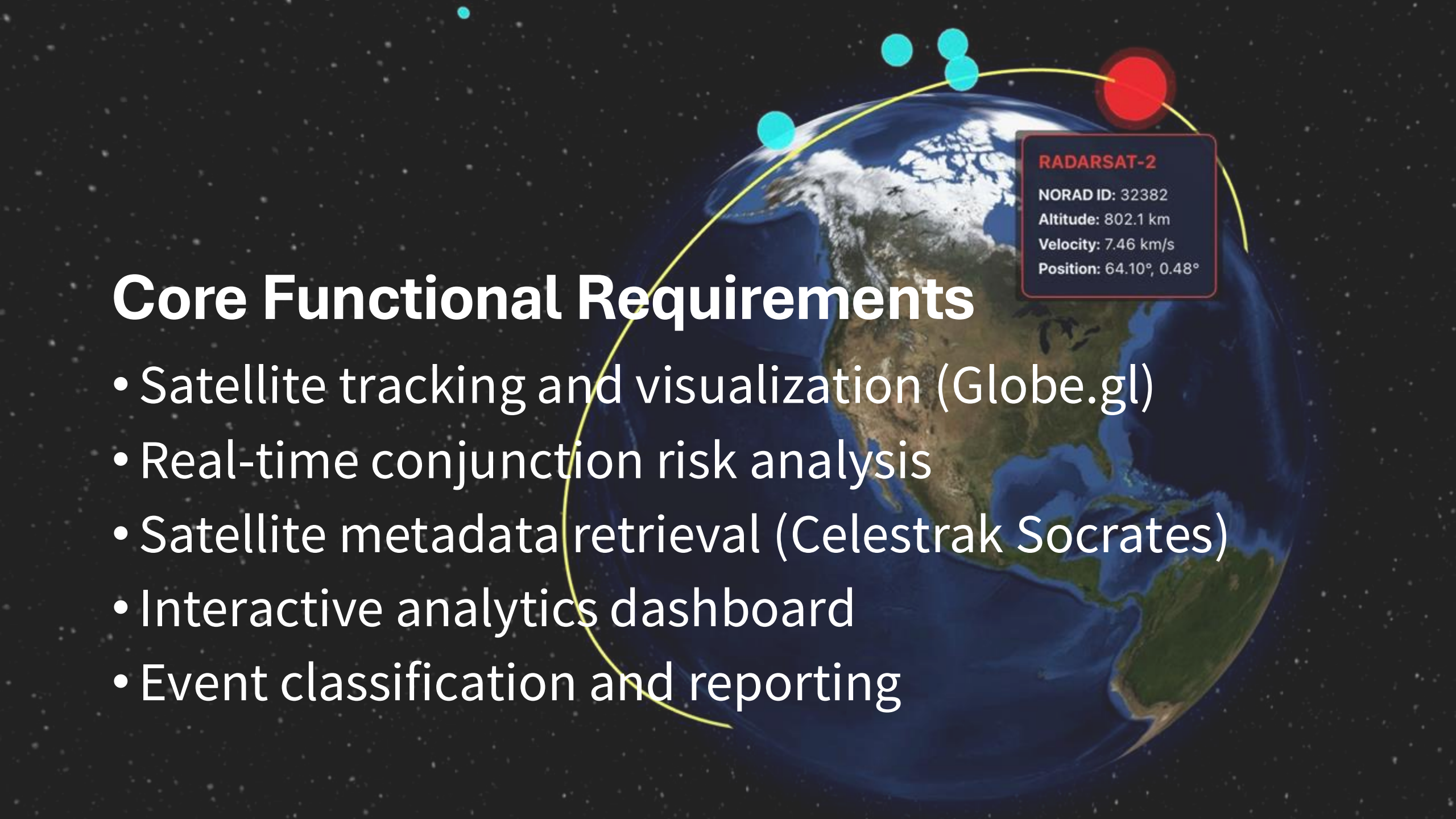
Team Members:

Gurleen | Prabhath | Shaji

Executive Summary



- Real-time monitoring of Canadian satellites
- Predicts potential orbital collisions using live data
- Supports research, education, and operational safety
- Built for speed, accuracy, and intuitive visualization



Core Functional Requirements

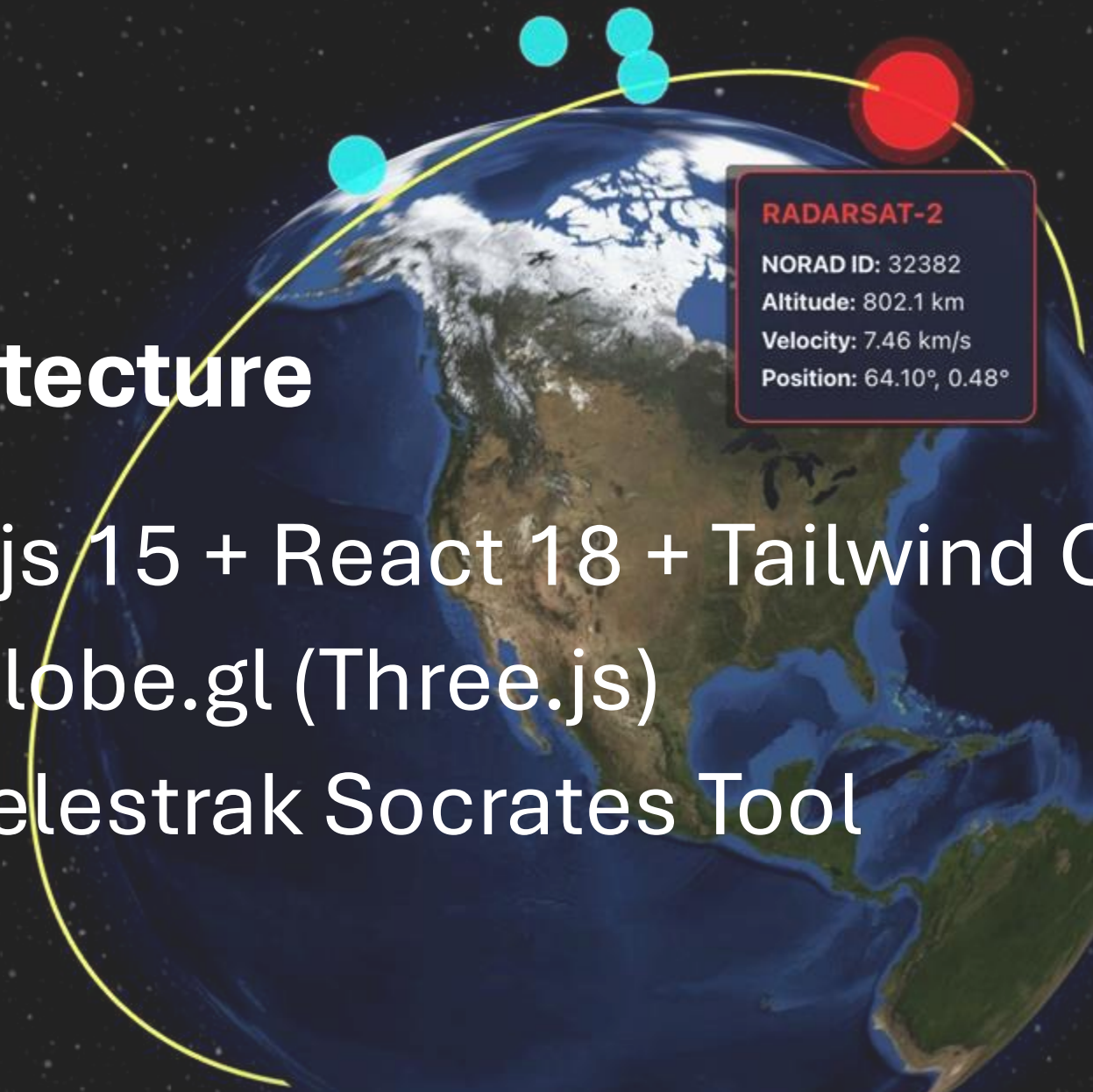
- Satellite tracking and visualization (Globe.gl)
- Real-time conjunction risk analysis
- Satellite metadata retrieval (Celestrak Socrates)
- Interactive analytics dashboard
- Event classification and reporting

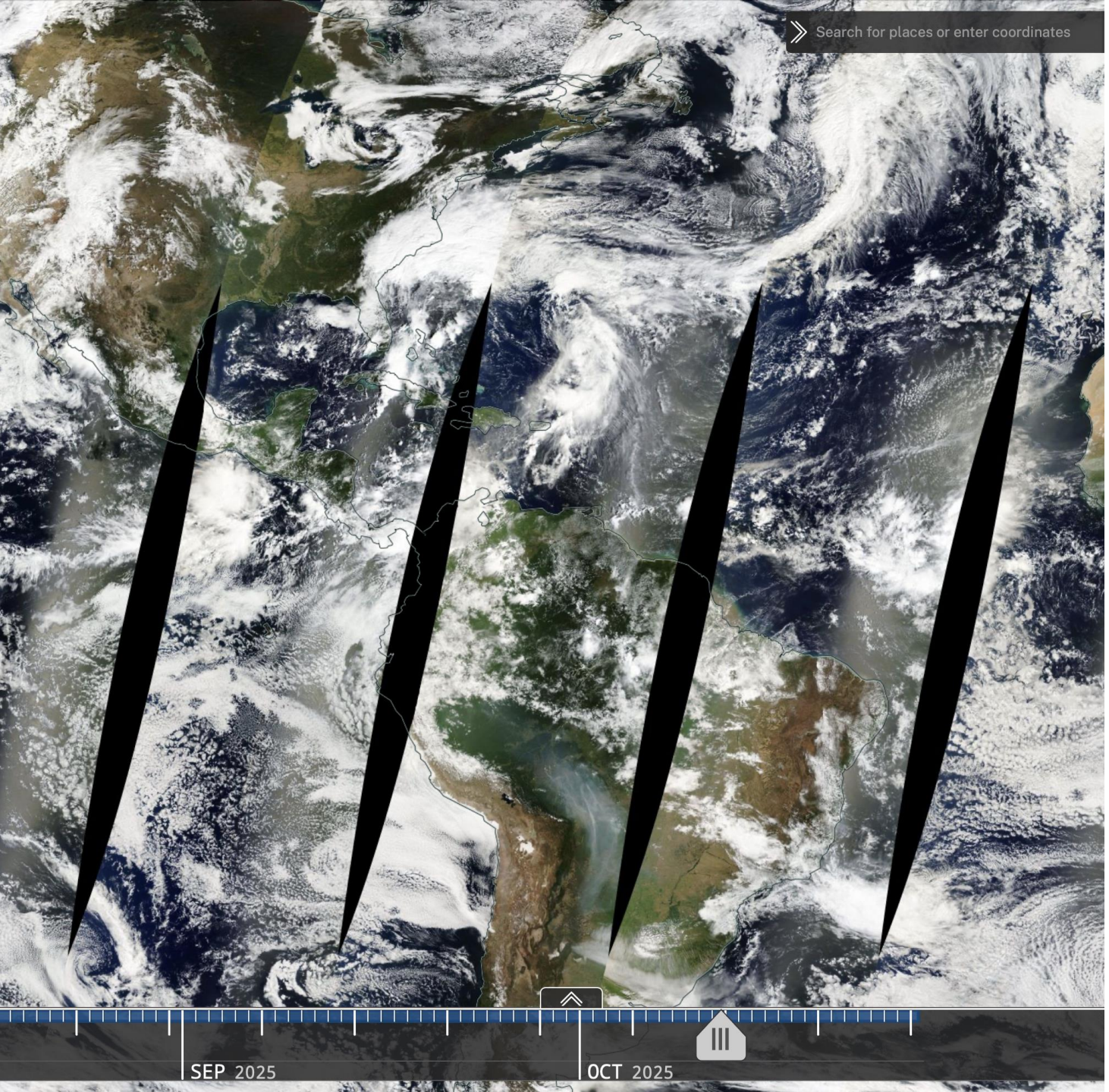
Risk Assessment & Classification

- High Risk < 1 km range or P > 0.0001 (Red)
- Medium Risk < 5 km range or P > 0.00001 (Yellow)
- Low Risk ≥ 5 km range or P ≤ 0.00001 (Gray)
- Dynamic algorithm re-evaluates risks with new data

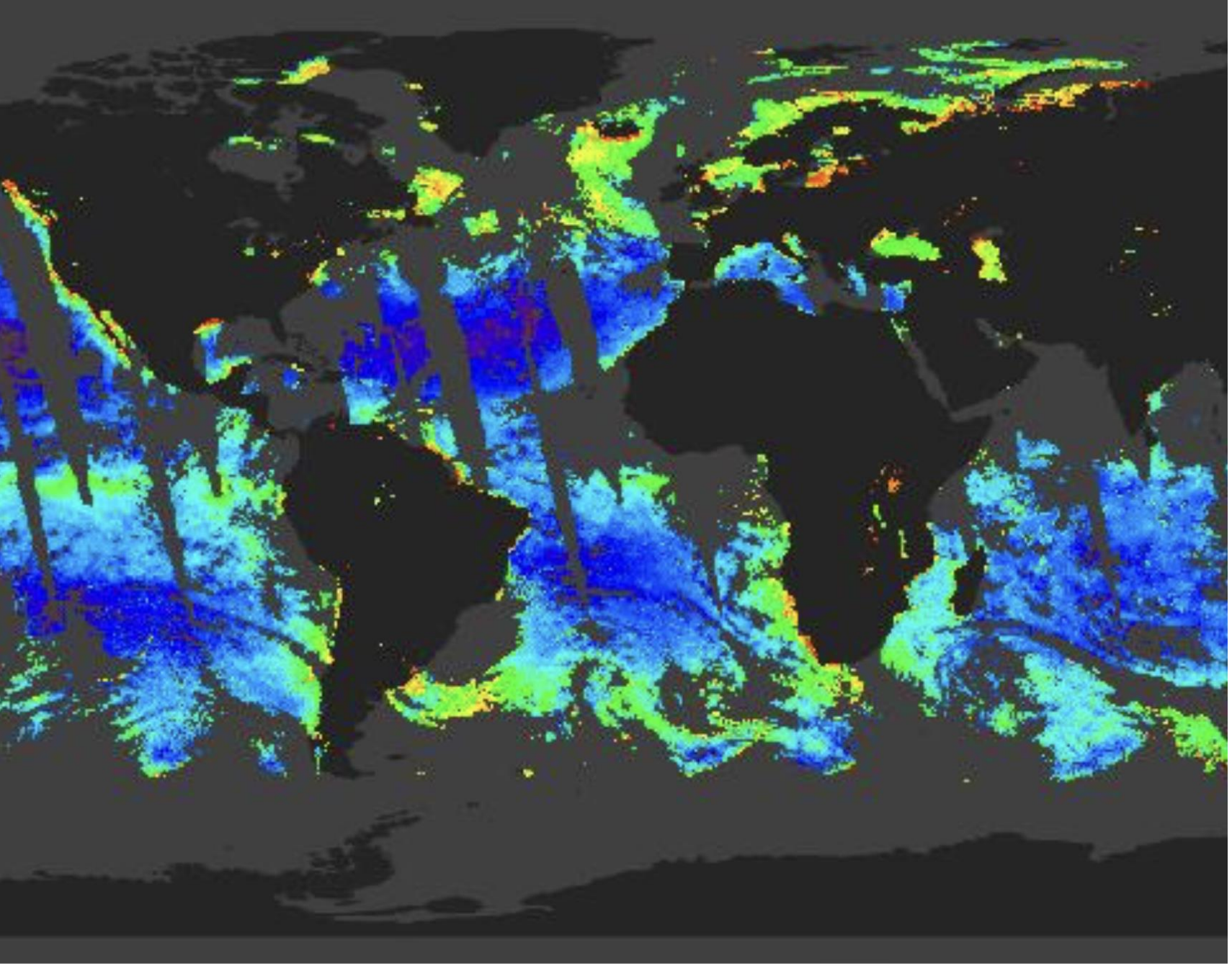
Technical Architecture

- Frontend: Next.js 15 + React 18 + Tailwind CSS
- Visualization: Globe.gl (Three.js)
- Data Source: Celestrak Socrates Tool





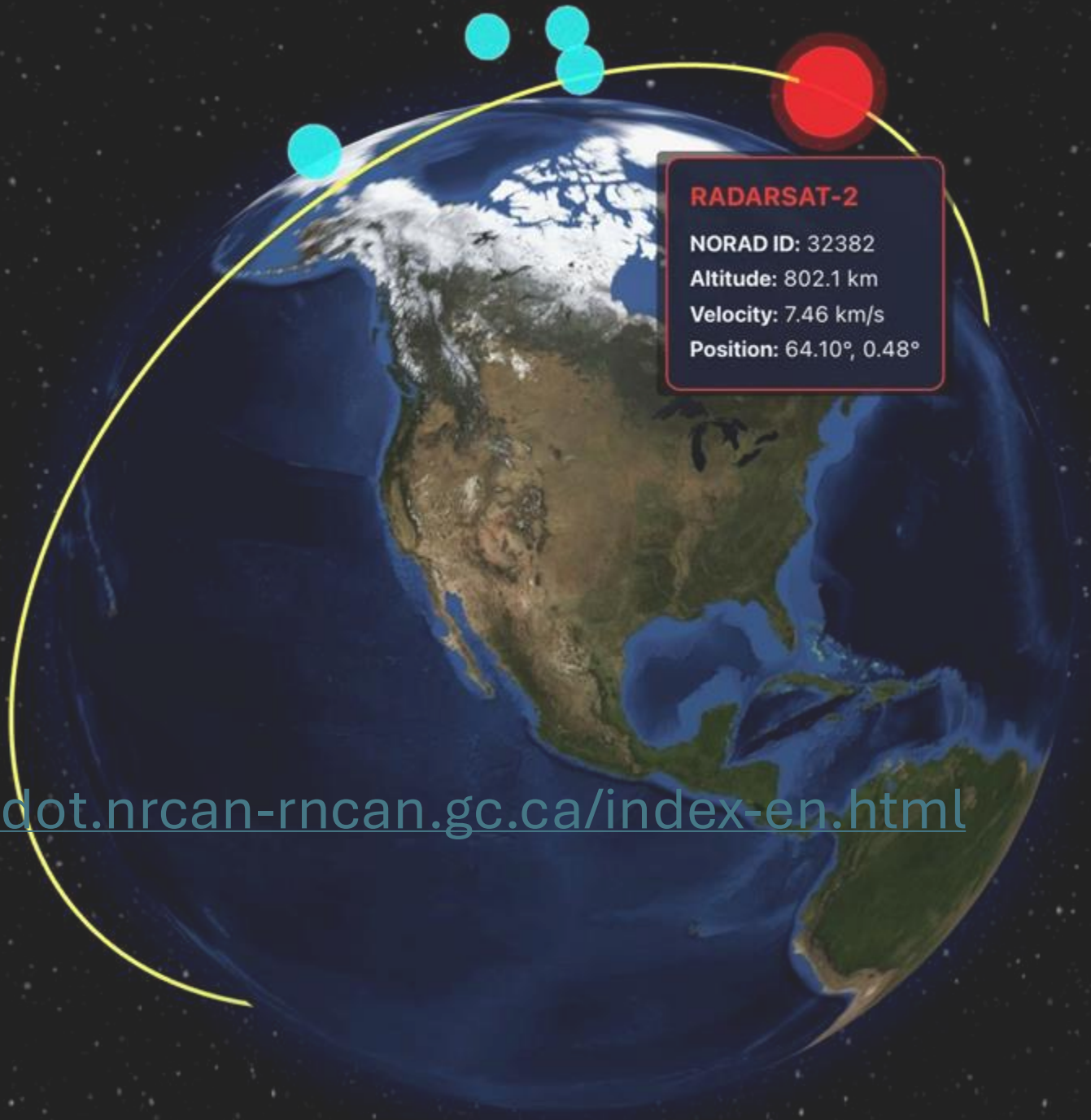
- Pockets of blind spots not covered by multiple satellites.
- Most international satellites follow similar paths.
- coverage areas is extensive high in density areas.
- Satellite data in parts of central and eastern Canada is outdated.



Costal Data

- Similar pattern is observed.

Canadian Data



- https://www.eodms-sgdot.nrcan-rncan.gc.ca/index-en.html

Hackathon Wrap-Up

A modern platform for real-time satellite conjunction analysis.

Enhancing safety, awareness, and innovation in space operations.