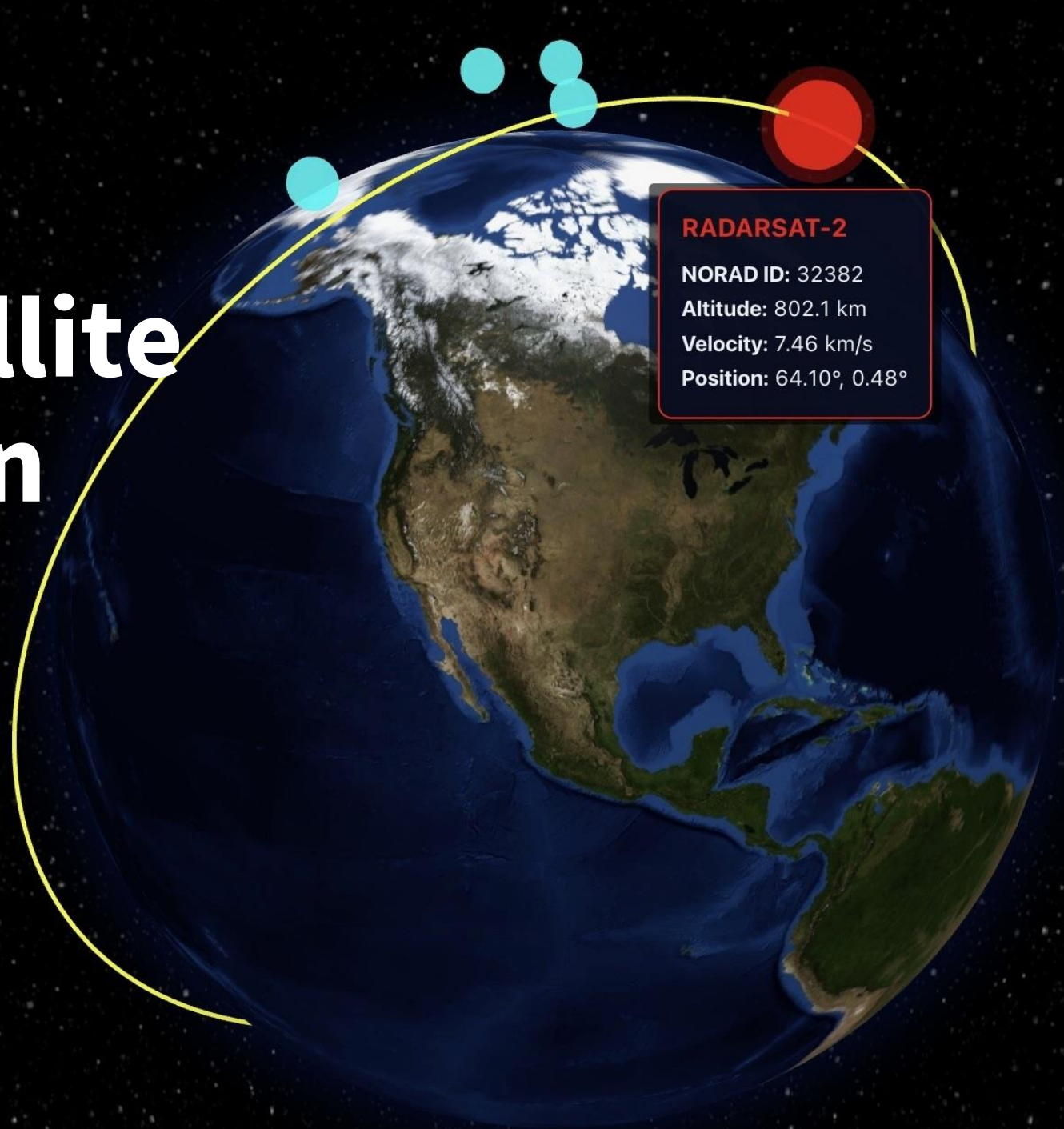


# Canadian Satellite Visualization

**Team Members:**

**Gurleen | Prabhath | Shaji**



## **RADARSAT-2**

**NORAD ID:** 32382

**Altitude:** 802.1 km

**Velocity:** 7.46 km/s

**Position:** 64.10°, 0.48°

# 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

## RADARSAT-2

NORAD ID: 32382

Altitude: 802.1 km

Velocity: 7.46 km/s

Position: 64.10°, 0.48°



# 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

## RADARSAT-2

NORAD ID: 32382

Altitude: 802.1 km

Velocity: 7.46 km/s

Position: 64.10°, 0.48°

# Risk Assessment & Classification

The background of the slide is a view of Earth from space, showing the Americas. A yellow line represents a satellite orbit around the planet. Several colored dots are placed along this orbit: a red dot at the top right, and several cyan dots further along the path. A semi-transparent dark blue box with a red border is positioned near the red dot, containing white text that provides technical details about the RADARSAT-2 satellite.

- High Risk  $< 1$  km range or  $P > 0.00001$  (Red)
- Medium Risk  $< 5$  km range or  $P > 0.000001$  (Yellow)
- Low Risk  $\geq 5$  km range or  $P \leq 0.000001$  (Gray)
- Dynamic algorithm re-evaluates risks with new data

## RADARSAT-2

NORAD ID: 32382

Altitude: 802.1 km

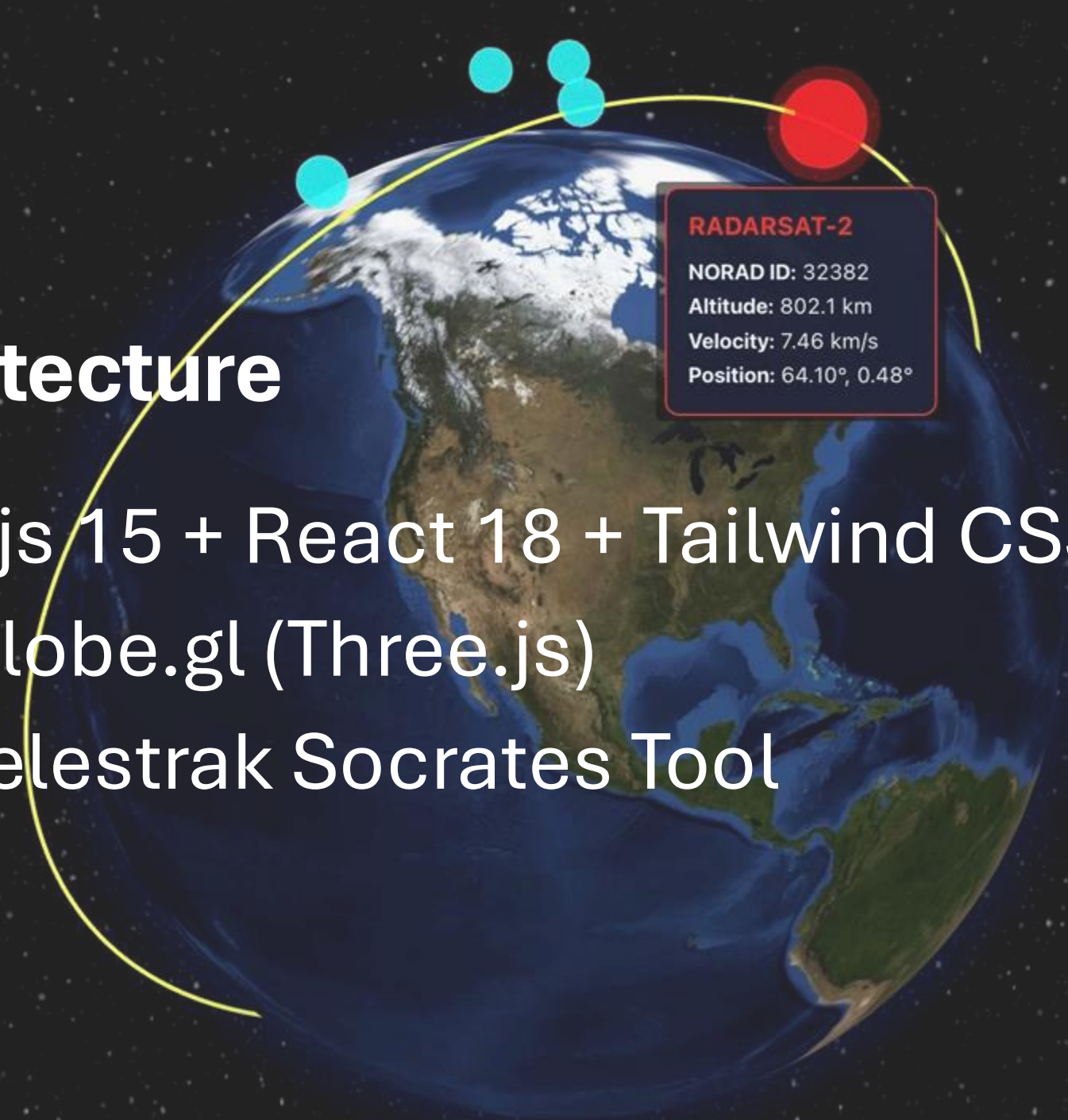
Velocity: 7.46 km/s

Position: 54.10°, 0.48°

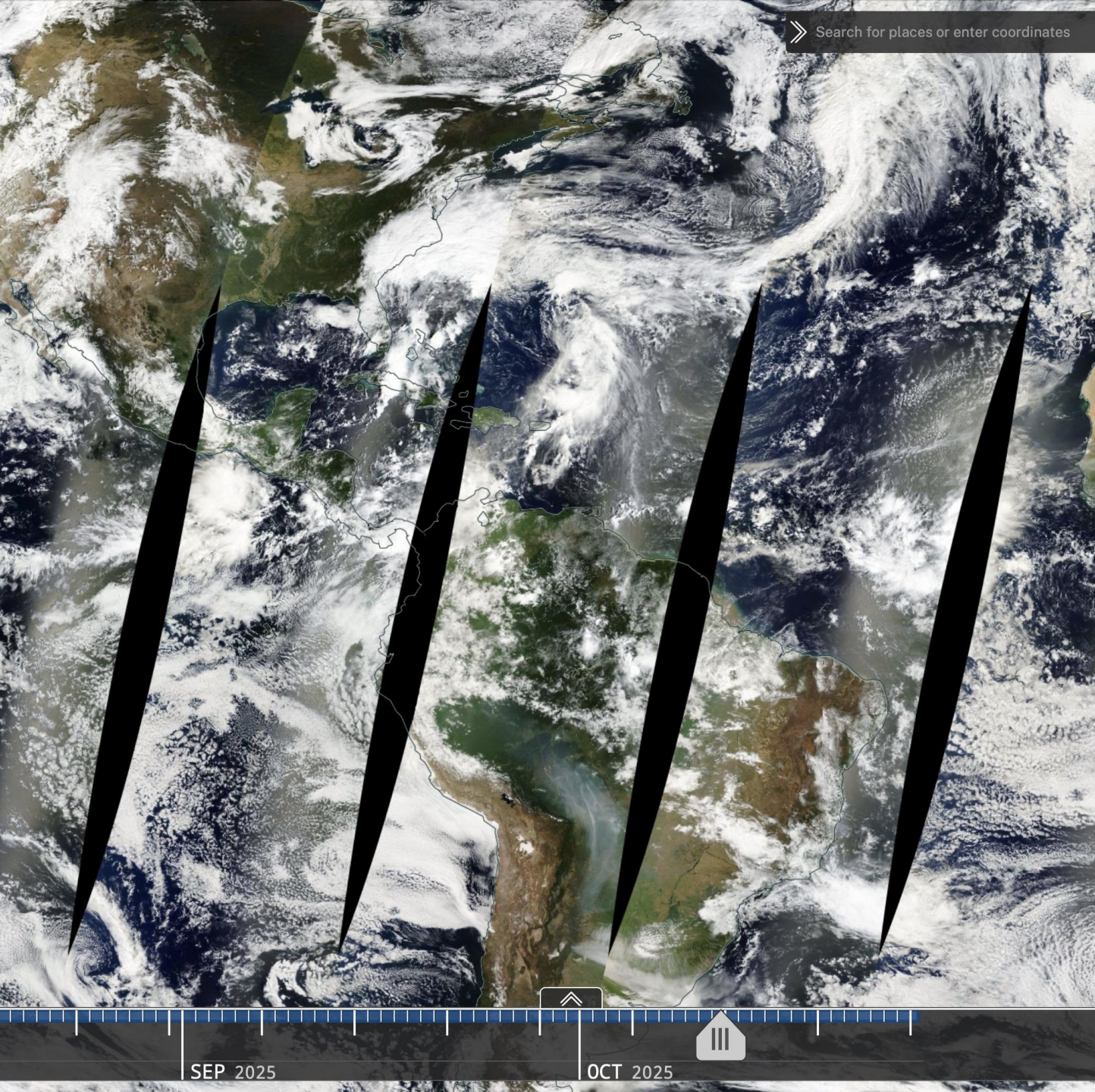


# Technical Architecture

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

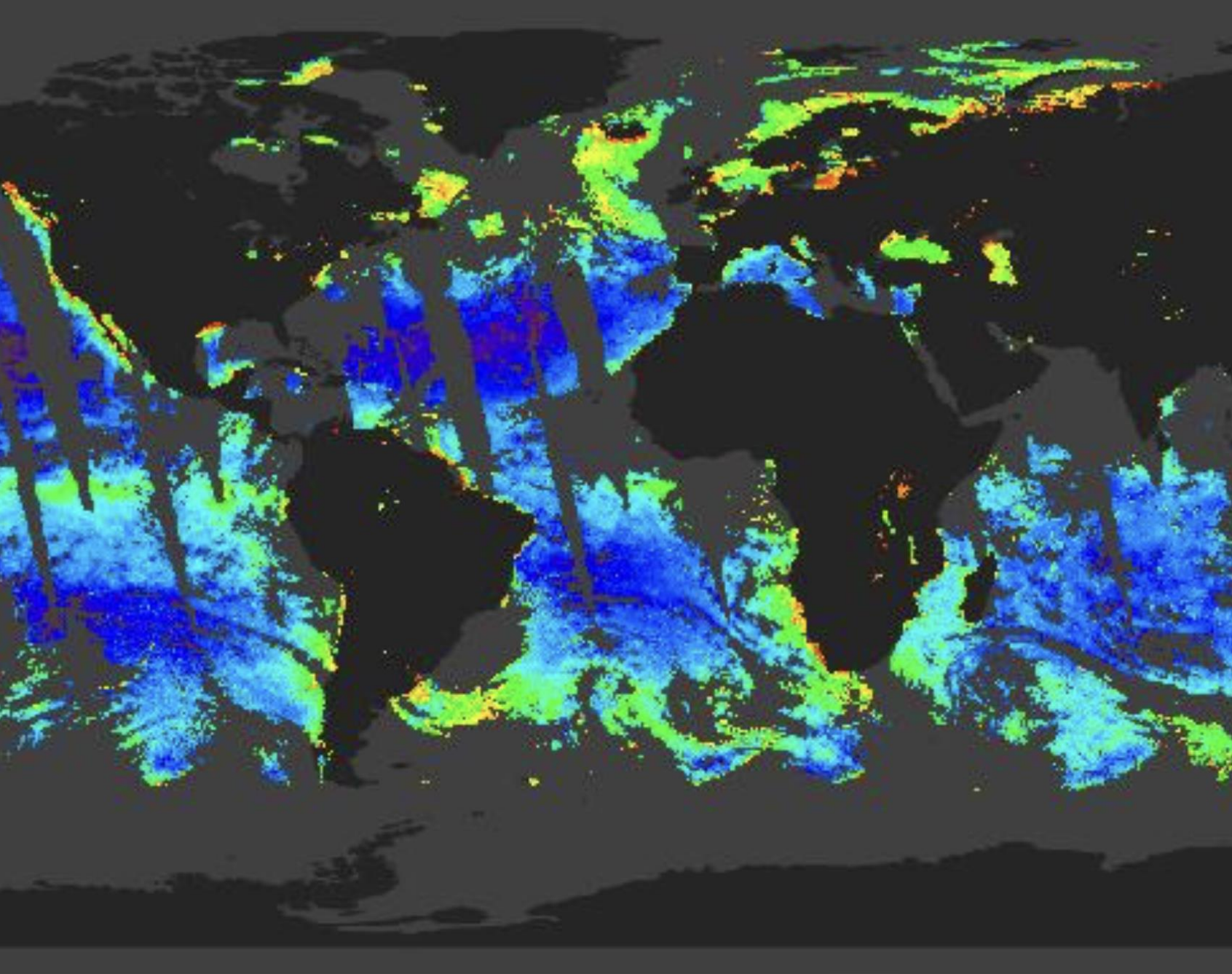






- Pockets of blind spots not covered by multiple satellites.
- Most international satellites follow similar paths.
- coverage areas is extensive high in density areas.
- Satellite data in parts of central and eastern Canada is outdated.

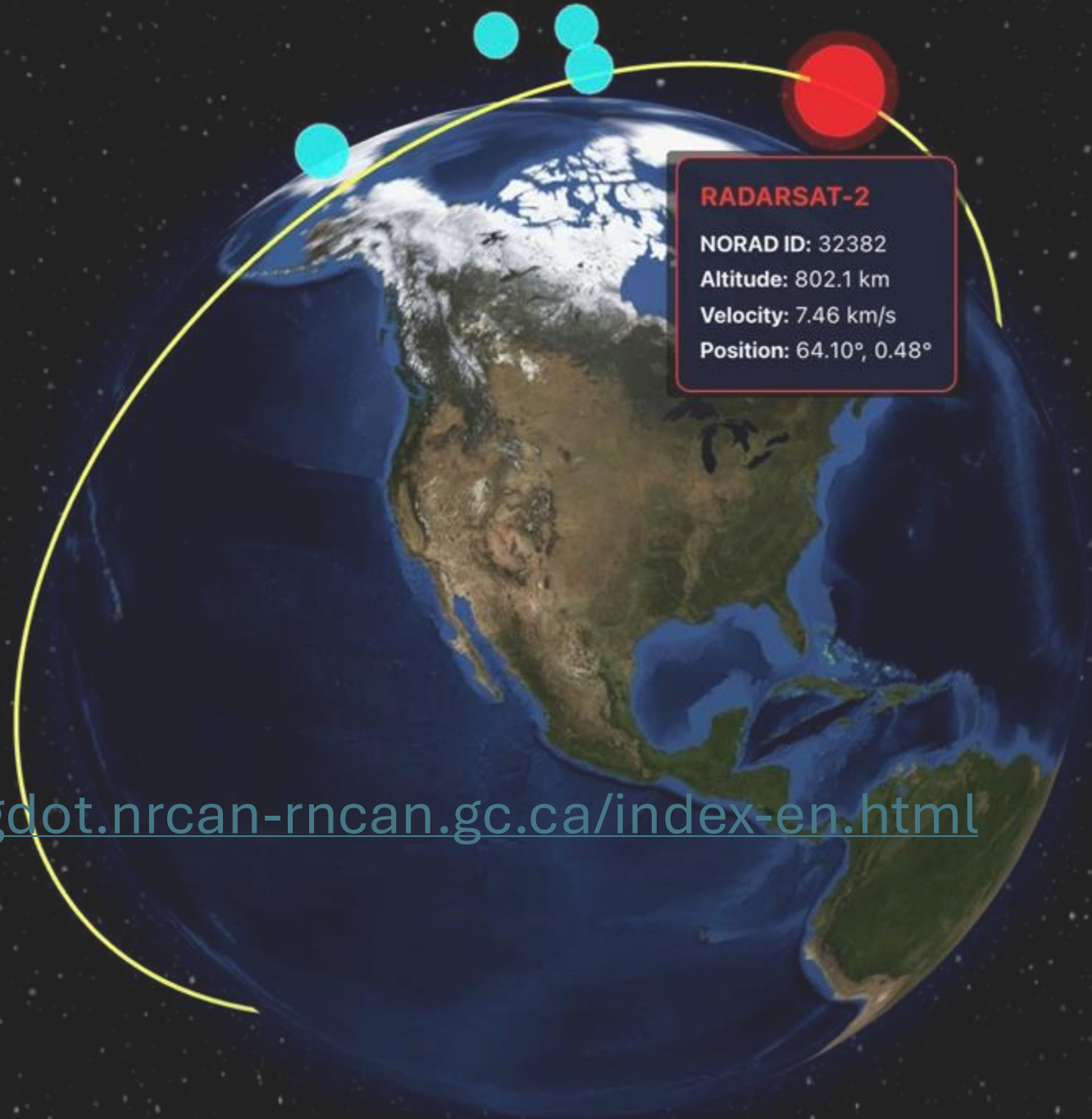




# Costal Data

- Similar pattern is observed.

# Canadian Data



## **RADARSAT-2**

NORAD ID: 32382

Altitude: 802.1 km

Velocity: 7.46 km/s

Position: 64.10°, 0.48°

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



The background of the slide is a dark space filled with stars. In the center is a realistic image of the Earth, showing North and South America. A yellow line represents a satellite orbit around the Earth. Along this orbit, there are several cyan-colored dots. One dot, located over the Atlantic Ocean, is highlighted with a larger red circle. A white rectangular box with a red border is attached to this red circle, containing satellite data.

# Hackathon Wrap-Up

A modern platform for real-time satellite conjunction analysis.

Enhancing safety, awareness, and innovation in space operations.