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Common Operating Data Infrastructure (CODI): A Federated Architecture for Local and Enterprise Data Integration

Department of the Air Force
Information Technology and Cyberpower

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Highest Overall Classification:
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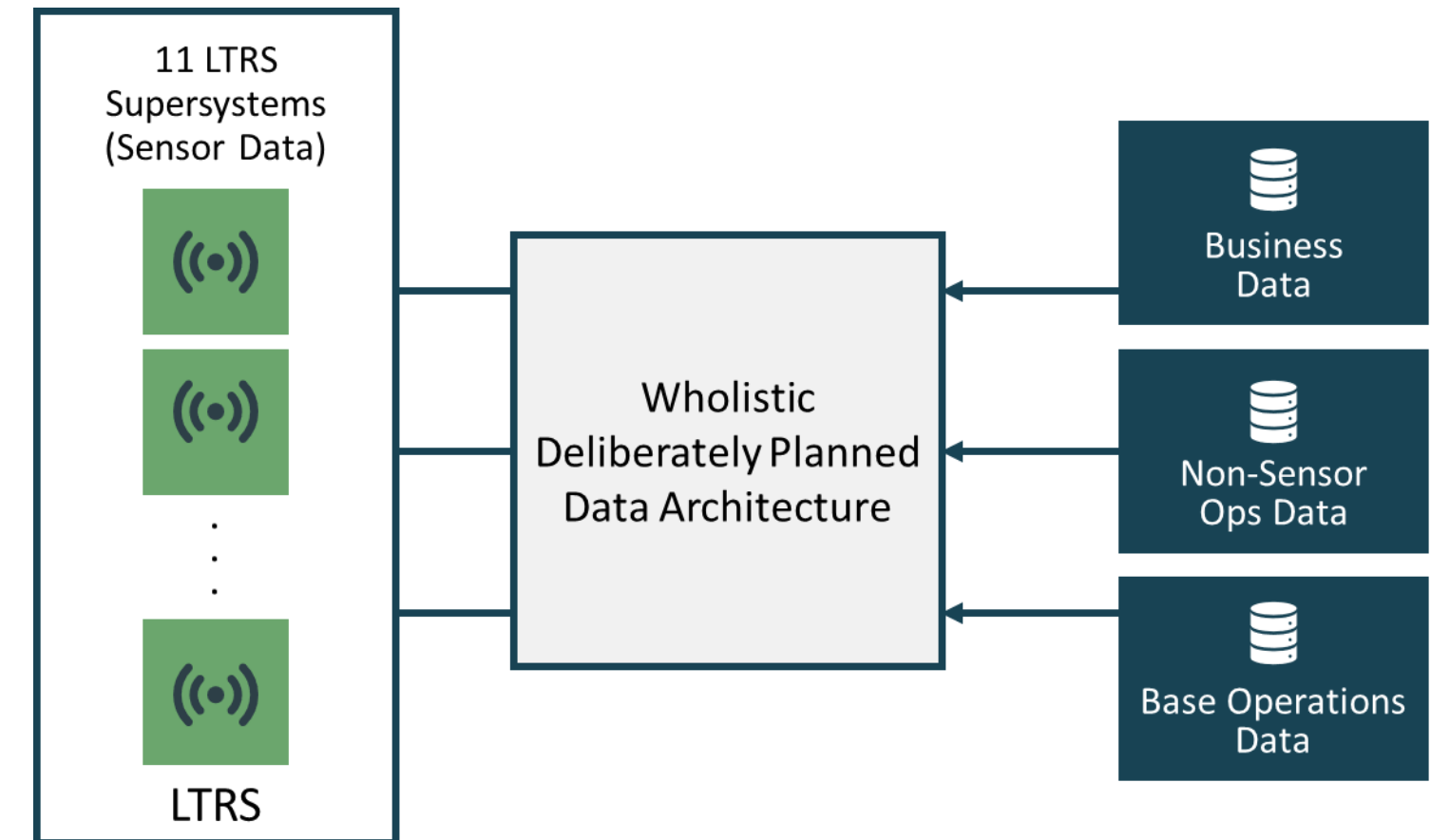
Why CODI?

Air Force Strategic and Operational Demands

- Growing need for unified yet flexible data infrastructure
- Compliance with DAF and USSF strategic data strategy – DAF Strategic Data Fabric
- Mission requirements demand agility, resilience, and interoperability

Why CODI?

- Mission-ready data in any environment
- Federated design = local autonomy + enterprise integration
- Resilient in contested, degraded, and operationally limited environments
- No vendor lock-in; aligned with DAF Strategic Data Fabric goals
 - Augmented the DAF Data Fabric with operational level data frameworks
 - Bridge the data gap between operations and strategic level initiatives





What is CODI?

Space Launch Delta 45's Common Operating Data Infrastructure, CODI, is purpose-built to ensure that mission-critical data remains accessible, secure, and actionable—regardless of environment.

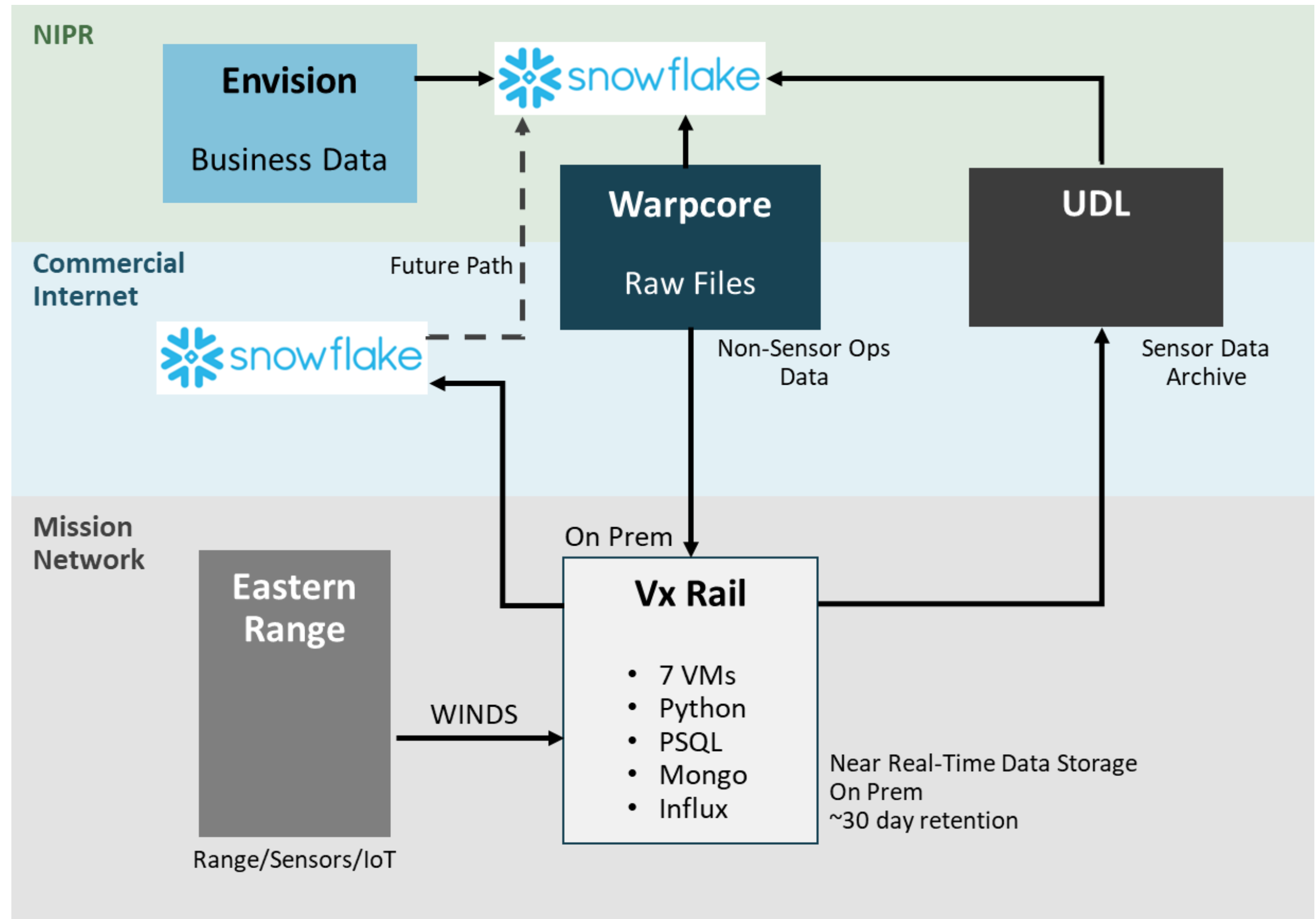
- Its federated architecture supports hybrid cloud operations and remains resilient even during catastrophic outages.
- By leveraging Snowflake as a federated data manager, CODI empowers Space Force units to govern, analyze, and share data locally while contributing to enterprise-wide initiatives.
- This design not only enhances operational agility and decision-making but also aligns with the Department of the Air Force's strategy to use open, scalable data platforms.



CODI's Federated Ecosystem

Using a federated architecture, CODI is able to bridge the strategic level DAF Data Fabric with operational level users.

This is facilitated by the utilization of Snowflake as “pseudo-data virtualization layer.”



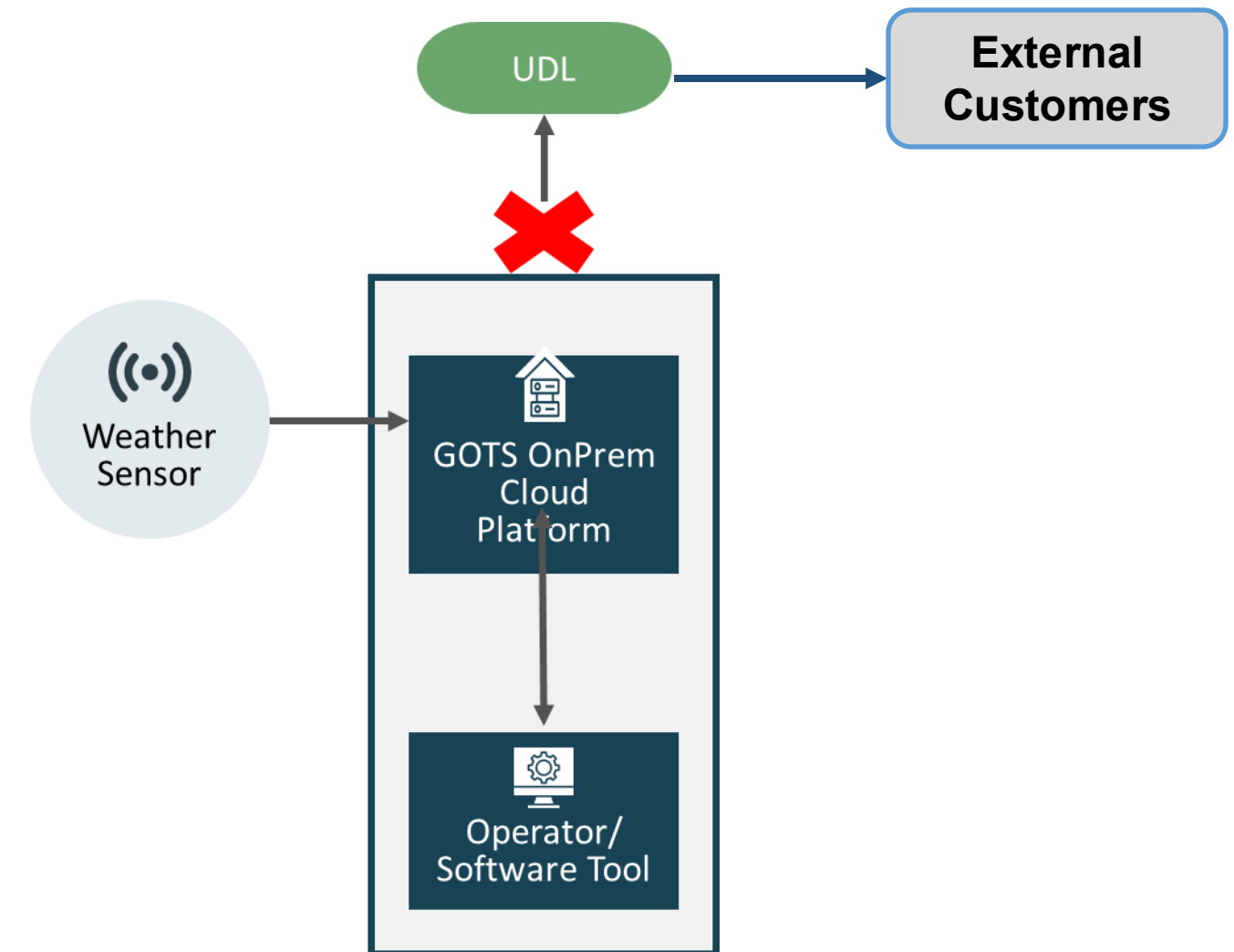
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From Ingestion to Insight

- Structured, semi-structured, encapsulated data support, stored in:
 - PostgreSQL, InfluxDB, and MongoDB
- Pipelines engineered using COTS Python packages
- Enables faster, more informed decision making through data accessibility
- Transformed into analytics-ready formats
 - Purpose built API's



Data Flow Example

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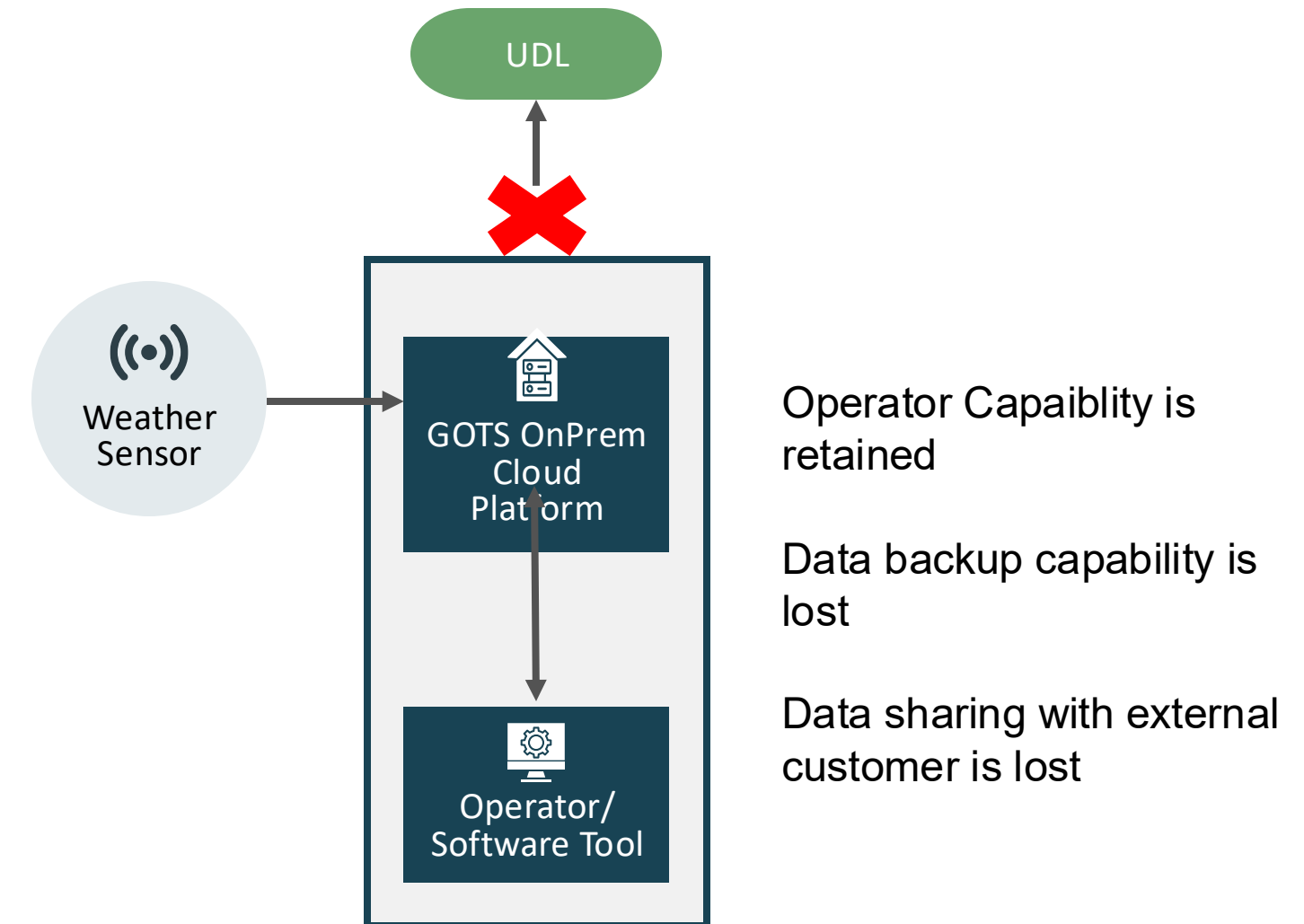
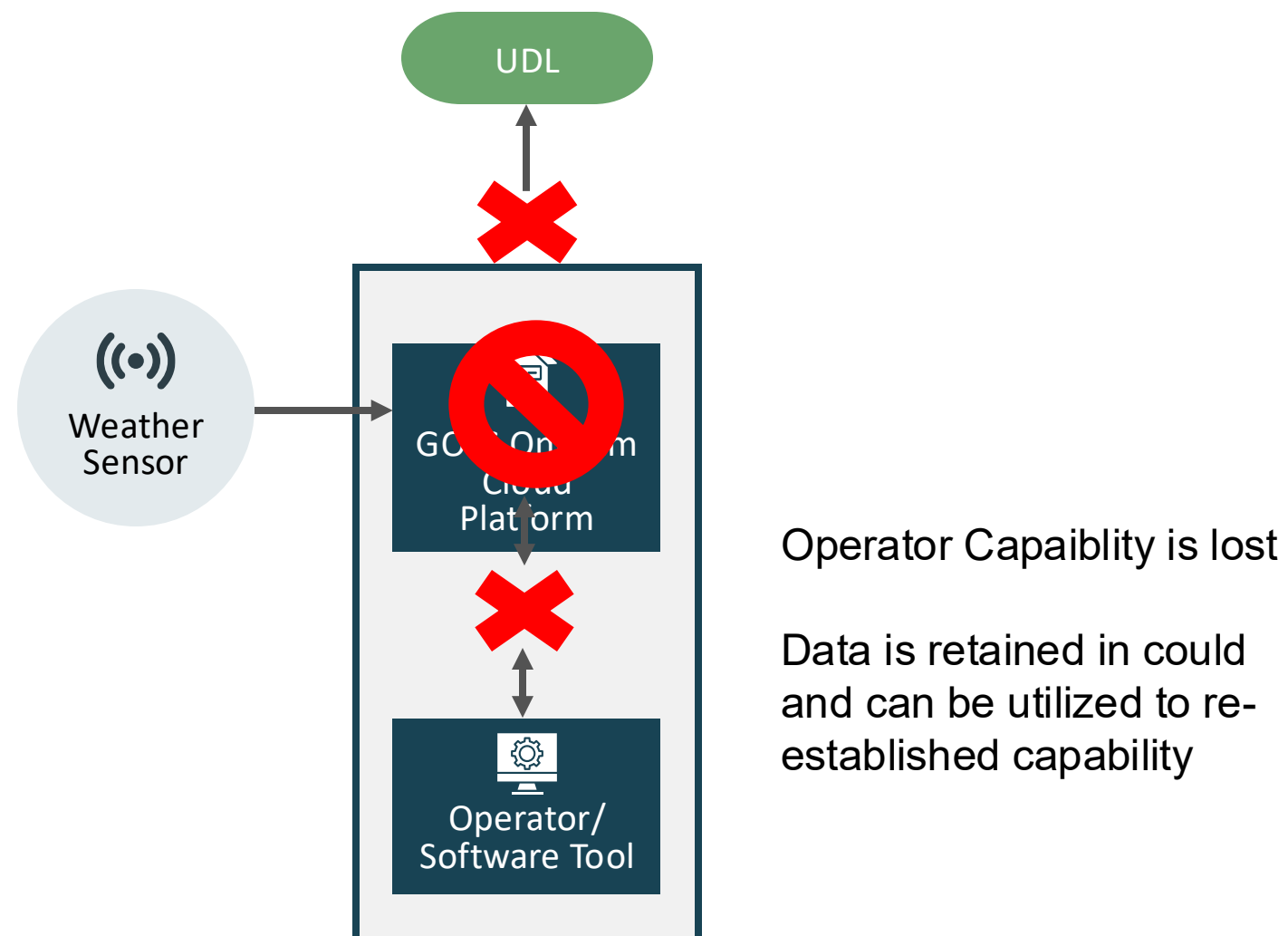
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Built for Operational Resilience

Architecture designs based heavily on resiliency requirements

Cloud components facilitate robust backup and storage capability, thereby, removing the hardware risks posed by solely on-premise deployments.

On premise cloud components facilitate operations in the event external internet connections are unavailable.



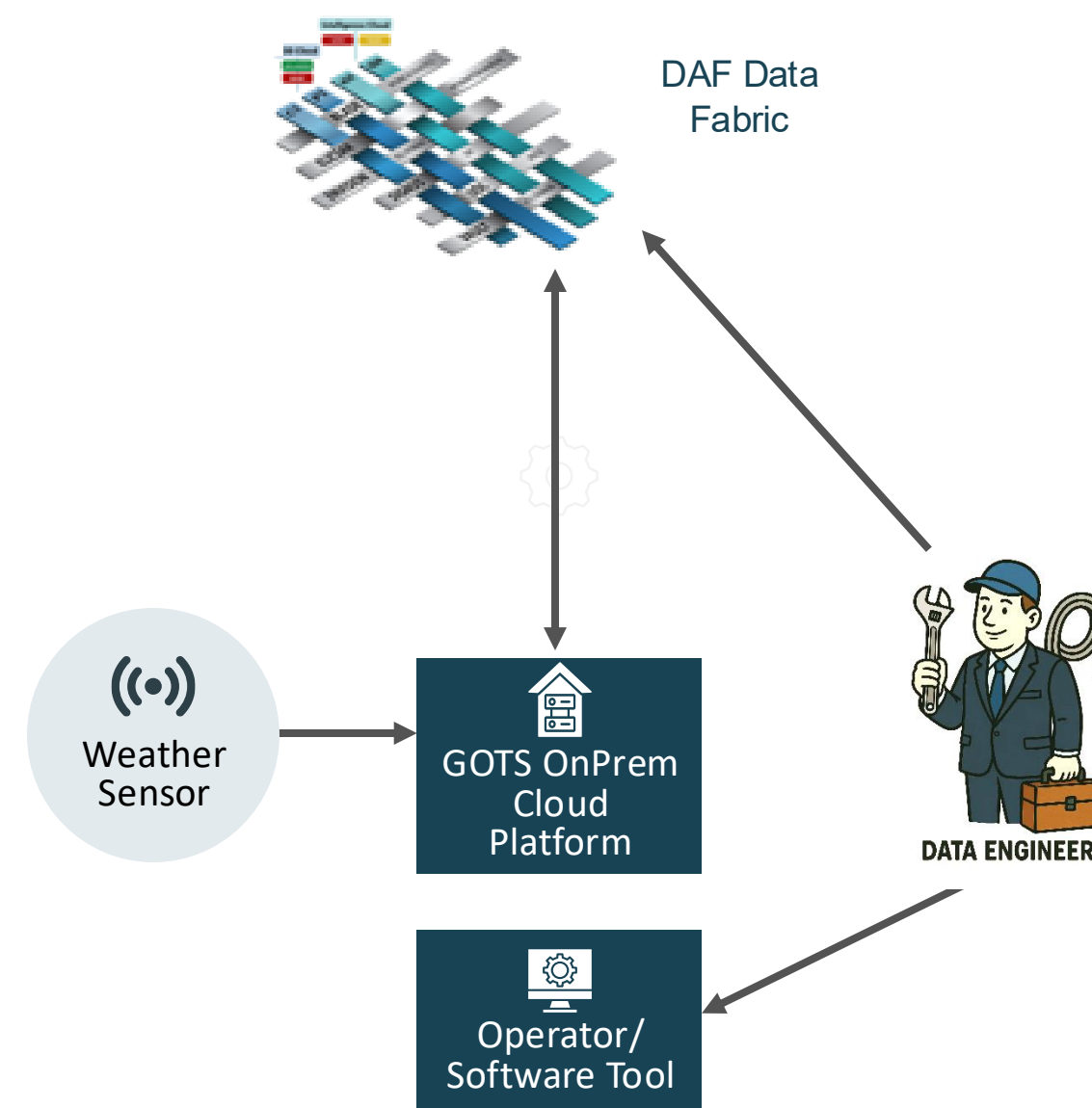
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CODI and Strategic Data Guidance

- CODI implements DAF data governance principles
- Supports interoperability and reuse across the force
- Enables local-to-enterprise data contribution



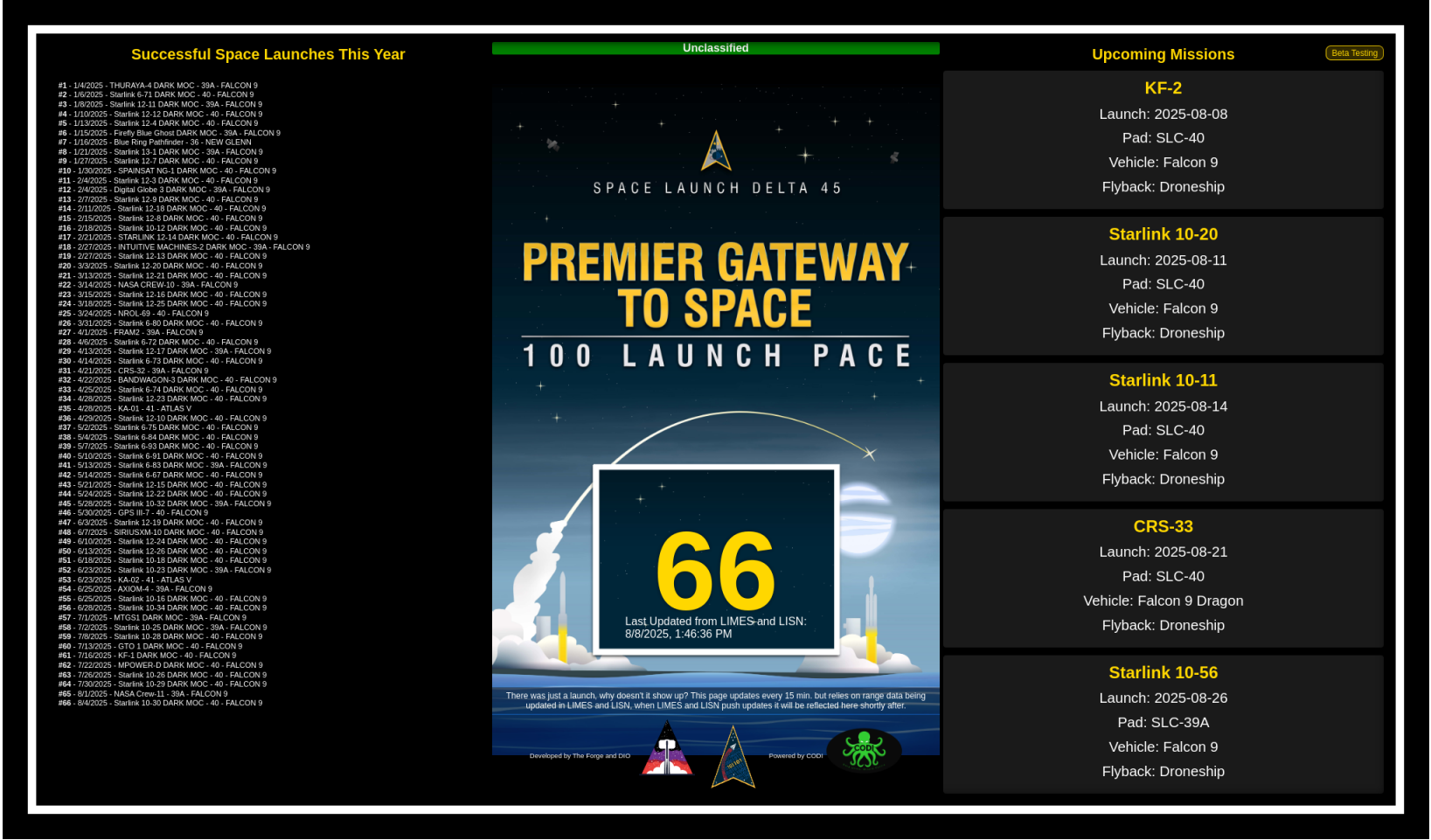
CODI is the implementation of the VAULT-IS capabilities

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Operationalizing CODI Today

- By combining separate data sources, we give stakeholders a holistic picture of the operational tempo on the Eastern Range.



Launch Count Update Board

- This tool automatically updates performance metrics of the Eastern Range that are tracked by senior leaders and help support investment decisions

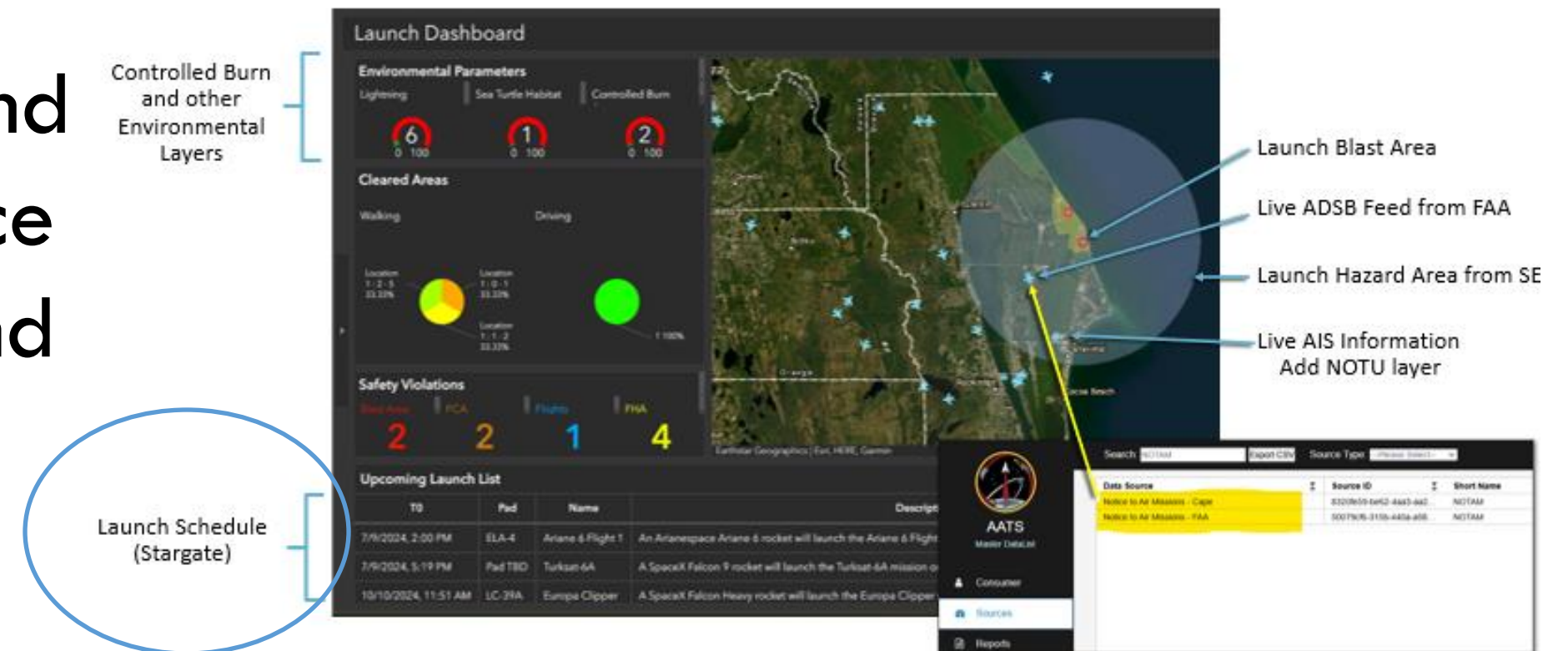


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Range Operations Example

Example of Map including Data Feeds from CODI

- Supplementing commercial AIS and ADSB data with range surveillance gives a more complete picture and can help stop a fouled range before it happens.



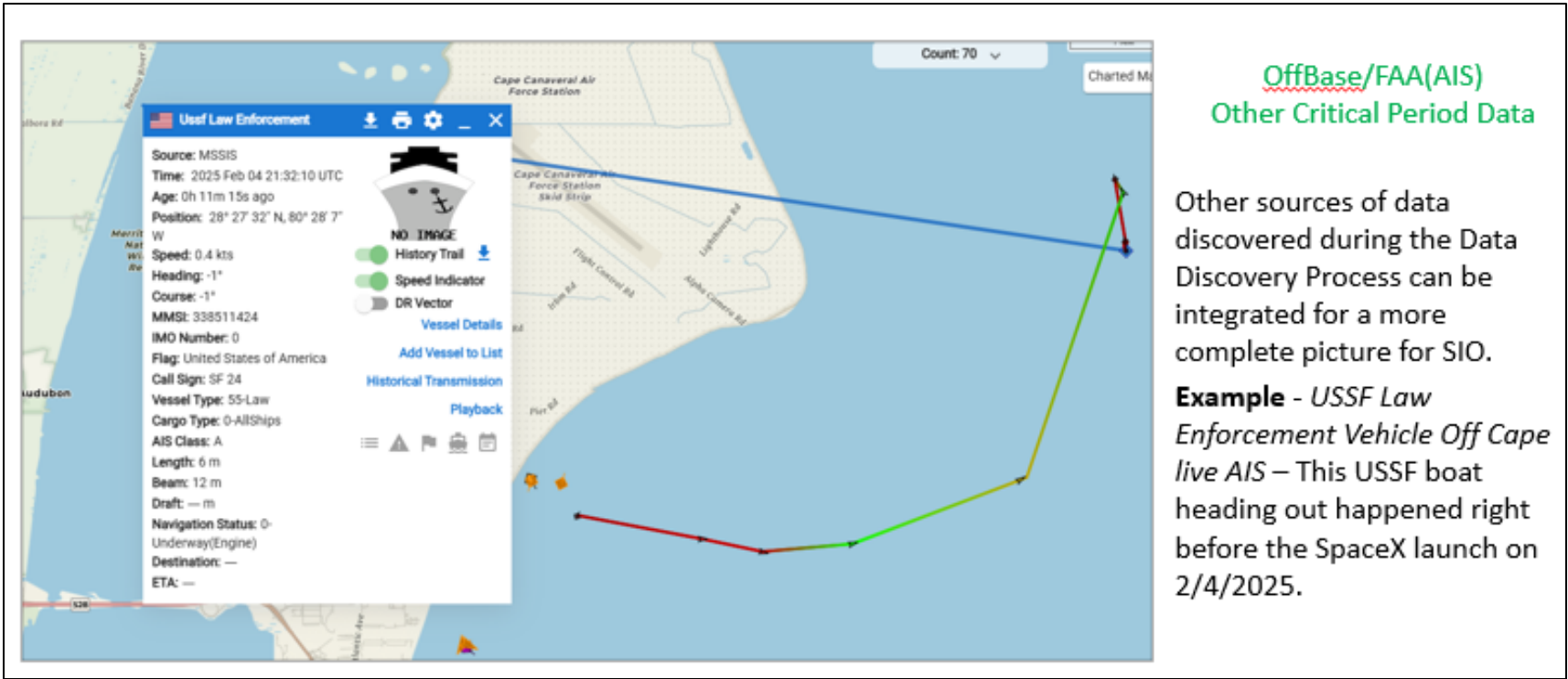
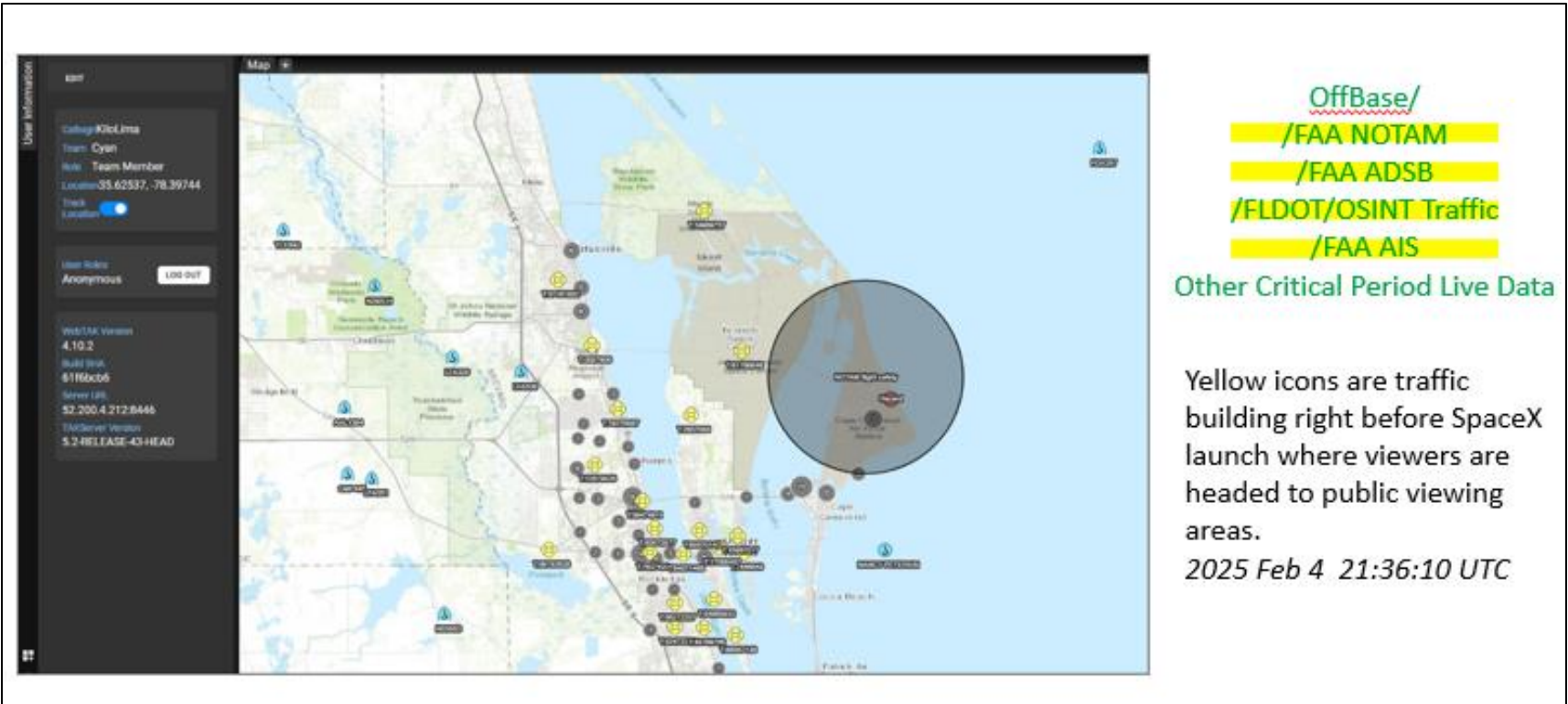
- Combining separate data sources facilitates complete situational awareness of both historic and planned range asset usage.
- By combining planned asset usage with RMA data, we can start to build a predictive maintenance model. This can drive a maintenance schedule that is purpose build to keep the range green.

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Security Example

- By providing Launch hazard areas in an easy, or automated, manner, Security Forces Defenders can have the most up to date and accurate information on where these hazards are.
- Providing the full schedule of operations at CCSFS in a one stop shop, reduces the workload on personnel to understand the operational environment.





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The Future of CODI



- Expansion to remaining DAF Data Fabric Platforms
- Broaden AI/ML integration
- Increase operational use cases

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Questions?

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