



NEXTGEN
FEDERAL SYSTEMS

Commercial R202R and Testbeds

Space Weather Roundtable

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NextGen Federal Systems

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Agenda

- Process Playbooks (1min)
 - Transitioning Research to Operations in Computing (TROPIC)
 - Designing Machine Learning Models for Weather Applications
- Use Case of Processes with Human Centered Design (3 min)
 - Air Force Weather's BIFRÖST Portal
 - Army's Weather Operational Effects
- Thoughts on a space weather R2O pipeline/testbed (1 min)



R20 Process Playbooks

Transitioning Research to Operations in Computing (TROPIC)
Designing Machine Learning Models for Weather Applications



Transitioning Research to Operations in Computing (TROPIC)

1. Government Engagement
2. Research Team Engagement
3. Application Analysis & Documentation
4. Application Hardening & Readiness
5. Application Operationalization
6. Application Hardening Procedures



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Designing Machine Learning Models for Weather Applications

1. Problem Space
2. Data Collection
3. Data Interrogation
4. Data Curation
5. Model and Algorithm Selection
6. Model Training
7. Testing and Validation
8. Iteration and Improvement
9. Deployment
10. Feedback Loop
11. Continuous Learning




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Use Cases of Processes with HCD

Air Force Weather's BIFRÖST Portal

Army's Weather Operational Effects

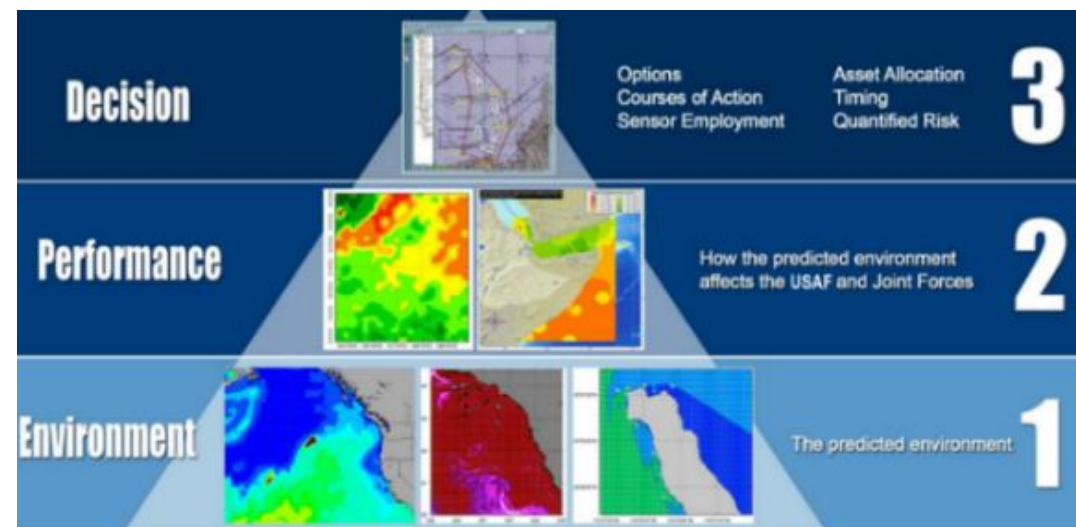


BIFRÖST Portal



Modern, high-performant, one-stop-shop web portal within the Air Force Weather Cloud Enterprise

- Provides the unified entry point for mission support tools/decision aids, visualizations, and impact assessments to enable warfighter decisions
- An integral part of the AF Weather WARPSpeed Product Team using DevSecOps and the AFW Cloud Enterprise CI/CD pipeline to meet requirements at the speed of need
- Over 10,000 users with more than 7,000 active within the past week

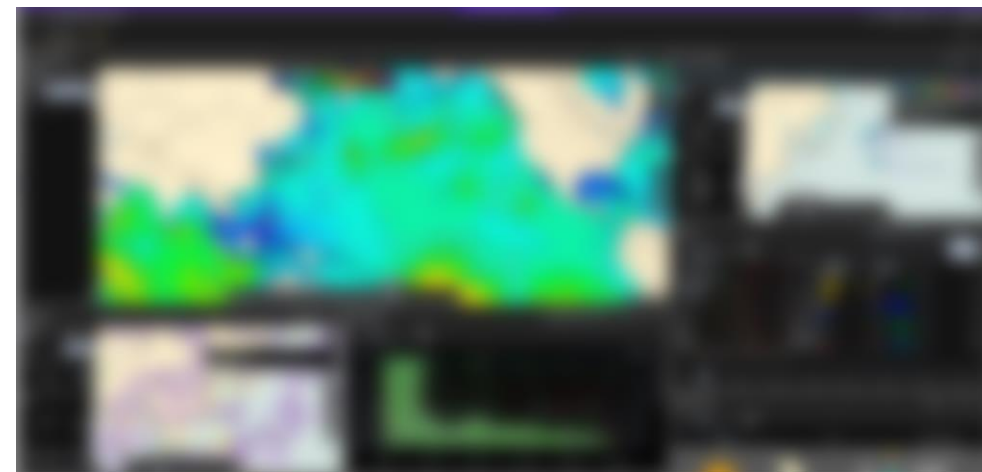




BIFRÖST User Experience



- Dashboards
 - Allows users complete control of how they organize data on their display
 - Can be made public or shared privately with user groups
- Cards
 - 34 different cards available
 - Can be linked so they share the same area or time
 - Full screen capability for extra screen real estate
 - Weather Viewer (Map) cards allow interactive geospatial weather layer views
 - Point based products such meteogram and skew-T are interactive with enhanced interrogation tools





BIFRÖST User Experience



- Constant feedback loop
 - Requirements → Design → Development → Testing → Deployment → User Feedback
- App design meetings twice a week including designers, developers, and users
- Large user working group meets regularly
- Consistent review of feedback
- Regular visits to the field for user interviews

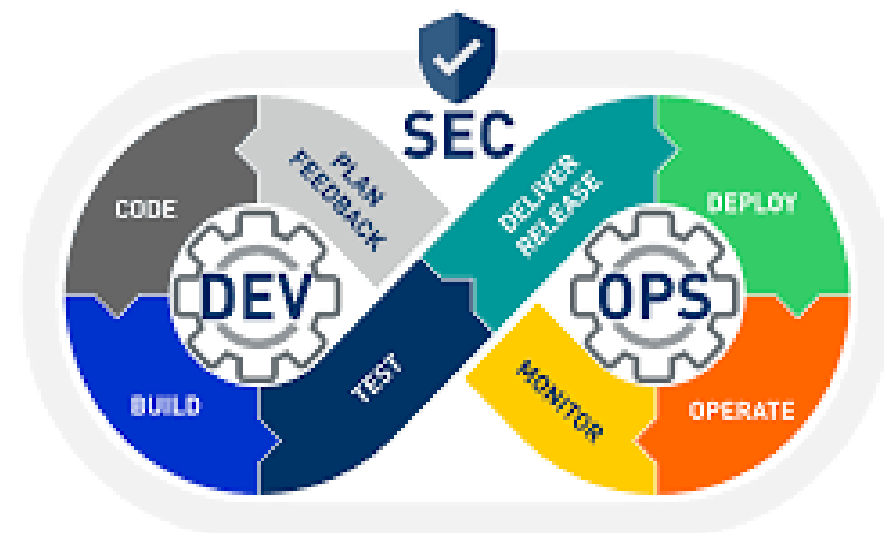




BIFRÖST DevSecOps



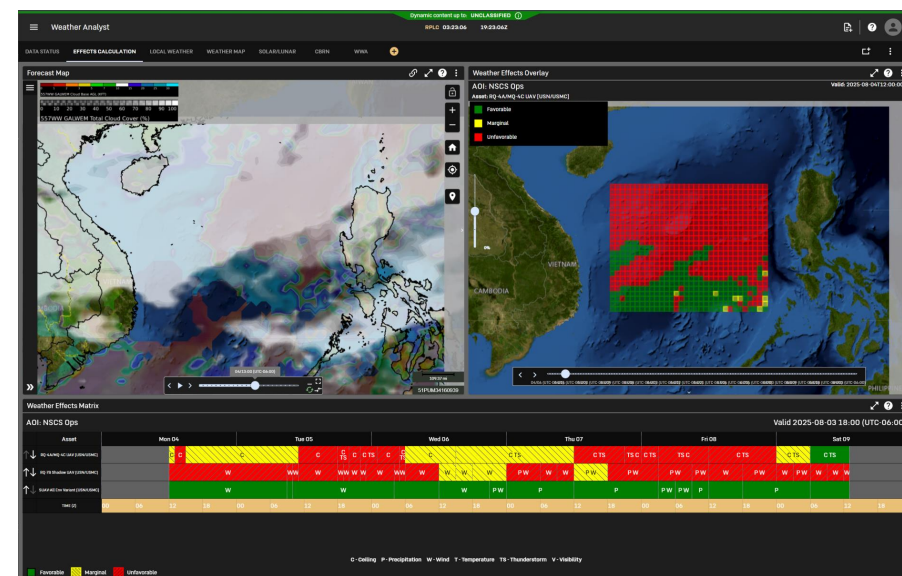
- New version deployed to production every 3 weeks
 - Hotfixes go out much faster
- Automated cybersecurity tools as part of the build pipeline
- Certificate to Field (CtF) renewed yearly
- BIFRÖST is deployed to 4 tiers to facilitate development and testing
 - Integration
 - Dev/test
 - Staging
 - Production
- Dev/test environment updated every time code is merged to develop
- New minor releases available on staging for one week prior to deployment to production





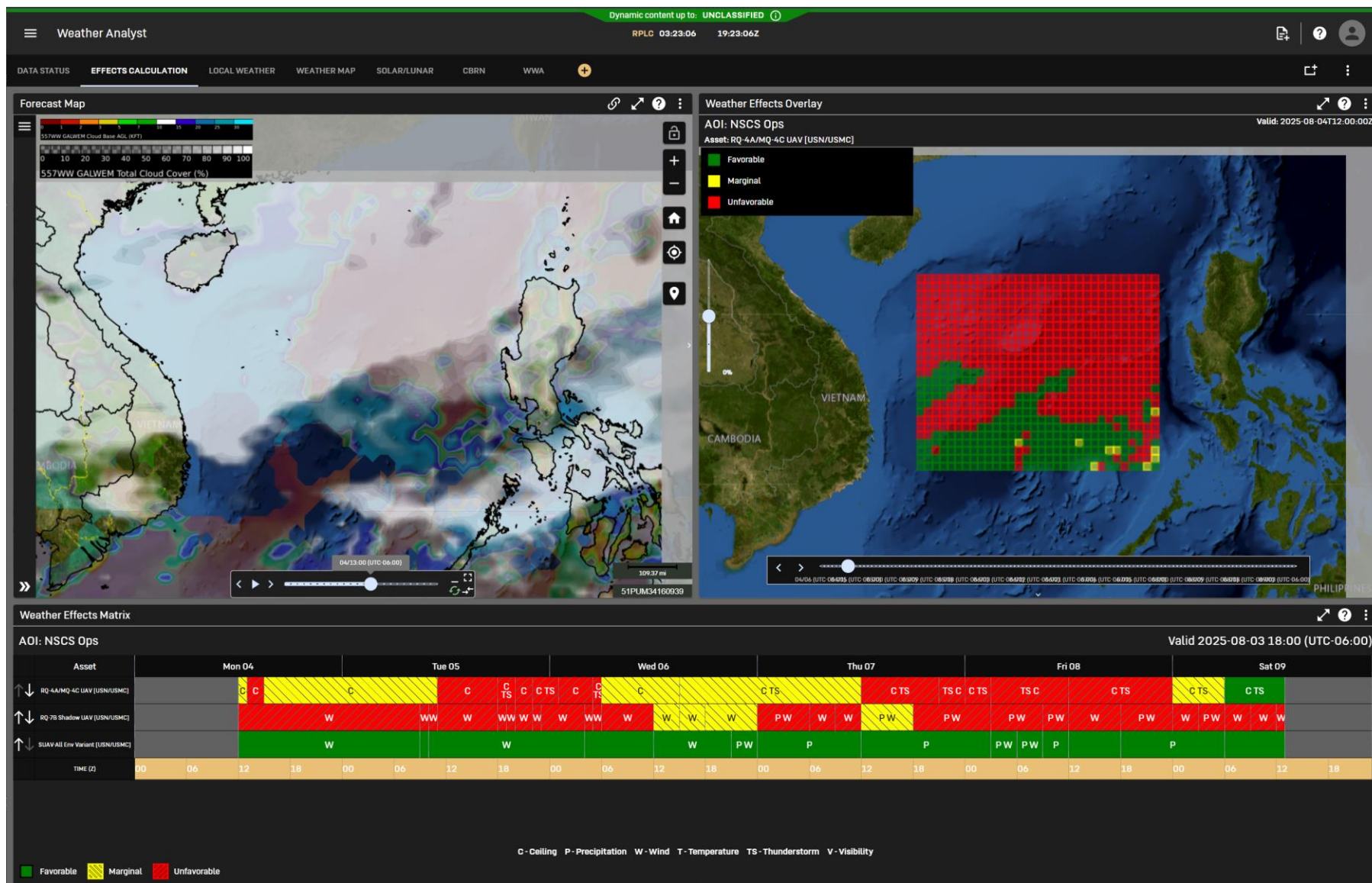
Army Wx Operational Effects (WxOE)

- Enables users to perform discovery, query, and local storage of forecast products
- Generate timely, mission-critical weather forecast products; **automatically derive weather impacts**
- Issue and receive user-tailored weather advisories and warnings within a specified area of operations
- Provides a solution to meet the WxOE interoperability, security, training, usability, product management, and data ingest capabilities as required





Wx Operational Effects





Space Wx R20 and Testbed Thoughts



Space Wx R20 and Testbed Pipeline Thoughts

- Requirements. examples
 - Consider cross-agency requirements if pipeline/testbed dependent
 - Funding/execution ownership?
 - Stakeholder access to appropriate system components in pipeline (e.g., RL/ARL, roles)
- Standard Government sourcing mechanics
 - RFI – receive industry best practices and solutions for developing and sustaining
 - RFP – shaped based on RFI responses and requirements
- Stakeholders
 - Agencies - forecasters, analysts, operators, modelers, etc.
 - Academia and Commercial - e.g., data, model, and tool providers
 - Industry - end users accessing web portal decision support tools (DST) and M2M data
- Impacts and HCD Driven
 - User-set thresholds for space wx impacts and customizable DST dashboarding
 - User-fused technological (industry) impacts with space wx data and forecasts