



IOOS

U.S. Integrated Ocean Observing System

Five-Day Ocean Forecast – Pre-Operational



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1 Five Day Ocean Forecast – Pre-Operational Use Case

The Five Day Ocean Forecast application is an operational system with a Service Level Agreement (SLA) that demands high reliability and availability. In order to maintain the level of service required in the operational system, updates to the operational system are thoroughly tested and vetted in a separate but equally stressing environment before being transitioned into the operational system.

Figure 1, presents the Use Case for maintaining and operating a Pre-Operational version of the Five Day Ocean Forecasting application. The scenario begins with the receipt of a change proposal generated as an output from the Academic Modeling and Algorithm Research Use Case, which is one example of the variety of different sources capable of generating a change proposal. After running the proposed change in parallel with the operational system and comparing the resulting outputs, the scenario ends with an approved change being queued for introduction into the operational system.

Figure 1 has been extracted from Popkin's System Architect where it resides as an OV-6a diagram. The readable version is available in System Architect and has been provided under separate cover in . . .

2 External Actors

This Use Case is targeted for the specific instance of Pre-Operational Five Day Ocean Forecasting. There can, and probably will be, several instances of Pre-Operational Five Day Ocean Forecasting models being examined at the same time, some at the national level and some at each Regional Association. Because of this the External actors are presented as generic interfaces that would be refined and defined for each instance – driven by the particular change proposal being vetted.

- **Change Proposal Source:** This scenario depicts the *Academic Modeling and Algorithm Research Use Case* as the change proposal source but alternative sources can and do exist.
- **Operational System:** Publishes the final set of inputs used for each operational model run, to which the Pre-Operational system subscribes.
- **IOOS Governance:** The IOOS Program Office and the Regional Association Program Offices are the governing body that approves change proposals and updates to the operational model.
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Five Day Ocean Forecasting - Pre-Operational (OV-6a Use Case)

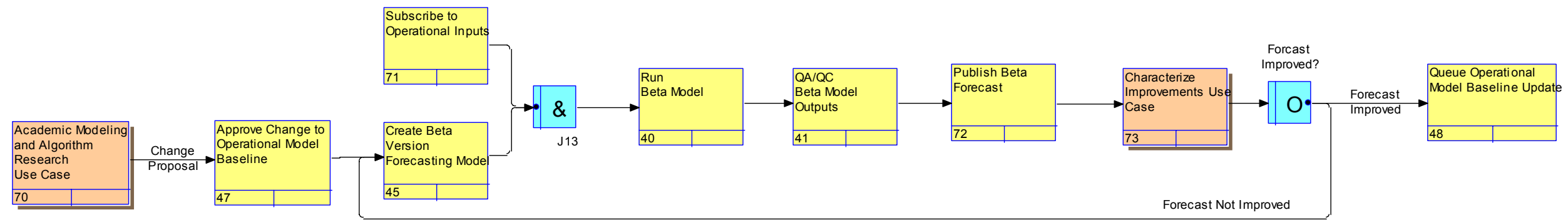


Figure 1, Five Day Ocean Forecast – OV-6a Use Case

3 Functional Flows

3.1 Primary Flow – Pre-Operational National Five Day Forecasting

3.1.1 Pre-Condition

The pre-condition for beta (developmental) national (global) forecasts is that the global, national, and regional operational systems and sensor networks are themselves operating normally and that the beta national forecast system is operating and no specific special events (TBD) have occurred.

3.1.2 Trigger

The trigger for setting off the next 6-hour forecast is that all necessary input data has become available. This could be achieved via a data queue flag going green. In addition the beta version will have additional contingencies, as it is a developmental system and by definition is ‘hands on’ to some extent.

3.1.3 Process Description

Use Case Steps	Architecture Viability Assessment
Step 10: Academic Modeling and Algorithm Research Use Case This is a separate Use Case that is run as a predecessor for This Use Case.	Refer to documentation for this Use Case.
Step 20: Approve Change to Operational Model Baseline The change proposal is presented to the appropriate configuration control board chaired by the appropriate governing body. Change proposals affecting a specific region are presented to the Regional Association PMO for review and approval. Change proposals affecting national, global, or multi-regions are presented to the IOOS PMO for review and approval.	This is a manual process not supported by the IOOS architecture.
Step 30: Create Beta Version Forecasting Model A Software Engineer accesses the source code for the operational model, performs the modifications in accordance with the approved change proposal (or a set of approved change proposals), performs unit testing, and integrates the updated modules into the system, which results in a Pre-operational or Beta version of the operational forecasting model.	This is a manual process supported by the IOOS System Development Environment (SDE).
Step 40: Subscribe to Operational Inputs The inputs used for each run of an operational model are published. The pre-operational model subscribes to the operational inputs so the Beta model can be run in parallel using the same data set.	The IOOS architecture provides Publish and Subscribe services as part of the Common Services.
Step 50: Run Beta Model When the operational input data set has been obtained, the pre-	The Operational model is run on IOOS servers

<p>Operational or Beta version of the operational forecasting model is run.</p>	<p>at RIN nodes under the governance of Service Level Agreements (SLAs) established by the governing organization.</p>
<p>Step 60: QA/QC Beta Model Outputs Multiple metrics are used to verify results from the model meet expectations.</p>	<p>This is part of the post processing component of the pre-operational model</p>
<p>Step 70: Publish Beta Forecast The operational model outputs are assembled into a forecast in a prescribed manner with the appropriate data structure but are only published to a limited audience, not through a web portal for general access. The Regional Association PMO maintains the results from a regional pre-operational model. The IOOS PMO maintains the results from a National or Global pre-Operational model.</p>	<p>The IOOS architecture provides Publish and Subscribe services as part of the Common Services.</p>
<p>Step 80: Characterize Improvements Use Case This is a separate Use Case called as a child to this Use Case that compares the results of a research or Pre-Operational forecast to Operational forecasts and actual sensor data.</p>	<p>Refer to documentation for this Use Case.</p>
<p>Step 90: Forecast Improved? The characterized improvements show whether the anticipated results have been achieved. If the proposed change has proven robust enough to meet the operational demands established by the operational Service Level Agreement (SLA) proceed to Step 100. If the proposed change has failed or not yet met expectations, loop back to step 30.</p>	<p>A human evaluation and a manual process not implemented as part of the IOOS architecture.</p>
<p>Step 100: Queue Operational Model Baseline Update When the set of changes have been properly vetted within the pre-operational Beta model, an updated version of the Operational Model is placed under configuration management control and placed on the queue for introduction into the Operational environment.</p>	<p>A human evaluation and a manual process not implemented as part of the IOOS architecture.</p>

3.1.4 Post Condition:

The post condition is the same as the precondition.