

# National Polar-orbiting Operational Environmental Satellite System (NPOESS) NPOESS Preparatory Project (NPP) Rapid Algorithm Updates



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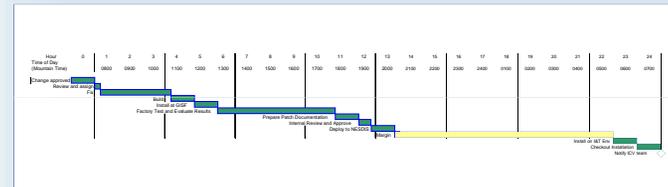
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Updates of operational IDPS algorithms need to be rapid, accurate, and compatible with the exigencies of 24/7 operations. As algorithms progress through the Calibration/Validation program, they mature and become more suitable for end users' needs, as defined by the product maturity levels in Figure 1. The program's approach to incorporate changes must handle algorithms in each stage of the validation regime appropriately, with processes and controls that balance the speed of updates against operational system considerations (Figures 2 and 3). In addition, to help ensure a rapid transition of the algorithm code into the operational baseline, NPOESS has developed tools and methods to reduce the cycle time from science algorithm to operational code. These tools (Figure 4) are being made available to any science algorithm developer who feels they may be beneficial, and will be required for use by GFE algorithm developers.

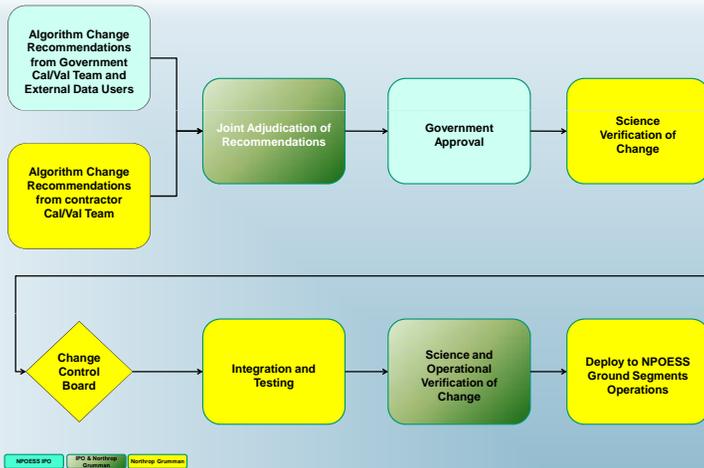
STAGE	Product Maturity Levels		Maturity Levels	
	NPOESS/NPP SDR	NPOESS/NPP EDR	Beta	Provisional
Preliminary	Beta	Beta	Early release, minimally validated, may contain significant errors	
	Provisional	Provisional	Product quality may not be optimal	
Comprehensive	Validated/Calibrated	Validated - Stage 1	Validated - Stage 1	Ready for use - small validation range
		Validated - Stage 2	Validated - Stage 2	Ready for use - wide validation range
		Validated - Stage 3	Validated - Stage 3	Ready for use - robust validation

Figure 1 - Algorithm Validation Categories and Maturity Levels



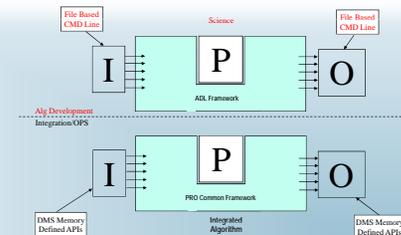
For algorithms in the "beta" maturity category, it is possible to execute the deployment of changes to the Integration and Test system at a Central in as little as 24 hours. This capability is essential during the Intensive Cal/Val timeframe, since immediate updates may be necessary to ensure continued production of xDRs for evaluation. For products at more advanced maturity levels, standard sustainment processes would apply to ensure all operational necessities are followed.

Figure 3 - Rapid Algorithm Deployment Timeline



Algorithm changes enter the Change Process through one of two routes: via discoveries made by the contractor Cal/Val team, or via the government Cal/Val team. This latter entry point provides the mechanism by which external entities may propose changes to NPOESS algorithms. Once proposed, all recommendations are jointly vetted and, if worthy, approved for incorporation. At this point, the change is verified from a scientific standpoint to ensure that it is both effective and compatible with other products and processes in the system. After all stakeholders are satisfied of the efficacy of the change, it is prioritized with other updates, integrated and tested with the complete system, and deployed to operations.

Figure 2 - High level Process for Algorithm Updates



The Algorithm Development Library provides a toolkit enabling algorithm developers to work outside of NPOESS-provided hardware, yet allow quick integration of new or modified algorithms into IDPS. This is accomplished by aligning the algorithm structure with the IDPS architecture approach, and using operational code-identical interface calls to perform I/O operations on the developer's native platform.

Figure 4 - Algorithm Development Library