



# NWS Operations Proving Ground

## How to Submit a Project Proposal



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## NWS OPG Project Proposal Process

**Background:** NOAA's Testbeds and Proving Grounds (TBPG) facilitate the orderly transition of research capabilities to operational implementation through developmental testing and pre-deployment evaluation for operational readiness and sustainability. Among the 12 TBPG members, the unique niche filled by the Operations Proving Ground (OPG) is to represent the NWS field offices in the research-to-operations (R2O) process. The OPG has the capability to configure itself as any WFO, and emulate operational practices for up to three different WFOs simultaneously.

Projects adopted for testing and evaluation at the OPG fall into three general categories:

- 1) Evaluations for Operational Readiness and/or Impact – OREs and OIEs are typically STI sponsored projects, focused on assessing the operational readiness of promising tools, techniques, or capabilities for implementation in the field. When successful, these evaluations represent the final step in R2O transition, validating extensive development and refinement work, which has usually taken place in testbed experiments or among a small group of pilot field offices. STI R2O projects almost always involve bringing NWS forecasters into the OPG facility, who go through a carefully planned series of exercises designed to assess whether the candidate tool improves their operational decision making without creating significant adverse impact on their workflow. *(Examples: GOES-R User Readiness evaluations such as those executed in 2015 featuring high-temporal resolution imagery from GOES-14 SRSOR periods, or the follow-on ABI/RGB exercises conducted in 2016 using Himawari-8 imagery as a proxy for GOES-R)*
- 2) Projects Aimed at Improving Forecast Process and/or Service Delivery – Service Improvement Projects are generally sponsored by AFS, in response to priorities and requirements established by the NWS Mission Delivery Council. These efforts include evaluating enhanced forecasting methodologies, risk communication strategies, and techniques to improve collaboration, consistency, or data sharing both internally and externally. These projects include forecasters, but may also involve core partners. *(Examples: DSS Boot Camp, EDD Focus Groups)* In some cases, projects such as these call upon the OPG to assist a NOAA Testbed in their developmental testing efforts. For example, if an experimental new process is being tested, and the linkage between national center and WFO is an important metric, the OPG is available to replicate the WFO activity in that process. *(Example: the Digital Aviation Services testing, conducted in concert with the Aviation Weather Testbed in 2016)*
- 3) Experimental Operating Concepts or Prototype Systems Testing – Occasionally, it is important to use an environment that safe and controlled but operationally realistic, in order to explore the viability of new organizational operating concepts for the future. Projects such as these, sponsored by the Office of Organization Excellence (OOE), can be useful for rapid prototyping; testing, evaluating, and refining ideas that can be used to inform future operational models, role clarity, improved decision support services, more effective integration of physical and social sciences, evolution of the work force and associated field structure, etc. *(Example: OWA Fully Integrated Field Structure testing of the Medium Range Collaborative Forecast Process)*

Some additional clarification is warranted with respect to the first category identified above – first because these the most common evaluations undertaken by the OPG; and additionally, because NWS SOOs and SSDs may have interest in submitting proposals for OPG testing to be incorporated as part of the transition pathway for their R2O projects.

There are multiple pathways for an applied research-to-operations (R2O) project to secure a “last mile” evaluation at the OPG. For example, a new tool or capability may begin its development as a CSTAR research project, which is refined by multiple contributors via VLab, undergoes an initial operational assessment in a testbed experiment, and ultimately is featured in an Operational Readiness Evaluation (ORE) at the OPG. Another project may originate as a local or regional innovation, which shows sufficient promise to warrant evaluation at the OPG for its broader applicability. Projects may also be evaluated at the OPG to identify the most effective means among two or more competing methods for generating a particular type of gridded product, or to evaluate the end-to-end collaboration process between National Centers, WFOs, and NWS Partners.

## **ORE Candidate Criteria**

Candidate projects must fulfill the following prerequisites, typically demonstrated via testbed experiments or at a small number of NWS pilot forecast offices:

### ***1. Unique Value-Added***

The project must exhibit the potential to offer new value to operations in some specific manner. Examples include: adding insight to forecaster decision making; providing notable improvement in generating grids or products; enhancing situational intelligence; or increasing clarity of messaging that leads to more effective risk management decisions by core partners and community leaders. This requirement extends to both usefulness (i.e., degree to which it adds meaningful value to the analysis, forecast, and/or warning process), and usability (i.e., ease with which it can be integrated into operational workflow and/or supplement other existing tools, products, or datasets).

### ***2. Minimal Adverse Impact***

It is important that the usefulness and value of any new operational capability is weighed against its impact on workload, workflow, assimilation, and other human factors that may affect a forecaster’s ability to make timely, accurate assessments while communicating that knowledge to community leaders and other decision makers.

### ***3. Technical Readiness***

Project Leads must substantiate that the new capability has undergone a sufficient amount of product development and beta testing to warrant an ORE. Appropriate “state of maturity” factors include software development (e.g., ability to integrate seamlessly into AWIPS-II), scientific integrity, product/display refinement, reliability in performance, configuration management, system interoperability, extensibility, sustainability, etc.

### ***4. Broad Applicability***

Most projects targeted for OPG evaluations are intended for operational use at many WFOs. While there are exceptions to this rule, ORE projects are not usually limited to practical application for a specific, restricted geographical location or for a single service sector. Similarly, tools that demonstrate a broad range and reach of usability for diverse operational tasks and responsibilities may be given priority over those with a more limited scope.

### ***5. Direct Connection to Strategic Goal(s) and/or MDC Priority Requirements***

Project proposals must identify a coherent connection to advancing the NWS Weather Ready Nation initiative, and/or clear linkage to a requirement established by the Mission Delivery Council or an approved NWS Annual Operating Plan goal, in order to be granted funding for testing and evaluation at the OPG.

## Technical Readiness Levels and OPG Engagement

To gauge the maturity level of a particular science/technology project, the OPG has adopted a modified form of the NASA Technical Readiness Level (TRL) scale (see Fig. 1). The TRL scale has a range between 1 and 9, where: 1 through 3 represents basic scientific research, 4 through 7 denotes a higher degree of applied research and initial prototyping, and above 7 signifies testing and demonstration in a realistic operational environment leading to field deployment.



Fig. 1. Diagram of the Technical Readiness Level scale as it applies to Operations Proving Ground involvement in the research-to-operations process. Optimally, prospective projects will engage early in the applied development phase, in order to maximize efficiency in the planning and execution of evaluations that result in successful operational implementation.

Evaluations conducted at the OPG, whether for operational readiness or operational impact, represent TRLs 8 and 9. However, it is important for the OPG to engage with prospective project developers at a much earlier stage - preferably at TRL 4 or 5. There are two primary reasons for earlier engagement:

1. The Annual Operating Plan process requires alignment with strategic objectives, justification for resources, and budget approval from at least three NWS portfolios (e.g., Science and Technology Integration, Analyze Forecast and Support, and Central Processing). About six months prior to the start of a fiscal year, priority goals are identified and discussions begin concerning prospective projects to be funded. The time span from initial proposals through budget approval to concrete planning and execution is typically on the order of 9-18 months.
2. Communication of the process by which a candidate tool is undergoing beta testing and product development is critical. This ensures relevance for operational evaluation, validation of readiness level, transparency in the development process, proper identification of evaluation objectives, and a clear understanding of the time and resources needed to prepare and execute an effective ORE.

There may be exceptions to this rule where greater agility and flexibility are required (e.g., a situation where a new tool is in high demand or under a tight deployment schedule). However, these cases are rare. For most projects, a successful transition to operations will be optimized through early engagement with the OPG in the planning and development process.

### OPG ORE Process

Although each R2O project is different, with its own unique characteristics that must be incorporated into a test plan, there are general OPG ORE commonalities.

For each new tool or capability, OPG ORE Objectives will include:

- NWS forecasters assessing unique value added for decision making, situational intelligence, production efficiency, etc.
- NWS forecasters assessing adverse impacts on workload, workflow, data integration, data overload, etc.
- NWS forecasters assessing usefulness and usability.
- OPG staff assessing performance against success metrics specified in test plan.
- NWS forecasters and OPG staff assessing the balance between the project's complexity, overall value, and implication for training.

OPG OREs, whether aimed at assessing “operational readiness” or “operational impact”, will consist of simulations where NWS forecasters will:

- use the new tool or capability in a realistic operational environment.
- apply the new tool or capability in varied situations and tasks that have immediate job relevance.
- provide candid feedback to OPG staff in formal and informal settings.
- consider the operational training needed to understand how to use the new tool or capability operationally.

For each OPG ORE, results will be gathered, published, and disseminated to NWS senior leadership that include recommendations related to:

- Readiness for field implementation (i.e., Unqualified Approval, Approval with Caveats, Not Ready)
- Specific applications, observations, and insights from the NWS forecaster perspective
- Operational training considerations

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## **OPG Project Proposals**

Each OPG candidate project should discuss and submit the following to Kim Runk, OPG Director (kim.runk@noaa.gov):

*Description of Project* – Discuss (1-2 paragraphs) the scope and potential NWS applicability of the new tool or capability. Include intended operational use, specific value to improving the forecast process, and how it will aid forecaster decision making.

*Supporting NWS Strategic Goals* – Explain (1-2 paragraphs) how successful transition of this project into operations advances a priority objective of the Weather Ready Nation initiative or a published Annual Operating Plan goal.

*Current and Future Development and Evaluations* – Discuss (1-2 paragraphs) the project's current development and testing process which will be (or has been) completed to ensure the project is at the appropriate TRL for an OPG ORE/OIE.

*System Configuration Requirements* – Identify the datasets and AWIPS systems configuration requirements needed to facilitate the OPG ORE/OIE.