



Readiness Levels Training Task Force

Final Briefing to the Line Office Transition Managers Committee

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Readiness Levels Training Task Force (RLTTF)

BACKGROUND

- Line Office Transition Managers Committee (LOTMC) created the RLTTF to address the challenges surrounding the use of Readiness Levels at NOAA (Readiness Levels Workshop May 2020)
- The task force was formed on December 2020 with the purpose to create draft training materials for increasing the utility of Readiness Levels at NOAA
- LOTMC provided the following guidance for the awareness of the Task Force:
 - The number of RLs (nine) should not change, though it is possible that the LOTMC may decide to slightly modify the RL definitions in NAO 216-105B
 - Training materials should include 1-2 examples of each of the different R&D project output types
 - The Task Force will consider different possibilities on how these training materials will be provided
 - In the case extra resources are needed, the task force will report back to the LOTMC for the request

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GOALS & DELIVERABLES

- Goal 1 Recommend Clarifications to RL Definitions
- Goal 2 Develop tools to improve RL understanding
- Goal 3 Develop RL criteria and/or decision trees to help discern project RLs
- Goal 4 Define Transition Types
- Goal 5 Develop potential RL training modules
 - **Goal 5a** Include 1-2 examples of each transition type
 - **Goal 5b** Provide recommendations on delivery and potential resources

Deliverables: RL Training Modules (5) and Final Report

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GOAL 1: RECOMMEND CLARIFICATIONS TO RL DEFINITIONS

Example 1: Lack of a verb use in some NAO definitions

RL3: Proof-of-concept for system, process, product, service, or tool; this can be considered an early phase of experimental development; feasibility studies may be included.

Simplified RL definition:

RL3: Developed a proof of concept.

The simplified definition is clear and concise, referring to the specific stage of maturity, or progress, and uses the proper verb tense to demonstrate the phase was completed.

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GOAL 1: RECOMMEND CLARIFICATIONS TO RL DEFINITIONS

Example 2: Ambiguity and overlap in use of environment terms in NAO defined RLs 6-7

RL6: Demonstration of a prototype system, subsystem, process, product, service, or tool in relevant or test environment (potential demonstrated).

RL7: Prototype system, process, product, service or tool demonstrated in an operational or other relevant environment (functionality demonstrated in near-real world environment; subsystem components fully integrated into system).

Simplified RL definitions:

RL6: Demonstrated the prototype in a relevant environment.

RL7: Demonstrated the prototype in an operational environment.

The simplified definitions refer to one, and only one, specific environment as well as phase of maturity, and uses the proper verb tense to demonstrate the phase was completed.

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GOAL 1: RECOMMEND CLARIFICATIONS TO RL DEFINITIONS

Example 3: Ambiguity and overlap in use of phases of progress terms in NAO defined RLs 3-5

RL3: Proof-of-concept for system, process, product, service, or tool; this can be considered an early phase of experimental development; feasibility studies may be included.

RL4: Successful evaluation of system, subsystem, process, product, service, or tool in a laboratory or other experimental environment; this can be considered an intermediate phase of development.

RL5: Successful evaluation of system, subsystem process, product, service, or tool in relevant environment through testing and prototyping; this can be considered the final stage of development before demonstration begins.

Simplified RL definitions:

RL3: Completed the evaluation / testing of proof of concept in a controlled / laboratory setting.

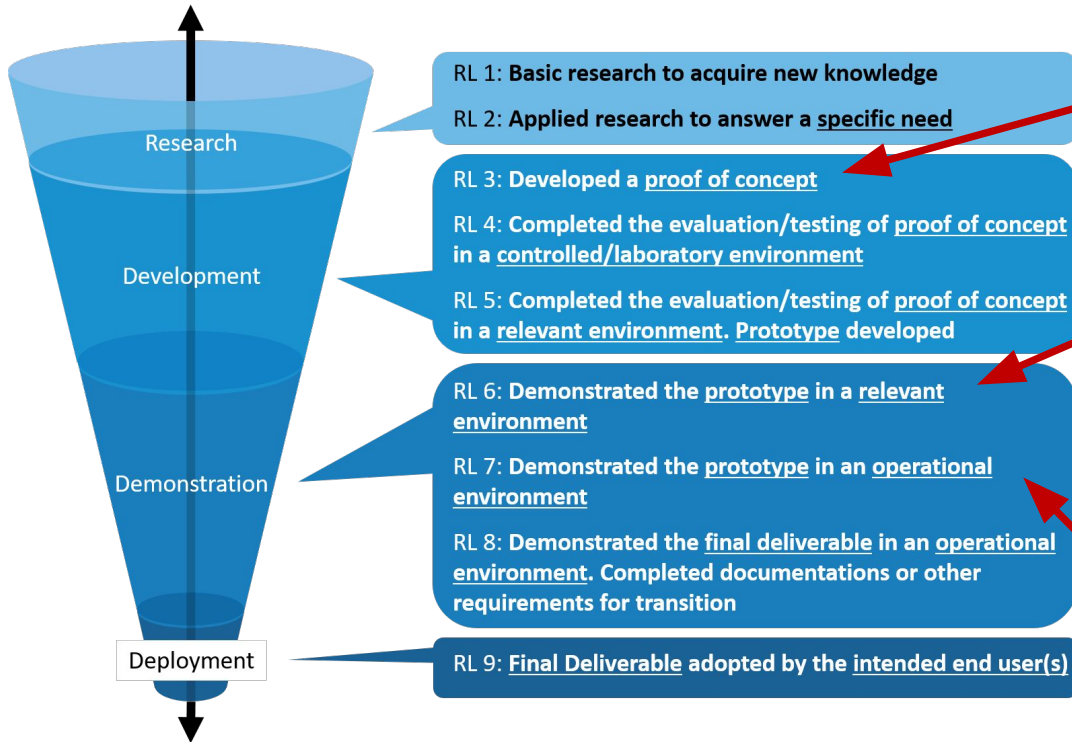
RL4: Completed the evaluation / testing of proof of concept in a relevant environment. Prototype developed.

RL5: Demonstrated the prototype in a relevant environment.

The simplified definitions refer to one, and only one, specific phase of maturity, and use an appropriate verb tense to demonstrate that the phase was completed.

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GOAL 2: DEVELOP TOOLS TO IMPROVE RL UNDERSTANDING



NAO Definition

RL 3: Proof-of-concept for system, process, product, service, or tool; this can be considered an early phase of experimental development; feasibility studies may be included.

RL 6: **Demonstration** of a **prototype** system, subsystem, process, product, service, or tool in **relevant or test environment** (potential demonstrated).

RL 7: **Prototype** system, process, product, service or tool **demonstrated** in an **operational** or other **relevant environment** (functionality demonstrated in near-real world environment; subsystem components fully integrated into system).

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GOAL 3: DEVELOP CRITERIA AND/OR DECISION TREES TO HELP DISCERN PROJECT RLS

Basic Research

RL 1

Applied Research

RL 2


			R&D Environment		
			Lab/Controlled	Relevant	Operational
R&D Progress	Proof of Concept Developed	RL 3			
	Proof of Concept Validated		RL 4	RL 5*	
	Prototype Demonstrated			RL 6	RL 7
	Finalized Output Demonstrated				RL 8

Finalized Output adopted by the intended end user(s)

RL 9

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GOAL 4: DEFINE TRANSITION TYPES


 Tool (Hardware): Physical components that comprise the developed system.

Product: a type of knowledge transfer output that results from R&D informational knowledge

 Process: Process is a type of knowledge transfer output that emphasizes the development of “how-to”s

Tool (Software): A software tool may be defined as a set of instructions or programs used to operate computers and execute specific tasks. In contrast to hardware, which describes the physical aspects of a tool, software is the intangible aspect that consists of programs that communicate tasks through programming code.

 System: A system is a combination of R&D outputs (tools, products, processes) viewed as sub-components that comprise a more comprehensive effort. A system is complex and should be tracked by its individual parts to determine the RL of a system. External dependencies can be considered when determining a system’s RL. In program management it is common to have individual parts or components of a system at different RLs during development. However, the system RL is defined by the lowest RL of the individual components in its critical path to conclusion or completion.

 Service: RLs are used solely to assess the maturity of R&D. It must be clear that the project and outputs are R&D related and not a routine effort. For example, service outputs from routine operations do not have an associated Readiness Level; by definition, routine activities do not qualify as R&D.

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GOAL 5: DEVELOP POTENTIAL RL TRAINING MODULES

Interactive Training Tools

- Modules for *relevant Transition Types
 - [Main Module](#)
 - [Tool \(Hardware\)](#)
 - [Tool \(Software\)](#)
 - [Product](#)
 - [Process](#)
- Definitions
- Examples



**The RLTF determined 'System' and 'Service' Transition Types do not require modules; justification is documented in the final report Section 3.3.*

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5A: INCLUDE 1-2 SAMPLE PROJECTS FOR EACH TRANSITION TYPE WITH RL EXAMPLES

Two Software Module Sample Projects:

Software Tool Project 1: Developing a novel wind wave model: In wind wave modeling, in deep water, a random phase spectral description is used. First and second generation wave models did not use first principles for evolving the wave spectra during wave growth. The examples used here describe the evolution through RLs for moving wave models with first-principle integration of source terms.

Software Tool Project 2: Incorporating data assimilation in the West Coast Operational Forecast System: This project aimed to create a NOS operational coastal model that uses advanced data assimilation capabilities. Data assimilation seeks to achieve an unbiased description of the ocean state through blending of observations with model physics. Incorporating data assimilation in the West Coast Operational Forecast System (WCOFS) will lead to greater system accuracy, significantly improving regional coastal intelligence. This project started at RL 4 as this project used existing models to create the forecast system.

Example when RL6 is achieved for each project:

Software Tool Project 1: The DIA (Discrete Interaction Approximation) was applied to realistic wave model conditions with a realistic domain and realistic wind fields. Initial model tuning was completed for stability

Software Tool Project 1: Successful WCOFS hindcast simulations were performed (on the R&D system) under different scenarios for the assimilated data types. These simulations were run to evaluate model sensitivity and performance under scenarios to determine how WCOFS should run in various data availability scenarios.

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GOAL 5B: PROVIDE RECOMMENDATIONS ON DELIVERY AND POTENTIAL RESOURCES

- Further Beta-Testing to a broader swath of NOAA scientists to gauge if the modules are useful and worth investing additional time and resources
- Elevate the distribution and assessment of the RL Training Module to a number of staff with various responsibilities to track and record the results of beta testing with a deadline for participation
- If the Training Modules do indeed prove useful, the RLTF recommends a longer-term, more stable web-based solution be developed to provide a more centralized, uniform interactive platform for all NOAA use
- Additionally, a Commerce Learning Center (CLC Training) module could be developed to provide additional benefit, and perhaps a requirement for course completion may be appropriate for specific NOAA staff, e.g. principal investigators on a regular basis



Questions?

