

## Technology Readiness Level (TRL) 2-9

Technology Readiness Level	Description
<b>Fundamental Research</b>	
<b>TRL 2 – Technology, product and/or process concept formulated</b>	Invention begins. Once basic principles are observed, practical applications can be invented. Activities are limited to analytic studies.
<b>Research and Development</b>	
<b>TRL 3 – Analytical and experimental critical function and/or proof of concept</b>	Active research and development is initiated. This includes analytical studies and/or laboratory studies. Activities might include components that are not yet integrated or representative.
<b>TRL 4 – Component and/or validation in laboratory environment</b>	Basic technological, product and/or process components are integrated to establish that they will work together. Activities include integration of "ad hoc" hardware in the laboratory.
<b>TRL 5 – Component and/or validation in simulated environment</b>	The basic technological, product and/or process components are integrated for testing in a simulated environment. Activities include laboratory integration of components.
<b>Pilot and Demonstration</b>	
<b>TRL 6 – Technology, product and/or process prototype demonstration in simulated environment</b>	Prototypes are tested in a relevant operational environment or laboratory. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a simulated operational environment.



<b>TRL 7 – Technology, product and/or process prototype demonstration in an operational environment</b>	Prototype near or at planned operational system level and requires demonstration of an actual prototype in an operational environment. Activities include prototype field testing.
<b>TRL 8 – Actual technology, product and/or process completed and qualified through test and demonstration</b>	Innovation has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development.
<b>Early Adoption</b>	
<b>TRL 9 – Actual technology, product and/or process proven through successful deployment in an operational setting</b>	Actual application of the product and/or process innovation in its final form or function.
<b>Commercial</b>	
	Technology, product and/or process development is complete and openly available in the marketplace.

**Proof of concept:** analytical and experimental demonstration of hardware/software concepts.

**Prototype:** the first early representation of the system which offers the expected functionality and performance expected of the final implementation.

**Laboratory environment:** a fully controlled test environment where a limited number of functions and variables are tested. Tests in a laboratory environment are solely for the purpose of demonstrating the underlying principles of technical performance (functions), without respect to the impact of environment.

**Operational environment:** "real-world" environment with conditions associated with typical use of the product and or process. If the technology will be used in various environments (e.g., the Arctic and Southern Canada), the technology must be developed and tested in each operational environment.