

# Emerging Technology Title

Principal Investigator, email contact, and organization

---

## Objectives

- High level description of your technology, which could consist of:
  - **Instrumentation** (hardware or processing and analysis methods)
  - **Information systems** (hardware or software for assessment or operation of observing systems, sensor webs, or multi-source data fusion and analysis)
- How does this technology/measurement address the PBL observational goals outlined in the technology survey request
- How would the technology be employed in Earth observing systems?
- Website for further info if available
- Co-Is/Partners

---

**Only material suitable for full and open distribution shall be submitted. Submittals shall be considered approved by the providing organization to be suitable for full and open distribution. No proprietary, export controlled, classified, or sensitive material should be provided.**

# Emerging Technology Title

Principal Investigator, email contact, and organization

---

## **Approach**

- How are you developing the technology?
- What are its novel aspects, and does it improve on the state-of-the-art?
- What platform(s) is it intended to be deployed on  
Remote sensing or computational platform(s)
- Citations

# Emerging Technology Title

Principal Investigator, email contact, and organization

---

---

**Graphic that convey the key aspects of the technology/instrument/measurement development**

---

---

**Only material suitable for full and open distribution shall be submitted. Submittals shall be considered approved by the providing organization to be suitable for full and open distribution. No proprietary, export controlled, classified, or sensitive material should be provided.**

# Emerging Technology Title

Principal Investigator, email contact, and organization

---

## **Technical Readiness Level**

- Current Technical Readiness Level (emerging technologies < 6)
  - Refer to NASA TRL definitions on following slides
- With current resources, expected TRL that will be reached and the time frame
- Potential TRL in 5 years if resources are available

## **Challenges**

- What are the key technology or methodology challenges?
- What activities are needed to overcome those challenges?

# NASA Technical Readiness Level Definitions (1 of 2)

TRL	Definition	Hardware Description	Software Description	Exit Criteria
1	Basic principles observed and reported.	Scientific knowledge generated underpinning hardware technology concepts/applications.	Scientific knowledge generated underpinning basic properties of software architecture and mathematical formulation.	Peer reviewed publication of research underlying the proposed concept/application.
2	Technology concept and/or application formulated.	Invention begins, practical application is identified but is speculative, no experimental proof or detailed analysis is available to support the conjecture.	Practical application is identified but is speculative, no experimental proof or detailed analysis is available to support the conjecture. Basic properties of algorithms, representations and concepts defined. Basic principles coded. Experiments performed with synthetic data.	Documented description of the application/concept that addresses feasibility and benefit.
3	Analytical and experimental critical function and/or characteristic proof of concept.	Analytical studies place the technology in an appropriate context and laboratory demonstrations, modeling and simulation validate analytical prediction.	Development of limited functionality to validate critical properties and predictions using non-integrated software components.	Documented analytical/ experimental results validating predictions of key parameters.
4	Component and/or breadboard validation in laboratory environment.	A low fidelity system/component breadboard is built and operated to demonstrate basic functionality and critical test environments, and associated performance predictions are defined relative to the final operating environment.	Key, functionally critical, software components are integrated, and functionally validated, to establish interoperability and begin architecture development. Relevant Environments defined and performance in this environment predicted.	Documented test performance demonstrating agreement with analytical predictions. Documented definition of relevant environment.
5	Component and/or breadboard validation in relevant environment.	A medium fidelity system/component brass board is built and operated to demonstrate overall performance in a simulated operational environment with realistic support elements that demonstrates overall performance in critical areas. Performance predictions are made for subsequent development phases.	End-to-end software elements implemented and interfaced with existing systems/simulations conforming to target environment. End-to-end software system, tested in relevant environment, meeting predicted performance. Operational environment performance predicted. Prototype implementations developed.	Documented test performance demonstrating agreement with analytical predictions. Documented definition of scaling requirements.

# NASA Technical Readiness Level Definitions (2 of 2)

TRL	Definition	Hardware Description	Software Description	Exit Criteria
6	System/sub-system model or prototype demonstration in an operational environment.	A high fidelity system/component prototype that adequately addresses all critical scaling issues is built and operated in a relevant environment to demonstrate operations under critical environmental conditions.	Prototype implementations of the software demonstrated on full-scale realistic problems. Partially integrate with existing hardware/software systems. Limited documentation available. Engineering feasibility fully demonstrated.	Documented test performance demonstrating agreement with analytical predictions.
7	System prototype demonstration in an operational environment.	A high fidelity engineering unit that adequately addresses all critical scaling issues is built and operated in a relevant environment to demonstrate performance in the actual operational environment and platform (ground, airborne, or space).	Prototype software exists having all key functionality available for demonstration and test. Well integrated with operational hardware/software systems demonstrating operational feasibility. Most software bugs removed. Limited documentation available.	Documented test performance demonstrating agreement with analytical predictions.
8	Actual system completed and "flight qualified" through test and demonstration.	The final product in its final configuration is successfully demonstrated through test and analysis for its intended operational environment and platform (ground, airborne, or space).	All software has been thoroughly debugged and fully integrated with all operational hardware and software systems. All user documentation, training documentation, and maintenance documentation completed. All functionality successfully demonstrated in simulated operational scenarios. Verification and Validation (V&V) completed.	Documented test performance verifying analytical predictions.
9	Actual system flight proven through successful mission operations.	The final product is successfully operated in an actual mission.	All software has been thoroughly debugged and fully integrated with all operational hardware/software systems. All documentation has been completed. Sustaining software engineering support is in place. System has been successfully operated in the operational environment.	Documented mission operational results.