
Reuse Tools to Help Enable Climate Research in NASA Missions

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Reusing software from current NASA missions can contribute to the data processing capabilities of the Earth science decadal survey missions and other future decadal-like missions focused on the Earth's climate and natural systems. The use of tools and recommended standards and practices, such as NASA's Reuse Readiness Levels (RRLs) to assess, identify, and categorize reusable software assets helps to reduce risk and cost of the development of mission software. Incorporating reuse practices in the software development process enables its timely construction and permits more time for developers to innovate and enhance the solution for the target science user community. RRLs and other such tools are applicable as far upstream as the mission Science Information Processing Systems (SIPS), all the way to the Distributed Active Archive Centers (DAACs) and to ad-hoc analyses conducted downstream by individual scientists and investigators.

A Reuse Enablement System (RES) offers capabilities to register and track software assets from previous missions that have potential for reuse in future missions. The RES can facilitate capabilities to reuse software and architectural components that are being developed for the decadal survey missions for possible use in future missions. The RES is also a mechanism to capture RRL assessments directly on a per-asset basis during the mission lifecycle. Exploring and incorporating software assets into a software development project also serves to educate and train developers on techniques proven effective for similar purposes. We expect the RES, RRLs, and other reuse enablement mechanisms to assist decadal missions in their software development lifecycles and to form a framework for the effective and efficient development of mission software, on-time, and within acceptable risk parameters and cost estimates, in the years to come.
