

5.10 AGILE GUIDANCE

While there is extensive industry guidance related to Agile management techniques, this section contains additional NSF guidance specific to Agile methodologies. The Awardee must also be cognizant of the general project management guidance found in this Guide including:

- the life cycle stage of the project.
- The need for a well-defined and comprehensive Work Breakdown Structure (WBS) .
- Having all scope assigned to the appropriate accountable individual (Control Account Manager – CAM).
- Ability to utilize rolling wave planning which involves detailed planning (work package or equivalent) for near-term efforts and more summary-level planning (planning packages or equivalent) for subsequent attempts.
- The entire effort planned to at least the planning package level for the period of performance.
- Appropriate use of an Integrated Master Schedule (IMS).
- Appropriate use of a change control plan for significant scope, schedule, and budget changes.
- Appropriate use of risk management, including those used to estimate budget contingency.

5.10.1 Specific Agile Guidance

This Agile guidance aims to explain how Agile systems can satisfy NSF expectation for project management and identify any unique processes and documentation necessary to support NSF review. It is not intended to provide instruction on Agile methodologies. Existing GAO,¹ PMBOK,² and NDIA-Agile³ guides can provide general Agile guidance.

The NSF expects the use of a hybrid WBS when utilizing the Agile methodology. This hybrid method unifies two different methodologies via the award's WBS. Traditional WBS structure is necessary at WBS Levels 1 and 2. An Awardee may elect to extend traditional methods to lower levels of the WBS, but Levels 1 and 2 are considered essential. [Figure 5.10.1-1](#) shows the WBS that uses a traditional methodology for WBS Levels 1 and 2 and the Agile methodology below. Note that some WBS legs utilize only traditional methodology, and Agile is confined only to the yellow leg:

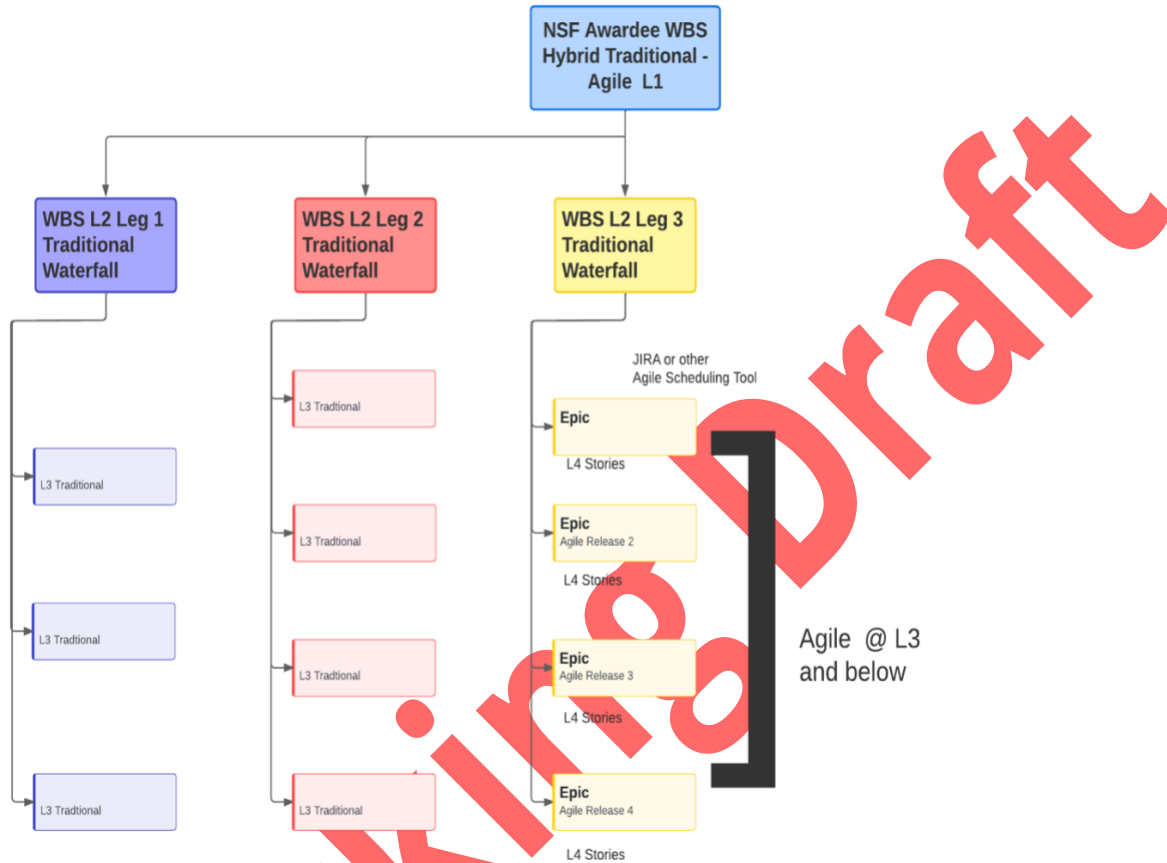
¹ The Government Accountability Office (GAO) Assessment Guide: Best Practices for Agile Adoption and Implementation (GAO-20-590G) may be used as a general guide to Agile implementation on RI effort but should be modified and tailored to the needs and requirements of the NSF.

² The Project Management Book of Knowledge (PMBOK 6th edition)/Agile Practice Guide (2017) Project Management Institute (PMI). <https://www.pmi.org/pmbok-guide-standards/practice-guides/agile> The agile practice guide is often included with the PMBOK 6th edition. Fees or membership in PMI are required to access these documents.

³ An Industry Practice Guide for Integrating Agile and Earn Value Management on Programs, National Defense Industrial Association (NDIA) December 9, 2022 Version 1.4 https://www.ndia.org/-/media/sites/ndia/divisions/ipmd/division-guides-and-resources/2023/ndia_ipmd_agileandevmguides_version_1-4.pdf?download=1

Figure 5.10.1-1

Traditional / Agile Hybrid Project Example #1 WBS



5.10.2 Additional Agile Documentation

If Agile methodology is utilized, the following special sections need to be added to the PEP:

- A WBS that clearly illustrates the traditional elements and those that are using Agile.
- A mapping table and expanded WBS dictionary identifying any linkage between traditional and Agile terminology. The WBS dictionary should define all significant Agile terminologies the Awardee elects to use.
- Traditional-Agile Data Flows:

Planning: Include a flow chart that shows how the Performance Measurement Baseline (PMB) refines itself downward from higher traditional WBS levels to detailed Agile planning (From WBS Level 1 to the most detailed Agile level).

Executing: Illustrate how Agile performance data flows upward from the lowest Agile

level to the traditional WBS levels and reports. Agile practitioners are free to utilize common and acceptable Agile methodologies and definitions. Methodologies and definitions are not restricted to a single set or those used in RIG examples. However, the above terminologies and processes used should be documented in the PEP.

5.10.3 Specific Agile Requirements

Traditional waterfall methodology guidance is included throughout the RIG and will not be repeated in this section. The following are specific Agile expectations:

- The initial budgetary and schedule estimation requires at least a planning package level for the entire performance period.
- Agile PMB budget/schedule estimates should be calculated via Agile sizing using the development team's story point estimates or equivalent metric.
- The detailed PMB should include performance measurement milestones at the appropriate detail level for Agile near-term scope. For example, budgeted stories may be assessed periodically, giving credit for completion, and summarizing cumulative performance (percent complete).
- Quality management, program management, and other non-coding (non-development) support activities may be utilized as a level of effort within an Agile WBS element. Agile focuses only on development (coding) activities within the WBS element.
- Agile scope progress should be calculated at the lowest level of the WBS on a percentage basis using a chosen metric.
- Rolled-up expenditures (i.e., actual costs) should be reported and measured against assigned budgets, which may be executed at the work package level or the Agile equivalent.
- Reporting methods, levels of rigor, and frequency for Agile components should be identified and documented.
- A forecast of combined story budgets and actual costs may exceed (or be forecasted to exceed) the overall epic budget. In this case, the Awardee either realizes an overrun or moves scope, schedule, and budget via the award's change management system.
- Agile should utilize the change management plan for scope, schedule, and budget changes and identify changes handled within the Agile process. Appropriate change management thresholds will be defined in the PEP.
- Agile may include a variety of methodologies (scrum, extreme programming, lean software development, etc.) and terminologies; any of these are allowable as long as they are properly identified in the PEP.