Work package 45-2-2 has investigated the state of software development in the avionics domain and proposed a process based on principles from agile software development methodologies

Needing more flexibility in avionics software development

- Avionic solutions grow more complex and larger parts are implemented as software – there is a need to rethink software development methods, beyond strict plan-driven development
- Costs related to certification are very high - we need to look for more cost effective ways to provide documentation
- Requirements are volatile – we need better ways to manage unclear and changing requirements
- Agile methods have shown improvement effects in non safety-critical domains – would it be possible to realize some of these effects for the avionic domain?

A survey of the state of software development in the European avionics domain and an analysis of recent research results has served as a basis for proposing a new software development process.
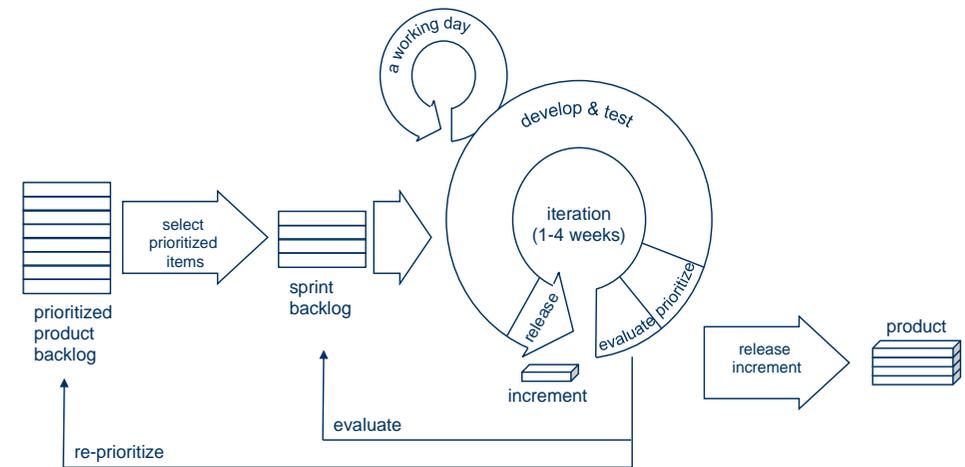
Agile methods as inspiration

Development is done iteratively and software and documentation is built incrementally. Short work periods with fixed duration (sprints), typically 4 weeks, allows for continuous learning and frequent evaluation of the software, allowing refinements of requirements based on recent test results.

Key agile principles are frequent interaction within multi-disciplinary teams, production of working software as the key measure of progress, direct involvement of customers and other stakeholders, and freedom to change plans and requirements based on recent results. (See www.agilemanifesto.org)

A recommended software process

Preparation: High level requirements are derived into user stories, which is selected for each sprint (development period of a few weeks)

Development: The result of a Sprint is a set of implemented and tested user stories that are integrated into a working application, which can be demonstrated

Closure: During Closure all data items required for certification that already exist in some form are brought up to date, and remaining data items, including the software configuration index, are produced