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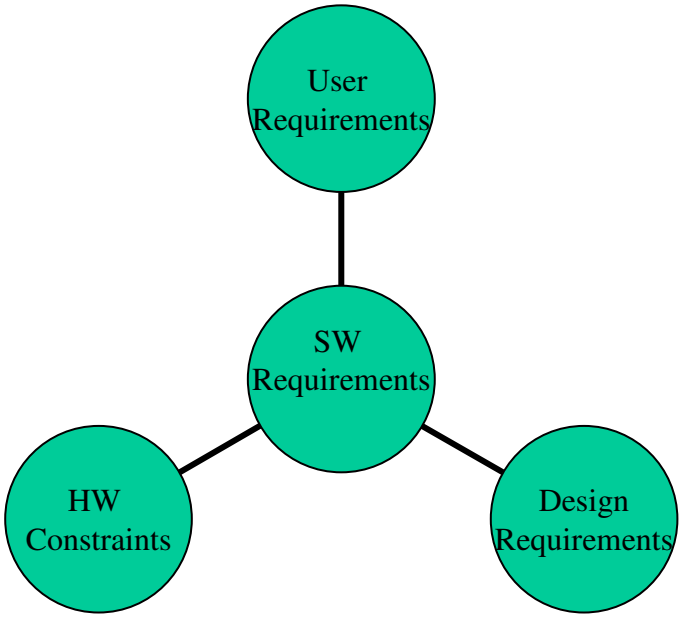
Deployment in the Space Sector

SW Environment

- SSF develops software that runs on embedded platforms
- User requirements usually have performance and hard real-time requirements
- Memory, processsing power, bandwith are usually limited.



The space sector has the same problems as everyone else...

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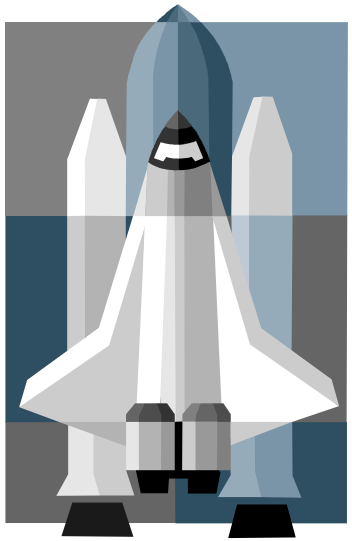
- Identifying conflicting/missing requirements happens too late in many cases
- Managing requirements tracing and evolution
- Cost of testing is too high, but there is no viable alternative
- Many requirements are not testable

SSF OBJECTIVES in DEPLOY



Define basic modeling methodology

- Compatible with space standards
- Special emphasis on supporting typical space architectures

Input to reasearch WPs

- Identify methodological challenges
- Identify tool problems and missing features

Requirements Evolution

- Tool support
- Evolution management
- Flowing down requirement changes

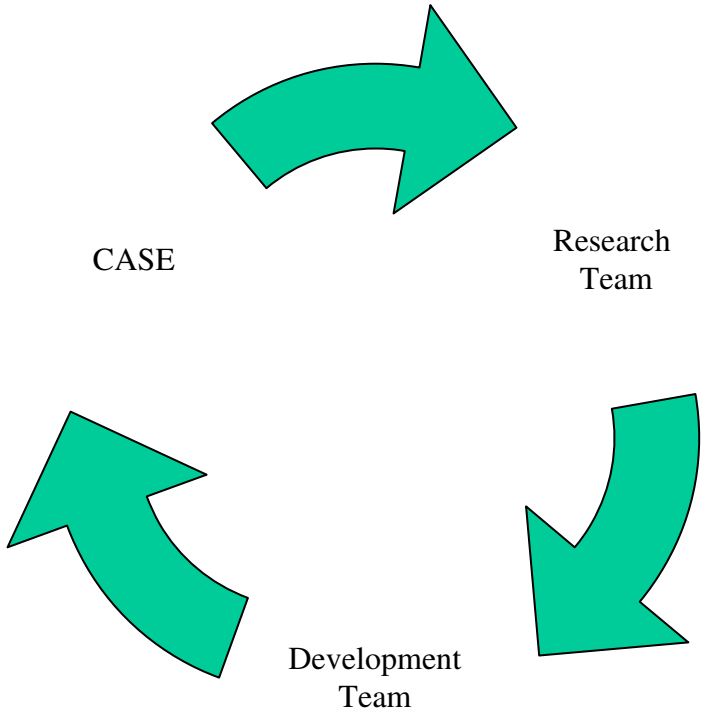
Process Integration

- Integrate formal engineering into the existing development model
- Where can work be saved in the current process?
- Which phases require more work?
- Are there things that should be done in a completely different way?

Approach & Organisation

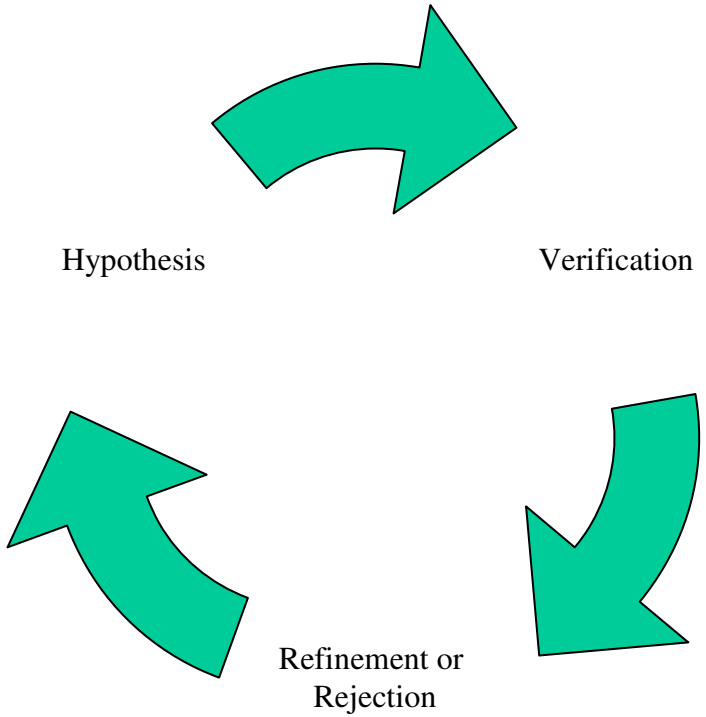
A case-based approach

- The case generates problems for research team
- The research team explores solutions
- The development team implements and tries solutions

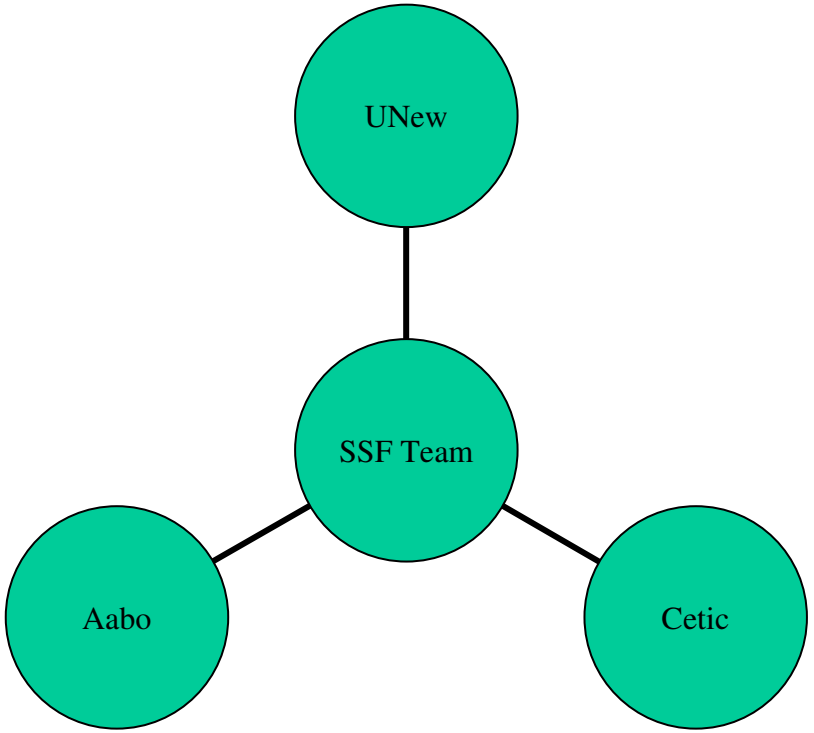


Solutions are hypothesis driven...

- Hypothesis on key problems are actively formulated
- Verification of hypothesis is done as quickly as possible within the case
- Hypothesis are refined or outright rejected.
- Approaching the problem ”with an open mind” usually a bad idea



WP3 Organisation



Partners

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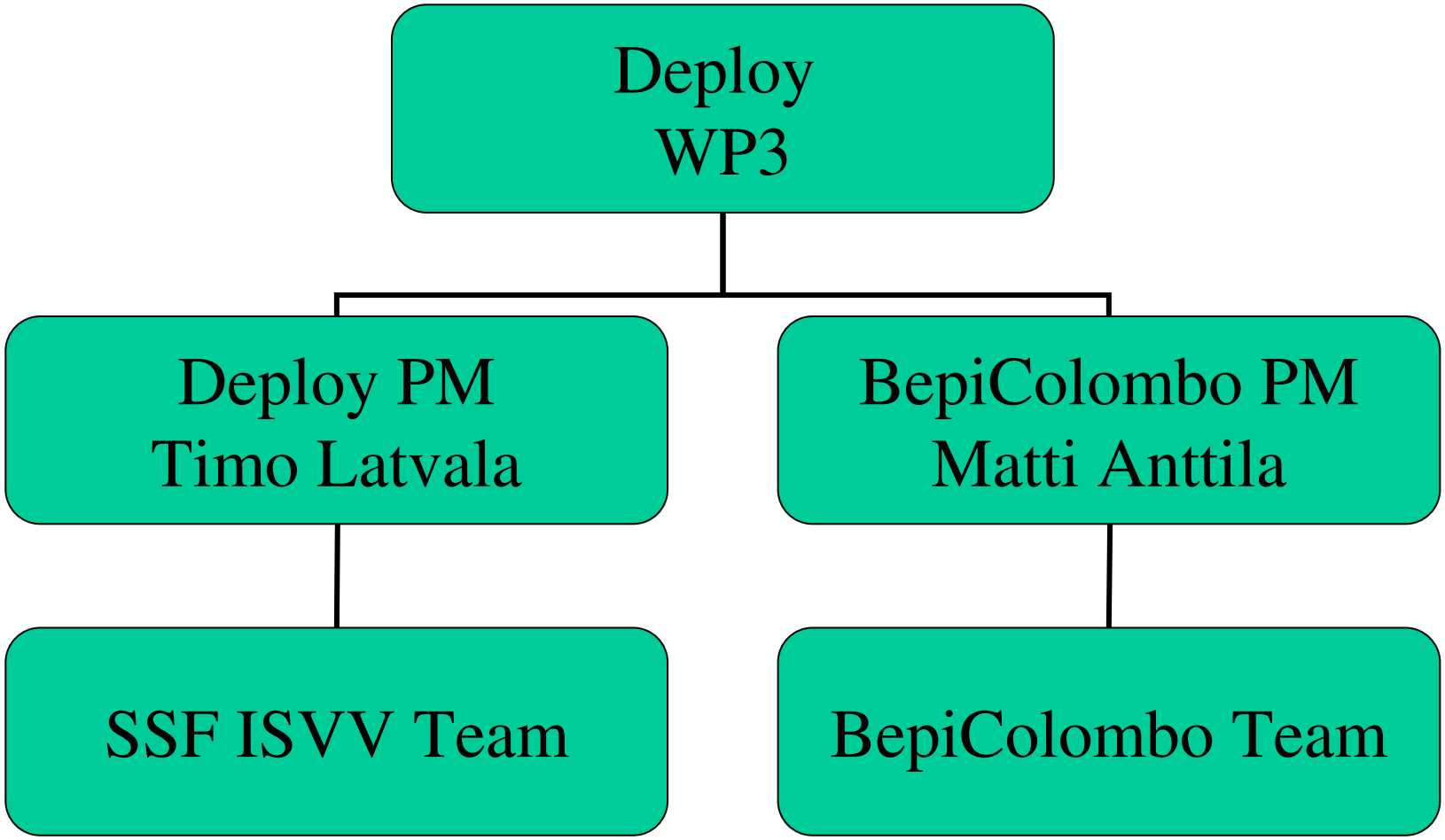
- Aabo
  - Training
  - Tool support
- Cetic
  - Measurement
- UNew
  - Training
  - Consortium Management

SSF Team



BepiColombo (2013) 2019-2021

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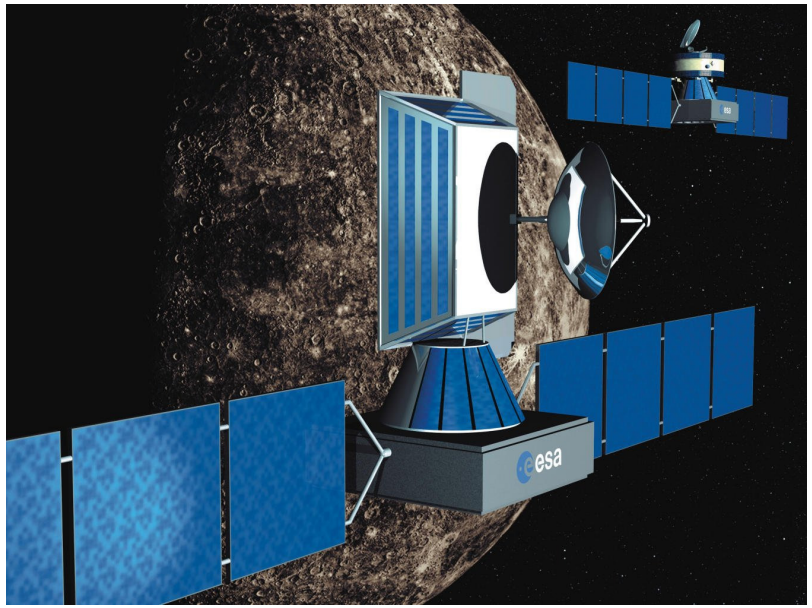


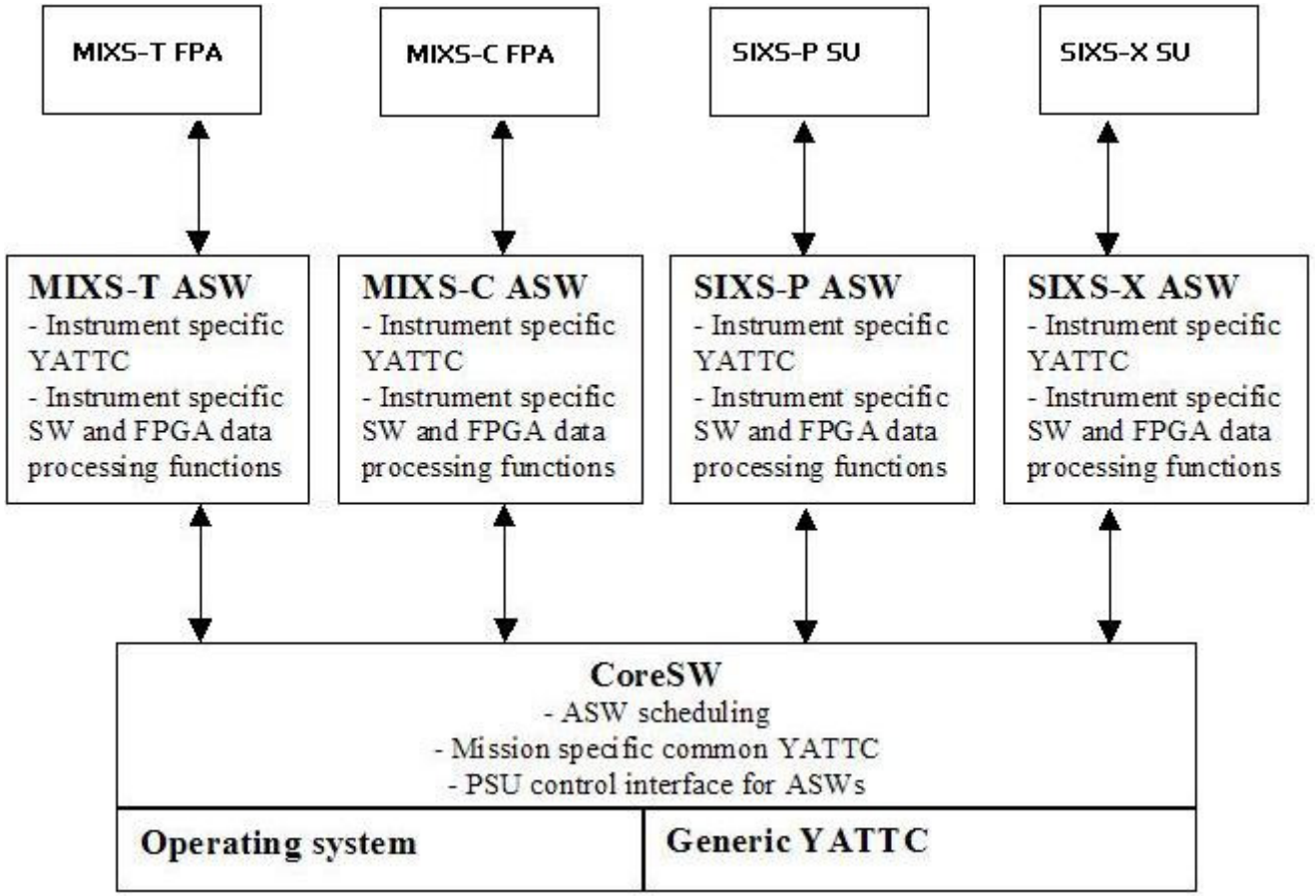
BepiColombo Mission

- ESA’s 5th cornerstone mission
- A key mission to study Mercury
- Objectives:
  - Origin and evolution of a planet close to the parent star
  - Mercury as a planet: form, interior, structure, geology, composition and craters
  - Mercury's vestigial atmosphere (exosphere): composition and dynamics
  - Mercury's magnetized envelope (magnetosphere): structure and dynamics
  - Origin of Mercury's magnetic field
  - Test of Einstein's theory of general relativity

SSF Contribution to BP

- ***SIXS Instrument: Application Software*** **(SIXS ASW)**
- Duration: 1/2007 – 9/2009:
- ***MIXS Instrument: Application Software*** **(MIXS ASW)**
- ***MIXS/SIXS Electronic Ground Support Equipment*** **(EGSE)**
- Project duration: 1/2007 – 9/2007:
- ***SIXS Systems Engineering support*** **(SE support)**
- - Project ongoing since 9/2005

BepiColombo SW



BepiColombo Schedule

- Draft of SW Specification Feb 2008
- Completed SW Specification Dec 2008
- First official build of SW Dec 2008
- Incremental builds of the SW Jan 2009 – Oct 2009
- Update of specification Apr 2009
- Update SW Jun 2009
- Qualification Review of SW Sep 2010

How do we get there?

Planning

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- Goals for December 2008
  - SSF Deploy team trained in Event-B, including the use of tools
  - Event-B Model of key parts of the MIX/SIXS ASW
  - Preliminary version of SSF contribution to JD1
  - Maturity assessment of the requirements specification

Key Challenges

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- Managing conflicting demands on the requirements specification (ECCS vs B)
- Verifying compatibility of architectual design with requirements (especially performance requirements)
- Relationship of architectual design and requirements
- Verifying consistency of architecture
- Verify software budget and scheduling

How do we know if we won?

- Standard quality metrics will be tracked in BepiColombo
- Productivity will be measured
- Engineers will assess usefulness of approach and tools

WP1 Events M1-M12

- Kick-off meeting 7-8 May
- Training Workshop June
- Requirements Engineering Workshop October
- Results workshop January 2009