Introduction GESOR round table

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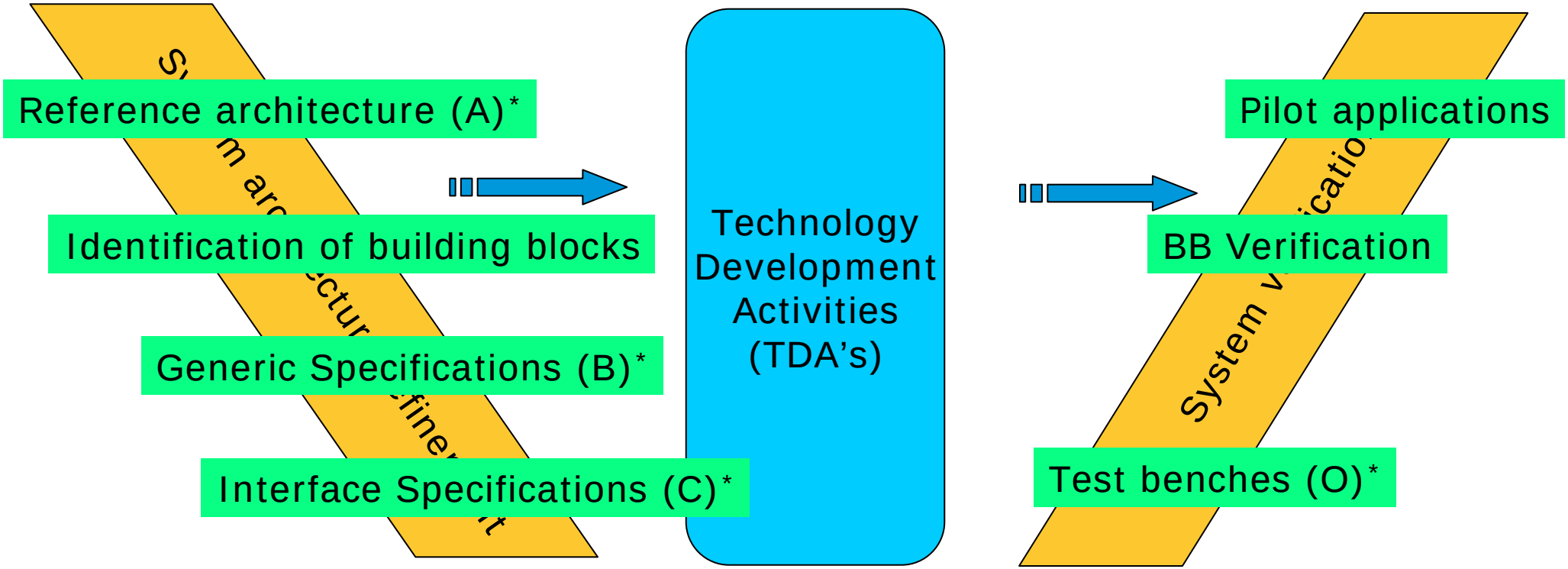
From Concept towards implementation, mapping to R&D programme



*) refer to the defined AIM's of the Embedded Avionics Systems dossiers

From Concept to implementation mapping to R&D programme

Reference

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Identifi

TDA's - examples –

Architecture

- Avionics system reference architecture consolidation
  - Where OBC/RTU is one of the WP
- Reference Architecture for High Reliability/ Availability systems (intended)

Execution Platform / operating systems

- IMA for Space / RTEMS / TSP kernels.

Interface definition

- Standardisation of Digital interfaces for Sensors (2011)

SOIS prototyping

- Remote Terminal Bus Component & Reusable HDSW

Terms used

- **Architecture**:
  IEEE Std 1471: "The fundamental organization of a system embodied in its components, their relationship to each other, and to the environment, and the principles guiding its design and evolution"

- **Standards:** Refers to an established norm or requirement issued by a recognised standardisation organisation (as ECSS, CCSDS or similar)

- **Reference Architecture**: An abstract representation of an architecture allowing to identify BBs and interfaces. The reference architecture is an agreed basis and a template solution for a particular domain, known and used by various stakeholders.

- **Avionics System Topology** : Representation of a reference architecture with modules/units/interconnects depicted in a representative manner: e.g. box/unit level, centralised or decentralised with redundancy and cross- strapping

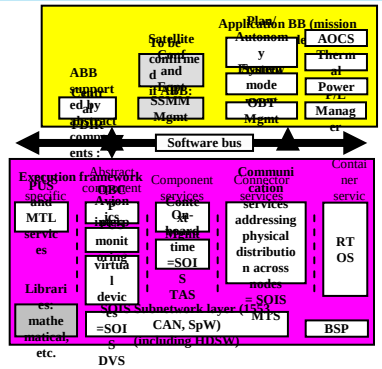
- **Generic specification / item**: specification/item that covers an extended domain of applications, (may be applicable after tailoring).
  - Generic specifications are functional spec's and may includes constraints as applicable standards, interface requirements and performance requirements

- **Canonical specification / item**: specification/item based on a generic specification (may be tailored) that respects SAVOIR rules/recommendations.

Terms used - software

- **Software reference architecture**
  A set of architectural design principles and a mapping of the usual functions implemented by the software onto the components and the execution platform.

- **Functional architecture**
  Focus is on the system functionalities to be implemented and on the relation to their environment
- A functional architecture is built, independently from the issues brought by the integration on an execution platform.

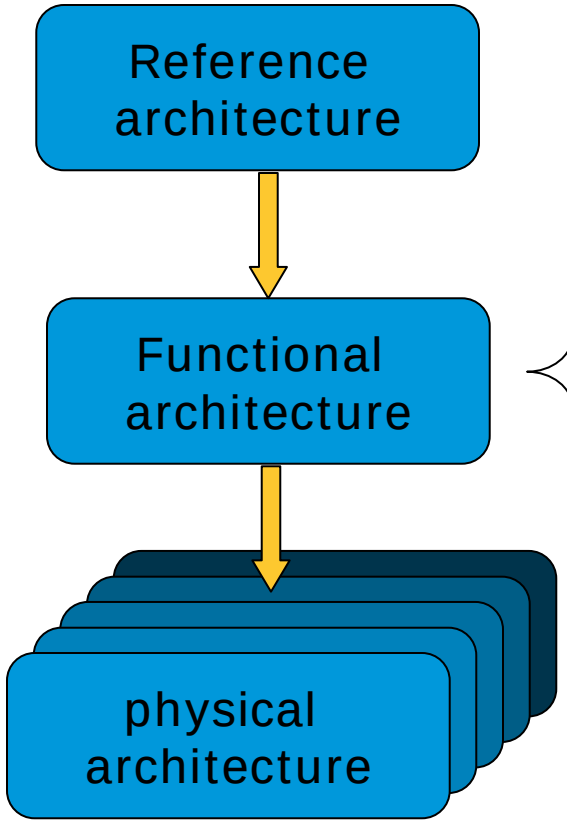


Set of generic spec's

- **Physical architecture**
  The Physical architecture describes the processing nodes of the system (i.e. on-board computer), sensors and actuators, the network topology (buses/point-to-point links/serial lines) that interconnects them and the communication protocol used by the physical communication layers.

Products – Building blocks

Process for creating Building Block Spec's



- Conceptual – abstract
- Generic functional Spec's (building block)'
  - Has no design requirements
  - May have constraints (non-functional req) as -performance, -interface req, -applicable standards
    - Interface spec's
- Product's (Building Blocks)

Process proposal for establishing generic reference spec's

1. Generated by ESA
   - An internal ESA draft generic / canonical reference spec' is generated.
   - Reviewed by a limited number of persons from D/TEC and Projects.
   - Reviewed by a SAG nominated WG (Industry, agencies, ESA)

2. Generated by an Industrial activity under specification of ESA
   - Reviewed by a limited number of persons from D/TEC and Projects.
   - Reviewed by a SAG nominated WG (Industry, agencies, ESA)

- Published under ECSS (Handbook or Technical Memorandum)

Round table question

1. Generic Specification for Reference Architecture: a way to reach cost effectiveness and quality improvement . Do we all agree? Drawbacks?
2. How to implement it ? We need Plan/Schedule definition
3. Would a Modular Generic Specification be the correct approach (where modular means composed of several sections addressing different functions)? E.g.
   - Availability requirements (cross strapping, Reconfiguration, SGM,
   - Built in test
   - Boot-up functionality
   - I/O Interface requirements (buses, discrete …..).
   - Others.
4. How many Generic Spec's for an OBC? (Spacecraft, Launchers-Space Transportation,…)
   - Or composed of a set of modular spec's?
5. Is there a need to standardise connectors.

Round table question

6. Should it be a minimum (including only mandatory functions) or Maximum Spec (to be tailored to specific mission) that would be the best approach ?
7. How will the generic spec's change the system engineering process of designing to requirements versus designing using products ?
8. Is a requirement management tool (DOORS, ...) needed to generate the GeSOR?
    - Requirements should be listed together with their justification, comments on this?
9. Assuming the OBC product will contain proprietary designs elements should the OBC/RTU supplier also be the suppler of a functional simulation model compliant to an agreed simulation infrastructure interface requirements
10. Others ?