

ADCSS 2020 M.I.L.A PF PRODUCT LINES APPROACH MANAGING DUAL SOURCE AND PRODUCT FAMILY FROM SPECIFICATION UP TO VALIDATION P. DANDRÉ / F. MAINGAM 2020/10/22

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M.I.L.A PLATFORM PRODUCT LINE

/// Thales Alenia Space: objective to rationalise its platform product lines among FRANCE and ITALY.

- /// Development of M.I.L.A platform product line (European platform product line) fully in line with Standard EO Platform initiative from ESA, also called "Common PF".
- /// M.I.L.A encompasses Copernicus, but also other institutional and commercial markets.
- /// Based on a modular and flexible building blocks approach to answer EO satellites missions with various kinds of payloads (LEO orbits).
- /// M.I.L.A platform product line benefits from Thales Alenia Space background in developing platform and associated AIT/AIV concept for operational Low Earth Orbiting constellations with a cost effective approach.



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M.I.L.A Platform – Product Line Engineering

/// M.I.L.A PF keys requirements related to variability:

- I Define a platform which can accommodate different missions possibly having conflicting requirements.
- Propose a modularity and flexibility of all subsystems to facilitate the interchangeable modules from multi-source suppliers.
- /// Product Line Engineering (PLE) approach put in place from the very beginning of the product definition based on THALES well-established tool chain for variability management.
- **/ Six** Product Reuse Categories identified:
- A Full-Custom Development
- B Copy and Modify
- C Reuse Building Blocks (BBs) catalogue
- D Reference Architecture and Commonalities (BBs)
- E Managed variability & derivation process with Customer-specific allowed
- F Managed variability & derivation process without Customer-specific





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M.I.L.A Platform – Product Line Engineering

/// M.I.L.A PF currently in Reuse Category D:

- I the product baseline is composed of a reference architecture and a set of building blocks;
- the project architecture implements the Reference Architecture and instantiates the set of building blocks.

- Product Policy & Product Plans (Business, Market)
- Stakeholders Requirements



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M.I.L.A Platform – Variability Management

/// To master the large variability and scalability of sub-systems between application missions and double source concept: definition of specific features.

/// Cover the variability and scalability of the MILA PF product line which can be seen as:

- I A function or equipment systematically implemented
- I A function or equipment may be implemented or not
- I A function or equipment may be implemented with different sources
- A function or equipment may be implemented with different performances
- I A function or equipment may be implemented with different sizing

- ➔ Mandatory feature
- ➔ Optional feature
- → Alternative feature
- → Alternative feature
- → Alternative feature

/// To maintain the coherency between the possible functioning points within the product range, specifics dependencies, attributes and constraints have been defined.

- **I Dependencies** : establish relationships between features crossing features hierarchy
- *I* Attributes : specify discrete values, parameters, ...
- **Constraints** : specify restrictions, authorized ranges for an attribute, ...

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M.I.L.A Platform – Variability Management

/// PLE process implementation

- Based on most recent and tooled Product Line Engineering approach already used in Thales Alenia Space.
- Orthogonal Variability" management concept to define separately variability models and engineering data (requirement, models,) which support variation points and to ease the instantiation of engineering data for the missions.



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M.I.L.A Platform / Application Missions - Assets flow

- The generic product lines specification (TRD) and units specs) are managed by the product lines.
- Application missions specifications (TRD and • units specs) are instantiated from generic specification (automatic tool)
- Additional specific PF specs are managed by Mission program.
- Same process applied for the architecture, and generic IVVQ assets



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M.I.L.A Platform – AOCS S/S Variability



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M.I.L.A Platform – Product line requirement assets (Example :TRD EPS S/S)



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M.I.L.A Platform – Product line requirement assets (Example :TRD EPS S/S)



APPLICATION (Project)

APPLICATION (Project) requirements

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Variant result model

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