



# *Component-based engineering: ESA position statement*

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- A SW/system crisis has been identified:
  - ◆ Culture is oriented towards single projects or market segments,
  - ◆ Low reuse except on very similar projects (ROSETTA/MARS EXPRESS)
  - ◆ System and Software design approaches are mostly empirical.
- What do we need:
  - ◆ Think in terms of system families,
  - ◆ Define and use standardized components,
  - ◆ A new system shall be a proven composition of existing and new standardized components.
  - ◆ Separate functional and non functional concerns.

- Working with a component-based approach:
  - ◆ Separation of concerns:
    - System architecture is proven wrt non-functional properties,
    - Application architecture is proven wrt functional properties.
    - Two layers of components are interacting.
  - ◆ Standardization:
    - Reference architecture is associated to each family,
    - Individual middleware or functional components are standardized.
  - ◆ Tailoring:
    - Standard components are tailorable,
    - Tailoring is limited by constraints on proof of composability.

- Technical interest:
  - ◆ Separation of concerns simplifies engineering tasks.
  - ◆ Proof of a component + proof of composability increase confidence in the design and reduce tests.
- Business interest:
  - ◆ New business opportunities for component providers
  - ◆ New tools to fully support the approach.
- Strategic interest:
  - ◆ More complex missions will be more attainable thanks to capitalisation of knowledge and the increased confidence on designs.
  - ◆ More effort will be put on advanced concepts (autonomy, constellations)