

“Definition of a Metrication Model for Model-Based Engineering”

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Abstract

MBSE (Model-Based System Engineering) places the development and exploitation of data and models at the centre of the technical processes associated with the traditional Systems and Software Engineering activities, such as Requirements Engineering, Design and Configuration, Analysis, and so on, which extensively benefit from it. MBSE adoption promise is to have an impact across the three dimensions of a typical space project: lifecycle phases, engineering domains (e.g. thermal, power, etc.) and the supply chain (e.g. Customer / Supplier relationship).

In this new scenario, the Quality Models need to be adapted as well so that quality can also be maintained in those space developments in which MBSE is adopted. As a result, conventional methods that rely on document-based metrics or software metrics must evolve and be refined according to MBSE needs.

METMOD (*Definition of a Metrication Model for Model-Based Engineering*) is a twelve month ESA activity that started in January 2023 and focuses on the definition of a reusable MBSE Quality Model (MQM) to ensure that the quality levels are maintained in those cases where MBSE is used. The applicability scope of this MQM covers System and Software Engineering models. The objective is that this MQM can be applied as part of a Metrication Programme independently of the model-based language, tool and method selected for the formalisation of the subject System or Software. Furthermore, the Metrication Programme will be tailored through the lifecycle of the project by considering the expectations, such as level of abstraction of the model, its maturity, the precision of the information defined, etc, so that it can be finally ensured regardless of the project phase that the models are robust, complete and trustworthy according to these expectations.

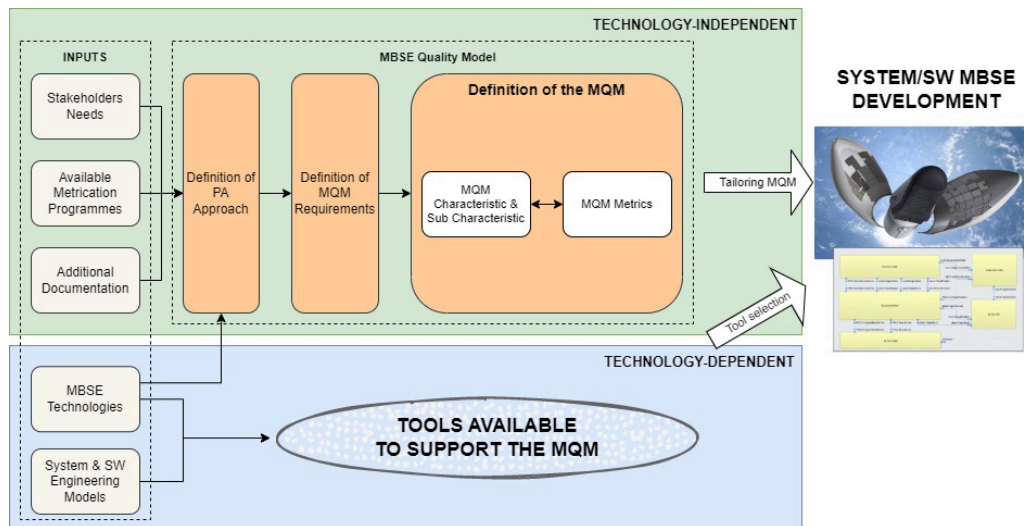


Figure 1. MBSE Quality Model (MQM) development approach

The information obtained from the application of the MQM can be used not only by Product Assurance-related roles but also by other stakeholders, such as Project Managers or a Customer, to have an informed view of the project’s status, detect problems, support trade-offs and design decisions, among others.

This MBSE Quality Model (MQM) will be demonstrated using two engineering models: a System model developed in Capella, and a Software model developed in TASTE. Both models have been selected during the initial phase of the activity after a detailed survey of available engineering models relevant for this activity.