







CONTREP: A Single-Source Framework for UML-based **Modelling and Design of Mixed-Criticality Systems**

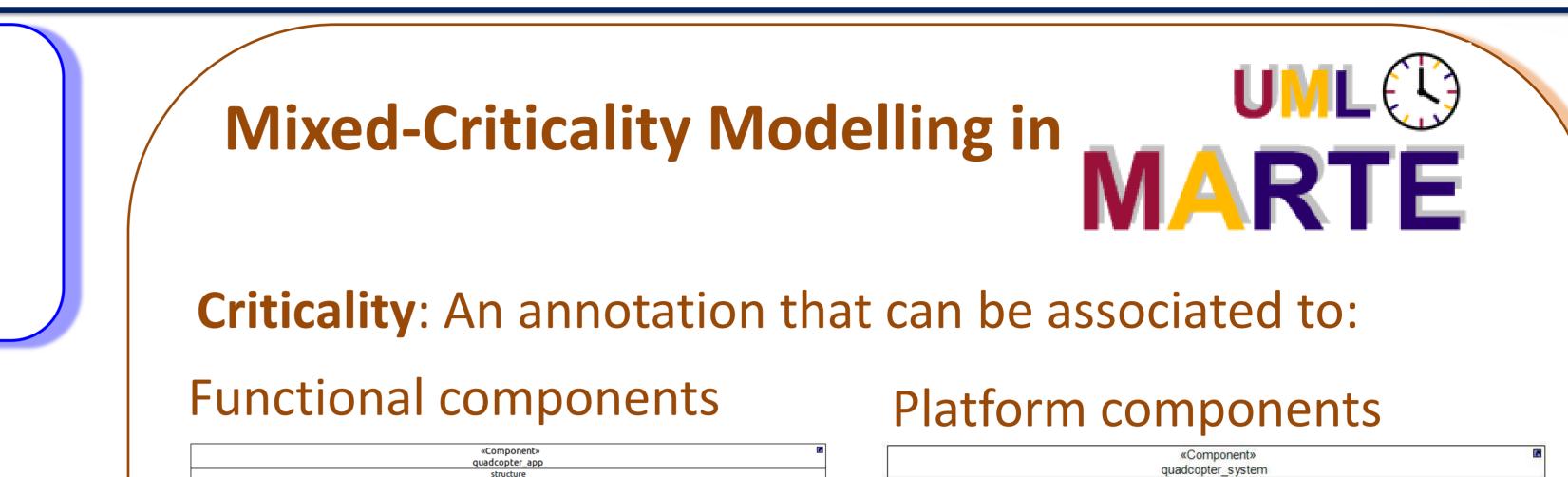
F. Herrera and E. Villar {fherrera, evillar}@teisa.unican.es

• Growing interest on Mixed-Criticality Systems

• Reuse and Efficiency \rightarrow more functionalities of different criticality implemented on cost-effective platforms

• **Criticality:** related to the impact of a failure on a component or on the violation of a functional or performance requirement

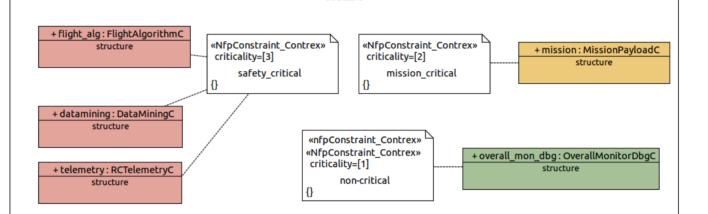
> Object Flight Alogorithm tracking Video

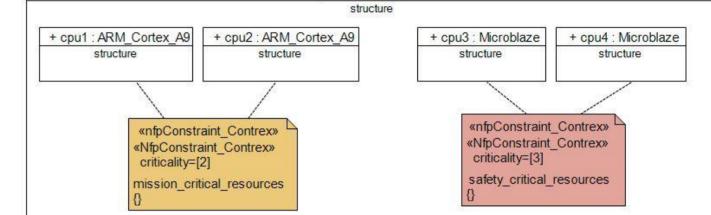




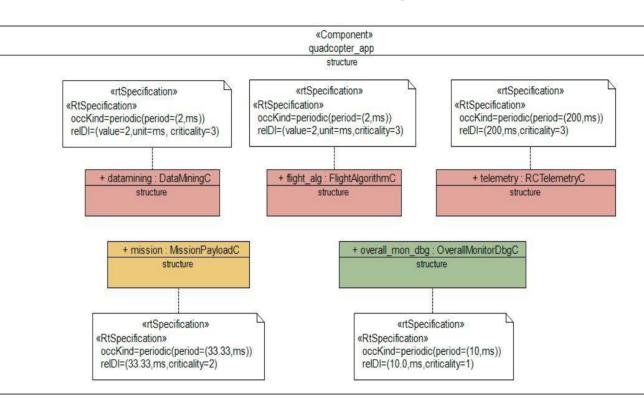
•Quadcopter system: safety-critical functionalities (flight algorithm, data mining, RC), mission critical functionalities (object tracking, video streaming) and non-critical functionalities (monitoring and debug)

Mixed-Criticality information used in model validation and in exploration after simulation-based performance assessment.

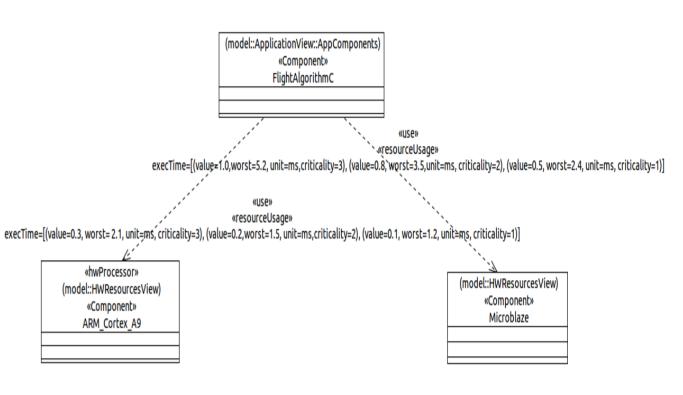




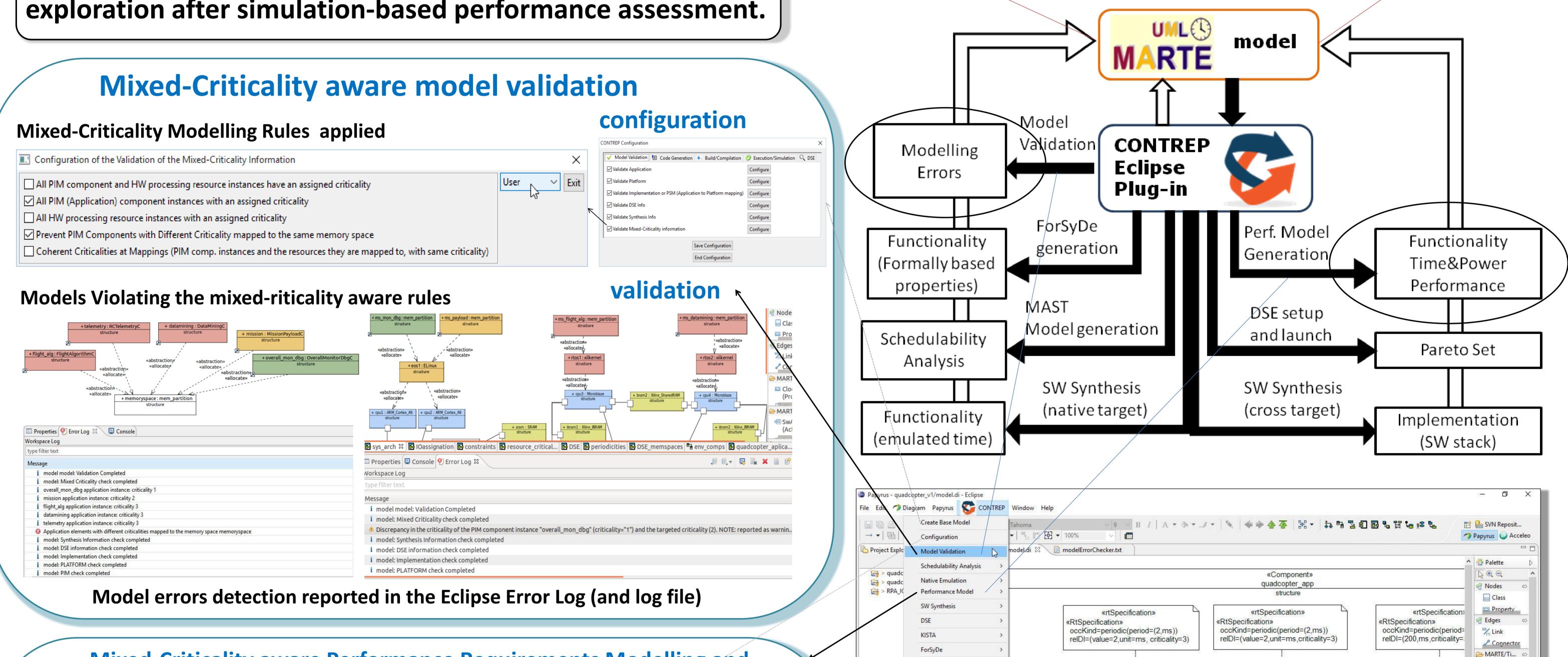
Performance Requirements



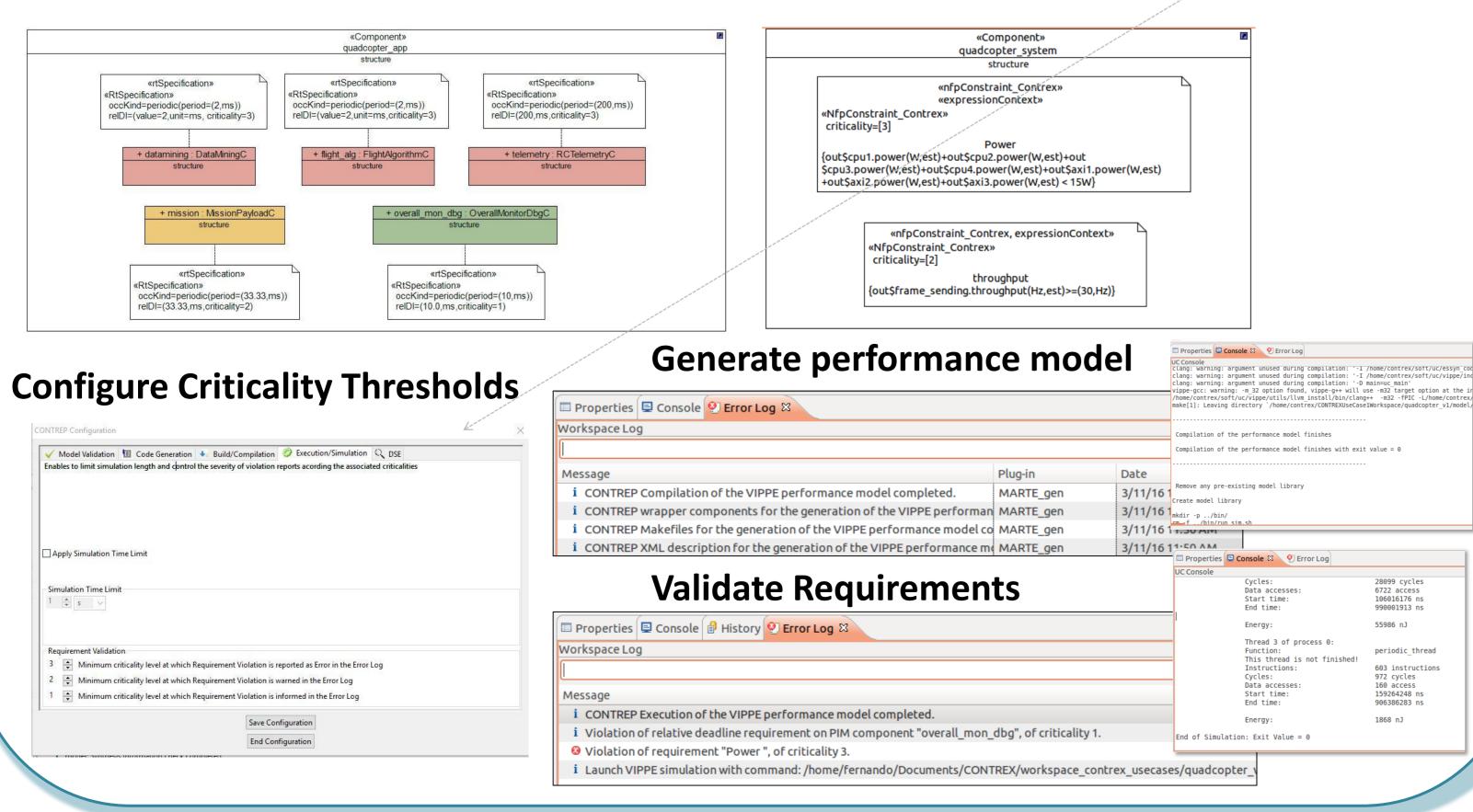
Extra-functional Annotations

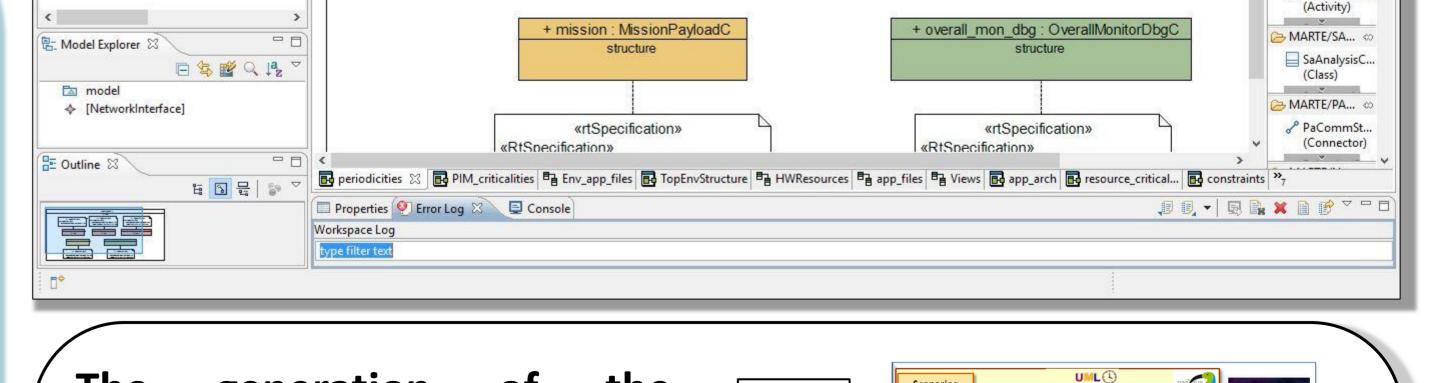


Single-Source Design Approach



Mixed-Criticality aware Performance Requirements Modelling and Validation based on an automatically generated fast performance model





+ flight_alg : FlightAlgorithmC

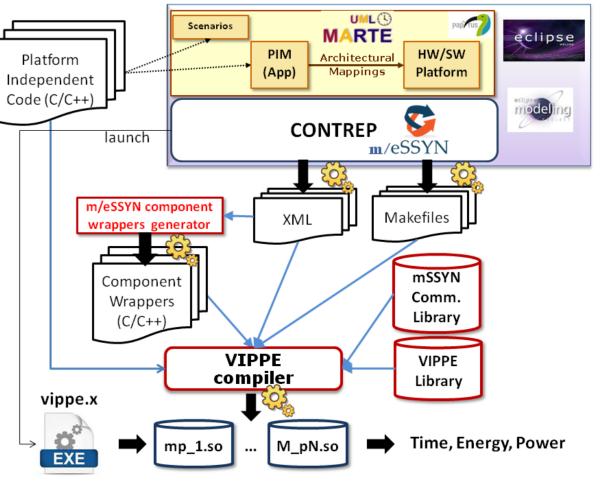
structure

datamining : DataMiningC

structure

of generation the The performance model from the UML/MARTE model İS automatic and relies on a advanced native simulation framework (VIPPE) and on the CONTREP and m/eSSYN code generators.

About CONTREP



Clock

(Property)

1 ----

MARTE/SRM SwAccessSe.

+ telemetry : RCTeler

structure