



## WP4 Workshop - Test Training on Functional Test

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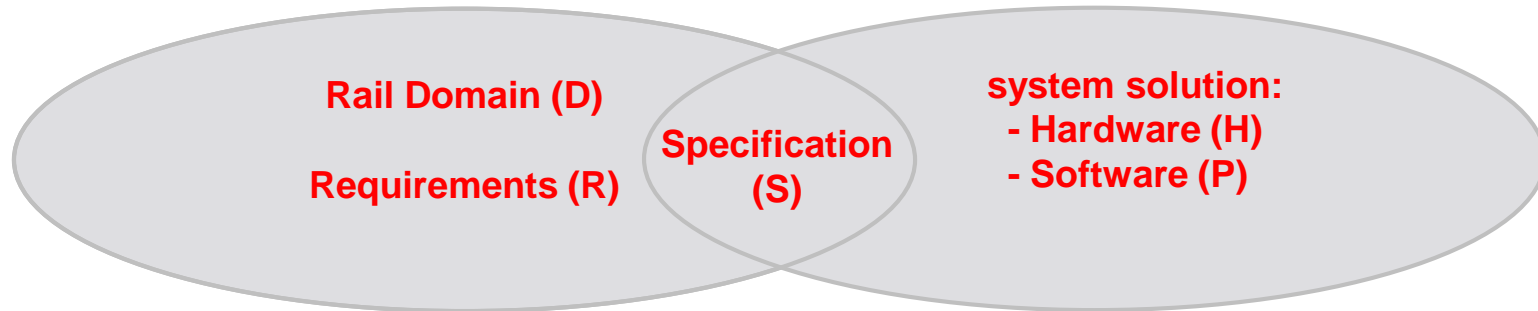
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openETCS@ITEA2 Project

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Braunschweig, 08.10.2013

# The World and the Machine<sup>1</sup>



- **Validation question:**

Do we build the right system? :

If the domain (excluding the system) has the properties D, and the system-to-be has the properties S, then the requirements R will be satisfied.

$$D \text{ and } S \Rightarrow R$$

- **Verification question**

Do we build the system right?

If the hardware has the properties H, and the software has the properties P, then the system requirements S will be satisfied.

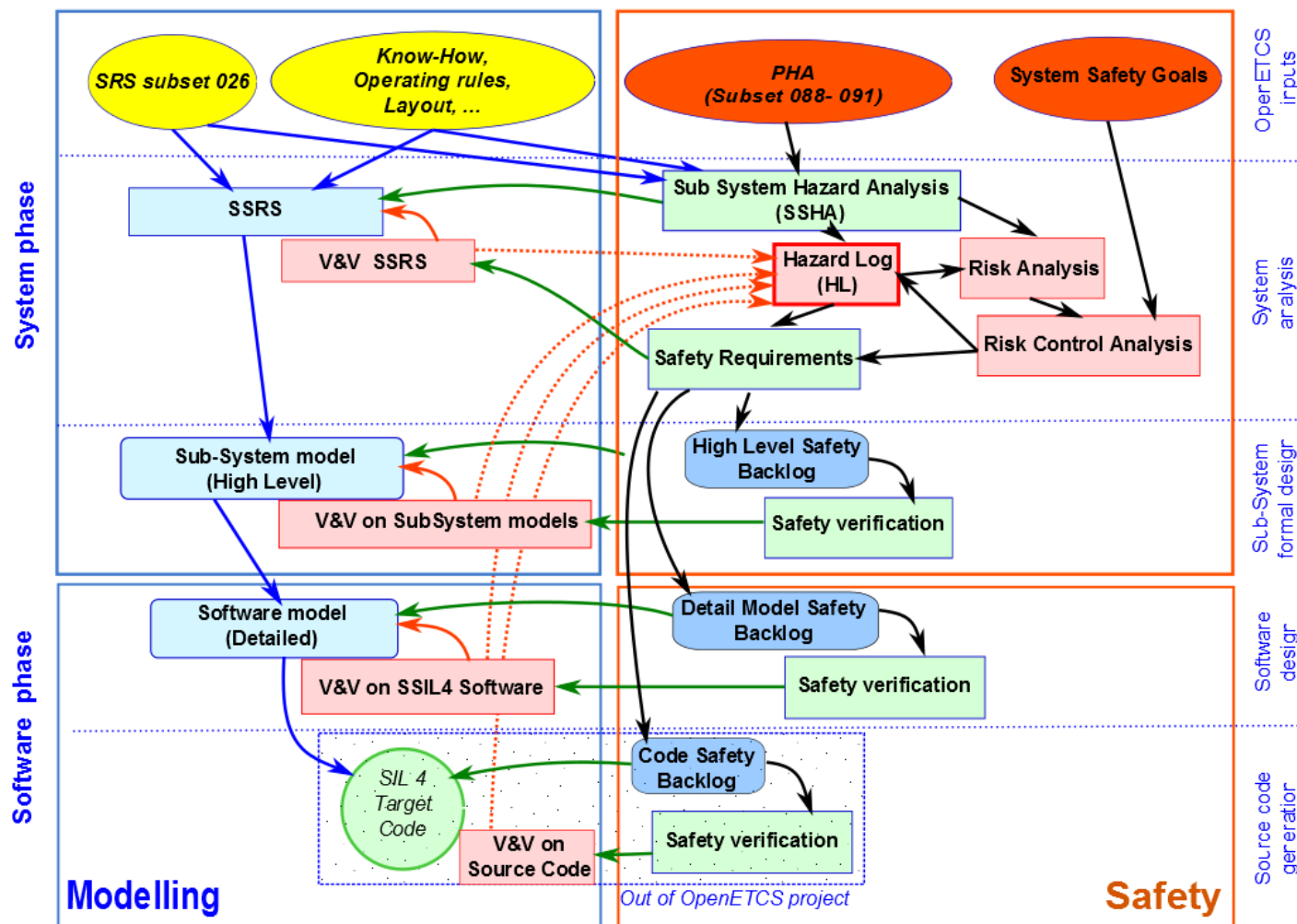
$$H \text{ and } P \Rightarrow S$$

Conclusion:

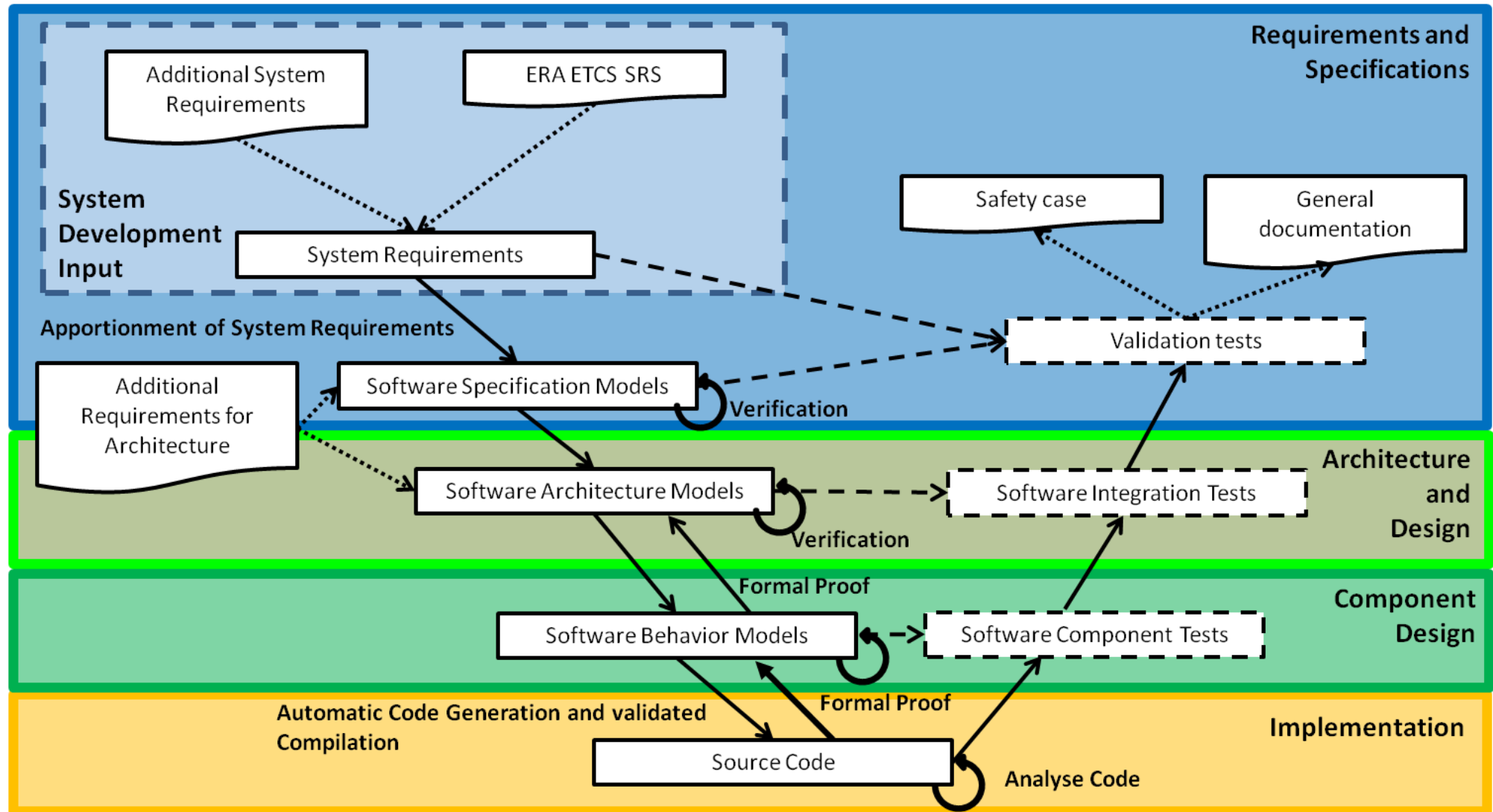
$$D \text{ and } H \text{ and } P \Rightarrow R$$

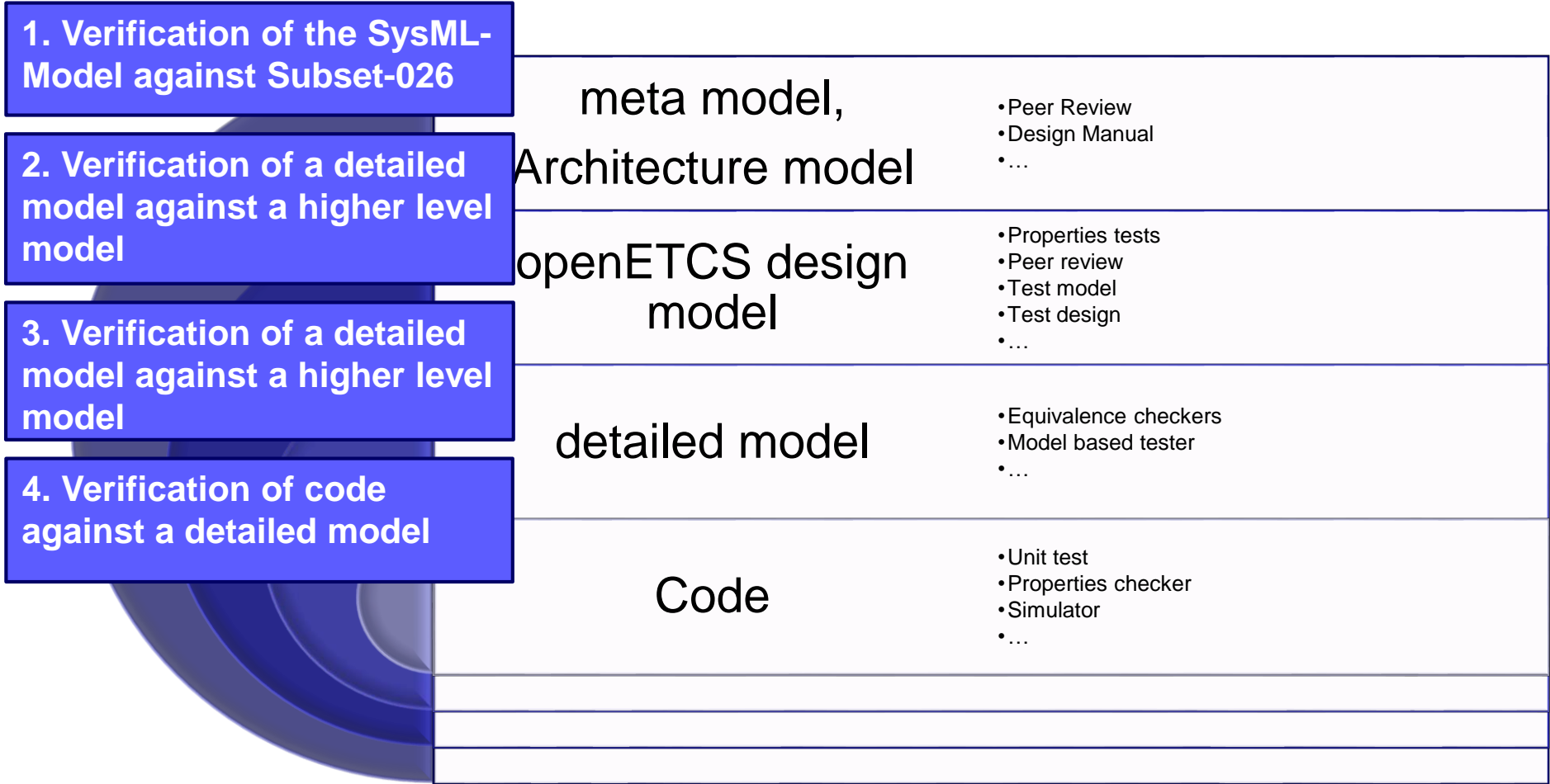
[1] M. Jackson, 1995

# Verification and Validation Inside openETCS



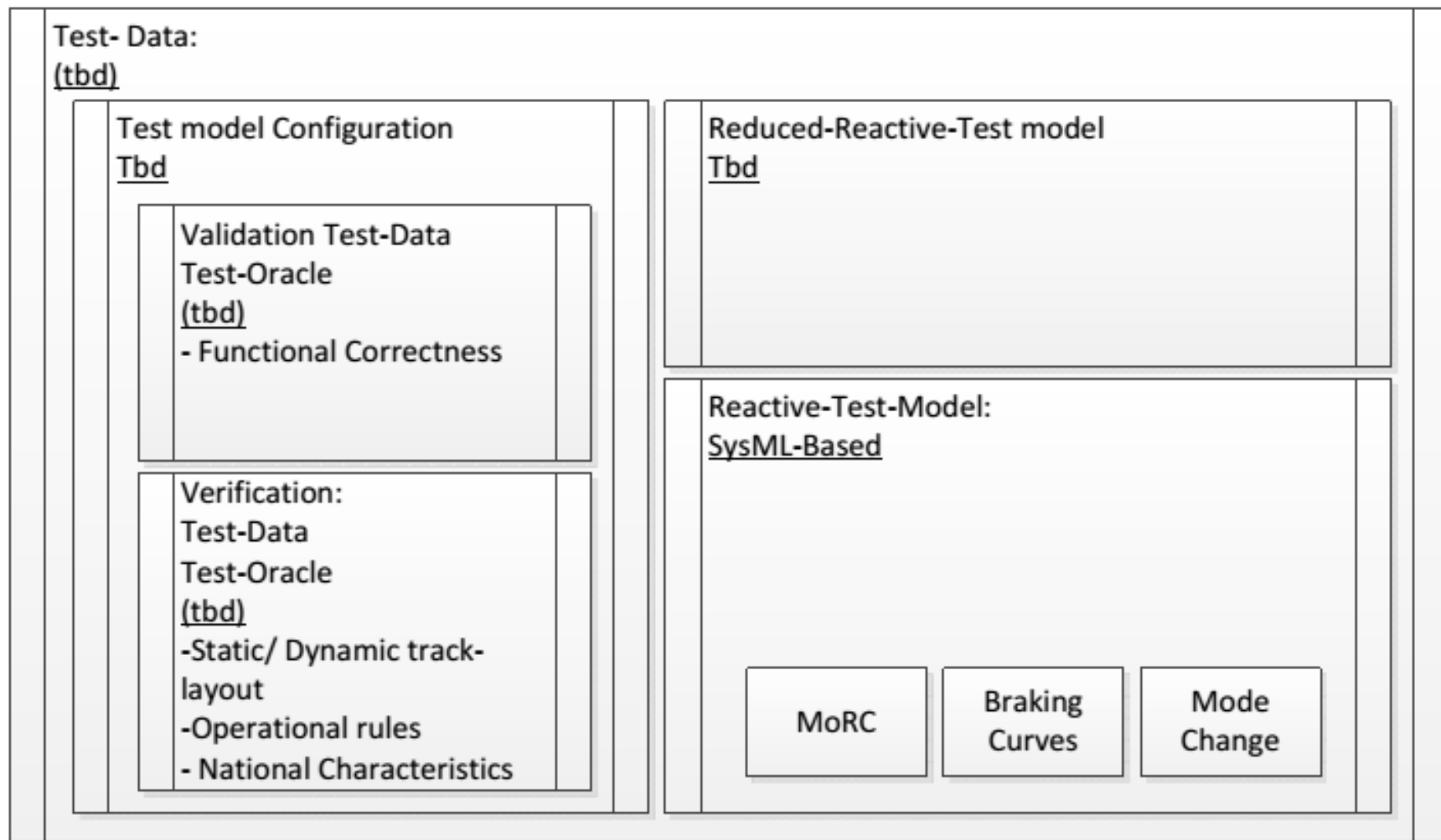
# Verification and Validation Inside openETCS





1. Validation of the SRS-Model against operational rules	meta model, SSRS	<ul style="list-style-type: none"><li>• Review by operators</li><li>• Peer Review</li><li>• ...</li></ul>
2. Validation of a model by validator or validation logic	openETCS design model	<ul style="list-style-type: none"><li>• Data Preparation for Operational Design</li><li>• Properties tests</li><li>• Peer review</li><li>• Model checking</li><li>• ...</li></ul>
3. Validation of code by validator or validation logic	detailed model	<ul style="list-style-type: none"><li>• Preparation of Simulator with operational scenario</li><li>• Model checking</li><li>• ...</li></ul>
4. Validation of code by validator or validation logic	Code	<ul style="list-style-type: none"><li>• Properties checker</li><li>• Preparation Simulator with operational scenario</li><li>• ...</li></ul>

# Test Model Configuration



## How verification will be triggered

- Design artifact owner shall trigger needed verification
- Check if artifact confirms to [Artifacts Acceptance Criteria](#)
- Check if there is already a verification activity enlisted in the [WP4 Issue Tracker](#)  
(If there is already an issue documenting the verification activities, please add your verification request to the existing issue. In the case no issue exists on this topic, go ahead and create [a new issue](#).)



The request should contain the following information:

1. *Verification Object*: Exactly which file(s) should be verified. Here a link with a hash should be provided.
2. *Verification Goal*: Please describe the goal of the verification. One classic example could be **Conformity** or **Coverage**.
3. *Design Phase*: Please enter a reference of the design phase your artifact complies to. This would be a reference to the Verificatoin and Validation Plan or to the Development Process documented within the requirements od openETCS.
4. *Specificatoin reference*: Please give the chapter(s) of the specification your object complies to. One possibility could be: **Subset-026-3.6.1.4** referring to chapter 3.6.1.4 of TSI-CCS Subset-026.

# Indicate Requirements build in test models

## Testmodel Traceability Matrix


On github at

[https://github.com/openETCS/validation/blob/master/DescriptionOfWork/openETCS\\_testmodel\\_scrum\\_workdistribution.ods](https://github.com/openETCS/validation/blob/master/DescriptionOfWork/openETCS_testmodel_scrum_workdistribution.ods)

SRS Parag. 3.3.0										
A	B	C	D	E	F	G	H	I	J	K
SRS Parag. 3.3.0	Informative	Requirement		openETCS Test model						
	Definition	Others	ONB	TRK	Optional	testable with openETCS testmod	self-assigned to Parnter	formalizi on language	transfere d to SysML	assessed by partner
3.1		x								
3.2		x								
3.3		x								
3.3.1		x								
3.3.1.1		x								
3.3.1.2		x								
3.3.1.3		x								
3.3.1.4		x								
3.4		x								
3.4.1		x								
3.4.1.1				x						
3.4.1.2		x								
3.4.1.2 a)		x								
3.4.1.2 b)		x								
3.4.1.2 c)		x								
3.4.1.3	x									
3.4.2		x								
3.4.2.1.1	x									
3.4.2.1.2	x									
3.4.2.2		x								
3.4.2.2.1	x									
3.4.2.2.2	x									
3.4.2.2.2 Figure 1		x								
3.4.2.3		x								
3.4.2.3.1	x									
3.4.2.3.1 Figure 1a		x								
3.4.2.3.2		x								

# Where to contribute inside validation

- Inside this workstream the contributions are collected inside user stories. You can find the [path to individual user stories here](#).

PUBLIC  openETCS / validation Watch 19 Star 6 Fork 14

branch: master validation / VnVUserStories / + [History](#)

Added testProfile for Papyrus Model  
cecilebraun authored 16 hours ago latest commit 28c37eccac

ModelVerificationTWT	Extended CPN model (includes additional procedures)	5 months ago
VnVUserStoryAll4Tec-AEbt	pdf generated	3 months ago
VnVUserStoryDLR	Initial draft of DMI formalisazion	3 months ago
VnVUserStoryERTMSolutions	Description of the variables used by the braking curves tests	7 months ago
VnVUserStoryFraunhoferFOKUS	remove graffile from user story	12 days ago
VnVUserStoryMinesTelecom	Update SpecificationFindings.tex	a month ago
VnVUserStorySQS	Halsted metric results	a month ago
VnVUserStorySystemel	small changes in VnV stories document	6 months ago
VnVUserStoryTemplate	added seperated URO User Story folder and cleaned up Template	9 months ago
VnVUserStoryURO	add pdf	6 months ago
VnVUserStoryUniBremen	Added testProfile for Papyrus Model	16 hours ago

- Thank you for your attention!