



WP3 – Modeling & Code Generation

supported by:



Federal Ministry
of Education
and Research



Région de
Bruxelles-
Capitale



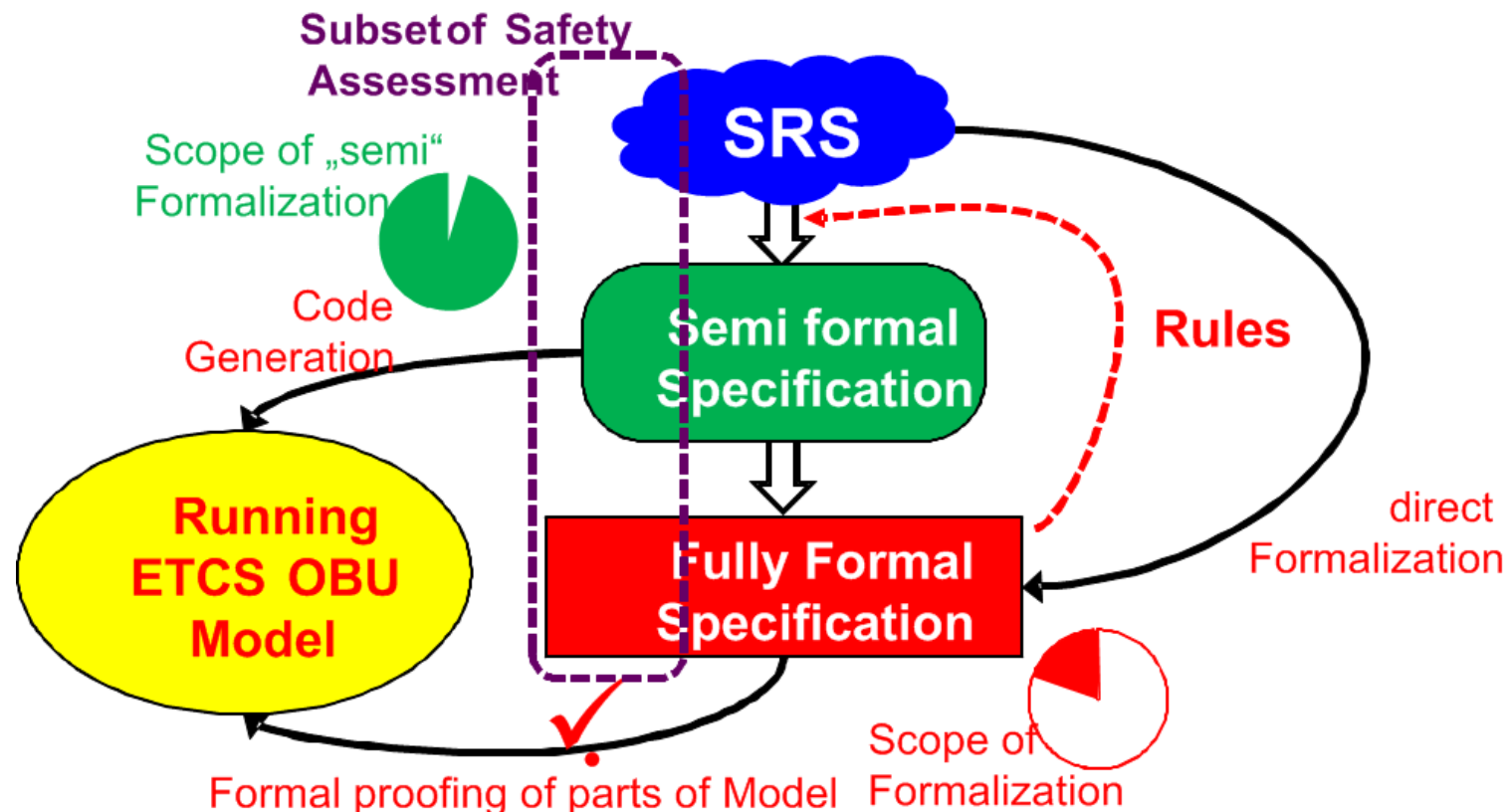
openETCS@ITEA2 Project

Jauquet, PF

Paris, 03.07.2013

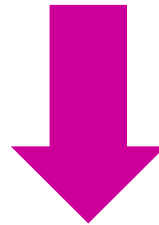
WP3 - Context

- Objective 1 : To get a functional reference ERTMS OBU
- Objective 2 : To get a safety assessment of the overall OpenETCS process & tools on part of the formal model



WP3 – OBU functional reference

- SRS documents are ERTMS system documents (Trackside + On-Board)
- SRS documents are to be completed with operational modes in order to define the ERTMS OBU
- Inter-operability risk and/or development costs result exclusively from divergent national operational modes and homologation rules

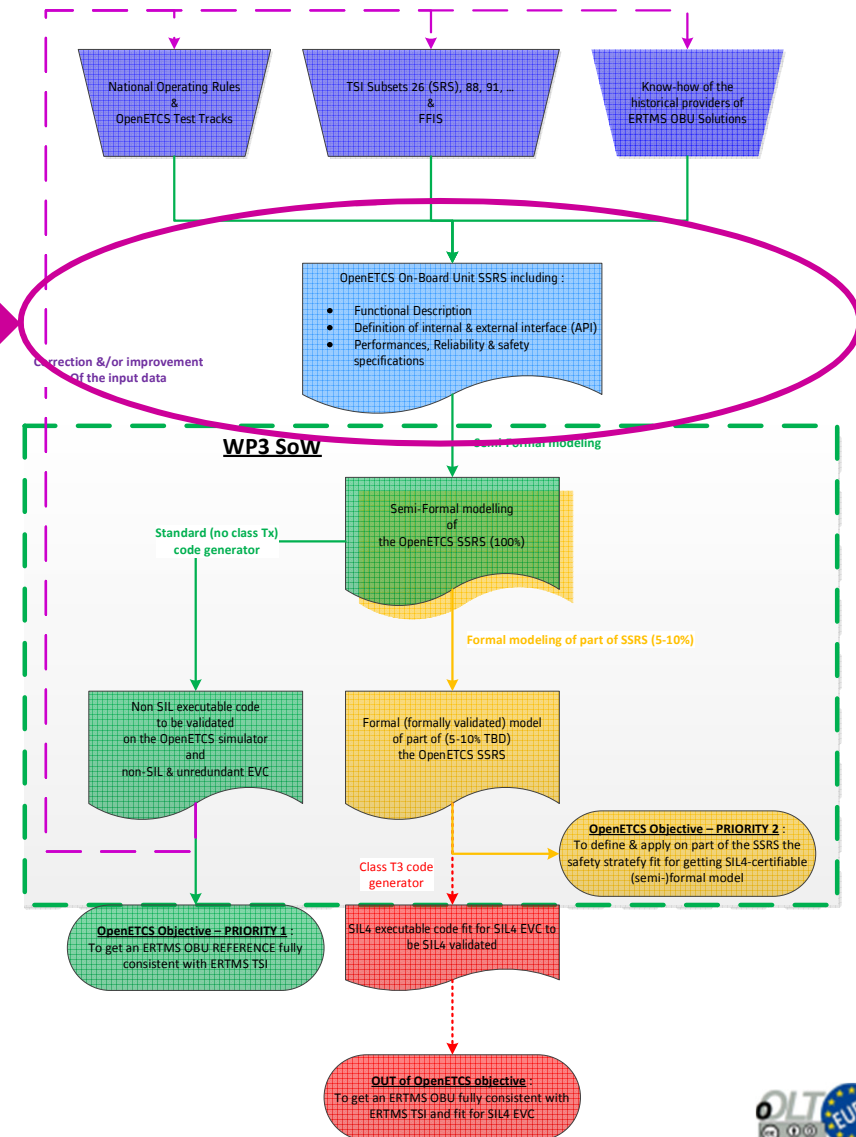


- OpenETCS project is an unique opportunity to produce an OBU SSRS
 - resulting from convergence of national operational modes
 - defining precisely the ERTMS OB subsystem to be modeled

WP3 – Inputs

Major Inputs for WP3 are :

- SSRS document as definition of the reference functional OB sub-system to be modeled
- Tools chain to be able to modelize (WP3), validate (WP4) and test (WP5) the reference functional OB model

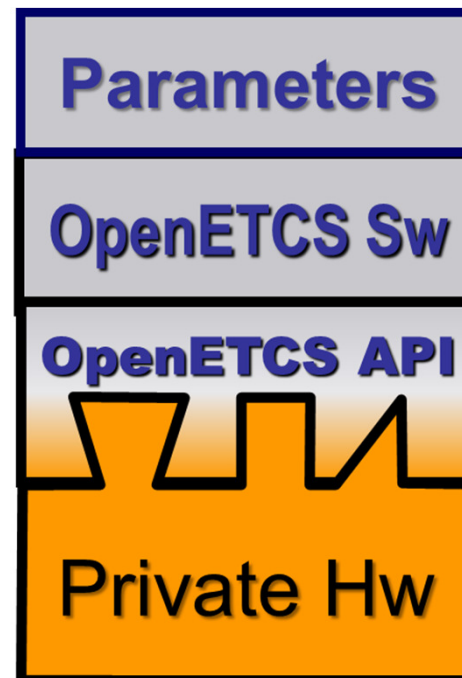


WP3 – Inputs

ERTMS Manufacturer



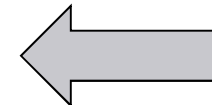
OpenETCS



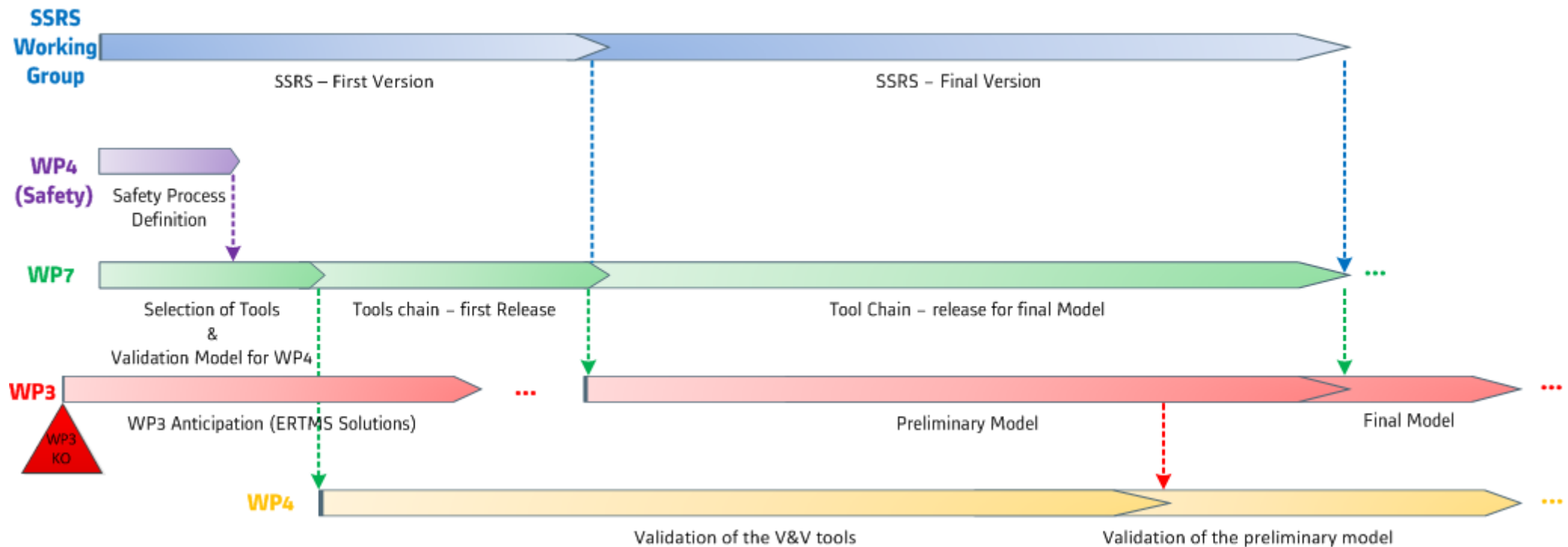
LAST MAJOR Input for WP3

IS

OpenETCS API (BL3)
whose ALSTOM will
lead the definition as
interface between
BSw and ASw



WP3 – Development Plan



WP3 – Task & Outcomes

- **Task 3.[1...4]** : WP7 Tasks
- **Task 3.5** : System Specification Model (Task Leader : ERTMS Solutions)
 - Description : semi-formal model of the SSRS requirements leading to identification of the overall variables and relationships binding them (= properties)
 - Outcome : Unitary validated semi-formal system model of the SSRS according to available tools
- **Task 3.6** : (semi-)Formal Functional Model (Task Leader : ERTMS Solutions)
 - Description :
 - Functional breakdown of the SSRS = primitives and services
 - Allocation of the variables to the different SSRS functions
 - Identification of the data flow between the different SSRS functions
 - Identification of the data flow between the SSRS functions and the Basic SoftWare as resulting from API BL3.0 definition
 - Outcome : Unitary validated (semi-)formal functional model according to available tools

- **Task 3.7** : (semi-)Formal Architectural Model (Task Leader : ALSTOM [TBC])
 - Description : While identified the hardware architecture best fitted to comply with the functional model, the OpenETCS API, the required performances (availability, safety, ...) and/or constraints (real time, ...), definition of the architectural model by allocation of the SSRS primitives to available components and/or available CPUs
 - Outcome : Unitary validated (semi-)formal architectural model of the SSRS according to available tools
- **Task 3.8** : Code Generation (Task Leader : Fraunhofer)
 - Description : SILO code generation
 - Outcome : Source code to be validated and tested

WP3 – Planning & Milestones

Reference	Milestone Description	Type	PIC	Version	Date
WP3.I1	SSRS requirements document	Input	TBD	Draft	T0
				Final	T0 + 6 months
WP3.I2	Modeling and validation tools	Input	WP7	Draft	T0
				Final	T0 + 6 months
WP3.I3	OpenETCS API document as interface between OpenETCS ASw and BSw	Input	ALSTOM	Draft	30.09.2013
				Final	T0 + 9 months
WP3.O1	OpenETCS System Specification Model	Output	ERTMS Solutions	Draft	T0 + 12 months
				Final	T0 + 24 months
WP3.O2	OpenETCS Functional Reference Model	Output	ERTMS Solutions	Draft	T0 + 13 months
				Final	T0 + 25 months
WP3.O3	OpenETCS Architectural Model	Output	ALSTOM	Draft	T0 + 14 months
				Final	T0 + 26 months
WP3.O4	OpenETCS SILO source code	Output	Fraunhofer	Draft	T0 + 15 months
				Final	T0 + 27 months

CONCLUSION : Very tough planning

- **API Definition** : Draft document provided in March 2013
 - Review comments received and to be treated
 - Document requested to be more detailed and reformatted in accordance with requests from the first meeting of SSRS working group
 - New document DRAFT will be provided not late than 30.09.2013
- **System Model** :
 - Anticipation launched by ERTMS Solutions based on subset 26
 - ~35% of SS26 already modeled

WP3 – Risk & Opportunity

- Planning : SSRS document to be secured in order to secure achievement of the OpenETCS objective 1 which is to get an ERTMS OBU functional reference model ↔ ALSTOM ready to participate as reviewer of SSRS
- Contract : PCA / FPP to be finalized in order to secure actual commitment of each partners