Workplan Tables

Project number

287563

Project title

ADVANCE—Advanced Design and Verification Environment for Cyber-physical System Engineering

Call (part) identifier

FP7-ICT-2011-7

Funding scheme

Collaborative project

Project Number [1]	287563	Project Acronym [2]	ADVANCE

LIST OF WORK PACKAGES (WP)						
WP Number [53]	WP Title	Type of activity [54]	Lead beneficiary number [55]	Person-months [56]	Start month [57]	End month [58]
WP 1	Dynamic Trusted Railway Interlocking Case Study	RTD	2	49.00	1	30
WP 2	Smart Energy Grid Case Study	RTD	5	33.00	1	30
WP 3	Methods and Tools for Model Construction and Proof	RTD	3	85.00	1	30
WP 4	Methods and Tools for Simulation and Testing	RTD	4	66.00	1	30
WP 5	Process Integration	RTD	1	34.00	1	30
WP 6	External Dissemination and Exploitation	RTD	5	13.00	1	30
WP 7	Management	MGT	1	23.00	1	30
			Total	303.00		

WT2:
List of Deliverables

Project Number [1]	287563	Project Acronym [2]	ADVANCE

Delive-rable Number [61]	Deliverable Title	WP number [53]	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D1.1	Railway Case Study Definition	1	2	5.00	R	PU	3
D1.2	Proof of concept application in railway domain	1	2	15.00	R	PU	12
D1.3	Full application in railway domain	1	2	29.00	R	PU	27
D2.1	Case study definition	2	5	4.00	R	PU	3
D2.2	Proof of concept application in smart energy domain	2	5	6.00	R	PU	12
D2.3	Full application in the smart energy domain	2	5	23.00	R	PU	27
D3.1	Tool development Roadmap	3	1	6.00	R	PU	3
D3.2	Methods and tools for model construction and proof I	3	3	44.00	R	PU	10
D3.3	Methods and tools for model construction and proof II	3	3	20.00	R	PU	22
D3.4	Methods and tools for model construction and proof III	3	3	15.00	R	PU	30
D4.1	Specification of multi-simulation framework	4	4	9.00	R	PU	3
D4.2	Methods and tools for simulation and testing I	4	4	30.00	R	PU	12
D4.3	Methods and tools for	4	4	16.00	R	PU	23

Delive-rable Number [61]	Deliverable Title	WP number [53]	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
	simulation and testing II						
D4.4	Methods and tools for simulation and testing III	4	4	11.00	R	PU	30
D5.1	ADVANCE Process Integration I	5	1	16.00	R	PU	12
D5.2	ADVANCE Process Integration II	5	1	12.00	R	PU	23
D5.3	ADVANCE Process Integration III	5	1	6.00	R	PU	30
D6.1	Project fact sheet	6	1	1.00	R	PU	1
D6.2	On-line repository and electronic dissemination mechanisms	6	1	1.00	R	PU	3
D6.3	Communication and Dissemination Plan	6	5	1.00	R	PU	3
D6.4	Annual Dissemination Report I	6	5	2.00	R	PU	12
D6.5	ADVANCE Training Material I	6	1	2.00	R	PU	15
D6.6	Annual Dissemination Report II	6	5	2.00	R	PU	23
D6.7	ADVANCE Training Material II	6	1	2.00	R	PU	30
D6.8	Final Dissemination Report	6	5	2.00	R	PU	30
D7.1	Periodic Report I	7	1	5.00	R	RE	11
D7.2	Periodic Report II	7	1	5.00	R	RE	22

Delive-rable Number [61]	Deliverable Title	WP number [53]	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D7.3	Periodic Report III	7	1	5.00	R	RE	30
D7.4	Project Final Report	7	1	8.00	R	PU	30
			Total	303.00			

WT3:
Work package description

Project Number [1]	287563	Project Acronym [2]	ADVANCE

One form per Work Package

Work package number [53]	WP1	Type of activity [54]	RTD
Work package title	Dynamic Trusted Railway Interlocking Case Study		
Start month	1		
End month	30		
Lead beneficiary number [55]	2		

Objectives

The overall objective of WP1 is to define a system specification method for the railway domain supported by the Event-B formal language and tools that can be used in a highly competitive industrial environment. This objective leads to the following specific objectives:
1. To define a cost effective system specification approach based on reusable formal models.
2. To define a system validation approach based on animation and proof of formal models including system mock-ups and tests scenarios from animation of formal models.
3. To define a system decomposition approach based on refinement of formal models.
4. To bring the methods and tools developed by the consortium to an industrial level.

Description of work and role of partners

Task T1.1 Definition of Requirements (M1-M3) (lead: Alstom)
• Definition of requirements on case study. The results of this task will be reported in D1.1.
• Identification of expectations on methods and tools and expected outcomes.

Task T1.2 Proof of Concept Case Study Development (M4-M10) (lead: Alstom)
• Take a cut-down definition of the case study through the entire ADVANCE work-flow. The results of this task will be reported in D1.2.

Task T1.3 Full Case Study Development (M13-M27) (lead: Alstom)
• Apply the method developed in Task T1.2 to the full case study. The results of this task will be reported in D1.3.

Task T1.4 Reflection (M28-M30) (lead: Alstom)
• Enhance the ADVANCE methods and tools in the light of the experiences of Task T1.3. The results of this task will be reported in a WP5 deliverable on process integration (D5.3).

Person-Months per Participant

Participant number [10]	Participant short name [11]	Person-months per participant
1	SOUTHAMPTON	2.00
2	AT	28.00
3	SYSTEREL	14.00
4	UDUS	5.00
	Total	49.00

List of deliverables						
Delive-rable Number [61]	Deliverable Title	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D1.1	Railway Case Study Definition	2	5.00	R	PU	3
D1.2	Proof of concept application in railway domain	2	15.00	R	PU	12
D1.3	Full application in railway domain	2	29.00	R	PU	27
		Total	49.00			

Description of deliverables

D1.1) Railway Case Study Definition: This deliverable provides technical definitions, requirements documents and architectural properties for the dynamic trusted railway interlocking system. It defines the expected outcomes and success criteria for application of the ADVANCE methods and tools to railway interlocking. [month 3]

D1.2) Proof of concept application in railway domain: This deliverable reports on the proof of concept application of ADVANCE methods and tools to the dynamic trusted railway interlocking system. This includes a reflection on the experiences in the proof of concept development that feeds into work on methods and tools in WP3 and WP4. [month 12]

D1.3) Full application in railway domain: This deliverable reports on the full application of ADVANCE methods and tools to the dynamic trusted railway interlocking system. It reports on successes, failures, lessons learned and guidance that is transferable to similar systems. [month 27]

Schedule of relevant Milestones				
Milestone number [59]	Milestone name	Lead benefi-ciary number	Delivery date from Annex I [60]	Comments
MS2	Case Study Definition	2	3	
MS5	Case Study Proof of Concept	5	12	
MS12	Full Case Study	5	27	

WT3:
Work package description

Project Number [1]	287563	Project Acronym [2]	ADVANCE

One form per Work Package

Work package number [53]	WP2	Type of activity [54]	RTD
Work package title	Smart Energy Grid Case Study		
Start month	1		
End month	30		
Lead beneficiary number [55]	5		

Objectives

The objectives of WP2 are
1. Obtain real-life smart grid data to form the basis of case study material
2. Using ADVANCE tools and techniques, model and verify the smart grid case study and demonstrate the efficacy of ADVANCE over more traditional engineering methods
3. To bring the methods and tools developed by the consortium to an industrial level.

Description of work and role of partners

Task T2.1 Definition of Requirements and Case Study (M1-M3) (lead: Critical)
• Definition of requirements on case study. The results of this task will be reported in D2.1.
• Identification of expectations on methods and tools and expected outcomes.

Task T2.2 Proof of Concept Case Study Development (M4-M110) (lead: Critical)
• Take a cut-down definition of the case study through the entire ADVANCE work-flow. The results of this task will be reported in D2.2.

Task T2.3 Full Case Study Development (M13-M27) (lead: Critical)
• Apply the method developed in Task T2.2 to the full case study. The results of this task will be reported in D2.3.

Task T2.4 Reflection (M28-M30) (lead: Critical)
• Enhance the ADVANCE method in the light of the experiences of Task 2.3. The results of this task will be reported in a WP5 deliverable on process integration (D5.3).

Person-Months per Participant

Participant number [10]	Participant short name [11]	Person-months per participant
1	SOUTHAMPTON	5.00
3	SYSTEREL	2.00
4	UDUS	2.00
5	CSWT	24.00
	Total	33.00

List of deliverables						
Delive-rable Number [61]	Deliverable Title	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D2.1	Case study definition	5	4.00	R	PU	3
D2.2	Proof of concept application in smart energy domain	5	6.00	R	PU	12
D2.3	Full application in the smart energy domain	5	23.00	R	PU	27
		Total	33.00			

Description of deliverables

D2.1) Case study definition: This deliverable provides technical definitions, requirements documents and architectural properties for the smart energy grid system. It defines the expected outcomes and success criteria for application of the ADVANCE methods and tools to smart grids. [month 3]

D2.2) Proof of concept application in smart energy domain: This deliverable reports on the proof of concept application of ADVANCE methods and tools to the smart energy grid system. This includes a reflection on the experiences in the proof of concept development that feeds into work on methods and tools in WP3 and WP4. [month 12]

D2.3) Full application in the smart energy domain: This deliverable reports on the full application of ADVANCE methods and tools to the smart energy grid system. It reports on successes, failures, lessons learned and guidance that is transferable to similar systems. [month 27]

Schedule of relevant Milestones				
Milestone number [59]	Milestone name	Lead benefi-ciary number	Delivery date from Annex I [60]	Comments
MS2	Case Study Definition	2	3	
MS5	Case Study Proof of Concept	5	12	
MS12	Full Case Study	5	27	

WT3:
Work package description

Project Number [1]	287563	Project Acronym [2]	ADVANCE

One form per Work Package

Work package number [53]	WP3	Type of activity [54]	RTD
Work package title	Methods and Tools for Model Construction and Proof		
Start month	1		
End month	30		
Lead beneficiary number [55]	3		

Objectives

The objectives of WP3 are
1. to provide the methodological and tooling means for modelling Systems-of-Systems.
2. to provide expert formal proof support to the industrial partners;
3. to improve the usability and productivity of the Rodin platform to support larger-scale developments;

Description of work and role of partners

Description of work

Task T3.1 Tools Road-mapping (M1-M3) (Lead: Soton)
• Develop a road-map for the tool development work of WP3 and WP4 for the remainder of the project.

Task T3.2 Platform maintenance (M1-M30) (Lead: Systerel)
• This task runs throughout the whole project. It ensures that the Rodin platform stays usable, despite being applied to larger-scale models. It involves both corrective and preventive maintenance of the tools, based on bug reports and feature requests from the partners.

Task T3.3 Automated Proof and Model-checking (M4-M24) (Lead: UDUS)
• The new modelling domains in WP1 and WP2 will require new automated proof capabilities over and above the existing capabilities of Rodin. We will address this as follows:
• Implement new or improve existing automated proof tools, linking to state of the art external tools (off-the shelf first-order theorem provers and SMT solvers).
• Provide expert support on how to use the provers for increasing the ratio of automated proofs.
• Improve the model checking tools so that the proportion of the search space that can feasibly be covered gets increased.

Task T3.4 Language extension (M13-M30) (Lead: Systerel)
• Enrich the mathematical language with language constructs and mathematical theories that are better suited to modelling of cyber-physical systems.
• Extend the Event-B language where necessary to improve expressiveness.
• Formal design patterns will arise from the case studies of WP1 and WP2. WP3 will provide support for integrating these in a library of re-usable patterns to improve productivity.

Task T3.5 Composition and decomposition (M13-M30) (Lead: Soton)
• Enhance the existing Event-B composition and decomposition methods and tools in order to support the typical system architecture approaches used in cyber-physical systems particulary targeting the case study architectures.
• Develop a cookbook describing how to use composition and decomposition to facilitate group working on large projects.

WT3:
Work package description

Person-Months per Participant

Participant number [10]	Participant short name [11]	Person-months per participant
1	SOUTHAMPTON	25.00
2	AT	5.00
3	SYSTEREL	30.00
4	UDUS	22.00
5	CSWT	3.00
	Total	85.00

List of deliverables

Delive-rable Number [61]	Deliverable Title	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D3.1	Tool development Roadmap	1	6.00	R	PU	3
D3.2	Methods and tools for model construction and proof I	3	44.00	R	PU	10
D3.3	Methods and tools for model construction and proof II	3	20.00	R	PU	22
D3.4	Methods and tools for model construction and proof III	3	15.00	R	PU	30
		Total	85.00			

Description of deliverables

D3.1) Tool development Roadmap: This deliverable provides a detailed road-map for the tool development work of WP3 and WP4 for the remainder of the project. In particular, it describes the planned deployment of enhancements that improve Rodin scalability and the availability of new proof tools, language extensions and composition/decomposition capabilities. It also details the timing of the delivery of the multi-simulation framework and ProB tool enhancements. [month 3]

D3.2) Methods and tools for model construction and proof I: This deliverable describes the maintenance actions carried through, together with a summary of progress on the improvement of automated proof and model checking. A list of the scalability enhancements achieved so far in the project, together with their expected impact on performance and capacity, is included and validated against the Tool Development Roadmap. Progress of the planned improvements to the existing automated proof tools is described, stating clearly what improvements have been delivered and how the development of longer-term improvements measures against the original plan. Appropriate documentation and tutorials are delivered to describe the methods that will ensure that these improvements can be best used to increase the proportion of automated proofs. Improvements to the ProB model checking tool and associated methods are also described. [month 10]

D3.3) Methods and tools for model construction and proof II: This deliverable describes the maintenance actions carried through, together with an update on the progress of automated proof and model checking against plan. Extensions and enhancements to the method documentation and tutorials are also supplied. It also presents the achievements made in the area of the mathematical language and other planned Event-B language extensions and report on the progress of composition / decomposition enhancements against plan. [month 22]

D3.4) Methods and tools for model construction and proof III: This deliverable provides a summary of the improvements made to the Rodin platform throughout the project. It validates the delivery of improvements to both tools and methods for model construction and proof against the original plan. In addition, it reports on the

development of formal design patterns that have arisen from the case studies of WP1 and WP2 and nature and availability of the supporting documentation and tutorials. It also reports on the composition / decomposition cookbook. [month 30]

Schedule of relevant Milestones

Milestone number [59]	Milestone name	Lead benefi- ciary number	Delivery date from Annex I [60]	Comments
MS4	First phase of Methods and Tools for Model Construction and Proof completed	3	10	
MS9	Second phase of Methods and Tools for Model Construction and Proof completed	3	22	
MS13	Complete Methods and Tools for Model Construction and Proof workpackage	3	30	

Project Number [1]	287563	Project Acronym [2]	ADVANCE

One form per Work Package			
Work package number [53]	WP4	Type of activity [54]	RTD
Work package title	Methods and Tools for Simulation and Testing		
Start month	1		
End month	30		
Lead beneficiary number [55]	4		

Objectives

Different simulation tools are better suited to simulating different parts of cyber-physical systems such as environments, host platforms, controllers, physical plant and communications. Rather than having a single simulation tool, it is more effective to have a multi-simulation framework for combining separate simulation tools in a seamless way. Simulation based on ProB will be used for simulation of high level models early in the design process. For performance reasons, simulation of mature component models will require code generation from detailed Event-B models. We will also support links with external simulators.
The objectives of WP4 are
1. Develop a multi-simulation framework
2. Scale up ProB to be able to deal with large designs (validated in the context of high-level descriptions of other systems) and very complicated constraints
3. Extend ProB's model-based testing to accommodate constrained random testing
4. Enable rich code-generation from a higher-level than the current state-of-the-art

Description of work and role of partners

Task T4.1 Specification of multi-simulation framework (M1-M3) (Lead: Soton)
• Analysis of the various simulation techniques and tools that will have to be integrated
• Elicitation of the requirements for the multi-simulation framework and drafting of an architecture (possibly using a plug-in mechanism) that will enable the tools and techniques above to be connected

Task T4.2 Multi-simulation framework development (M4-M24) (Lead: Soton)
• Prototype multi-simulation framework (M12)
This prototype will probably be based on the current ProB animator (the graphical visualization is already extensible, and could provide a way to link up other Java-based simulation tools)
• Final multi-simulation framework (M24)

Task T4.3 Model simulation with ProB (M4-M24) (Lead: UDUS)
• Improve scalability of ProB to deal with large hardware models
• Improve the constraint-solving kernel of ProB to enable Task T4.4
• Development of new visualization techniques to aid humans understand large-scale simulations

Task T4.4 Model-based testing (M4-M30) (Lead: UDUS)
• Extend the MBT framework developed in DEPLOY to accommodate random testing (M12)
This will require new random enumeration algorithms inside the ProB kernel
• Extend ProB's coverage detection for the multi-simulation framework and develop a constrained random testing tool (M30)

Task T4.5 Code generation (M13-M30) (Lead: Soton)
• Generation of stand-alone prototypes from high-level models using the ProB kernel
• Code generation from high-level models. Target languages include Ada and C.
• Code generation will exploit model transformation technology and generated code components will run efficiently within the multi-simulation framework.

Person-Months per Participant

Participant number [10]	Participant short name [11]	Person-months per participant
1	SOUTHAMPTON	25.00
2	AT	8.00
3	SYSTEREL	6.00
4	UDUS	24.00
5	CSWT	3.00
	Total	66.00

List of deliverables

Delive-rable Number [61]	Deliverable Title	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D4.1	Specification of multi-simulation framework	4	9.00	R	PU	3
D4.2	Methods and tools for simulation and testing I	4	30.00	R	PU	12
D4.3	Methods and tools for simulation and testing II	4	16.00	R	PU	23
D4.4	Methods and tools for simulation and testing III	4	11.00	R	PU	30
	Total		66.00			

Description of deliverables

D4.1) Specification of multi-simulation framework: This deliverable describes the various simulation tools and techniques that will have to be combined to provide an effective multi-simulation framework. The specification focusses on the structural mechanism needed to integrate a simulation tool into the framework, possibly as a plug-in, and the communication mechanisms that needs to be supported to ensure the efficient transfer of data between co-operating simulation tools. The requirements for the final multi-simulation framework are expressed and an architecture will be specified. [month 3]

D4.2) Methods and tools for simulation and testing I: This deliverable describes the prototype multi-simulation framework, as well as the result of first experiments. The focus is on describing the simulation of high-level models using the ProB animator and measuring how well the implemented enhancements to this technology meets the performance requirements for high-level simulation. A roadmap for implementing the full-blown multi-simulation framework is also presented, detailing further enhancements to ProB and the requirements for Event-B model code generation to enable high-performance simulation of Event-B models at a more detailed level. [month 12]

D4.3) Methods and tools for simulation and testing II: This deliverable describes the final delivered multi-simulation framework, the supporting documentation and tutorials and how well the framework meets its performance and capacity requirements with respect to both high level models simulated with ProB and with prototype examples of more-detailed, code-generated models. The deliverable also describes the improvements made to the constraint-solving kernel of ProB which is a pre-requisite for constrained random testing. The effectiveness of the new visualization techniques developed to aid understanding of large-scale simulations are also evaluated and measured. Although still under development, progress on the model-based testing and code generation are described and measured against the plan. [month 23]

D4.4) Methods and tools for simulation and testing III: This deliverable covers the final version of all simulation, code generation and testing tools. It describes the extended Model-Based Testing framework and the associated documentation and tutorials provided to support the new constrained random testing method. The supporting coverage metrics and coverage detection and reporting mechanisms are also described. Finally, the results of the code generation development are described and measured against the plan. Documentation and tutorials for the generation of both Ada and C models will be provided, and the simulation efficiency of these generated models measured. [month 30]

Schedule of relevant Milestones

Milestone number [59]	Milestone name	Lead benefi- ciary number	Delivery date from Annex I [60]	Comments
MS3	Simulation Framework specification completed	4	3	
MS7	First phase of Methods and Tools for Simulation and Testing completed	4	12	
MS11	Second phase of Methods and Tools for Simulation and Testing completed	4	23	
MS14	Complete Methods and Tools for Simulation and Testing workpackage	4	30	

WT3:
Work package description

Project Number [1]	287563	Project Acronym [2]	ADVANCE

Work package number [53]	WP5	Type of activity [54]	RTD
Work package title	Process Integration		
Start month	1		
End month	30		
Lead beneficiary number [55]	1		

Objectives

It is important that the ADVANCE methods and tools are used in effective ways that add value to the design flow and can be integrated with existing development processes. The objectives of WP5 are
1. To link formal modelling with requirements analysis and safety analysis
2. To develop formal model-based design flows that combine proof and simulation
3. To develop guidelines on integrating ADVANCE methods and tools with existing processes

Description of work and role of partners

Task T5.1 Methods and tools for linking requirements with formal models (M3-M24) (Lead: UDUS)
• Develop methods for structuring system requirements and properties in a way that makes them amenable to formal modelling and supports traceability between informal requirements and formal models
• Extend the Rodin toolset to support the integration of requirements and formal modelling
• Validate these methods and tools using WP1 and WP2 case studies

Task T5.2 Methods and tools for linking safety analysis with formal models (M3-M24) (Lead: Systerel)
• Develop methods for exploiting formal modelling in identifying and analysing safety hazards
• Extend Rodin toolset to support the integration of formal modelling and safety analysis
• Validate these methods and tools using WP1 and WP2 case studies

Task T5.3 Guidelines for integrated ADVANCE design flows (M12-M30) (Lead: Soton)
• Define model-based design flows that combine proof and simulation
• Provide guidelines on effective use of modelling, proof and simulation based on experiences in WP1 and WP2 case studies
• Provide guidelines on integrating ADVANCE methods and tools with existing development processes based on experiences in WP1 and WP2 case studies

Person-Months per Participant

Participant number [10]	Participant short name [11]	Person-months per participant
1	SOUTHAMPTON	13.00
2	AT	2.00
3	SYSTEREL	6.00
4	UDUS	10.00
5	CSWT	3.00
	Total	34.00

List of deliverables

Delive-rable Number [61]	Deliverable Title	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D5.1	ADVANCE Process Integration I	1	16.00	R	PU	12
D5.2	ADVANCE Process Integration II	1	12.00	R	PU	23
D5.3	ADVANCE Process Integration III	1	6.00	R	PU	30
		Total	34.00			

Description of deliverables

D5.1) ADVANCE Process Integration I: This deliverable reports on the initial work on combining formal modelling with requirements analysis and safety analysis and measures progress of these activities against plan. The emphasis is to review the development of the methods that will need to be in place to enable requirements and safety analysis to be linked to formal models. The progress on tool development is then be assessed to ensure that this development will meet the methodological requirements. [month 12]

D5.2) ADVANCE Process Integration II: This deliverable reports on the final work on combining formal modelling with requirements analysis and safety analysis, including tool support. It ensures that the tools delivered support properly the requirements and safety analysis methods that have been developed and that the accompanying documentation and tutorials are in place. It also reports on initial work on integration of design flows that combine proof and simulation. [month 23]

D5.3) ADVANCE Process Integration III: This final deliverable provides guidelines on integrated design flows that exploit the ADVANCE methods and tools based on the WP1 and WP2 case study experiences. It describes the documentation and tutorials for the model-based design flows that contains the guidelines for good practice throughout the design flow. It records a detailed account of the WP1 and WP2 case studies experiences as they relate to the proposed integrated design flows and the guidelines for integrating ADVANCE methods and tools with existing development processes. [month 30]

Schedule of relevant Milestones

Milestone number [59]	Milestone name	Lead benefi-ciary number	Delivery date from Annex I [60]	Comments
MS6	First phase of Process Integration completed	1	12	
MS10	Second Phase of Process Integration completed	1	23	
MS15	Process Integration completed	1	30	

WT3:
Work package description

Project Number [1]	287563	Project Acronym [2]	ADVANCE

Work package number [53]	WP6	Type of activity [54]	RTD
Work package title	External Dissemination and Exploitation		
Start month	1		
End month	30		
Lead beneficiary number [55]	5		

Objectives

The results of the ADVANCE project (methods, tools, guidelines, case study material) will be disseminated to a broad industrial and academic community using electronic forums, through the establishment of an industrial interest group and through targeted dissemination workshops. This will lead to long term exploitation of the results by internal and external industrial partners. The objectives of WP6 are
1. To build a community of industrial parties interested in tracking ADVANCE methods and tools
2. To develop an on-line repository of training resources
3. To maintain an on-line repository of research results
4. To cross fertilise ADVANCE R&D with other relevant ICT projects

Description of work and role of partners

Task T6.1 Industrial Interest Group (M3-M30) (lead: Critical)
• Build a group of industrial parties interested in tracking ADVANCE methods and tools (IIG). This will build on the existing group of industrial users of the Event-B language and Rodin toolset (e.g., Bosch, Siemens, SAP, Space Systems Finland, GM, AeS Brasil, AWE, ClearSy, XMOS, NEC, ARM).
• Provide support and accept queries and suggestions from IIG through a dedicated mailing list
• Organise IIG dissemination workshops at Month 16 and Month 28 to showcase results

Task T6.2 Training Resources (M3-M30) (lead: Soton)
• Develop training material for ADVANCE methods and tools for external users
• Make training resources openly available on-line
• Deliver training material to Masters programmes in Southampton and Düsseldorf

Task T6.3 Dissemination of Research Results (M1-M30) (lead: Soton)
• Produce a communication and dissemination plan highlighting key activities to be performed to communicate project results
• Publish research papers in international conferences and journals as well as relevant trade publications
• Manage an on-line repository of research results including access to ADVANCE tools in open-source form, research papers, case study material, public ADVANCE deliverables, method and tool guidelines
• The repository will be a combination of a public wiki and an eprints repository following the event-b.org model. It will be managed by Soton who already manage the event-b.org and deploy-eprints repositories.
• Exploit social networking media such as Facebook, Twitter and LinkedIn for dissemination

Task T6.4 Collaboration with other ICT Projects (M1-M30) (lead: Soton)
• Engage with collaboration activities organised by the ICT Objective "New paradigms for embedded systems, monitoring and control towards complex systems engineering"
• Participate in scientific workshops related to ICT Programme such as FMCO (Formal Methods for Components and Objects)
• Coordination of standardisation efforts with related ICT projects and initiatives especially in rail and energy grid domains

Concertation and Clustering

The project will actively participate in the Concertation activities organised at ICT Programme level relating to the areas of Complex systems Engineering and System-of-Systems, involving ongoing FP6 and FP7 projects in this area, with the objective of providing input towards common activities and receiving feedback, contributing advice and guidance and receiving information relating to ICT programme implementation, standards, policy and regulatory activities, national or international initiatives, etc. The project will be involved in, even propose, Clustering activities around themes of interest.

Dissemination Package

In line with its obligations regarding dissemination of results and achievements, the Coordinator will insure that all public documents* generated by the project are duly collected in a Dissemination Package, which is associated with the periodic reports.

The Coordinator will raise public awareness of the project via press releases (at least at the launch and end of the project), and will endeavour to ensure media coverage of important project events.

The project undertakes to establish a web site supported by the project partners, to provide a unified view of the Project; a copy thereof must be included in the Dissemination Package.

* Including, but not restricted to, the following material: video material covering experiments, demonstrations and trials; animations of "real-time" simulation results; presentations, animated/voice-over or not; promotional material (leaflets, posters, etc.); press releases; and whenever available any CD-ROMs produced by/for the project for promotional or documentation purposes. Given the nature of all these items, they will be provided, where appropriate, together with their electronic version, and otherwise (videos, posters, etc) and whenever possible in duplicate. Furthermore, ONE copy of the Proceedings of all Conferences/Seminars/Symposia as well as Magazines/Journals the project has published papers/articles in shall also be included.

Person-Months per Participant

Participant number [10]	Participant short name [11]	Person-months per participant
1	SOUTHAMPTON	4.00
2	AT	1.00
3	SYSTEREL	3.00
4	UDUS	2.00
5	CSWT	3.00
	Total	13.00

List of deliverables

Deliverable Number [61]	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature [62]	Dissemination level [63]	Delivery date [64]
D6.1	Project fact sheet	1	1.00	R	PU	1
D6.2	On-line repository and electronic dissemination mechanisms	1	1.00	R	PU	3
D6.3	Communication and Dissemination Plan	5	1.00	R	PU	3
D6.4	Annual Dissemination Report I	5	2.00	R	PU	12
D6.5	ADVANCE Training Material I	1	2.00	R	PU	15
D6.6	Annual Dissemination Report II	5	2.00	R	PU	23

Delive-rable Number [61]	Deliverable Title	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D6.7	ADVANCE Training Material II	1	2.00	R	PU	30
D6.8	Final Dissemination Report	5	2.00	R	PU	30
	Total		13.00			

List of deliverables

Description of deliverables

D6.1) Project fact sheet: A two page report on the project objectives and proposed approach written according to an EC template. [month 1]

D6.2) On-line repository and electronic dissemination mechanisms: Set up ADVANCE wiki and eprints repository for ADVANCE results. Set up IIG mailing list and social networking forums. As well as a project website with a project logo to distinguish this project. [month 3]

D6.3) Communication and Dissemination Plan: Produce a plan that can be updated throughout the course of the project detailing how communication and dissemination of project results will be realised via various mediums such as press releases etc. [month 3]

D6.4) Annual Dissemination Report I: Report on dissemination activities performed during Year 1 of the project – specifically listing conferences and networking events attended where project research and results were discussed and/or presented to the scientific/business community and document tangible outcomes of these meetings/interactions. [month 12]

D6.5) ADVANCE Training Material I: First version of ADVANCE methods and tools training material. This material will beis available on the on-line repository and should describes steps to be followed by a new user in order to use the tools and methods developed in the remit of this project. [month 15]

D6.6) Annual Dissemination Report II: Report on dissemination activities performed during Year 2 of the project – specifically listing conferences and networking events attended where project research and results were discussed and/or presented to the scientific/business community and document tangible outcomes of these meetings/interactions. [month 23]

D6.7) ADVANCE Training Material II: Final version of ADVANCE methods and tools training material. This material will beis available on the on-line repository and should describes steps to be followed by a new user in order to use the tools and methods developed in the remit of this project. [month 30]

D6.8) Final Dissemination Report: Report on dissemination activities performed during Year 3 of the project – specifically listing conferences and networking events attended where project research and results were discussed and/or presented to the scientific/business community and document tangible outcomes of these meetings/interactions. [month 30]

Schedule of relevant Milestones

Milestone number [59]	Milestone name	Lead benefi-ciary number	Delivery date from Annex I [60]	Comments
MS1	Project Infrastructure in place	5	3	
MS8	ADVANCE Training Material	1	15	
MS16	ADVANCE Training Material delivered	1	30	

WT3:
Work package description

Project Number [1]	287563	Project Acronym [2]	ADVANCE

Work package number [53]	WP7	Type of activity [54]	MGT
Work package title	Management		
Start month	1		
End month	30		
Lead beneficiary number [55]	1		

Objectives

The objectives of WP7 are to ensure the activities outlined in the proposal are performed whilst adhering to the budget and schedule estimates provided
This work package ensures the overall management of the project in accordance with the Project Agreement, including project planning, coordination and day-to-day management as well as the handling of the legal and contractual matters.

Description of work and role of partners

WP7 comprises the following tasks and activities:

T7.1: Project Coordination (M1 to M30) (lead: Southampton)
Administer the financial contribution of the Union ensuring that all the appropriate payments are made to the other beneficiaries without unjustified delay.
Keep the records and financial accounts making it possible to determine at any time what portion of the financial contribution of the Union has been paid to each beneficiary for the purposes of the project.
Inform the Commission of the distribution of the financial contribution of the Union and the date of transfers to the beneficiaries.
Review the reports to verify consistency with the project tasks before transmitting them
to the Commission.
Monitor the compliance by beneficiaries with their obligations under this grant
agreement.
Communication between the consortium and the European Commission, interfacing to the Project Officer.
Reporting to the European Commission, including preparation of the Final Report and the project reviews.
Setting up of the Project Management Plan.
Setting up meetings and communication flows with the project management and project board.

T7.2: Procedures management (M1 to M3) (lead: CSWT)
Definition and setting up of the project procedures, administration and related tools, including document control and approval and the project archive;
Management of the approval process for deliverables and other documents.

T7.3: Project management (M1 to M30) (lead: CSWT)
Definition of the process iterations, regarding in particular the implementation;
Control of the good achievement of the work, including its timely delivery;
Identification of significant risks and implementation of remedial actions when necessary;
Control of the budget and resources/efforts and expenses

Person-Months per Participant

Participant number [10]	Participant short name [11]	Person-months per participant
1	SOUTHAMPTON	10.00

Person-Months per Participant

Participant number [10]	Participant short name [11]	Person-months per participant
2	AT	1.00
3	SYSTEREL	1.00
4	UDUS	1.00
5	CSWT	10.00
	Total	23.00

List of deliverables

Delive-rable Number [61]	Deliverable Title	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D7.1	Periodic Report I	1	5.00	R	RE	11
D7.2	Periodic Report II	1	5.00	R	RE	22
D7.3	Periodic Report III	1	5.00	R	RE	30
D7.4	Project Final Report	1	8.00	R	PU	30
		Total	23.00			

Description of deliverables

D7.1) Periodic Report I: The Project Manager is in charge of collecting the internal financial and management support documents (Resource Matrices and Cost Statements) from the individual beneficiaries for the periodic report. Based on this material a consolidated report will be sent to the Project Coordinator. The Project Coordinator reviews and approves the periodic report to be sent to the Project Officer. [month 11]

D7.2) Periodic Report II: The Project Manager is in charge of collecting the internal financial and management support documents (Resource Matrices and Cost Statements) from the individual beneficiaries for the periodic report. Based on this material a consolidated report will be sent to the Project Coordinator. The Project Coordinator reviews and approves the periodic report to be sent to the Project Officer. [month 22]

D7.3) Periodic Report III: The Project Manager is in charge of collecting the internal financial and management support documents (Resource Matrices and Cost Statements) from the individual beneficiaries for the periodic report. Based on this material a consolidated report will be sent to the Project Coordinator. The Project Coordinator reviews and approves the periodic report to be sent to the Project Officer. [month 30]

D7.4) Project Final Report: Final project report based on template provided by EU will include an executive summary which is published to capture the research findings from the project, major outcomes and follow on actions as well as important lessons learned in the course of performing this research project. [month 30]

Schedule of relevant Milestones

Milestone number [59]	Milestone name	Lead benefi-ciary number	Delivery date from Annex I [60]	Comments
MS1	Project Infrastructure in place	5	3	

Project Number [1]	287563	Project Acronym [2]	ADVANCE

List and Schedule of Milestones

Milestone number [59]	Milestone name	WP number [53]	Lead benefi-ciary number	Delivery date from Annex I [60]	Comments
MS1	Project Infrastructure in place	WP6, WP7	5	3	
MS2	Case Study Definition	WP1, WP2	2	3	
MS3	Simulation Framework specification completed	WP4	4	3	
MS4	First phase of Methods and Tools for Model Construction and Proof completed	WP3	3	10	
MS5	Case Study Proof of Concept	WP1, WP2	5	12	
MS6	First phase of Process Integration completed	WP5	1	12	
MS7	First phase of Methods and Tools for Simulation and Testing completed	WP4	4	12	
MS8	ADVANCE Training Material	WP6	1	15	
MS9	Second phase of Methods and Tools for Model Construction and Proof completed	WP3	3	22	
MS10	Second Phase of Process Integration completed	WP5	1	23	
MS11	Second phase of Methods and Tools for Simulation and Testing completed	WP4	4	23	
MS12	Full Case Study	WP1, WP2	5	27	
MS13	Complete Methods and Tools for Model Construction and Proof workpackage	WP3	3	30	
MS14	Complete Methods and Tools for	WP4	4	30	

Milestone number [59]	Milestone name	WP number [53]	Lead beneficiary number	Delivery date from Annex I [60]	Comments
	Simulation and Testing workpackage				
MS15	Process Integration completed	WP5	1	30	
MS16	ADVANCE Training Material delivered	WP6	1	30	

WT5:
Tentative schedule of Project Reviews

Project Number [1]	287563	Project Acronym [2]	ADVANCE

Tentative schedule of Project Reviews			
Review number [65]	Tentative timing	Planned venue of review	Comments, if any
RV 1	13	Brussels	First project review
RV 2	24	Brussels	Second project review
RV 3	32	Brussels	Final project review

WT6:
Project Effort by Beneficiary and Work Package

Project Number [1]	287563	Project Acronym [2]	ADVANCE

Indicative efforts (man-months) per Beneficiary per Work Package

Beneficiary number and short-name	WP 1	WP 2	WP 3	WP 4	WP 5	WP 6	WP 7	Total per Beneficiary
1 - SOUTHAMPTON	2.00	5.00	25.00	25.00	13.00	4.00	10.00	84.00
2 - AT	28.00	0.00	5.00	8.00	2.00	1.00	1.00	45.00
3 - SYSTEREL	14.00	2.00	30.00	6.00	6.00	3.00	1.00	62.00
4 - UDUS	5.00	2.00	22.00	24.00	10.00	2.00	1.00	66.00
5 - CSWT	0.00	24.00	3.00	3.00	3.00	3.00	10.00	46.00
Total	49.00	33.00	85.00	66.00	34.00	13.00	23.00	303.00

WT7:
Project Effort by Activity type per Beneficiary

Project Number [1]	287563	Project Acronym [2]	ADVANCE

Indicative efforts per Activity Type per Beneficiary

Activity type	Part. 1 SOUTHAM	Part. 2 AT	Part. 3 SYSTERE	Part. 4 UDUS	Part. 5 CSWT	Total
1. RTD/Innovation activities						
WP 1	2.00	28.00	14.00	5.00	0.00	49.00
WP 2	5.00	0.00	2.00	2.00	24.00	33.00
WP 3	25.00	5.00	30.00	22.00	3.00	85.00
WP 4	25.00	8.00	6.00	24.00	3.00	66.00
WP 5	13.00	2.00	6.00	10.00	3.00	34.00
WP 6	4.00	1.00	3.00	2.00	3.00	13.00
Total Research	74.00	44.00	61.00	65.00	36.00	280.00
2. Demonstration activities						
Total Demo	0.00	0.00	0.00	0.00	0.00	0.00
3. Consortium Management activities						
WP 7	10.00	1.00	1.00	1.00	10.00	23.00
Total Management	10.00	1.00	1.00	1.00	10.00	23.00
4. Other activities						
Total other	0.00	0.00	0.00	0.00	0.00	0.00
Total	84.00	45.00	62.00	66.00	46.00	303.00

1. Project number

The project number has been assigned by the Commission as the unique identifier for your project. It cannot be changed. The project number **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

2. Project acronym

Use the project acronym as given in the submitted proposal. It cannot be changed unless agreed so during the negotiations. The same acronym **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

53. Work Package number

Work package number: WP1, WP2, WP3, ..., WPn

54. Type of activity

For all FP7 projects each work package must relate to one (and only one) of the following possible types of activity (only if applicable for the chosen funding scheme – must correspond to the GPF Form Ax.v):

• **RTD/INNO =** Research and technological development including scientific coordination - applicable for Collaborative Projects and Networks of Excellence

• **DEM =** Demonstration - applicable for collaborative projects and Research for the Benefit of Specific Groups

• **MGT =** Management of the consortium - applicable for all funding schemes

• **OTHER =** Other specific activities, applicable for all funding schemes

• **COORD =** Coordination activities – applicable only for CAs

• **SUPP =** Support activities – applicable only for SAs

55. Lead beneficiary number

Number of the beneficiary leading the work in this work package.

56. Person-months per work package

The total number of person-months allocated to each work package.

57. Start month

Relative start date for the work in the specific work packages, month 1 marking the start date of the project, and all other start dates being relative to this start date.

58. End month

Relative end date, month 1 marking the start date of the project, and all end dates being relative to this start date.

59. Milestone number

Milestone number:MS1, MS2, …, MSn

60. Delivery date for Milestone

Month in which the milestone will be achieved. Month 1 marking the start date of the project, and all delivery dates being relative to this start date.

61. Deliverable number

Deliverable numbers in order of delivery dates: D1 – Dn

62. Nature

Please indicate the nature of the deliverable using one of the following codes

R = Report, **P** = Prototype, **D** = Demonstrator, **O** = Other

63. Dissemination level

Please indicate the dissemination level using one of the following codes:

• **PU =** Public

• **PP =** Restricted to other programme participants (including the Commission Services)

• **RE =** Restricted to a group specified by the consortium (including the Commission Services)

• **CO =** Confidential, only for members of the consortium (including the Commission Services)

• **Restreint UE =** Classified with the classification level "Restreint UE" according to Commission Decision 2001/844 and amendments

• **Confidentiel UE =** Classified with the mention of the classification level "Confidentiel UE" according to Commission Decision 2001/844 and amendments

• **Secret UE =** Classified with the mention of the classification level "Secret UE" according to Commission Decision 2001/844 and amendments

64. Delivery date for Deliverable

Month in which the deliverables will be available. Month 1 marking the start date of the project, and all delivery dates being relative to this start date

65. Review number

Review number: RV1, RV2, ..., RVn

66. Tentative timing of reviews

Month after which the review will take place. Month 1 marking the start date of the project, and all delivery dates being relative to this start date.

67. Person-months per Deliverable

The total number of person-month allocated to each deliverable.