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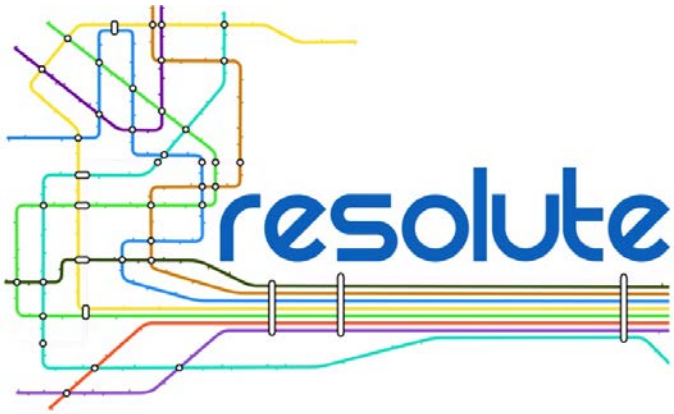

Resilience management guidelines and Operationalization applied to Urban Transport Environment

RESOLUTE project presentation

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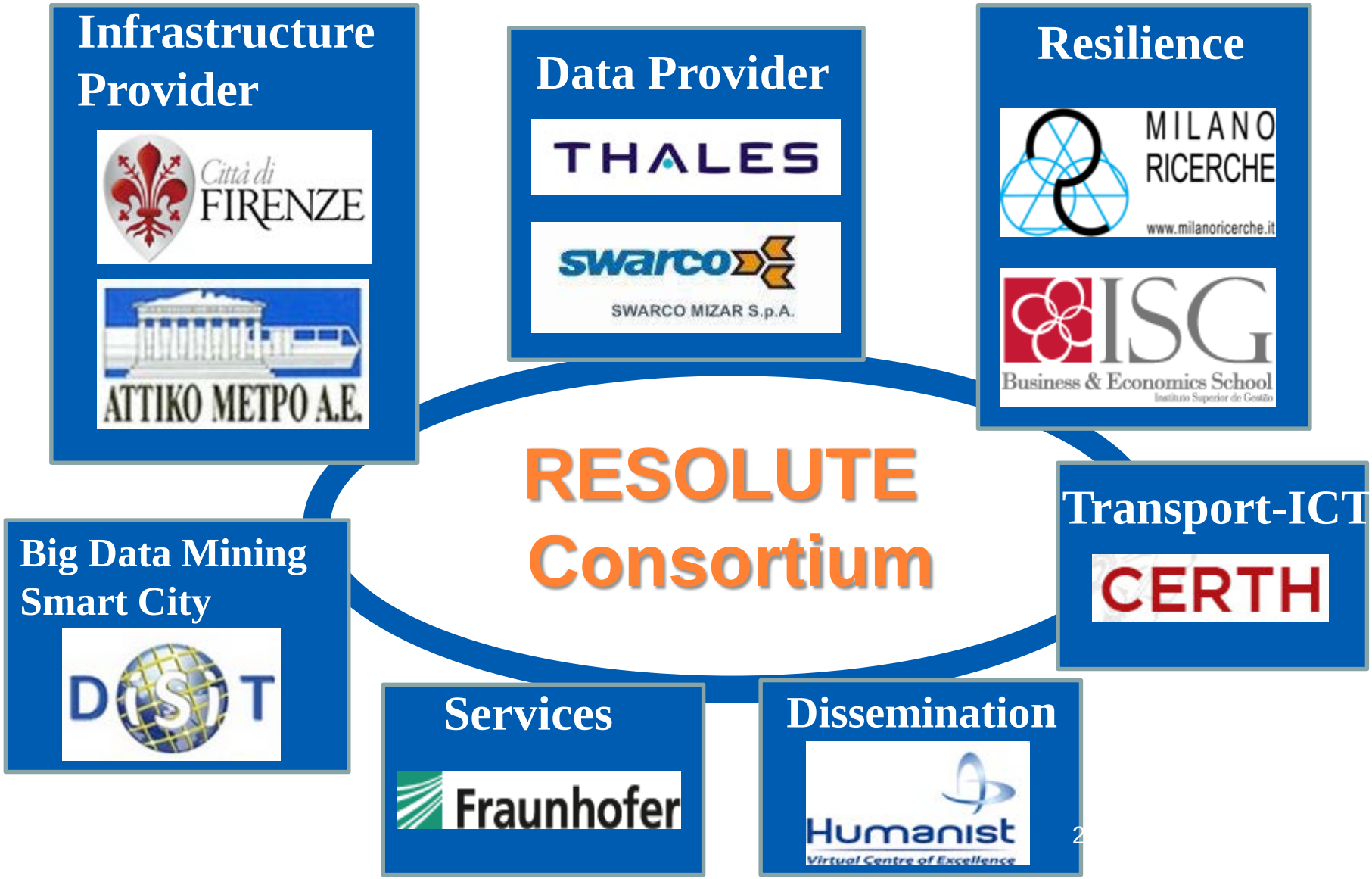
University of Florence

DRS7 Coordination meeting

15-09-2015

Bruxelles

Co-ordinated by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RESOLUTE 5 Objectives

Obj1- **Conducting a systematic review and assessment** of the state of the art of the Resilience assessment and Management concepts, national guidelines and their implementation strategies in order to develop a conceptual framework for resilience within Urban Transport Systems

Obj2 - Development of **European Resilience Management Guidelines** (ERMG)

Obj3 - Operationalize and validate the ERMG by implementing the RESOLUTE Collaborative **Resilience Assessment and Management Support System (CRAMSS)** for Urban Transport System (UTS) addressing Roads and Rails Infrastructures

RESOLUTE 5 Objectives

Obj4 – Enhancing resilience through **improved support to human decision making processes**, particularly through increased focus on the training of final users (first responders, civil protections, infrastructure managers) and population on ERMG and RESOLUTE system

Obj5 – **ERMG wide dissemination, acceptance and adoption** at EU and Associated Countries level

RESOLUTE motivations

Enhancing resilience in Urban Transport Systems is considered imperative for two main reasons:

1) Such systems provide critical support **to every socio-economic activity** and are currently themselves one of the most important economic sectors in Europe.

2) The paths that convey people, goods and information, **are the same** through which risks are propagated. Transport systems have thus developed a prominent safety and business critical nature, in view of which current management practices have shown evidence of important limitations

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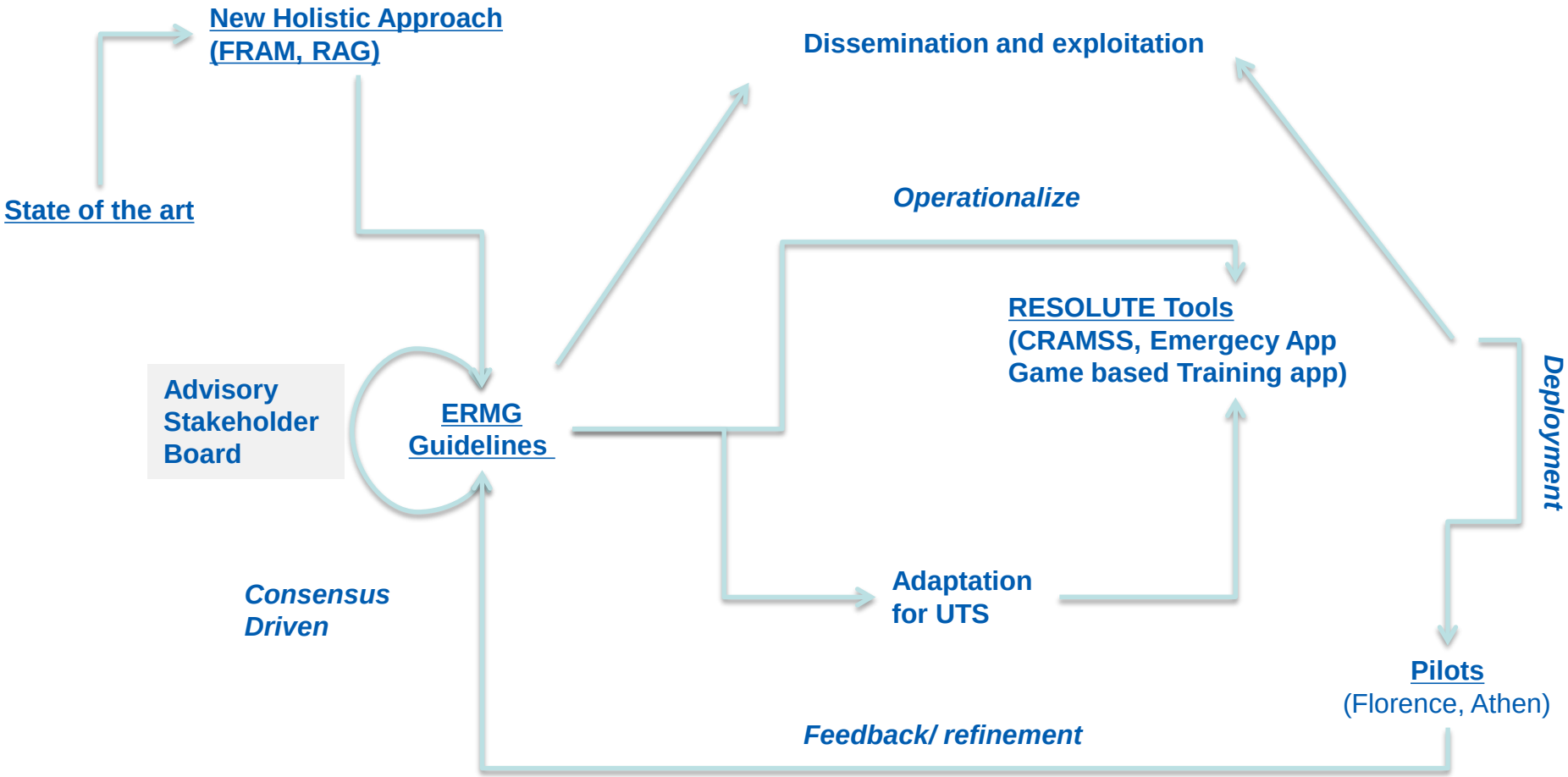
RESOLUTE Map



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RESOLUTE Main KPI

Metric	Metric description	Objective	Minimum	Optimum
MET1	State of the art reviewed and assessed	Obj 1	80%	95%
MET2	Percentage of UTS specific risk factors identified in the SOTA addressed into ERMG.	Obj 2	85%	95%
MET3	ERMG effectiveness - percentage of resilience awareness improvement in the final users once the ERMG has been disseminated respect to final users control group where the ERMG has not been disseminated.	Obj2	65%	75%
MET4	Resilience improvement – percentage of improvement determined by RESOLUTE solution for a class of resilience profiles defined by the RAG multidimensional criteria.	Obj2	50%	75%
MET5	Coverage - Percentage of guidelines tested in the pilots respect to the entire corpus of guidelines defined in the project.	Obj3	80%	90%
MET6	RESOLUTE training effectiveness - percentage of awareness and skill improvement after the Training activities	Obj4	75%	85%
MET7	Number of final users involved in User Forum	Obj4	#1000	#3000
MET8	Number of Emergency App downloaded	Obj4	#3000	#6000
MET9	Number of user engaged in RESOLUTE training activities	Obj4	#500	#1000
MET10	Percentage of EU and Associated countries reached by dissemination activities.	Obj5	75%	95%

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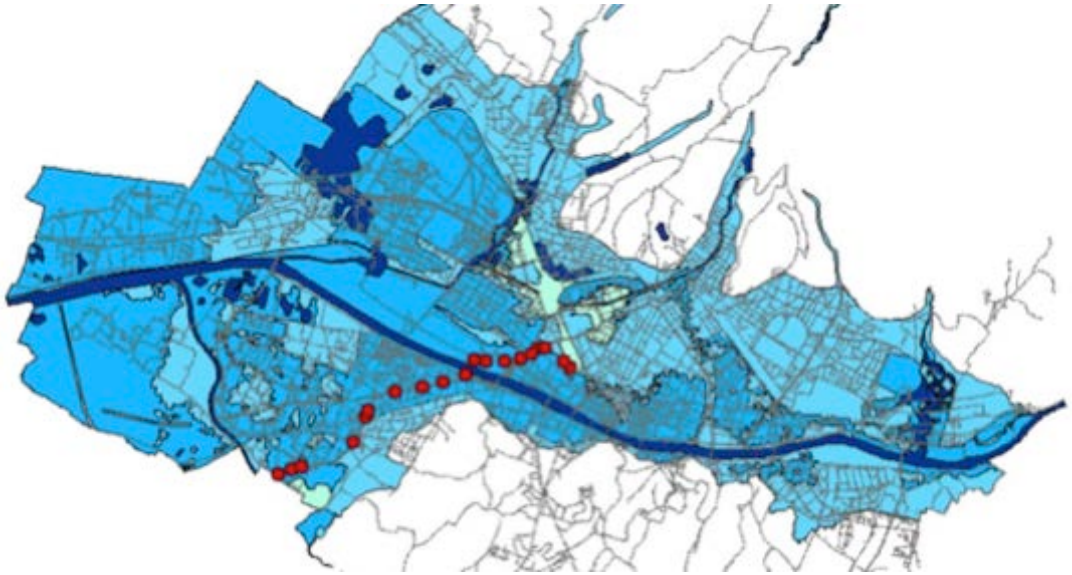
RESOLUTE Pilots



Città di FIRENZE

Over 70% of the city infrastructures are at Hidrogeological risk

- Model and to analyze traffic for automatic and semi-automatic recognizing of exceptional (flood) situations and related corrective actions through the deployment of ERMG defined in the project
- Run various scenarios of flood events in order to estimate resilience of the Urban Transport System in Florence through the integration of the CRAMSS system with the actual traffic management system in Florence
- Measure and validate the ERMG guidelines

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Bruxelles, 15 September

Florence Pilots objectives

Demonstrate and validate an integrated system of mobility management which, besides forecasting, will involve a corrective strategy actuation for restoring of safety condition for system users and of effectiveness of the public transport network in case of **flooding**.

- Identification, design and realization of data acquisition system
- Definition of communication technologies supporting different identified acquisition systems
- Development of integration modeling for information acquired by different sources
- Algorithms development and data processing models for innovative acquisition systems (crowd sourcing)
- Realization of interactive CRAMSS enabling dynamic programming of travel plan for each requiring user.

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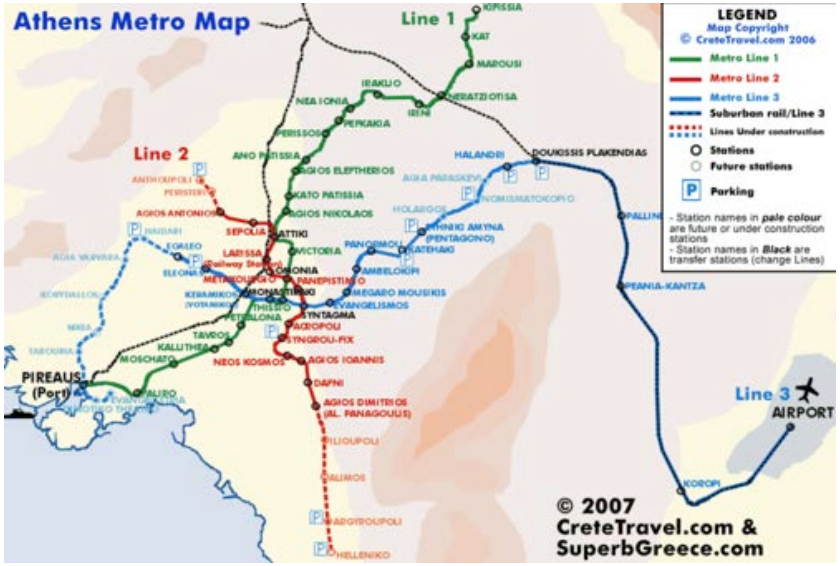
Attiko METPO Pilots



ATTIKO METPO A.E.

98Km metro line
65 stations
1M passenges daily

- Examine the performance of existing rules and procedures of metro operation for management of critical events
- Run various scenarios of threats to estimate resilience of the Urban Transport System in Athens (adequacy of substitute modes) using the Transport Model for Athens developed and owned by Attiko Metro through the deployment of ERMG defined in the project
- Measure the impact of negative human sentiments (e.g. fear) on resilience of the Urban Transport System in the post- bombing period via stated preference survey

Attiko METPO Pilots

Demonstrate and validate an integrated system of mobility management which, besides forecasting, will involve a corrective strategy actuation for restoring of safety condition for system users and of effectiveness of the public transport network in case of intentional, **malevolent human threats**.

- Help produce realistic resilience guidelines in the case of malevolent actions against urban transport systems
- Develop example strategy to select among alternative scenarios of actions based on various scenarios of threats with the use of a transport model

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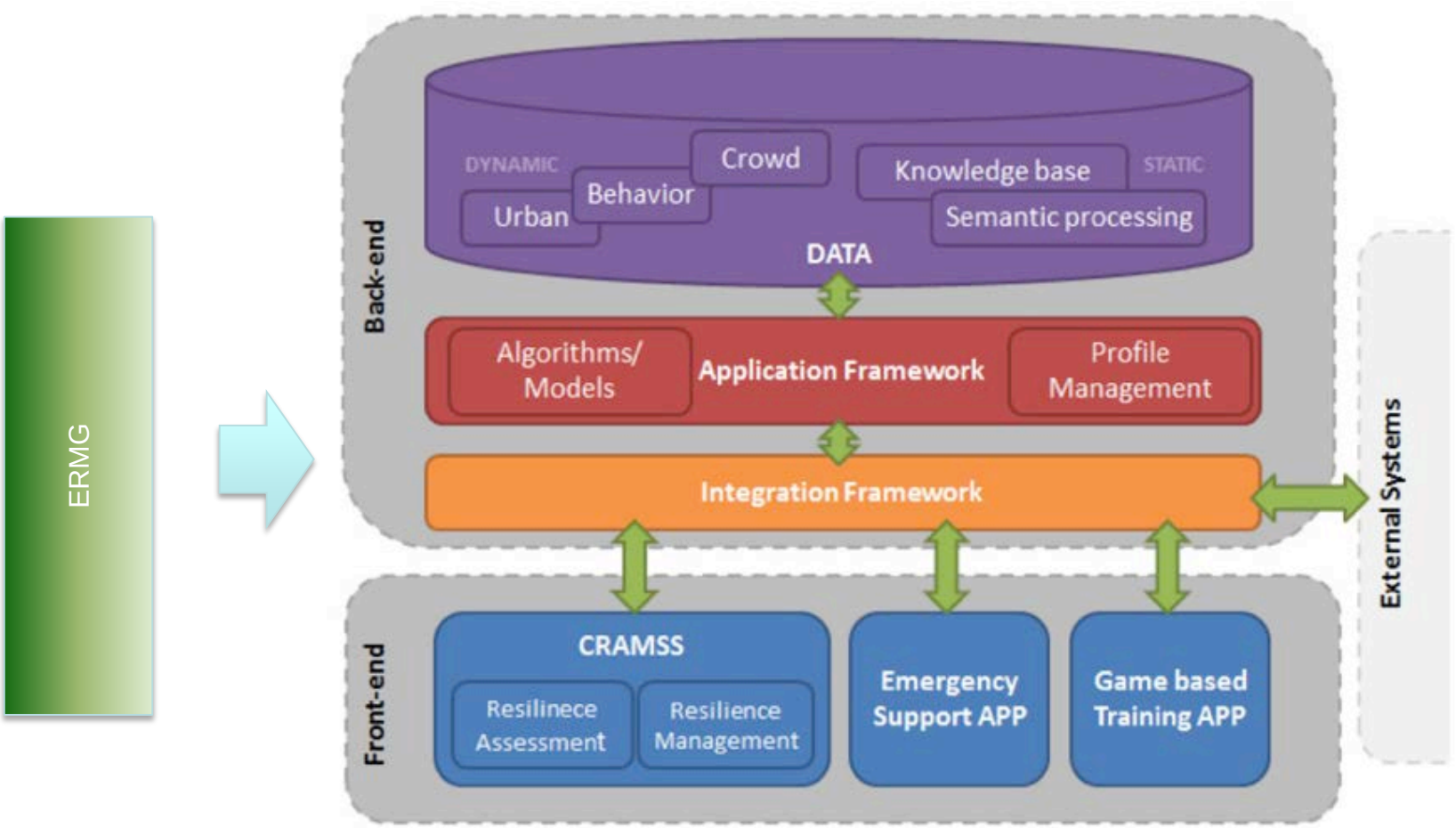
RESOLUTE Solution



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RESOLUTE Solution

- **CRAMSS framework** is based on an open, service oriented, multi-layer architecture and will embrace both a vertical (top-down and bottom-up) and a horizontal (across sectors and stakeholders) approach and that incorporates, at a minimum – and subject to final architecture, open standards data ingestion services; a data substrate containing both reference and dynamic data (the DATA layer);

- **internal APIs** for the application of analytics tools, modelling and simulation services (the Application Framework), RESOLUTE applications (the Application layer), and so on;

- full public API that allows the integration with existing external systems (the Integration Framework), in order to promote and effect the exploitation of RESOLUTE services by third parties.

Game based training

Game-based training has been associated with greater cognitive effort - an important condition for skill learning and improvements in

- skill execution,
- problem solving and
- decision-making

following game-based training than training involving repetitious technical instruction [Gabbett, Jenkins, Abernethy, 2009].

In RESOLUTE we design and develop a game based **meta-application** for Training in order to train different user categories (people at large on risk perception or early warning interpretation, Critical Infrastructure managers on ERMG application, etc.) according to their learning objectives

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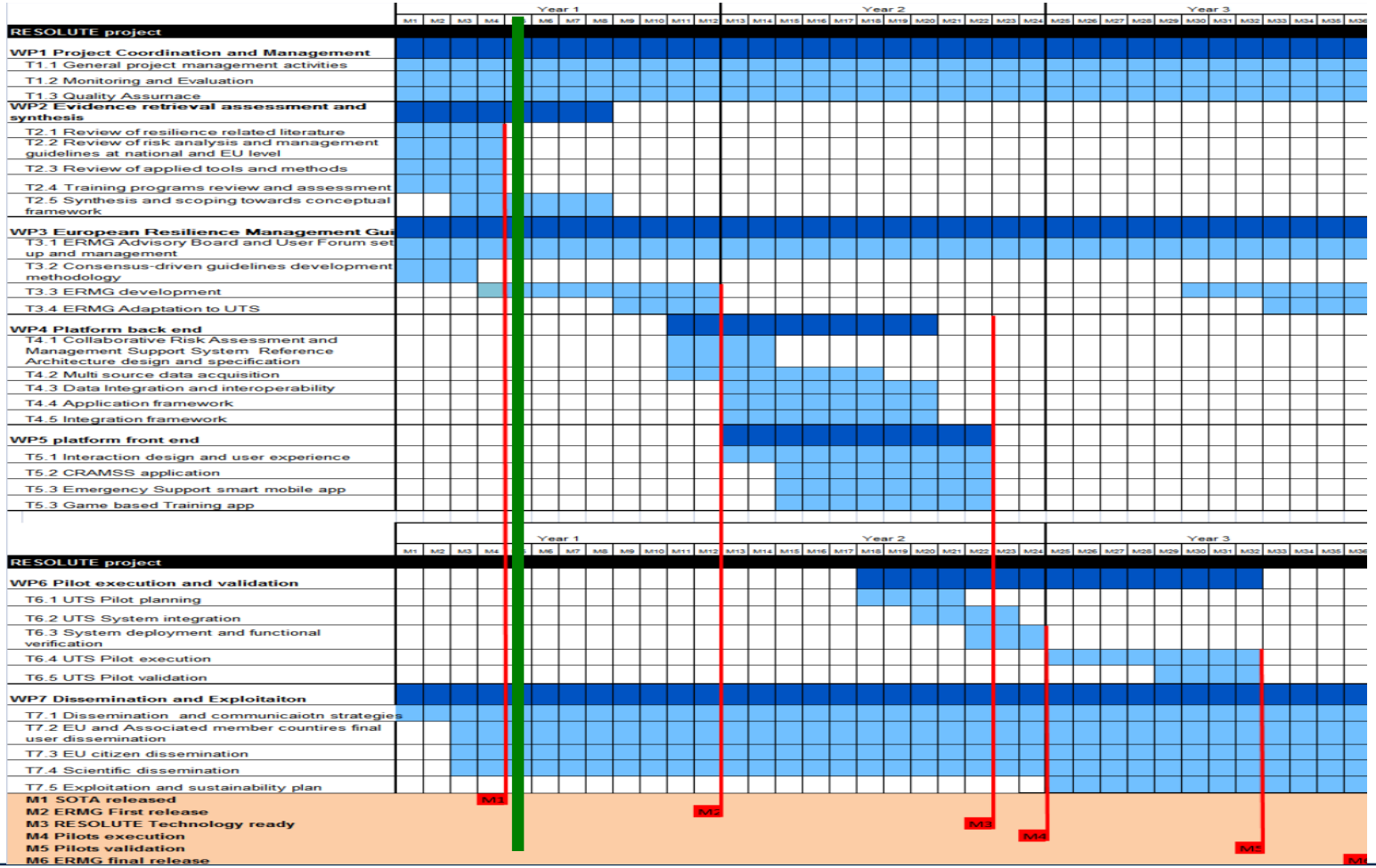
Where we are…



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Public deliverables

D2.1 - State of the Art review and assessment report (Report, M4) - Delivered
D2.2 - Synthesis and scoping for RESOLUTE (Report, M8)
D3.4 - Guidelines methodology (Report, M3) - Delivered
D3.5 - European Resilience Management Guidelines (Report, M12)
D3.6 - European Resilience Management Guidelines (Report, M36)
D3.7 - ERMG adaptation to UTS (Report, M12)
D3.8 - ERMG adaptation to UTS (Report, M36)
D4.1 - Back end reference architecture and specifications (Report, M14)
D4.2 - Multi source data acquisition (Report, M18)
D4.3 - Application framework (Report, M20)
D4.4 - Information Model and Interoperability (Report, M20)
D4.5 - Integration Framework Implementation (Report, M20)
D5.1 - Blue print of user experience and interaction for CRAMSS and Apps (Report, M14)
D5.2 - Blue print of user experience and interaction for CRAMSS and Apps (Report, M22)
D5.3 - CRAMSS application (Demonstrator, M22)
D5.4 - Mobile Emergency aupport App (Demonstrator, M22)
D5.5 - Game based Training App (Demonstrator, M22)
D6.4 - UTS Pilot Validation (Report, M32)
D7.2 - Proceedings of the first workshop (Report, M7) – to be organized during the CoU event
D7.3 - Proceedings of the second workshop (Report, M14)
D7.4 - Proceedings of the third workshop (Report, M24)
D7.5 - Proceedings of the final event (Report, M36)
D7.6 - Report on exploitation and business models for RESOLUTE technologies (Report, M36)

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RESOLUTE Coordinator

UNIVERSITÀ DEGLI STUDI FIRENZE

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- **Techniques**: data analytic, clustering, indexing and search, link discovering, regression, holistic regression, machine learning, prediction, inference, deduction, recognition, disambiguation.
- **DISIT solutions for:** user behaviour analysis, recommendation, multilingual and cross media indexing, user and collective profiling, indoor/outdoor navigation, media synchronisation, matchmaking, audio transcoding, decision support, sentient and autonomous agents and tools, open data, linked open data.