www.absolute-project.com

ABSOLUTE : Aerial **B**ase **S**tations with **O**pportunistic **L**inks for **U**nexpected & **T**emporary **E**vents

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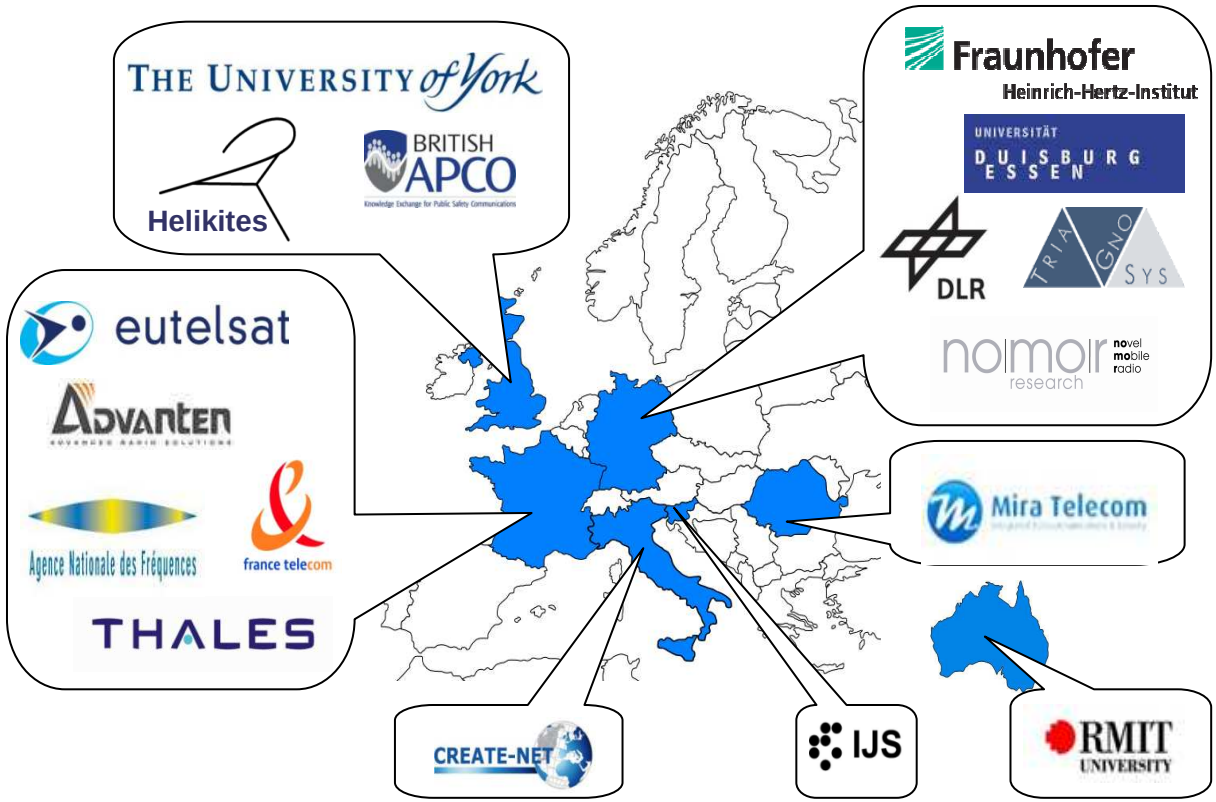
Secured Wireless Products Activity (SWP)

FUTURE NETWORKS

SEVENTH FRAMEWORK PROGRAMME

ABSOLUTE at a glance (1/2)

- ABSOLUTE is an FP7 Call-8 Integrated Project
- Duration: October 2012 – September 2015
- Total Project Budget: 11.3 M€
- Maximum EC Funding: 8 M€
- Resources: 1023 PM



- **ABSOLUTE Consortium is composed of 17 partners**
  - Industrial partners (Thales, France Telecom, Eutelsat),
  - SME (Advanten, Allsopp Helikites, Mira Telecom, TriaGnoSys, Nomor research),
  - Universities (University of Duisburg Essen, University of York, RMIT University),
  - Research centres (Create-Net, DLR- German Aerospace Center, Jozef Stefan Institute, Fraunhofer Heinrich Hertz Institute),
  - End Users (BAPCO)
  - Regulator (ANFR)

ABSOLUTE at a glance (2/2)

With an External Advisory Board of 11 members providing inputs for user requirements and participating to the final demonstration

END USERS

Protezione Civile
Provincia Autonoma di Trento

REPUBLIC OF SLOVENIA
MINISTRY OF DEFENCE
ADMINISTRATION FOR CIVIL PROTECTION AND DISASTER RELIEF

afac
Australasian Fire and Emergency Service Authorities Council

Bundesanstalt Technisches Hilfswerk
THW, Germany

Inspectorate for Emergency Situations, Government of Romania

MINISTERIO DE DEFENSA
ITM La Marañosa
Instituto Tecnológico
SPANISH MINISTRY OF DEFENCE

東京の消防
FIRE SERVICE IN TOKYO

REGULATORS

CEPT ECC Electronic Communications Committee
ECO european communications office

Ofcom

EUROPEAN AVIATION SAFETY AGENCY
AGENCE EUROPÉENNE DE LA SÉCURITÉ AÉRIENNE
EUROPÄISCHE AGENTUR FÜR FLUGSICHERHEIT

LARGE EVENT ORGANIZERS

AROSO & DE LAURENTIS
CONSULTORES ASSOCIADOS

Problems solved by ABSOLUTE

- **In the aftermath of an emergency, disaster or any related tremendous unexpected events, communications infrastructure play an essential role**
  - In most cases, the “normal” terrestrial infrastructure is seriously compromised and cannot guarantee reliable communications for citizens and rescue teams

- **By using rapidly deployable flexible aerial platforms with embedded 4G eNodeB, ABSOLUTE project will provide maximum system availability, communications reliability and robustness for :**
  - First responder communications & emergency communications for survivors,
  - Critical infrastructure restoration support systems,
  - Post-disaster surveillance, Medical service networks,..

- **ABSOLUTE project will allow to increase network capacity during specific events (Olympic Games,..)**
  - Network operators will be able to deploy rapidly aerial platforms to enhance their 4G network capacity

Main objectives (1/2)

- **To design and develop a rapidly deployable mobile network architecture composed of**
  - An aerial segment
  - A terrestrial segment
  - A satellite back haul segment
- **To demonstrate high-capacity, low-latency and coverage capabilities of LTE-A solutions adapted for broadband emergency communications and embedded on aerial platforms**
- **To develop techniques for dynamic spectrum access and management for seamless network re-configurability and scalability,**
- **To study novel techniques for direct communications between LTE-A user equipments for public safety scenarios**
- **To develop opportunistic networking techniques for improved communication robustness, system availability and link resilience**

Main objectives (2/2)

- **To prototype the sub-systems**
  - The Low altitude aerial platform (LAP) with its components
    - The ABSOLUTE 4G LTE-A eNodeB is part of the payload of the aerial platform
    - The weight of all components to be embedded in the LAP, the power supply, the antenna design will be a challenge
  - The Light Land Mobile Base Stations (with LTE-A eNodeBs, Tetra and satellite station)
    - Act as a gateway
  - User terminal integrating LTE UE and existing emergency wireless technologies (TETRA)
  - S-band satellite users terminals
- **To validate through lab and realistic field demonstrations the features of ABSOLUTE**
- **To contribute to the relevant standardization groups (3GPP, ETSI) and regulatory bodies (CEPT).**

Target Results

Flexible and Resilient Public Safety and Disaster Recovery System and prototype components

- Hybrid Aerial-Terrestrial Communication infrastructure with integrated satellite Communications support for backhaul
- Rapidly deployable aerial communication platform and prototypes (LTE-A based) integrating with low-flying aircrafts (LAPs) or UAVs for aerial-terrestrial, aerial-aerial links and aerial-satellite links
- Smart easily deployable land Mobile Base Station platform and prototypes embedding LTE-A, advanced disaster recovery support, TETRA, sensor network gateways, positioning and localization support, satcom links etc.

Cognitive and Context Aware communications and network management solutions for public safety communications

System level simulator for hybrid Aerial-Terrestrial-Satellite Systems

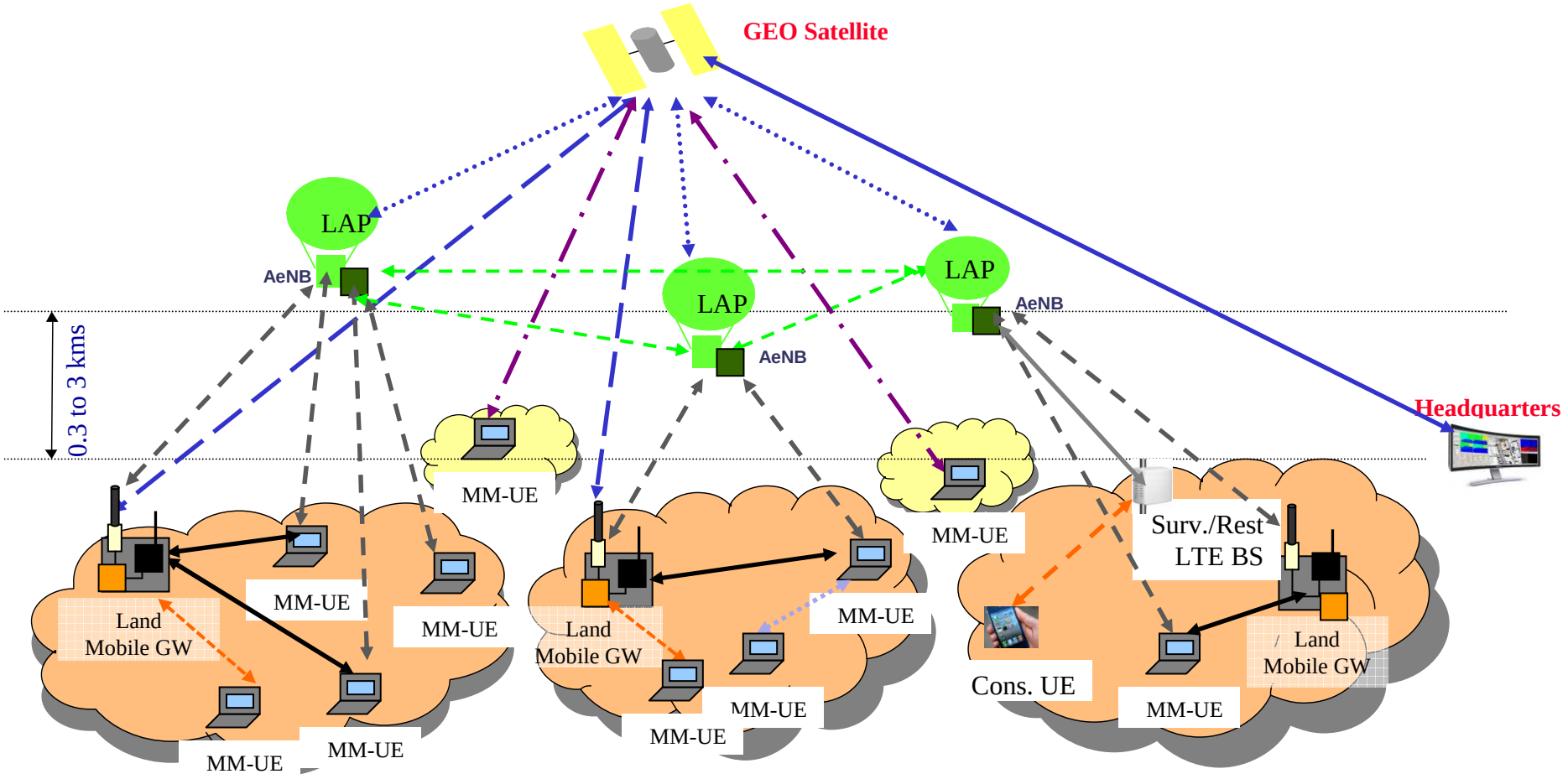
Demonstration and pilot field trials validating the ABSOLUTE concepts

Key performance indicators

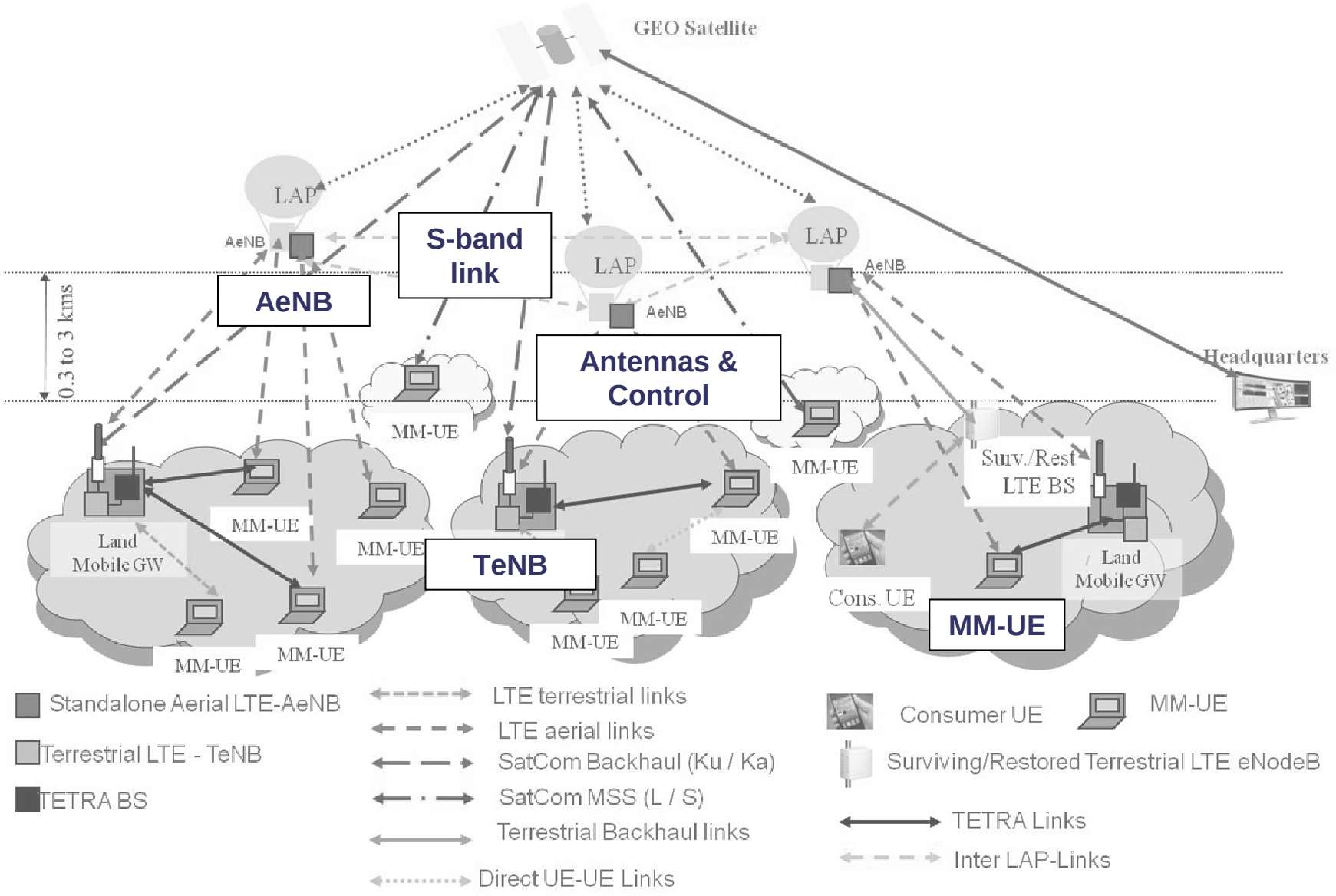
Key performance indicators set to measure the project success

- Significant Impact on Public safety regulation and LTE standardisation in Europe (direct mode, group communications,..)
- Successful Implementation and integration of Aerial LTE-A eNodeB (AeNodeB), Terrestrial LTE-A eNodeB with Ka-band satellite backhauling, advanced multimode LTE-A Professional terminal with enhanced functionalities (cognitive mechanisms, direct mode, networking mechanisms)
- Final demonstration with stakeholders and end users

Technical Approach: ABSOLUTE System View



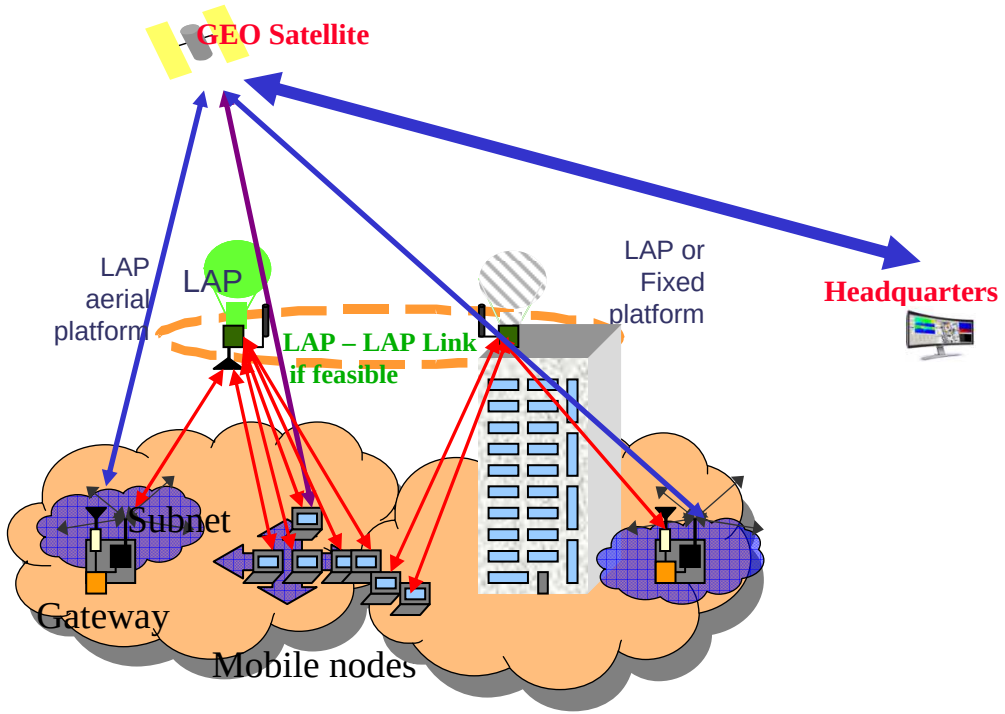
Technical Approach: Sub-systems Implementation



Technical Approach: Synopsis of Demonstrations

Field test trials

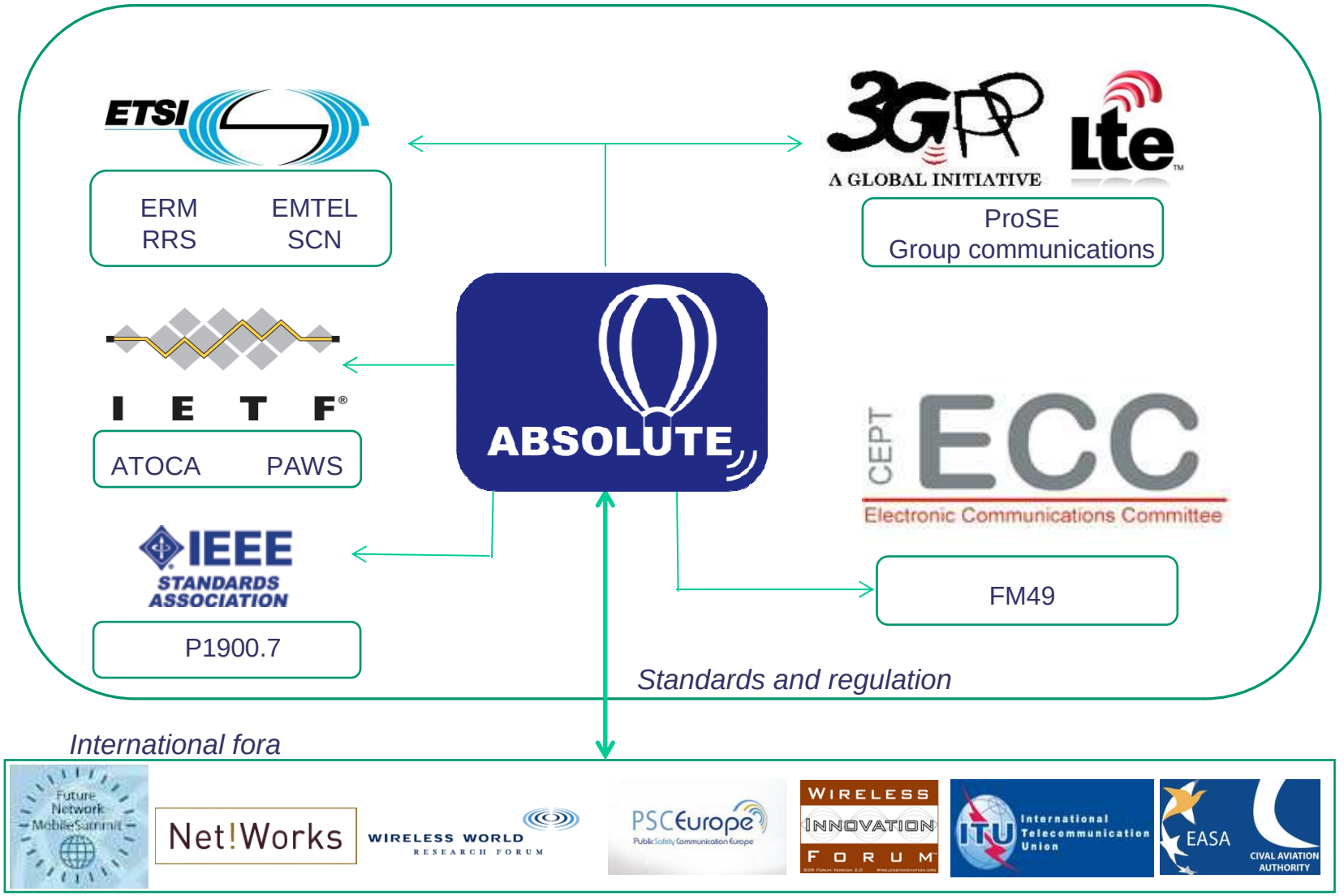
- To assess system performances
- To test key functionalities



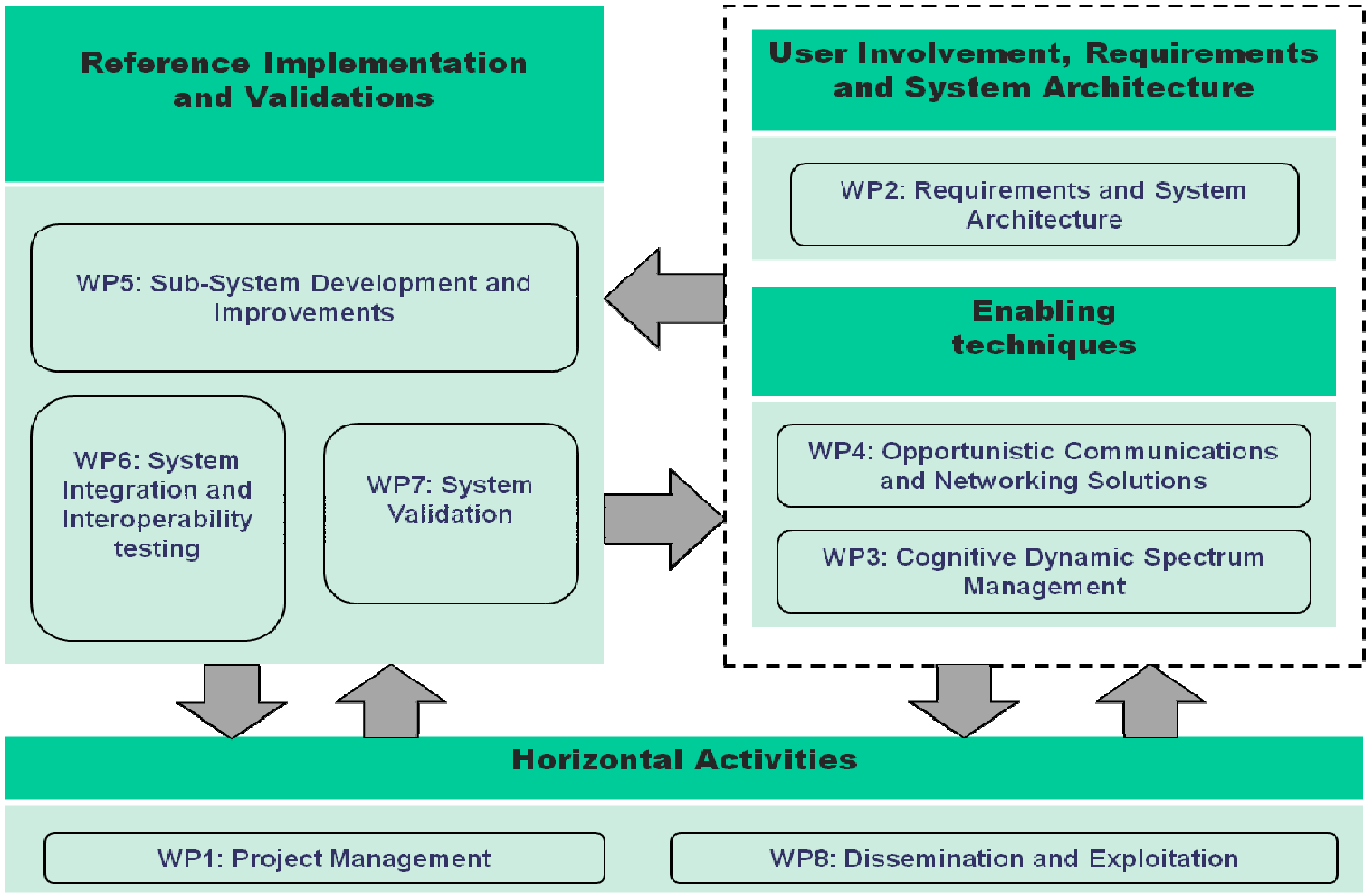
Final demonstration

- To demonstrate to stake holders and to end users the ABSOLUTE concept

Technical Approach: Contributions to Standards & Regulation



ABSOLUTE Work Organization



Partner Roles and Focus in ABSOLUTE (1/3)

Industry & SME

Contributions

- Steer system requirements, use cases, scenario definitions and business models
- Propose innovative concepts for public safety applications using 4G technology
- Contribute to the ABSOLUTE sub-system components development (LTE sub-systems, antennas, S-band satellite terminal ..)
- Perform integration and interoperability testing
- Perform field testing of ABSOLUTE sub-system components
- Ensure successful system validation in lab, during pilot field trials and ensure a successful final demonstration
- Monitor and guide transfer of research contributions to standardization bodies
- Interface with public authorities regarding public safety spectrum usage and regulatory aspects

Dissemination

- Leverage project results at standards bodies, mainly within 3GPP and ETSI
- Represent the project within major industry-driven fora in Europe and worldwide and establish liaison and cooperation with initiatives relevant to ABSOLUTE

Partner Roles and Focus in ABSOLUTE (2/3)

Universities & Research Centers

Contributions

- **Main focus on the following research areas:**
  - Dynamic spectrum sensing and access schemes for rapid network configuration and interoperability
  - Opportunistic relaying mechanisms for improved link resilience and communication robustness
  - Energy efficient aerial-terrestrial communication links
  - Flexible cooperation of heterogeneous network elements for optimum network utilization and resilient connectivity
  - Light-weight mobility management protocols for communication robustness under AeNodeB/TeNodeB mobility
- **Participate to the design and implementation of the cognitive extensions for the AeNodeB/TeNodeB platforms**
- **Participate to the integration of the new components for the AeNodeB platform**
- **Participate to the implementation and testing of the S-bans satellite link**
- **Evaluate the system level KPIs in the hybrid aerial-terrestrial simulator**
- **Perform field testing and participate to the final demonstration**

Dissemination

- **Scientific publications in conferences and journals**
- **Training activities for stakeholders & students, organization of project workshops**

Partner Roles and Focus in ABSOLUTE (3/3)

End users & Stakeholders

Contributions

- Steer the user level requirements for ABSOLUTE and to ensure the user-centric objectives are maintained throughout the project
- Provide feedback on system architecture and its evolution
- Provide feedback on regulatory considerations
- Propose recommendations on the use case scenarios and the system level requirements
- Evaluate the acceptance ratios of the ABSOLUTE business models
- Support the public demonstration and trials and provide feedback

Dissemination

- Participate to the technology showcase events
- Disseminate the ABSOLUTE technological approach within the External advisory members business domain and customers

Thanks

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