

MONET

Mechanisms for Optimization of hybrid ad-hoc
and satellite NETWORKS

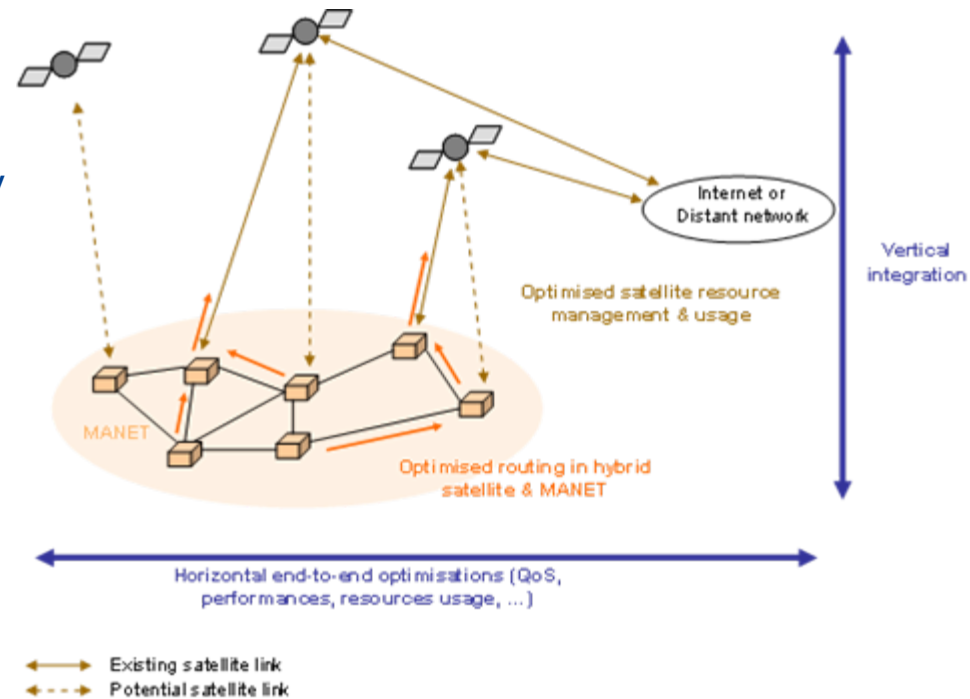
FP7 INFSO-ICT-247176

Agenda

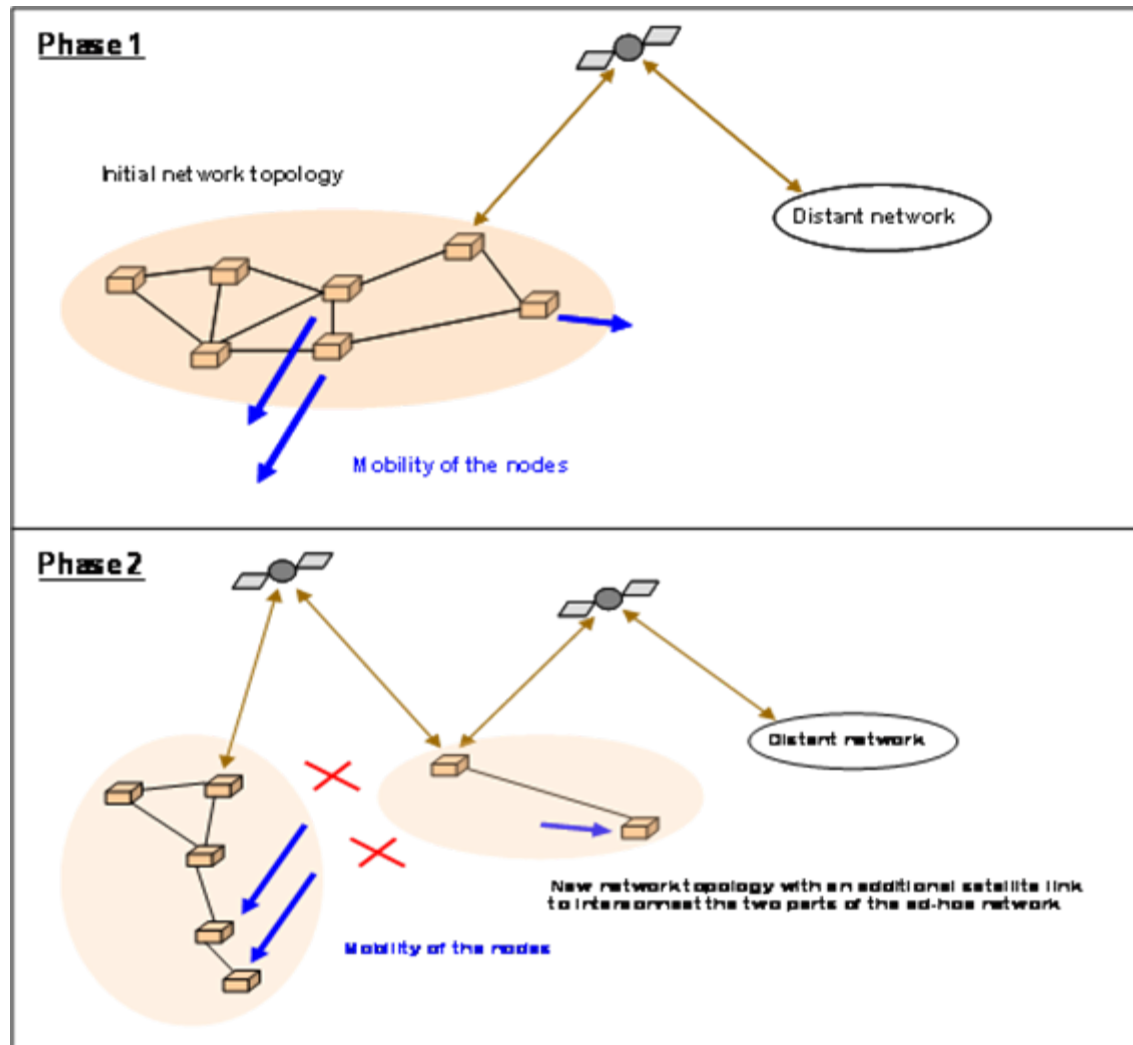
- Context and Objectives
- Main tangible objectives
- Consortium and roles

Context and Objectives

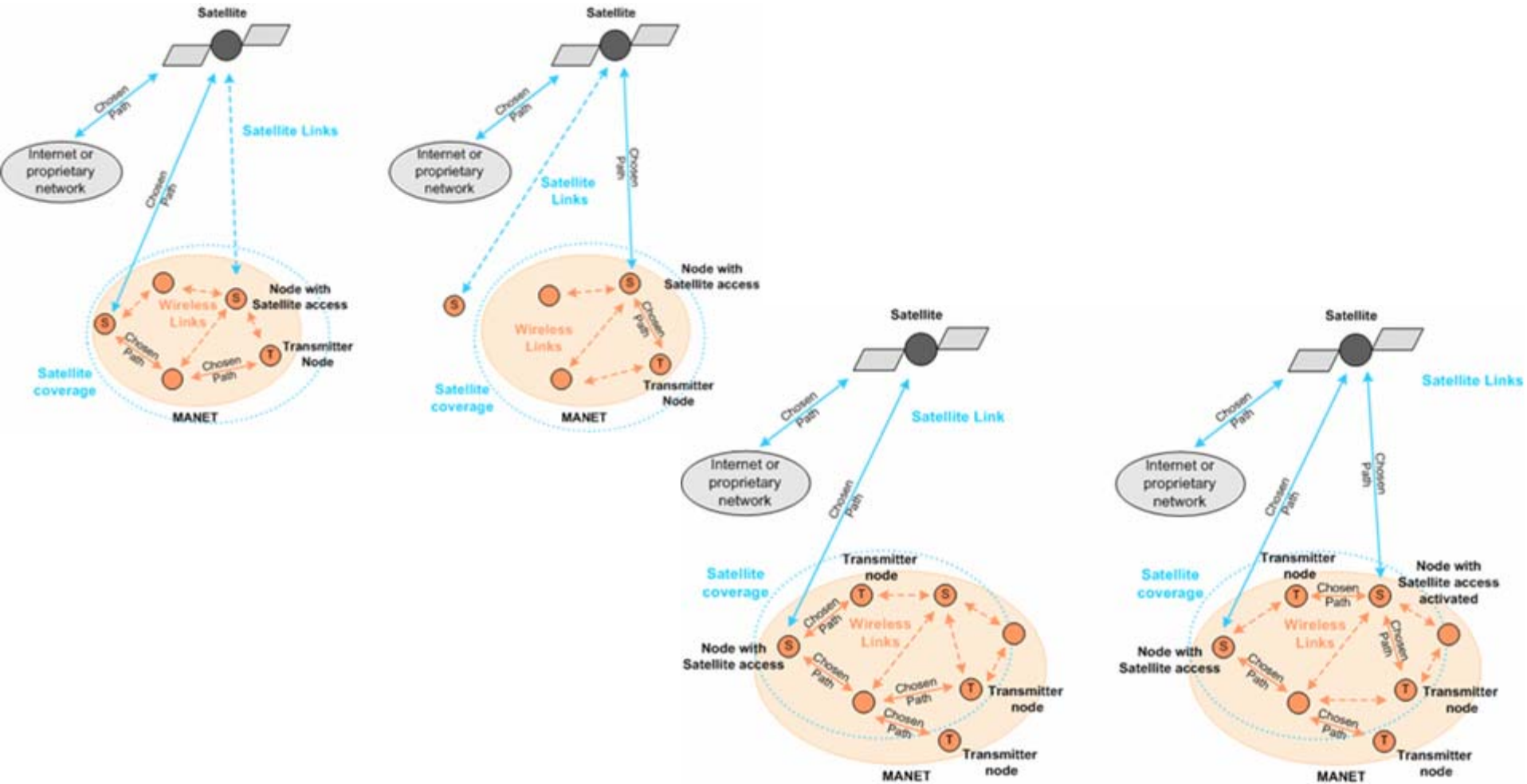
- Wireless Ad-hoc Networks provide field communication links among deployed personnel, automatically adapting the network topology to the field context.
- MSS for links between the field resources and other entities using easily deployable mobile communication units.
- Changing MANET
- Nodes with links to backbone
- Dynamic, changing links
- The concept of a hybrid MANET-Satellite network is therefore a natural evolution of considering the problem of providing local and remote connectivity in a highly mobile, dynamic and often remote environment Context (current challenges)



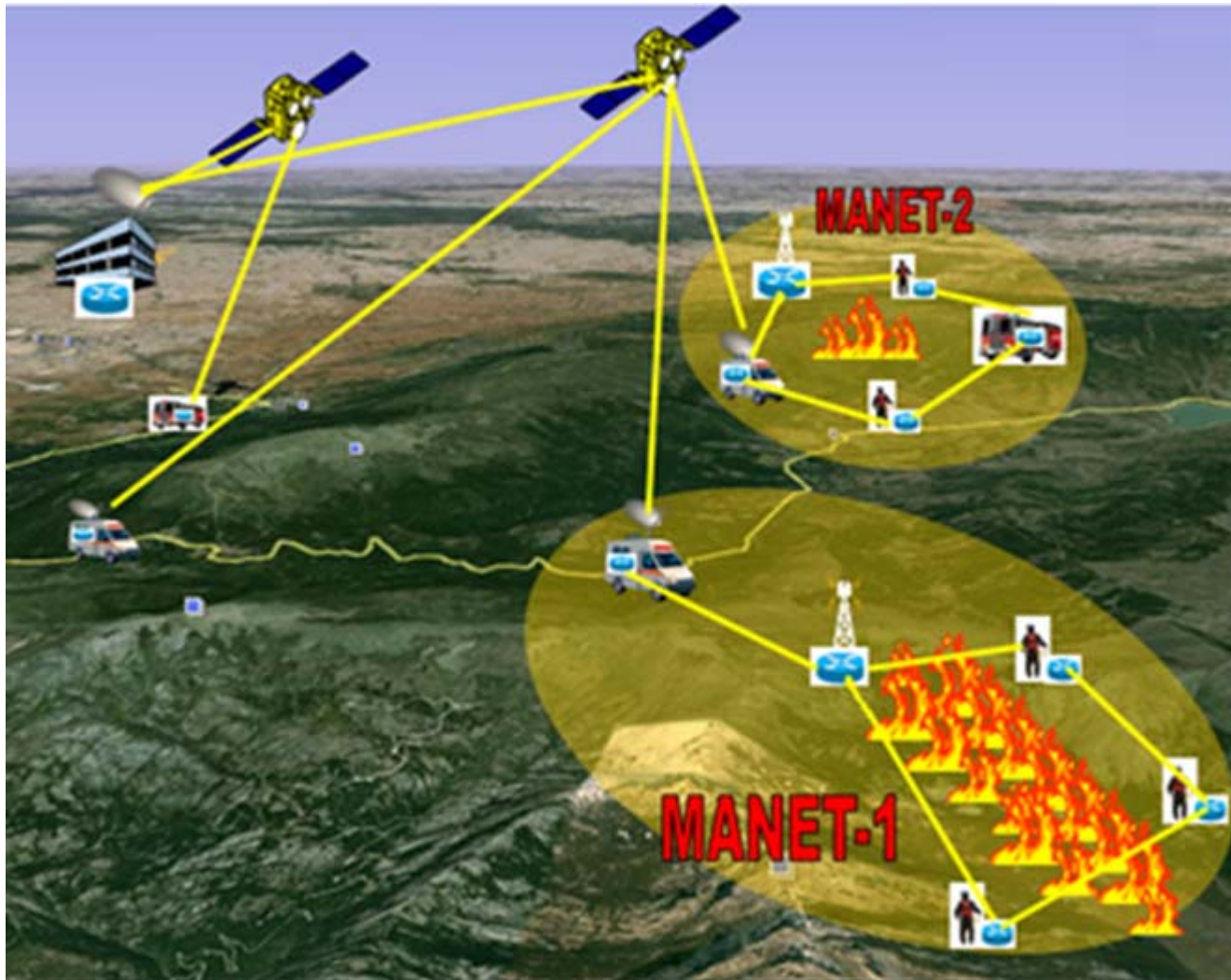
Context and Objectives



Context and Objectives



Context and Objectives



Main tangible Objectives

- To develop a complete understanding of the problems and complexity underlying the highly dynamic and heterogeneous environment of a hybrid MANET-Satellite network
- To optimize the use of satellite access links in a MANET through mechanisms that propose and implement changes in topology and resources used
- To provide seamless broadband services to everyone at any time in a hybrid MANET-satellite network thanks to optimized algorithms and network mechanisms
- To overcome performance bottlenecks and roadblocks in hybrid MANET-Satellite networks to enable a more pervasive and optimized network structure

Main tangible Objectives

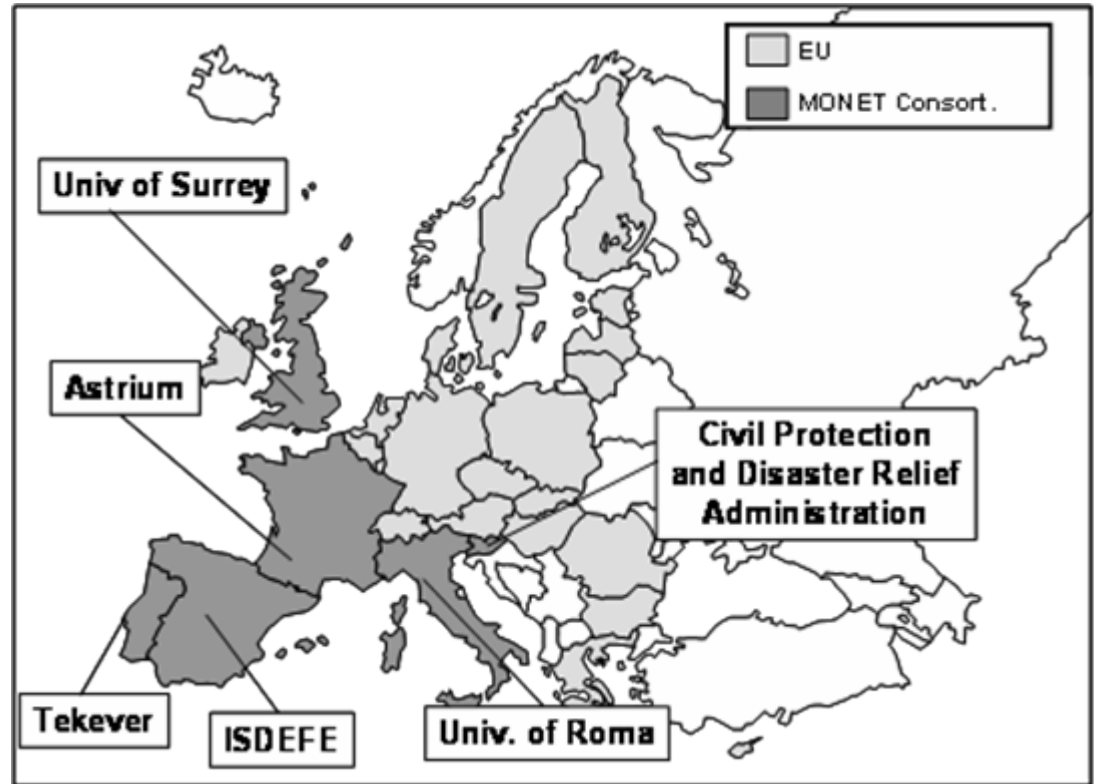
Scientific and Technical Objectives	Expected Achievements
Perception of the possible applications and uses for such a pervasive hybrid network	Set of study scenarios to be considered in the analysis and research; Development of a concept of operations
Detailed understanding of the complexity and challenges of heterogeneous, dynamic and distributed environments	Design of the protocol, functional and network architectures of MONET ; Top-down and bottom-up complementary approaches
Improve availability of satellite access links in the context of an ever-changing MANET	Re-organisation of the MANET to connect to access points; Re-organisation of the access points themselves; Horizontal handover procedures (selection of satellite access points); Adjusted routing in accordance with the current network situation;
Enable the support of more services in these networks (video, voice and data)	Network management & re-organisation policy and decision tools; Resources management mechanisms (network layer, MAC layer or Cross-layer); QoS policy and mechanisms;
Overcome performance bottlenecks in hybrid MANET-satellite networks	Use of satellite as relay between 2 MANET; Bandwidth management modelling and algorithms that adapt to link and traffic conditions; Call admission control; optimized resource management with adaptive modulation and coding; Routing protocols (load balancing); Cross-layer information distribution mechanisms;
Reduce the costs of operations in hybrid MANET-satellite networks	Ability to control Satlinks in MANETs; Ability to choose between satellite service providers (if more than one is available); Routing protocols (energy-saving, fault-tolerant);
Integrate satellite in MANET in a cost effective way	Mechanisms to enable automatic choice of lower cost access points (e.g. choice between fixed broadband and satellite according to QoS)
Implement a prototype of an optimized composite MANET-Satellite network	Implementation of algorithms in both laboratory test-bed and in actual hardware devices and terminals; New / modified / extended protocols;
Validation of concept and solutions	Test the feasibility of proposed optimizations; Test of proposed solutions in scenario representative of real life application;

Main tangible Objectives

- Success criteria
 - Simulations demonstrating merit of algorithms and mechanisms for each segment and for the system as a whole;
 - Demonstration of optimization mechanisms in near real life environment with end-users;
 - Increase satellite access link availability in ad-hoc mobile environment;
 - Reduction of costs of communications in hybrid ad-hoc/satellite environment;

Consortium & roles

- TEKEVER (PT) – coordinator
- CRAT – U. Rome (IT)
- U. Surrey (UK)
- ISDEFE (ES)
- Astrium (FR)
- Administration for Civil Protection and Disaster Relief (SI)



Consortium & roles

Partner	Background / expertise / skills
TEKEVER	Mobile systems, middleware development, wireless communications and ad-hoc networking
University of Rome-CRAT	QoS and resource management, interworking management, multicast/broadcast control, service management
University of Surrey	Mobile and wireless communication systems, satellite communications and networks, future Internet, ad-hoc networks, networking protocols and security
ISDEFE	Requirements specification and systems validation, as technical assistance to institutional market: Engineering consulting for defence and homeland security
ASTRIUM	Broadband communications, data relay services, mobile and aeronautical communications, system of system integration, end-to-end hybrid satellite-wireless communication systems
Slovenian Administration for Civil Protection and Disaster Relief	Emergency response and disaster relief, operational knowledge and understanding of user needs

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