CONSERN REPORT

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CONSERN TimeLine – Facts and Figures

CONSERN
COOPERATIVE AND SELF-GROWING ENERGY-AWARE NETWORKS

Project Contractual start. 1 June

Kick Off Meeting, Mykonos, EL, 4-7 July

2nd F2F Munich, Du, 28-29 Sep.

3rd F2F Munich, Du, 26-28 Jan.

4th F2F Stockholm, Sw, 7-9 June

1st Review 8 July, Athens, GR

M1 M2 M5 M9 M13 M14
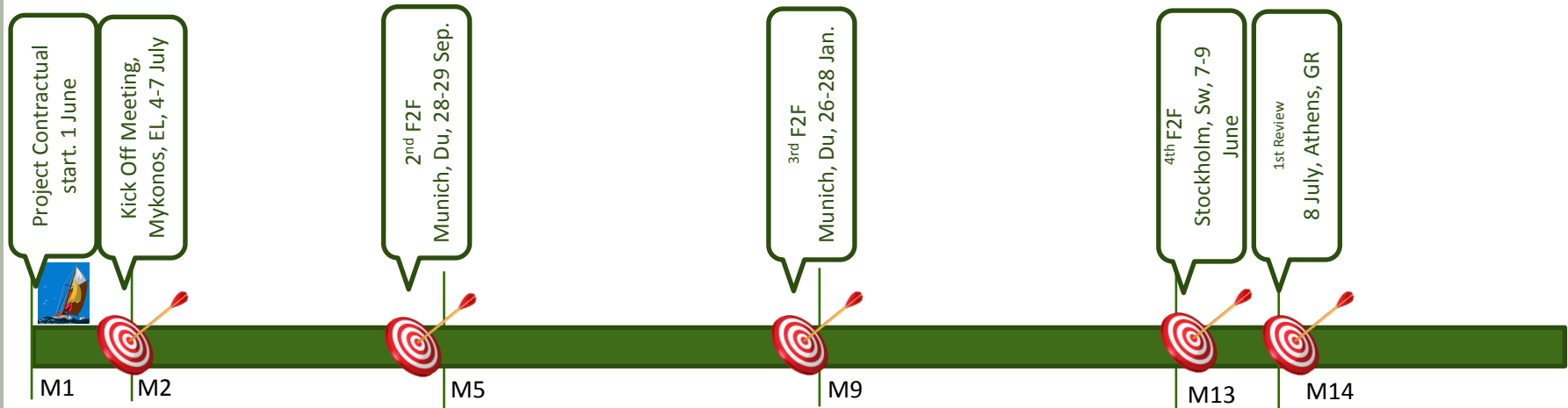
❑ **Deliverables (submitted)**
- D1.1: Scenarios, Use Cases and System Requirements
- D4.1: Initial Description of Self-Growing Scenarios, Properties, Requirements and Envisaged Framework
- D3.1: Enablers for Energy-Aware Cooperative Decision and Control
- D5.1: Technical challenges for proof-of-concept and validation
- D3.2: Design of Energy-Aware Networking and Cooperation Mechanisms
- D4.2: Distributed Self-Growing Architecture and Interface Description
- D1.2: High Level Market and Impact Assessment, Standardisation, Dissemination and Exploitation Activities
- D2.1: System Level Energy Optimisation Solutions
- D2.2: Terminal Level Energy Optimisations Solutions

❑ **Milestones (completed)**
- M2.1: Selection of Low Energy Protocols, Design Tools and Modelling Tools
- M4.1: Self-growing scenarios, architecture and framework
- M3.1: Synchronisation with WP1 for use cases and WP4 for architectures and APIs suitable for Self-Growing networks
- M1.1: Identification of Policies and relevant Socio-economic Impact Factors
- M3.2: Synchronisation with WP2 on low energy protocols
- M2.2: Energy Optimisations for Systems and Terminals
- M1.2: Inter-domain Business Implications
- M5.1: Cross-checking of intermediate prototyping planning with all other WPs
- M4.2: Architecture, interfaces and interface procedures
- M3.3: Synchronisation with WP5 in the selection of algorithms for implementation

CONSERN Y1 ACHIEVEMENTS (1/3)

❑ Reference framework
- Elaborated Scenarios highlighting applicability and impact of energy-aware self-growing networks:
- Technical Use Cases capturing more specific capabilities in terms of energy optimisation, cooperative control and self-growing mechanisms.

❑ Impact assessment
- High-level impact assessment of CONSERN technologies
- Elaboration of two main business models (operator-centric and operator-independent) for the home/office CONSERN scenario,
- Development of respective value networks - Outline convergences and divergences between business actors

❑ Energy optimisation modelling and mechanisms:
- Low energy protocols, design tools, simulation tools and modelling tools for energy awareness and efficiency,
- Solutions for adding energy awareness to network design, modelling and simulation tools
- Energy optimization mechanisms for networks, network nodes and terminals
- Exemplary case of how energy awareness could be combined with the self-growing paradigm.

CONSERN Y1 ACHIEVEMENTS (2/3)

❑ **Cooperation enablers and mechanisms for cooperative decision and control:**

- Problem definition and formulation, models development and description of related mechanisms and algorithms focusing on:
  - ❑ Relay and cooperative communications,
  - ❑ Cooperative decision making and power control (assisted with self-learning techniques),
  - ❑ Energy savings in HetNet environments,
  - ❑ Cooperative network protocols,
  - ❑ Cooperation mechanisms and optimisations in heterogeneous neighbouring networks,
  - ❑ Information fusion and outlier detection.

❑ **Enablers for Self-growing paradigms**

- Elaborated use cases highlighting self-growing aspects,
- Development of CONSERN architecture focusing on self-growing aspects,
- Specification of logical interfaces for information exchange between functional units within the self-growing architecture
- Definition of key functionality enabling self-growing,
- Identification of approach for prototyping self-growing functionality supporting policy and rule set exchange between components.

CONSERN Y1 ACHIEVEMENTS (3/3)

❑ Prototyping Activities
- Use Cases analysis, evaluation and pre-selection
- Interaction between WP5 and WP2, WP3 and WP4 in order to align in particular software development and algorithmic development activities with the requirements of WP5,
- Proof-of-Concept components
  - ❑ Indoor Self-Growing / Energy Efficiency Applications integrating 3G and WiFi modems,
  - ❑ Dynamic Node Management for Energy-Efficiency,
  - ❑ Automatic reconfiguration of wireless sensor nodes and network behaviour to cope with dynamic interference and collaborate with co-located networks.,
  - ❑ Purpose change in a Sensor-Network - Rule Based Operation,
  - ❑ Cooperative energy aware solutions and self-growing mechanisms in multi RAT networks,
  - ❑ Virtual platform modelling.

❑ Dissemination, standardisation and exploitation
- One (1) magazine paper submitted,
- Eleven (11) scientific papers submitted in conferences and workshops,
- Participation in concertation and cluster meetings,
- Participation in panels and workshops
- Participation and monitoring of a number of related standardisation activities and initial contributions in:
  - ❑ ETSI TC RRS,
  - ❑ IEEE P802.11
- Patents achieved
  - ❑ PCT/SE2010/000285: "Method and apparatus of communications" (HWSE)
  - ❑ PCT/SE2010/000317: "Generalised Architecture for Control of Communication Entities" (HWSE) .

HIGHLIGHTING CONSERN ARCHITECTURE

❑ Self-growing architecture based on cognitive engine (CCE) communicating with other cognitive engines and with functional units (FUs)

❑ A CONSERN entity (CE) may represent or collocate with another network node, or may be a dedicated network node
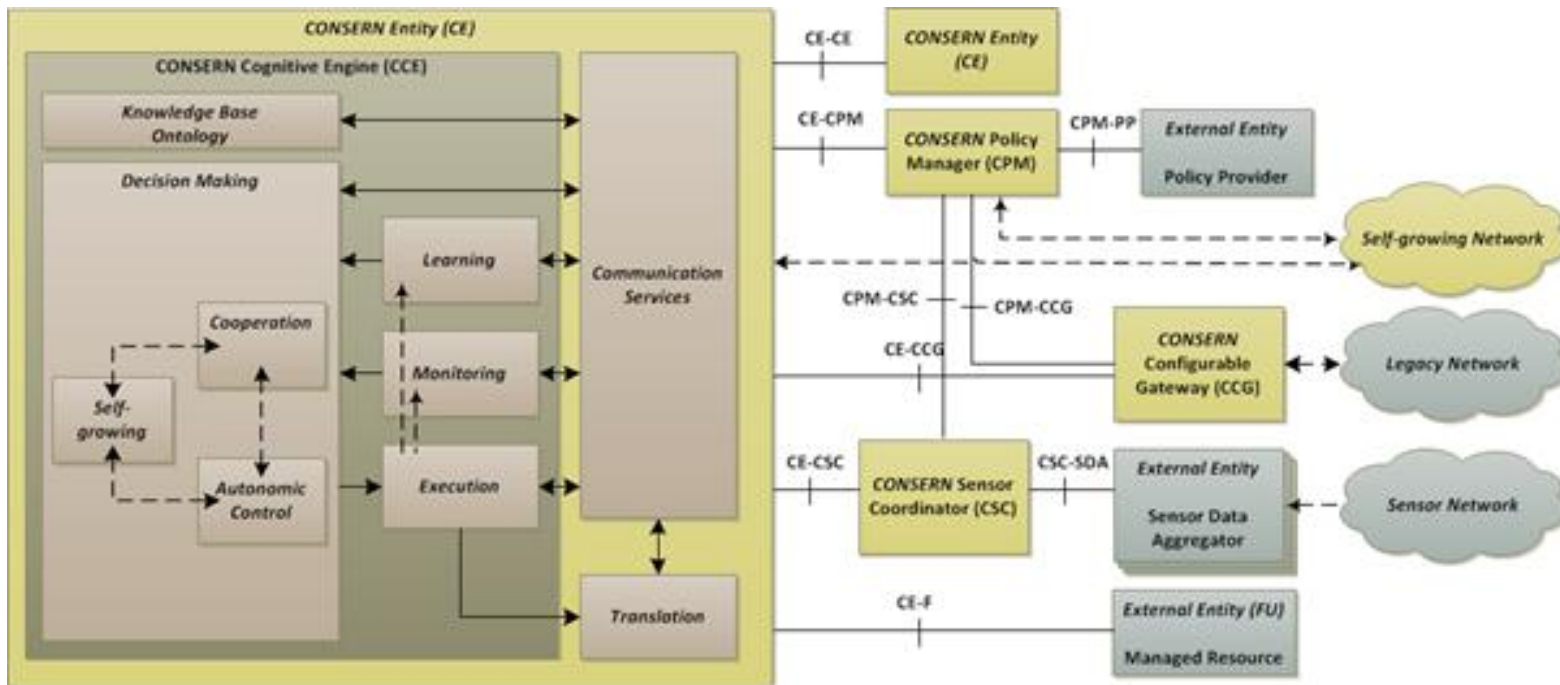
CONSERN Updated Standardisation Plan

❑ The partners' participation to ETSI RRS, 3GPP and 802.11 standardization has revealed particular opportunities for immediate contribution in ETSI RRS.

  ▪ ETSI RRS: The following two recently initiated WIs are in particular suite for Energy Efficiency related contributions, preferably related to requirements, corresponding enablers and self-growing paradigms:

    ❑ WI on "Radio Reconfiguration related Requirements for Mobile Devices"

    ❑ WI on "System requirements for Operation in UHF TV Band White Spaces"

  ▪ 3GPP

    ❑ Possible extension of LTE X2 signalling interface between BSs, to enable remote cell switch-off (needed for cooperative autonomous algorithms in CONSERN)

    ❑ Potential impact: specify new types of channel measurements and Channel State Information Logic (CS) for Coordinated Multipoint Transmission, enhance signalling

  ▪ 802.11

    ❑ Continue involvement in task group TGai, identify additional contribution opportunities related to self-growing aspects