Welcome to the World of Standards

ETSI

World Class Standards

A TECHNICAL VIEW ON ETSI ACTIVITIES ON COGNITIVE RADIO

Working Party 5A Seminar on Cognitive Radio Systems and the use of White Spaces - Geneva, November 18th

Dr. Markus Mueck, Chairman ETSI RRS & INTEL

CRS Activities in ETSI

ETSI and M/512 current activities
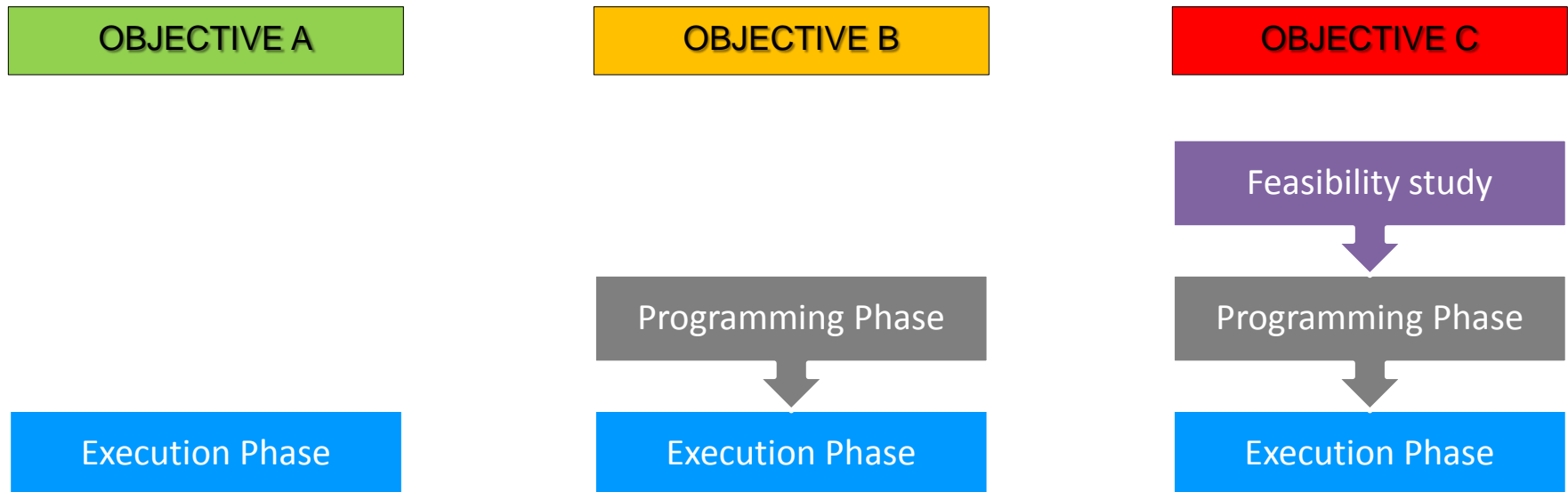
M/512: future work

Cognitive Radio Systems Activities in ETSI

- The ETSI Reconfigurable Radio Systems (RRS) Technical Committee (TC) is the center of competence within ETSI for Cognitive Radio Systems;

- ETSI has been developing Cognitive Radio Systems (CRS) standards for over 5 years, examples include

  - *ETSI TR 102 682 v1.1.1 Reconfigurable Radio Systems (RRS); Functional Architecture (FA) for the Management and Control of Reconfigurable Radio Systems, 2009;*

  - *ETSI TR 102 802 v1.1.1 Reconfigurable Radio Systems (RRS); Cognitive Radio System Concept, 2010;*

  - *ETSI TR 102 684 v1.1.1 Reconfigurable Radio Systems (RRS); Feasibility Study on Control Channels for Cognitive Radio Systems, 2012;*

- In 2013, ETSI had accepted EC Mandate M/512 related to Reconfigurable Radio Systems;

- Furthermore, technical solutions related to the revision of the R&TTE Directive are of focus in ETSI RRS;

- The Structure of the TC RRS has been adapted in order to match the needs of EC Mandate M/512 and the revised R&TTE Directive.
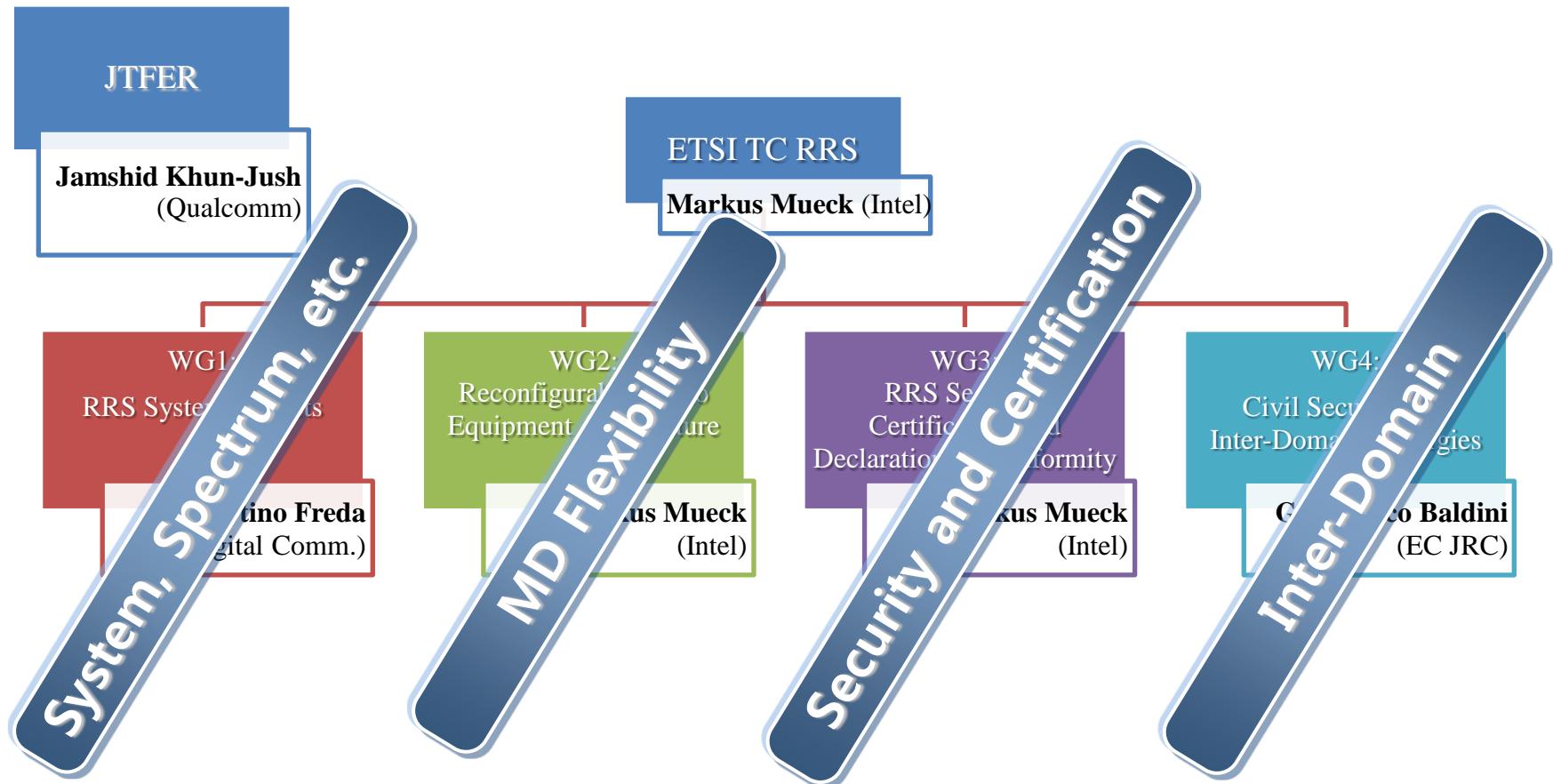
Structure of the EC Mandate on RRS (M/512)

- TC RRS is the responsible body in ETSI for EC Mandate M/512 on three objectives
  - Objective A for the Commercial Domain: to enable the deployment and operation of CRS including WSD and devices under LSA
  - Objective B (on hold) for the Civil Security and Military Domain: to standardize an SCA-based SDR architecture.
  - Objective C for the Civil Security & Military Domain: to explore potential areas of synergy among commercial, civil security and military applications.

OBJECTIVE A	OBJECTIVE B	OBJECTIVE C
		Feasibility study
	Programming Phase	Programming Phase
Execution Phase	Execution Phase	Execution Phase

"Programming Phase": Definition of a standardization Work Programme

Structure of ETSI RRS

ETSI

JTFER

Jamshid Khun-Jush
(Qualcomm)

ETSI TC RRS

Markus Mueck (Intel)

WG1:
RRS System... ...ts
...tino Freda
...gital Comm.)

WG2:
Reconfigura... ...
Equipment ...ture
...kus Mueck
(Intel)

WG3:
RRS Se...
Certific... ...d
Declarati... ...formity
...kus Mueck
(Intel)

WG4:
Civil Secu...
Inter-Dom... ...gies
G... ...o Baldini
(EC JRC)

System, Spectrum, etc.

MD Flexibility

*Security and Certification*

Inter-Domain

- The committee has focused on the RRS encompassing both SDR and CR;

- The committee's activities include studies on the feasibility of RRS standardization, collecting and defining RRS requirements, identifying gaps where existing standards do not fulfill those requirements and proposing solutions to fill those gaps.

Objective A: CRS including WSD and devices under LSA – Licensed Shared Access in 2.3-2.4 GHz

- Concerning Licensed Shared Access technology, ETSI RRS is developing Technical Specifications and is closely interacting with CEPT WG FM:

  - *System Reference Document (SRdoc); Mobile broadband services in the 2 300 MHz – 2 400 MHz frequency band under Licensed Shared Access regime;*

  - *TS 103 154 - System requirements for operation of Mobile Broadband Systems in the 2300 MHz - 2400 MHz band under Licensed Shared Access (LSA) regime.*
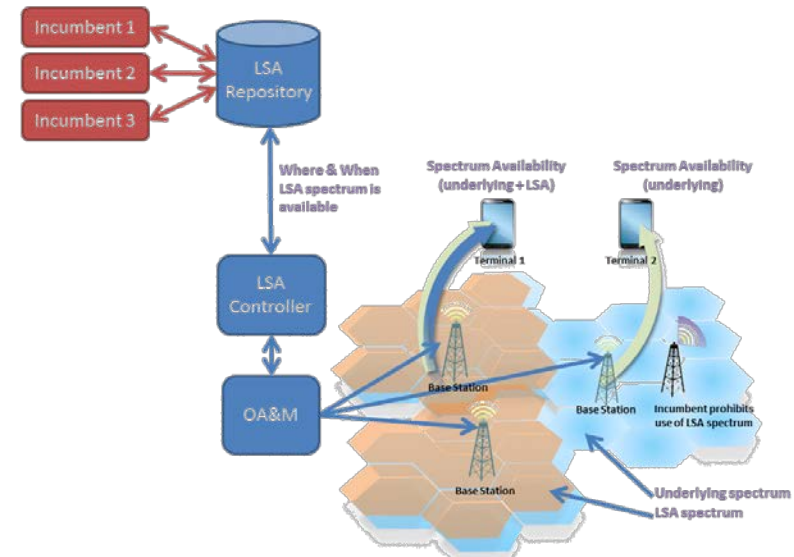
Source: ETSI TR 103 113 / System Reference Document - "*An example architecture for technical realization of the LSA concept*".

- ETSI RRS has a 3 step working process: (1) system requirements definition (under work), (2) system architecture development and (3) interfaces/protocols standardisation.

- The aspects of LSA operation in the 2.3-2.4 GHz band that require Harmonized Standardisation have not yet been fully identified.

- ETSI RRS is closely collaborating with CEPT WG FM, in particular related to ECC Report 205 on Licensed Shared Access.

- Work on **Definition of System Requirements for LSA** proceeds in grouping requirements into functional category and performance category. These are currently specified in Draft ETSI TS 103 154.

  - *Based on these requirements and underlying working assumptions*
    - *on the Regulatory Framework and*
    - *on agreed Sharing Rules between Incumbent and LSA Licensee*

    the LSA system architecture and protocols / interfaces will be specified in a subsequent phase.
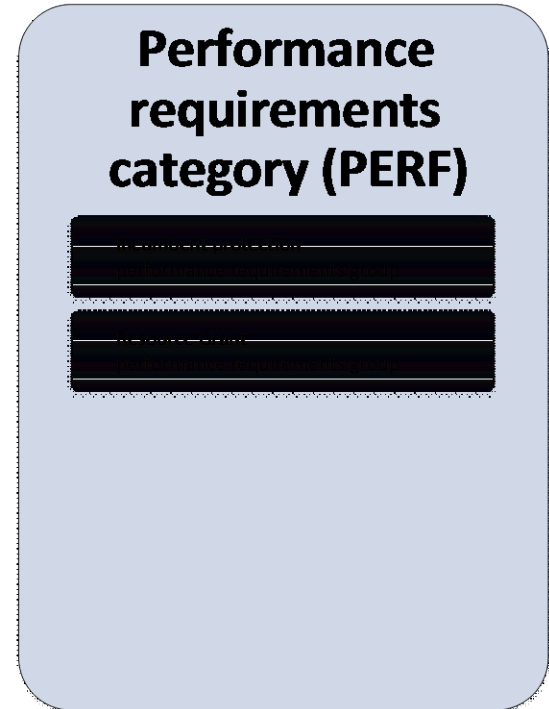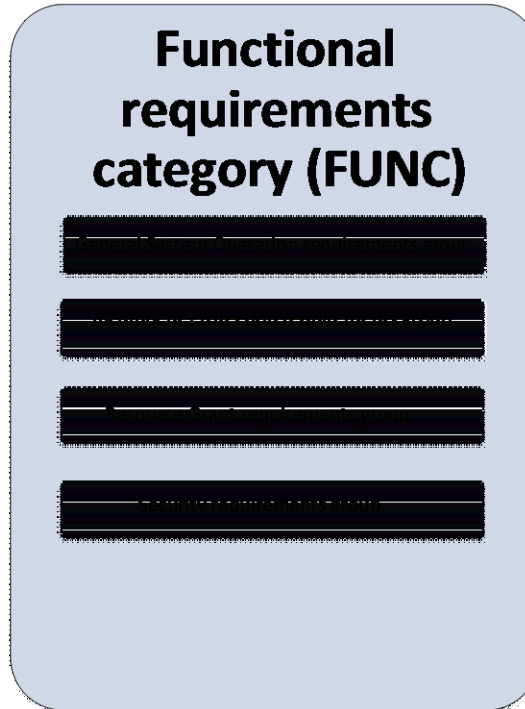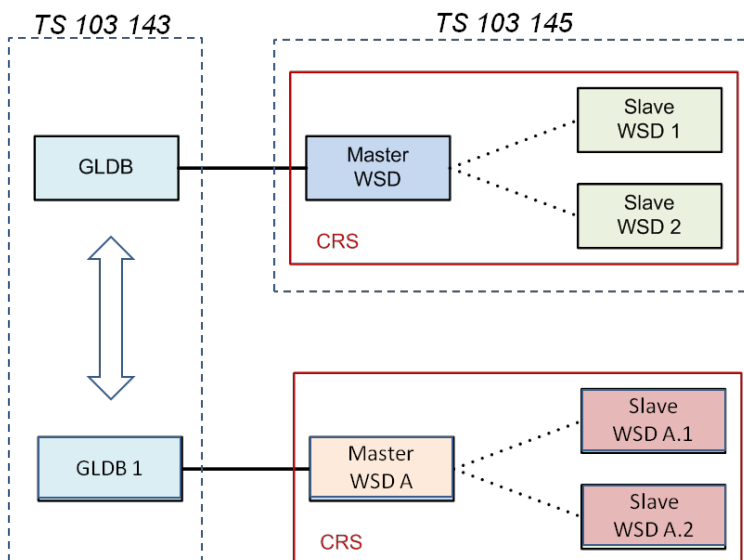

Source: Requirement Organization in Draft ETSI TS 103 154 (under work).

Objective A: CRS including WSD and devices under LSA – coordinated / uncoordinated TVWS Solutions
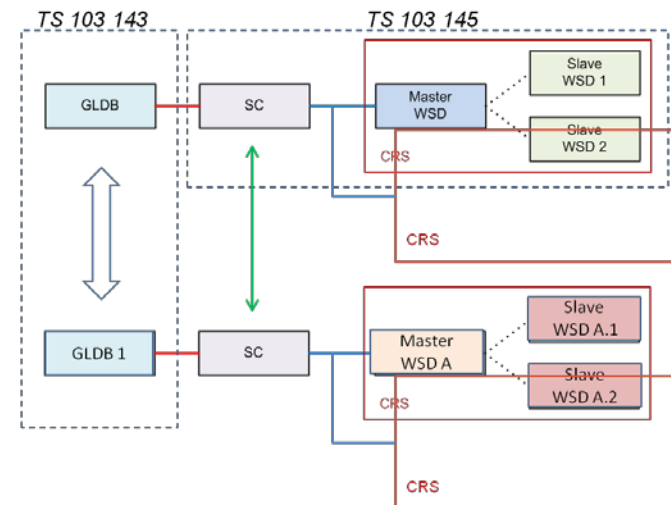
- Concerning TV White Space technology, ETSI is addressing:

  - *Harmonized Standard EN 301 598 for WSDs used as Wireless Access Systems in the band 470 MHz to 790 MHz;*

  - *Use Cases, System Requirements, System Architecture and High Level Procedures for Coordinated and Uncoordinated Use of TV White Spaces;*

  - *Geo-location database solutions including coordination of multiple databases.*
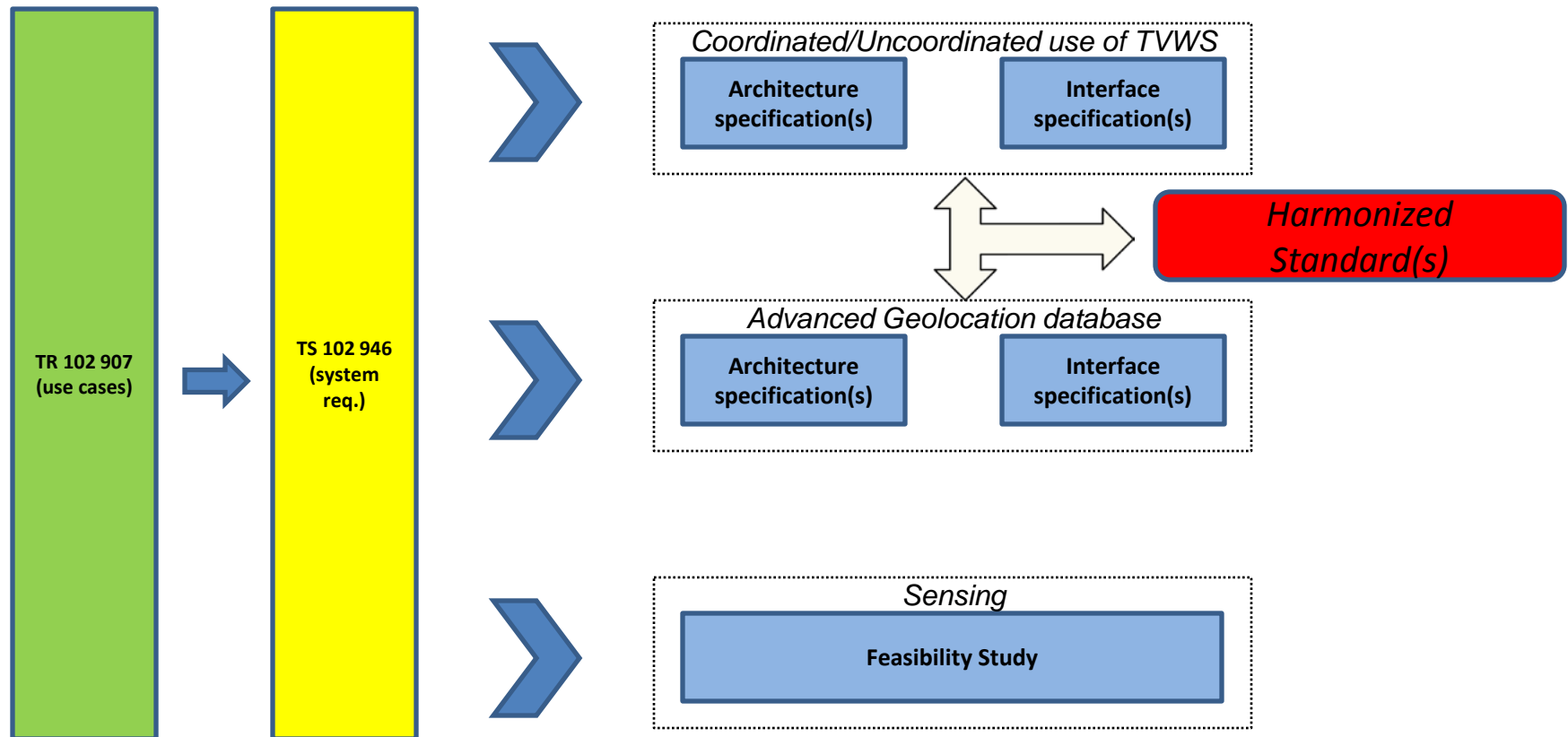
Uncoordinated TVWS

Coordinated TVWS

- ETSI RRS activities on TVWS solutions are summarized below

Coordinated/Uncoordinated use of TVWS

| Architecture specification(s) | Interface specification(s) |

TR 102 907 (use cases) → **TS 102 946 (system req.)**

Harmonized Standard(s)

Advanced Geolocation database

| Architecture specification(s) | Interface specification(s) |

Sensing

Feasibility Study

Objective C: areas of synergy among commercial, civil security and military applications

- ETSI RRS has issued a presentation to key stakeholders for publicizing the activtity and the opportunity;

- ETSI RRS has adopted a New Working Item on „*Feasibility study on inter-domains synergies; Synergies between civil security, military and commercial domains*"

- ETSI RRS plans to focus on i) *Definitions of use cases; ii) Definition of potential system requirements; iii) Discussion of feasibility and implementation obstacles of the use cases, which may include related market information and iv) Analysis and discussion on the regulatory implications.*

Call for contributors

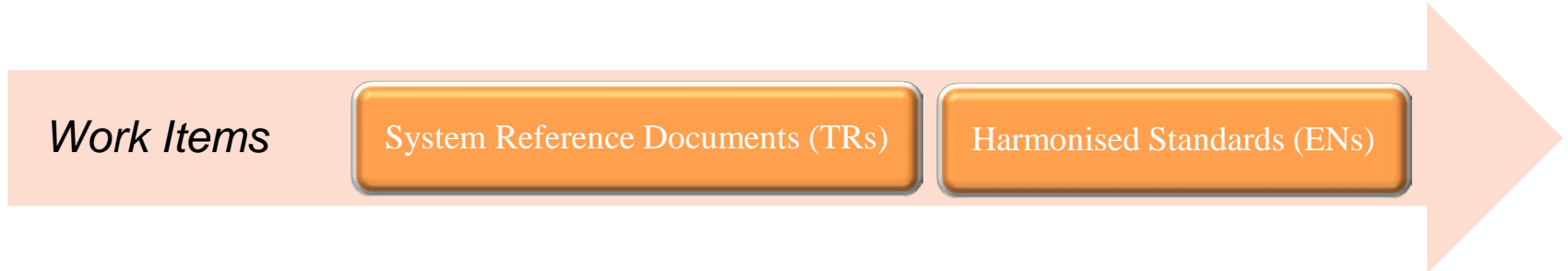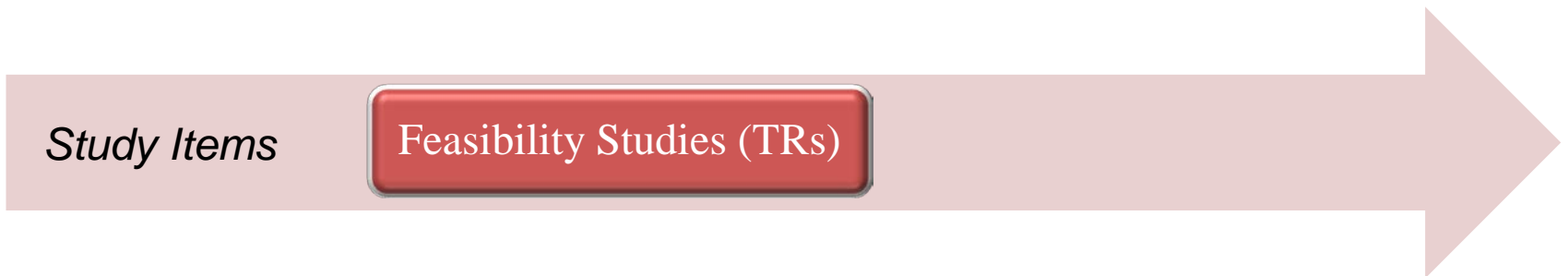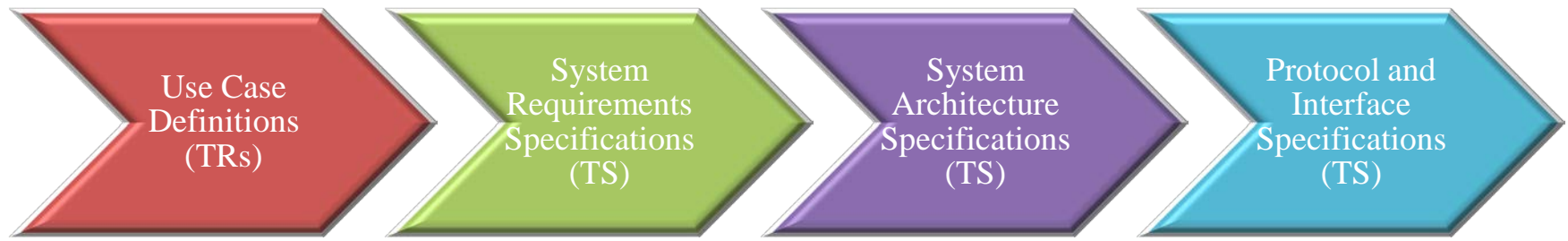The definition of the areas of synergy (subjects) deserves a specific discussion:

- *Benefit from latest wireless broadband technologies (e.g., LTE)*
- *Exploring additional social benefits for the community*
- *Improve the operational capability and cost efficiency of civil security*
- *Exploring new business opportunities*
- *Benefit from economy of scales*

Next Steps

- ETSI RRS will further develop solutions related EC Mandate M/512 building on the current activities in Obective A & C;

- ETSI RRS will interact with Objective B stakeholders with the objective of driving corresponding activities in the future;

- ETSI RRS develops solutions related to revision of R&TTE Directive, in particular in the field of Equipment Reconfiguration by Software.

Backup

Glossary

- CRS   Cognitive Radio System
- EN   European Norm
- HS   Harmonised Standard
- LSA   Licensed Shared Access
- R&TTED   Radio and Telecommunications Terminal Equipment Directive
- RRS   Reconfigurable Radio Systems
- SCA   Software Communications Architecture
- TC   Technical Committee
- TR   Technical Report
- TS   Technical Specification
- TVWS   TV White Space
- WSD   White Space Device

Standardization Process in TC RRS

Use Case Definitions (TRs)	System Requirements Specifications (TS)	System Architecture Specifications (TS)	Protocol and Interface Specifications (TS)

Study Items — Feasibility Studies (TRs)

Work Items — System Reference Documents (TRs) | Harmonised Standards (ENs)

EC Mandate on RRS: Objective A

- Objective A for the Commercial Domain: to enable the deployment and operation of CRS including WSD and devices under LSA dependent for their use of radio spectrum upon information obtained from GLDB.

- Three main goals:
  - To allow CRSs and WSDs to comply with EU and national legislation on the placing on the market and the use ... with the R&TTE Directive
  - To ensure that implementation of ... create barriers to the Single Market
  - To ensure that standardisation of CRS and ... happens timely in Europe in order to lead or keep pace with global developments

" radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communication and orbital resources so as to avoid harmful interference."

- Expected output: harmonised standards providing presumption of conformity with <u>Article 3(2)</u> of the R&TTE Directive
- Work is ongoing

EC Mandate on RRS: Objective B

- Objective B for the Civil Security and Military Domain: to standardize an SCA-based SDR architecture for the military domain as well as an SDR architecture (for instance "SCA-light") for the civil security domain:
  - To facilitate waveform portability and support for intra-border interoperability at national level, cross-border interoperability at the European level, as well as for joint civil security-military operational scenarios.
  - To support coordination on SDR architectures with other similar initiatives, such as the Joint Tactical Radio System (JTRS) program in the USA.
  - To standardize suitable SDR architecture(s) meeting the specific requirements of civil security and military domains, aiming to facilitate the design of SDR equipment.
  - To identify validation and measurements procedures, which can support certification activities.
- On request from the EDA, this objective is currently "frozen"

EC Mandate on RRS: Objective C

- Objective C for the Civil Security & Military Domain: to explore potential areas of synergy among commercial, civil security and military applications.
  - Architectures and interfaces for dynamic use of spectrum resources among commercial, civil security and/or military domains for disaster relief.
  - A reconfigurable mobile device architecture for commercial and civil security applications.
  - Other potential synergies to be identified.

- Work has just started

ETSI and M/512

- The ETSI Technical Committee responsible for EC Mandate M/512 is TC RRS
- ETSI TC RRS and TC ERM have also agreed to create a task force (JTFER) with the aim to develop RRS related Harmonised Standards (and so also the Harmonised Standards developed in response to the mandate)
- ETSI TC BRAN started the development of an Harmonised Standard (EN 301 598) for TV White Space devices before the EC Mandate was actually received and accepted. As that work falls now under the EC Mandate, JTFER will assist TC BRAN in the development and maintenance of EN 301 598 as necessary. Any additional Harmonised Standard that may be necessary will be developed under the task force while all other European Standards in response to the mandate will be developed under TC RRS.

TC RRS work under M/512: Objective A

- The following ongoing work on White Spaces is also linked to the mandated work:

  - TS 102 908: Coexistence Architecture for Cognitive Radio Networks on UHF White Space Frequency Bands (*start of work*)

  - TS 102 946: System requirements for Operation in UHF TV Band White Spaces (*close to finalisation*)

  - TS 103 145: System Architecture and High Level Procedures for Coordinated and Uncoordinated Use of TV White Spaces (*close to finalisation*)

  - TS 103 143: System architecture for information exchange between different Geo-location Databases (GLDBs) enabling the operation of White Space Devices (WSDs) (*early draft available*)

TC RRS work under M/512: Objective A

- The following ongoing work is based on TS 103 143 and TS 103 145 and it is directly linked to M/512:

  - EN 303 144: Enabling the operation of Cognitive Radio System (CRS) dependent for their use of radio spectrum on information obtained from Geo-location Databases (GLDBs); Parameters and procedures for information exchange between different GLDBs