

# ESSaC

## Final Results

ESSaC Consortium  
WInnComm Europe / Brussels / June 2011



indra **EB**



**RONDE & SCHWARZ**



**SAAB**



**THALES**

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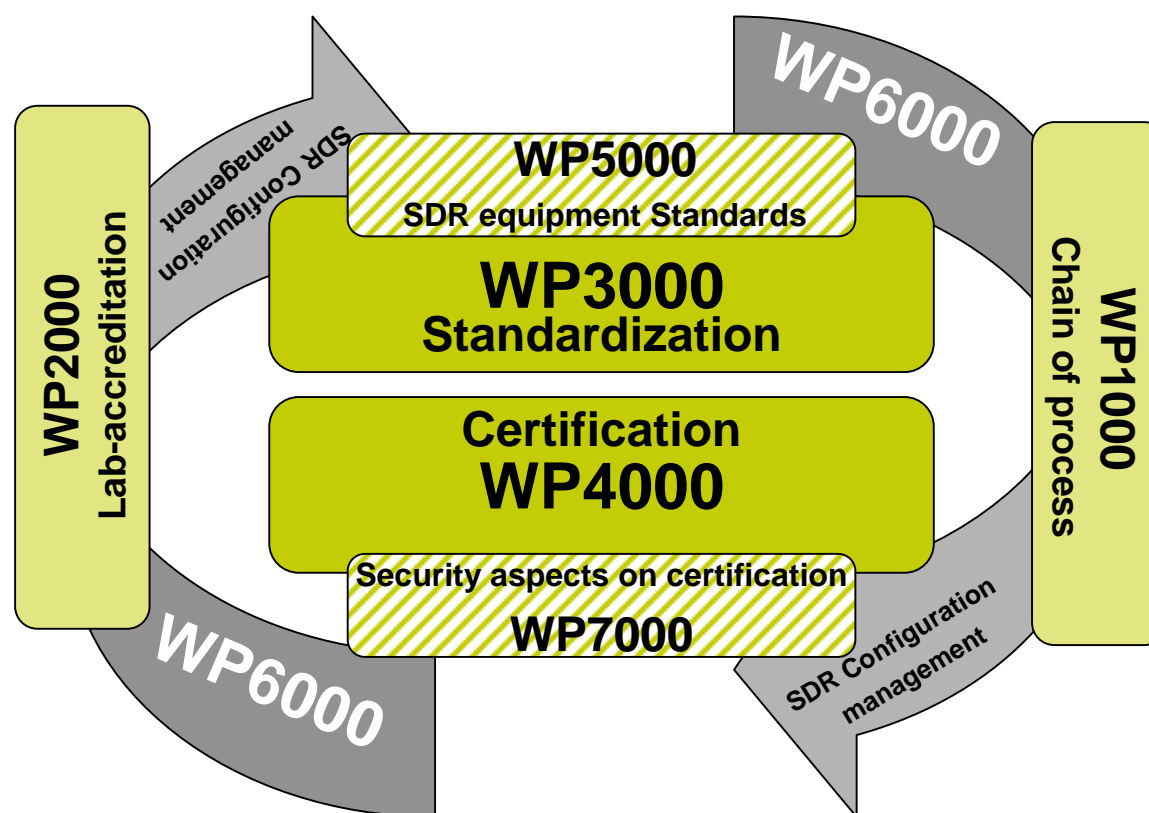
# SDR standardisation and certification feasibility study

- On Jun 6, 2009, EDA (European Defence Agency) publishes the tender: “**SDR standardisation and certification feasibility study**”
- Consortium ESSaC was created to answer this tender:
  - Indra (Leader)
  - Elektrobit
  - Radmor
  - Rohde & Schwarz
  - Saab technologies
  - Selex Communications
  - Thales Communications



## ESSaC work distribution

- In order to facilitate the programme development, a different set of workpackages has been defined.



# ESSaC Work distribution and objectives

## WP1000



To analyze the important aspects of the chain of process for development of SDR standards and certification capabilities

## WP2000



The purpose of the WP2000 is to investigate and to identify the important aspects for test lab accreditation

## WP3000



Evaluate and propose what can be standardized in the WFs and Platforms domains → What? How? Future?



## ESSaC Work distribution and objectives

**WP4000**



Investigate and identify the important aspects for Certification, being identify the IPR and security as the main stoppers to achieve SDR certification

**WP5000**



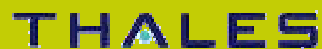
To investigate other standards to be used with SDR products like environmental STDs (electricity, EMC, vibration, shock, humidity, temperature, etc)

**WP6000**



Define the principles and practical mechanisms for the configuration management needed in the certification process of software defined radios over their life cycles

**WP7000**



investigate security aspects related to certification



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# WP1- Chain of Process – Definitions for Standardisation

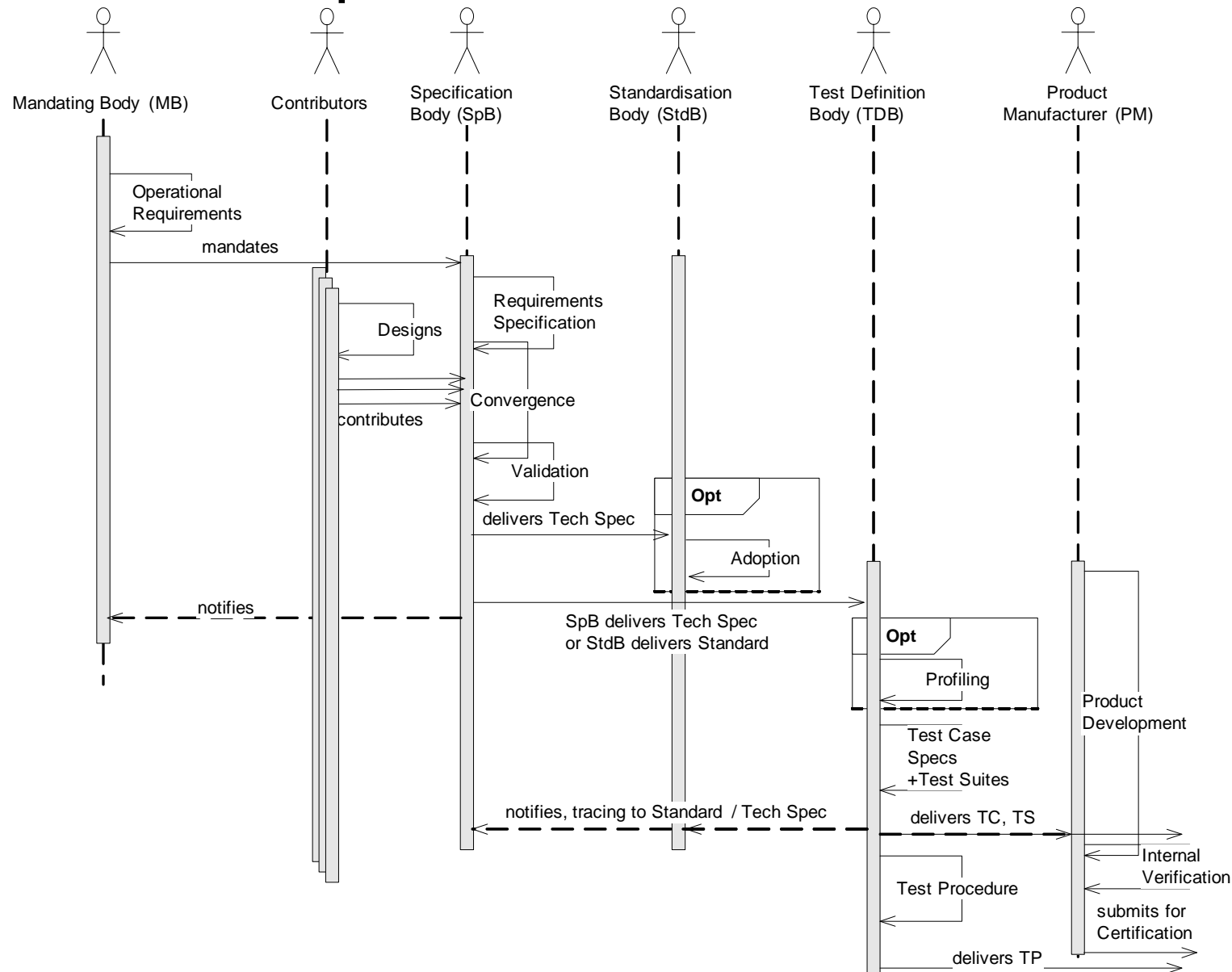
Roles	Definition
Mandating Body (MB)	Organisation mandating a Specification Body to deliver Technical Specifications fulfilling provided Operational Requirements
Contributor	Entity designing specifications in response to operational requirements. A Contributor can be an individual private company or an administration, or a closed group of companies or administrations performing a design activity within a project / program.
Specification Body (SpB)	Open, usually non-for-profit organisation of Industry Experts and Market Stakeholders, called “Contributors”, which is generating Technical Specifications (a.k.a. “voluntary standard”) by hosting the technical convergence between the contributions using open and transparent processes.
Standards Body (StdB)	Body set up to define, maintain and distribute standards using open and transparent processes. An organisation willing to play the role of a Standardisation Body must be formally endorsed by National or Regional Standards Organisations.
Test Definition Body (TDB)	Body defining the Profiles and Certification Criteria associated to a given specification.

- SpB is “open”, whereas Contributor is “closed”
- SpB is where the technical convergence happens.
- StdB is where a converged Technical Specification gains “formal standards” status
- SpB and StdB roles may be executed sequentially by a single organisation, or by two separate organisations



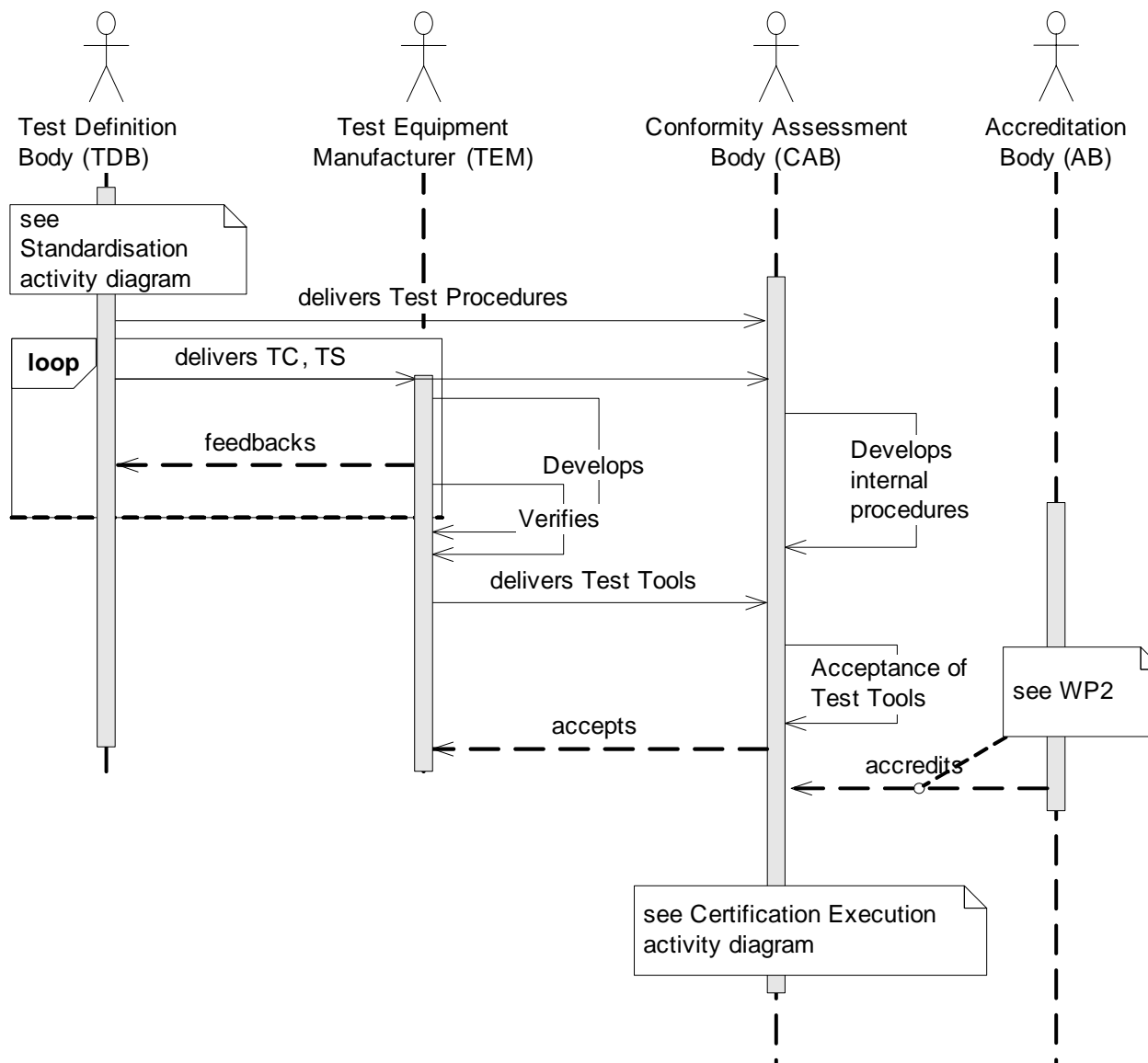
## Results

# WP1- Generic process for Standardisation



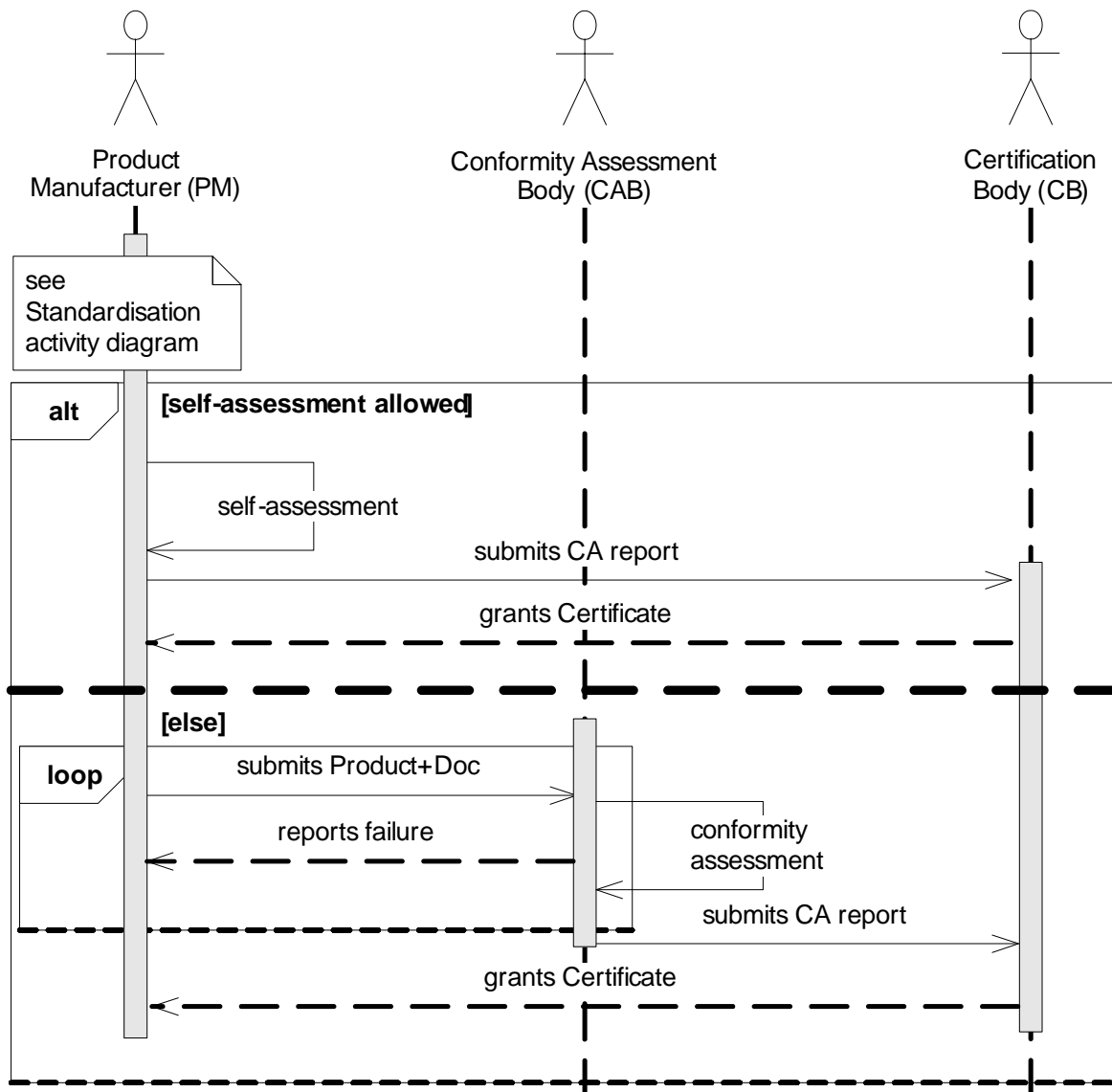
## Results

# WP1- Generic process for Certification preparation



## Results

# WP1- Generic process for Certification execution



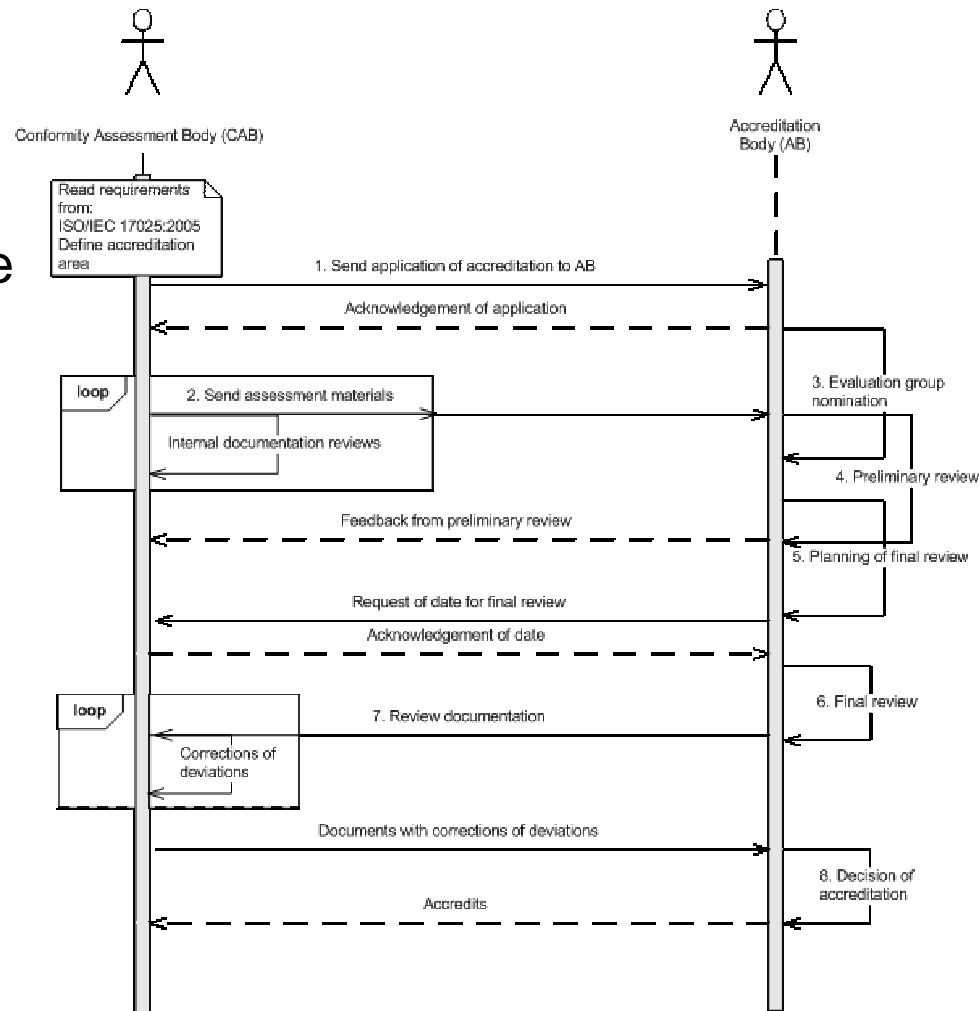
## WP2 – Lab Accreditation Applicable Scope

- What the scope of lab accreditation could be, i.e. what an evaluation, done by an Accreditation Body upon a Test Lab, might cover. The abilities of the Test Lab candidate are determined on high level as well as the assets which might be required
- There is a clear requirement for more test labs worldwide.
- There is an existing hierarchical organizational structure of laboratory accreditation starting with the International Laboratory Accreditation Cooperation (ILAC) on top level. The next level in the hierarchy is built by the regional bodies like the European Accreditation Cooperation (EA). Below is the level of the national bodies like FINAS for Finland or DakkS for Germany.
- The main conclusion is that the mechanism of test laboratory accreditation for SDR and military application can be followed as it is described in standards ISO/IEC 17025 and ISO/IEC 17011. Also forms and checklists do exist, for example from DakkS or FINAS which can be adapted to SDR applications.



## WP2 – Lab-Accreditation Process

- UML diagram to show the sequence of actions for the laboratory accreditation describing the categories
  - Assessment of accreditation
  - Maintenance of accreditation



## WP3 – Standardization on SDRs

For pursuing the SDR Ecosystem the whole SDR system shall be analyzed for finding how and where act during the standardization process

This analysis leads to identify three main phases:

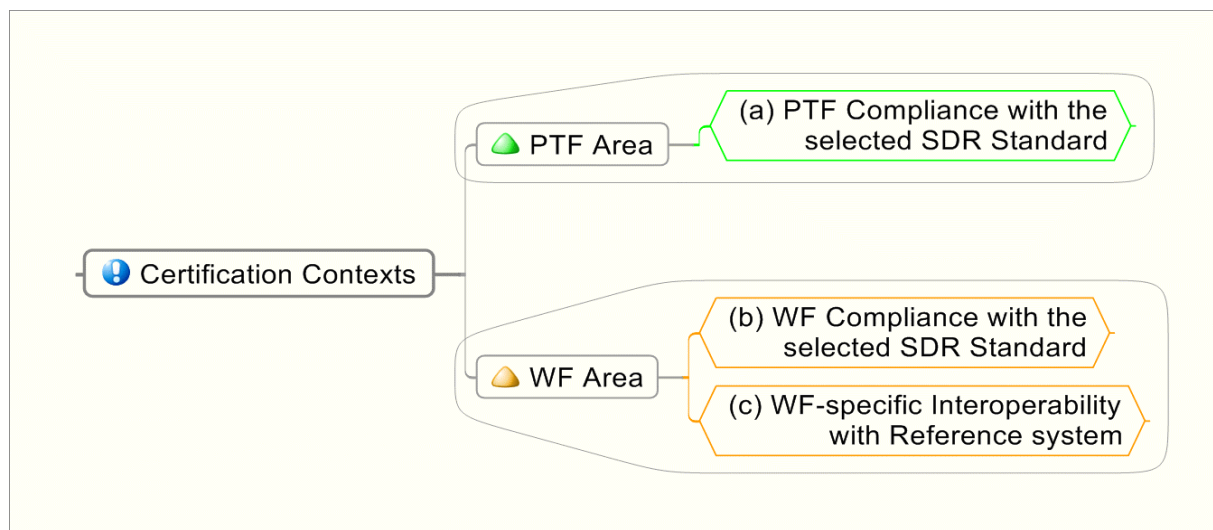
- **SDR Architecture Standardization**

- **Platform Area**

- a) *For enabling the Certification versus an Architecture chosen as “the Standard” (PTF)*

- **Waveform Area**

- b) *In terms of WF portability on a Certified SDR Platform (PTF and WF)*
    - c) *In terms of WF interoperability Certification after the first two steps (PTF+WF)*



## WP3 – OtbS identification

- Once identified the phase and the step the so called OtbS have to be standardized
  - “Platform SDR STD compliance” Certification Area
    - Platform OE
    - Platform API
    - Platform Performances
  - “Waveform SDR STD compliance” Certification Area
    - WF basic SCA requirements
    - WF to PTF relations
  - “Waveform Interoperability” Certification Area
  - “Radio Set STD compliance” Certification Area
    - Radio Set Physical Security
  - “Security Subsystem STD compliance” Certification Area





## WP3 – Investigation into Standardization & Specification Bodies

- Purpose:
  - The objective of this task was to conduct an investigation into candidates to be a standardization body and a custodian of the future SDR standard in Europe.
- Following organizations were selected and described in details as potential candidates to fulfill the task:
  - **ETSI** – European Telecommunications Standards Institute
  - **ITU** – International Telecommunication Union
  - **IEEE** – Institute of Electrical and Electronics Engineers, Inc
  - **CEN / CENELEC** – European Committee for Standardization / European Committee for Electrotechnical Standardization
  - **ISO** – International Standardization Organization
  - **IEC** – International Electrotechnical Commission
  - **WINNF** – Wireless Innovation Forum
  - **OMG** – Object Management Group
  - **NSA** – NATO Standardization Agency



## Results

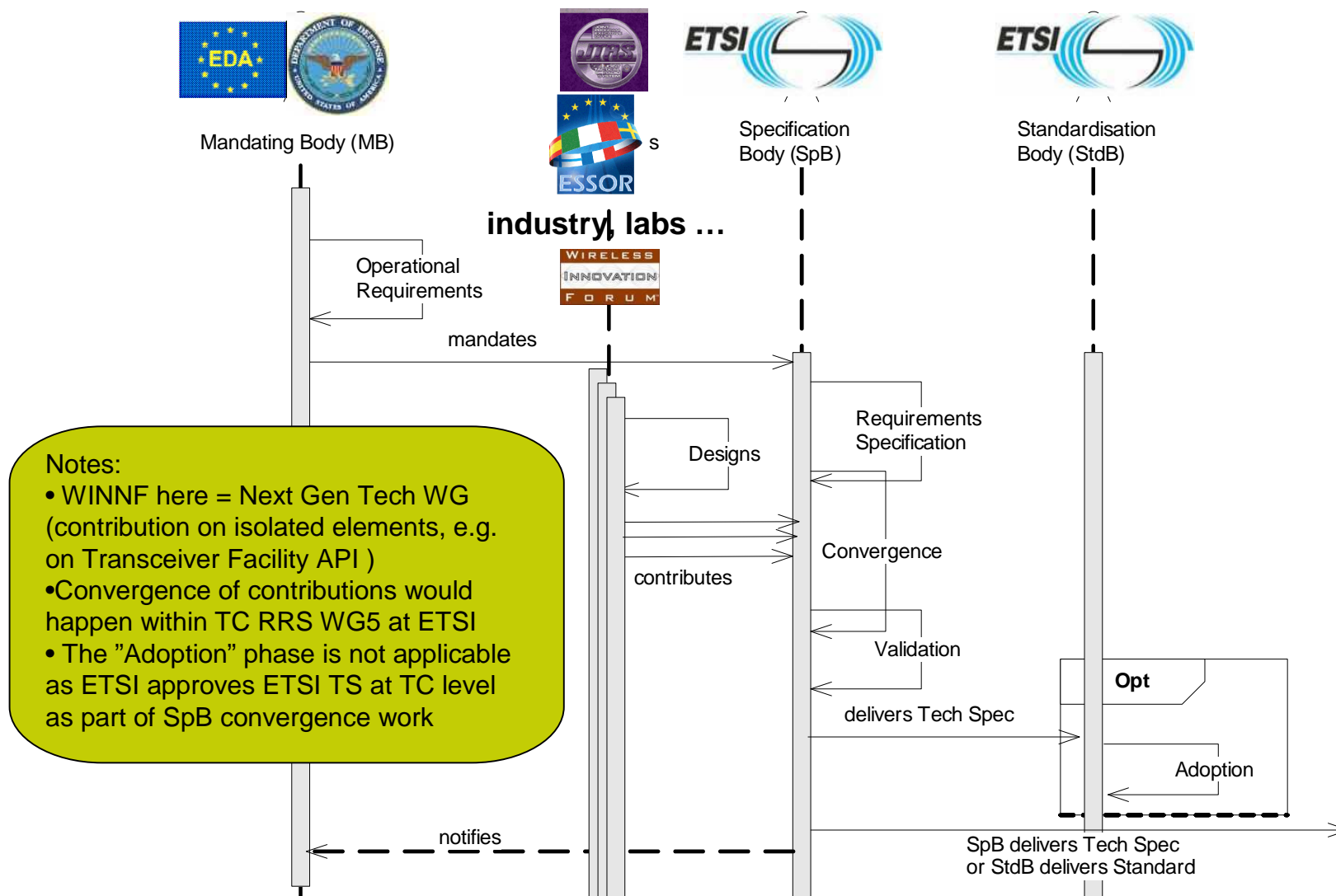
# WP3 – ETSI – WInnF comparison table

Requirements & Capabilities	ETSI	WInnF
Officially Recognized (EC, ANSI)	Yes	No
SDR Background	Medium, current focus is on Wireless systems for Commercial Telecoms and Civil Security	High
SCA Hardware Abstraction Expertise (enabler of separation of "Platform" and "Waveform")	Low	High
Expertise at Military Domain	Low	Medium
Capability to treat Classified Information	No	No
Experience to create/manage Standard	High, World Wide Recognized	Medium-Low – Only Voluntary Standards
Structure in place to host convergence on SDR technical Specification	Medium: RRS is related to SDR Specification, but a new Working Group to be created for military domain (quick creation is possible)	High (existing Coordinating Committee on International SCA Standards)
Partnership with Other Standard Organizations	Yes	Yes
Partnership with Government	Yes, EC Governments	Yes, JTRS (public liaison for SCA Next, reproduction of legacy SCA specs)
Voting/Balloting Rules	<ul style="list-style-type: none"> <li>Consensus based</li> <li>Voting weight based on Units of Contributions (UoC)</li> </ul>	<ul style="list-style-type: none"> <li>Consensus based</li> <li>Voting weight (1 member, 1 vote)</li> </ul>
SCA Specification Custodianship	Needs JTRS endorsement	Needs JTRS endorsement
ESSOR Specification Custodianship	Needs ESSOR endorsement	Needs ESSOR endorsement
Participation fees	See Table 2-2 - 2011 Contributions to ETSI	See Table 3 - Contributions to join WInnF
Locations	Legal entity : France Global membership	Legal entity : US Global membership



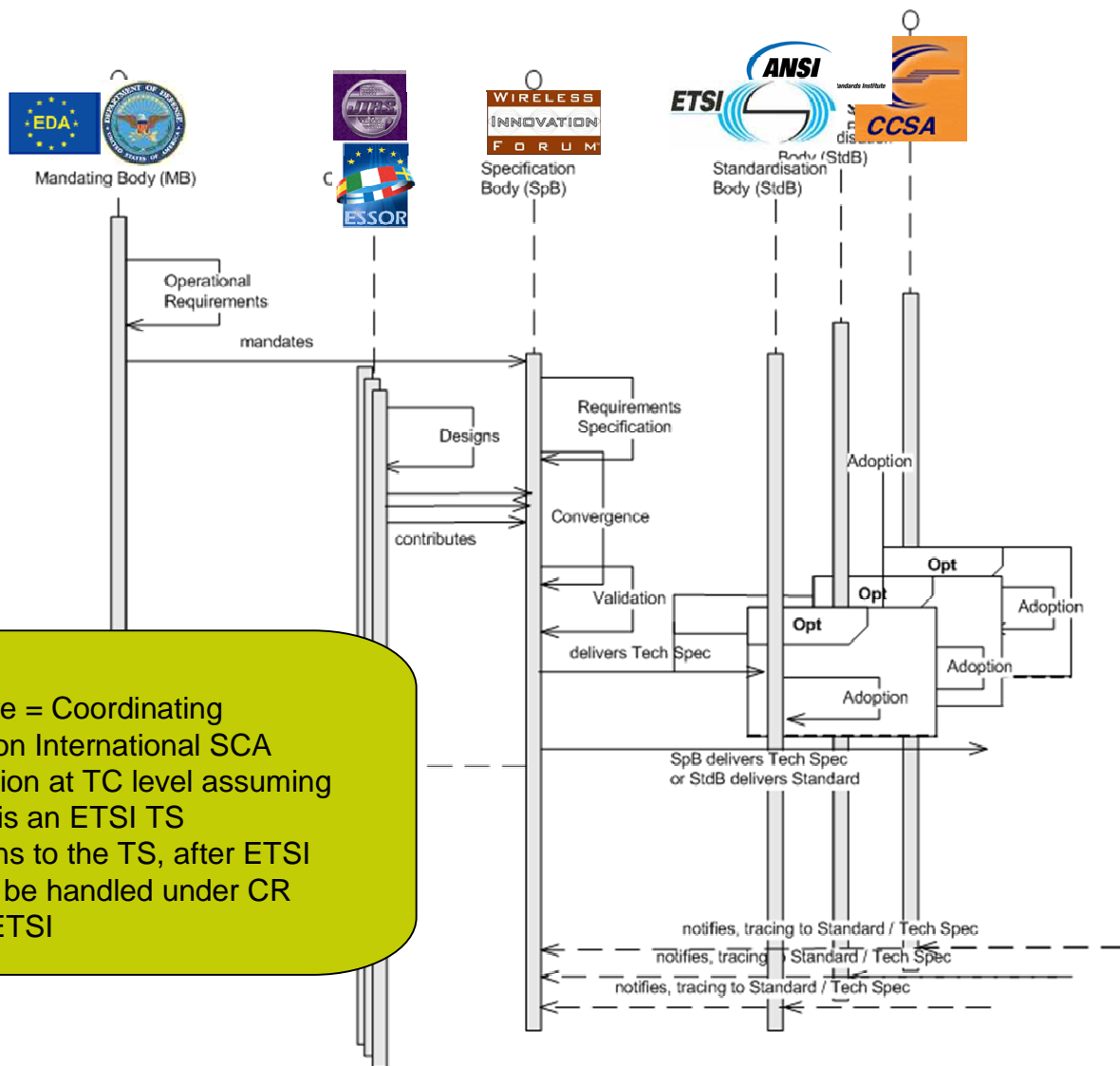
## Results

# WP3 – Possibilities for Basket 1. ETSI-centric approach



## Results

## WP3 – Possibilities for Basket 1. WINNF-centric approach (short term)

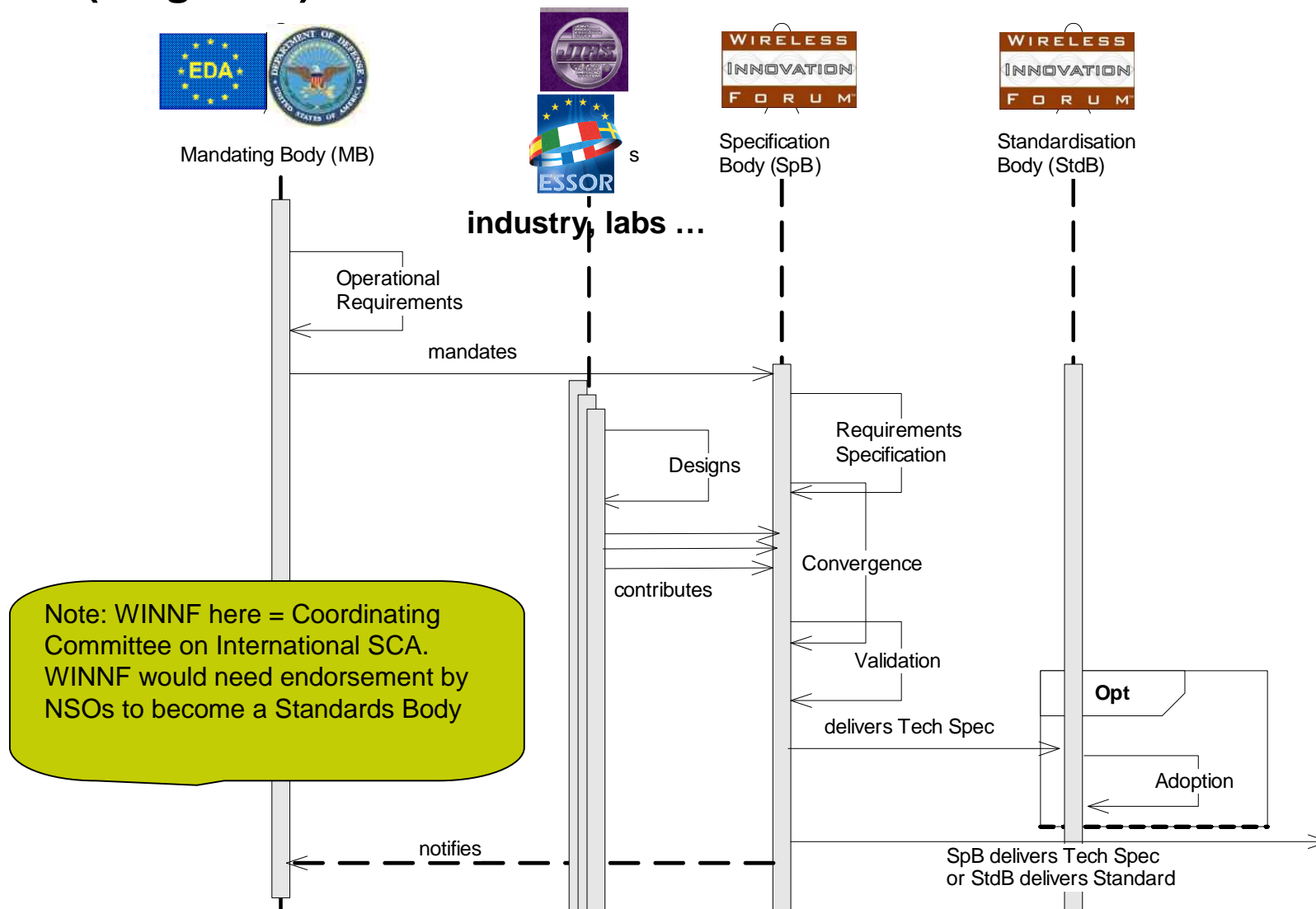


### Notes:

- WINNF here = Coordinating Committee on International SCA
- ETSI adoption at TC level assuming Deliverable is an ETSI TS
- modifications to the TS, after ETSI adoption, to be handled under CR process at ETSI

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# WP3 – Possibilities for Basket 1. WINNF-centric approach (long term)



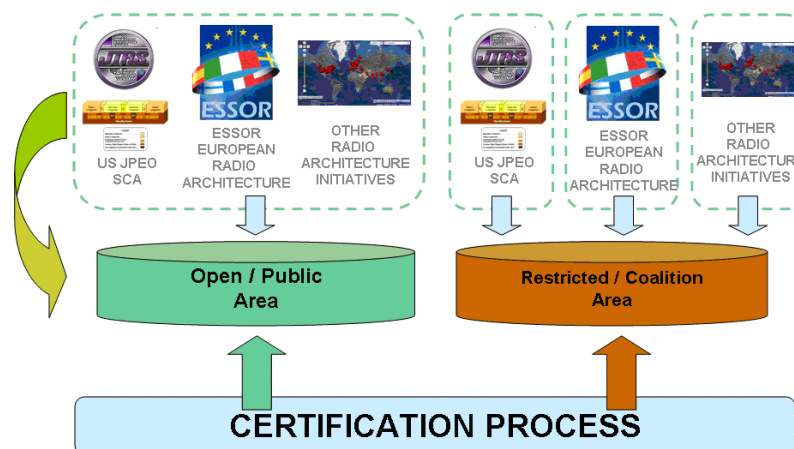
## WP4- Certification Bodies Candidates

- Known certification activities are leaded by:
  - **JPEO**. The JPEO has established the Testing laboratory, in order to perform the certification of both SDR platforms and SCA compliance waveforms.
- Preparatory activities on certification infrastructure:
  - **EDA**. The European Defence Agency has launched different programs in order to provide the basis of the infrastructure of the SDR certification within Europe.
  - **Wireless Innovation Forum**. The Wireless Innovation Forum (previously known as SDR Forum) has created a Certification and Testing Working Group, in order to provide an industrial perspective of the SDR certification.



## WP4- Certification Bodies Candidates

- Certification Entities defined:
  - Pure Certification Body. Interpretation of Test Reports
  - Unitary Centre. Performs all certification actions
  - Certification Body Capable. Compromise between Pure Certification Body and Unitary Centre
  - Self Certification Body. Own manufacturer performs Certification tests
- Taking the 3-basket model defined by EDA as a reference, international, coalition and national certification bodies can be established



## WP4- Certification Bodies Candidates

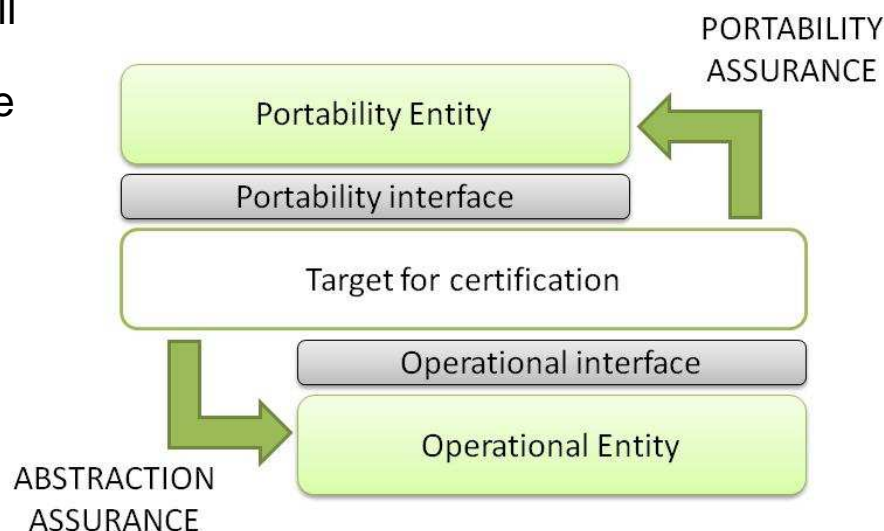
- Role of organizations
  - EDA
    - **Facilitator.** Of relationships between European industries and governments involved in the certification body and other organizations (e.g. JTEL)
    - **Coordinator.** Between several on-going European SDR initiatives, acting as a catalyst in the establishment of the European Certification Network
  - NATO
    - Empowers interoperability among different PTFs
    - Creation of a WF repository
  - JTEL
    - Unique SDR Certification-capable laboratory
    - Future European Certification bodies should perform cross-fertilization activities with JTEL
- The scenarios depicted before prompt that the recommendation from this consortium is the creation of European specific centres with the adequate knowledge and experience on SDR in order to:
  - Understand the meanings of the test results presented in the test reports.
  - Propose improvements on the standards in light of the results
- These centres will be consider strategic in the development of the European SDR Capability



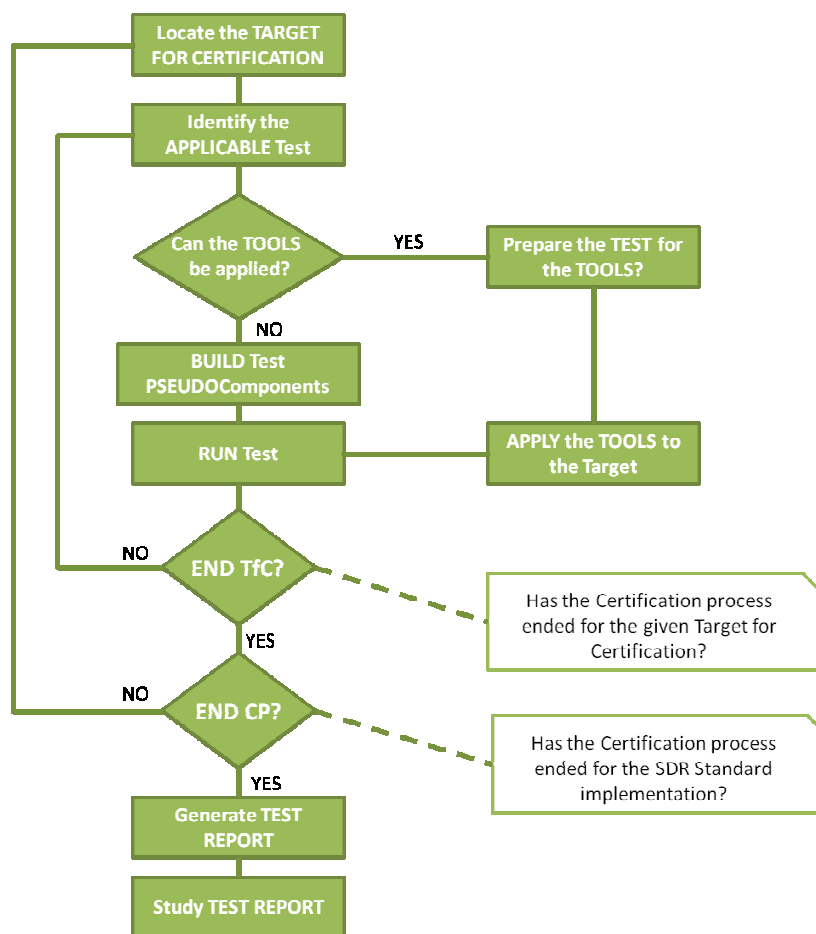


## WP4- Task, mechanisms & processes for Certification

- The ESSaC achievement on Certification process is the Target for certification paradigm, based on portability and operational abstraction interfaces:
- Portability Entity. This entity will represent the portability requirements and needs for the current target for certification.
- Target for certification. The current target for certification entity, which will be under evaluation.
- Operational Entity. This entity will represent the operational requirements and needs for the current target for certification.



## WP4- Task, mechanisms & processes for Certification



- Locate the target for certification. The target will be provided and chosen from the whole SDR equipment but it can be flexible enough to be obtained by its own (e.g. Core Framework)
- Identification of the applicable test. It is necessary to identify the applicable test that can be run over the components.
- Identification of the tools to be applied to the test. Is there any tool available to perform the testing of the Target for Certification? If the answer is affirmative, the tools will be tuned in order to be applied to the given Target for Certification. If there are no tools available, then the test will have to be tailored to fit the needs of the testing.
- Test the target for certification. Once the tools or the implementation of the test are ready, the formal test is performed, storing the results for further inspection.
- Identification of the end of the testing phase of the Target for certification. All the requirements have to be tested in order to assure or not that the component is compliant with a given standard.
- Identification of the end of the Certification Process. This can include a whole radio equipment based on SDR standards, or just a component.
- Generate Test Report.
- Study the Test Report for Certification stamp.

## WP4- Self Certification

- The task has been working on the question:  
**who will be seeking this certification?**
- SDR development companies which market and sells complete SDR's and/or SDR modules will be a prime user of this certification process offered by the Certification Bodies.
- Factors that can drive the SDR to *self certify*:
  - Old versions of vendor software - vendor may not be interested in expending resources to get "back versions" certified.
  - Incomplete set of applications from one SDR vendor
  - Multiple customers using different applications - due to the existence of a great number of legacy systems, strong likelihood there will be differences between customers or organizations.

SDR vendors will explore the self certification route to achieving meaningful use of certified SDR equipment



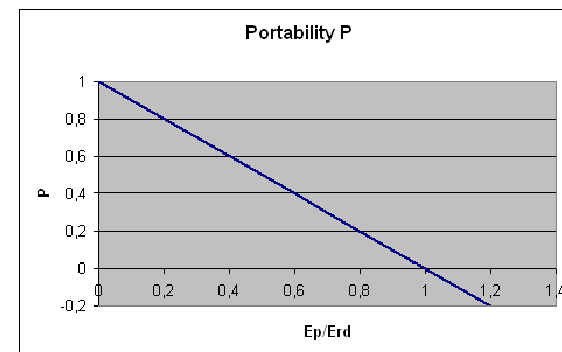
## WP4- Levels of Certification

- A good example for minimum level of certification is certification of electromagnetic compatibility (EMC)
- Background for looking for the right level of certification
  - Certification does have impact on cost, time to market, IPR
  - Sufficient support of portability required
- Degree of Portability
  - Portability can be defined in terms of a Figure of Merit P

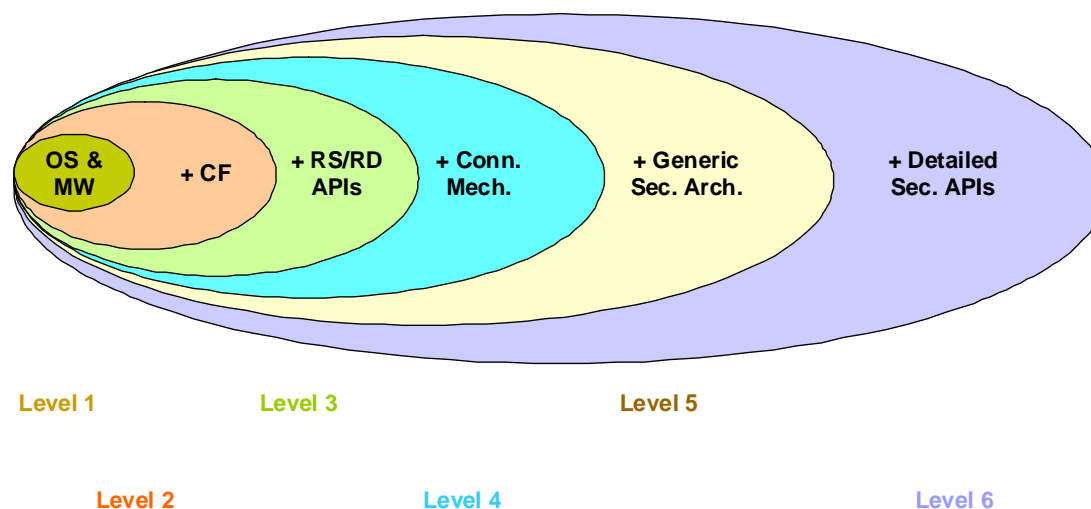
$$P = 1 - E_p/E_{rd}$$

$E_p$  = Effort to port

$E_{rd}$  = Effort for redevelopment



## WP4- Levels of Certification



- Level 1: Operating System and Middleware
- Level 2: Level 1 + Core Framework
- Level 3: Level 2 + Radio Services APIs+ Radio Devices APIs
- Level 4: Level 3 + Connectivity Mechanisms
- Level 5: Level 4 + Generic Security Architecture
- Level 6: Level 5 + Detailed Security APIs

## WP5 – Standards related to SDR products

- Future SDR devices, despite being compliant with the future SDR standards, will have to fulfil other standards too.
- Applicable tests were categorized according to the specific type of land tactical radios which are: personal role radios, handheld radios, manpack radios and mobile radios.
- Conclusion of this study is that standards related to non-SDR radiocommunication devices can be easily adapted to future SDR devices. Therefore, there is no need to create new standards, in scope of EE, EMC etc., related solely to SDR.



## WP6 – SDR Configuration Management

- Main configuration items in the SDR market have been identified as well baselines based on 3-basket model.
- As a conclusion, initial hierarchy of Configuration Items for the SDR is as follows:
  - An SDR with specified system capabilities is a System
  - Platforms and waveforms are Products
  - Modules include waveform standards and specification, standards for SCA compliance, sets of standard APIs
  - Components include details of SCA compliance, details of particular APIs
- It is suggested the nation should be the owner of Requirement Baseline and Product Baseline should be owned by SDR vendor.



## WP7- Security Aspects on Certification

- It was shown that national regulations on control of movements for military goods may introduce constraints on cross-boundary Conformity Assessment. In addition, the certification testing in the Conformity Assessment Body in other countries will need careful control
- It is thus clear and recommended National certification due to the presence of Basket 3 sensitive information with recognition of this National certification between European Nations.
- The procedures for certification of security features in several countries were compared, concluding that they are similar in Finland, France, Germany, Italy, Spain and Sweden. The differences are minor and do not represent a disturbance for future definition of harmonized EU security certification procedures.





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## Conclusions 1/3

- A full investigation about all required ESSaC activities has been provided:
  - Procedures, requirements and candidates for Lab-Accreditation
  - Procedures, requirements and candidates for Standardization
  - Procedures, requirements and candidates for Certification
  - Other standards related to SDR products
  - Configuration management from a certification point of view
  - Security aspects for Certification



## Conclusions 2/3

- Some needs have been derived from this study, such as:
  - Need of agreements between mayor SDR stakeholders (National Govs, EDA, JTRS, ETSI, WINNF, ...) for the sake of reaching the desirable Standardization at Basket 1
  - It is missing an organization for a “customized coalition standardization” at Basket 2
  - Lack of expertise in the existing European certification bodies
    - **Creation of specific centres with the adequate knowledge and experience which allow the improvement and maintenance of European SDR standards**
  - A new initiative to establish networked SDR standardization and certification capabilities in Europe, using ESSaC outcome as the technical work baseline



## Conclusions 3/3

- From the ESSaC management point of view:
  - ✓ All expected deliverables provided to EDA for each milestone
  - ✓ No delays suffered in the project, risks well controlled
  - ✓ Strong implication of all SDR stakeholders in this project (multiples related meetings between EDA, ESSaC Consortium, Organizations and/or MoDs) → **Worldwide interest**



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