ECSS Update for ASIC-FPGA-IPCore development

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ECSS Update for ASIC-FPGA-IPCore development

- Why change ECSS-Q-ST-60-02?
- ECSS WG work and outputs
- ECSS-E-ST-20-40
- ECSS-Q-ST-60-03

Why modify ECSS-Q-ST-60-02?

An ECSS WG was created in 2019 to "*change, update and improve the existing ECSS-Q-ST-60-02C "ASIC and FPGA Development" standard to reflect the evolution and changes in ASIC and FPGA technology since the publication of the present standard 10 years ago*".

ECSS WG work and outputs

- The ECSS WG decided to create 2 new standards to supersede ECSS-Q-ST-60-02C.
  - **ECSS-E-ST-20-40** for all generic engineering requirements to:
    - reflect today's higher complexity, including SoCs,
    - Define a more detailed and comprehensive generic engineering standard for the different types of ASICs, FPGAs and IP Cores,
    - incorporate requirements for HW/SW co-design
    - incorporate requirements for Engineering/PA co-engineering,
    - Address industry demand to include tailoring using criticality (as done in SW engineering)
  - **ECSS-Q-ST-60-03** for all Product Assurance requirements and CM requirements, incorporating requirements for Engineering/PA co-engineering

Analoguous to the co-engineering requirements in software standards, TEC-EDM is book captain for ECSS-E-ST-20-40, and TEC-QQS is book captain for ECSS-Q-ST-60-03

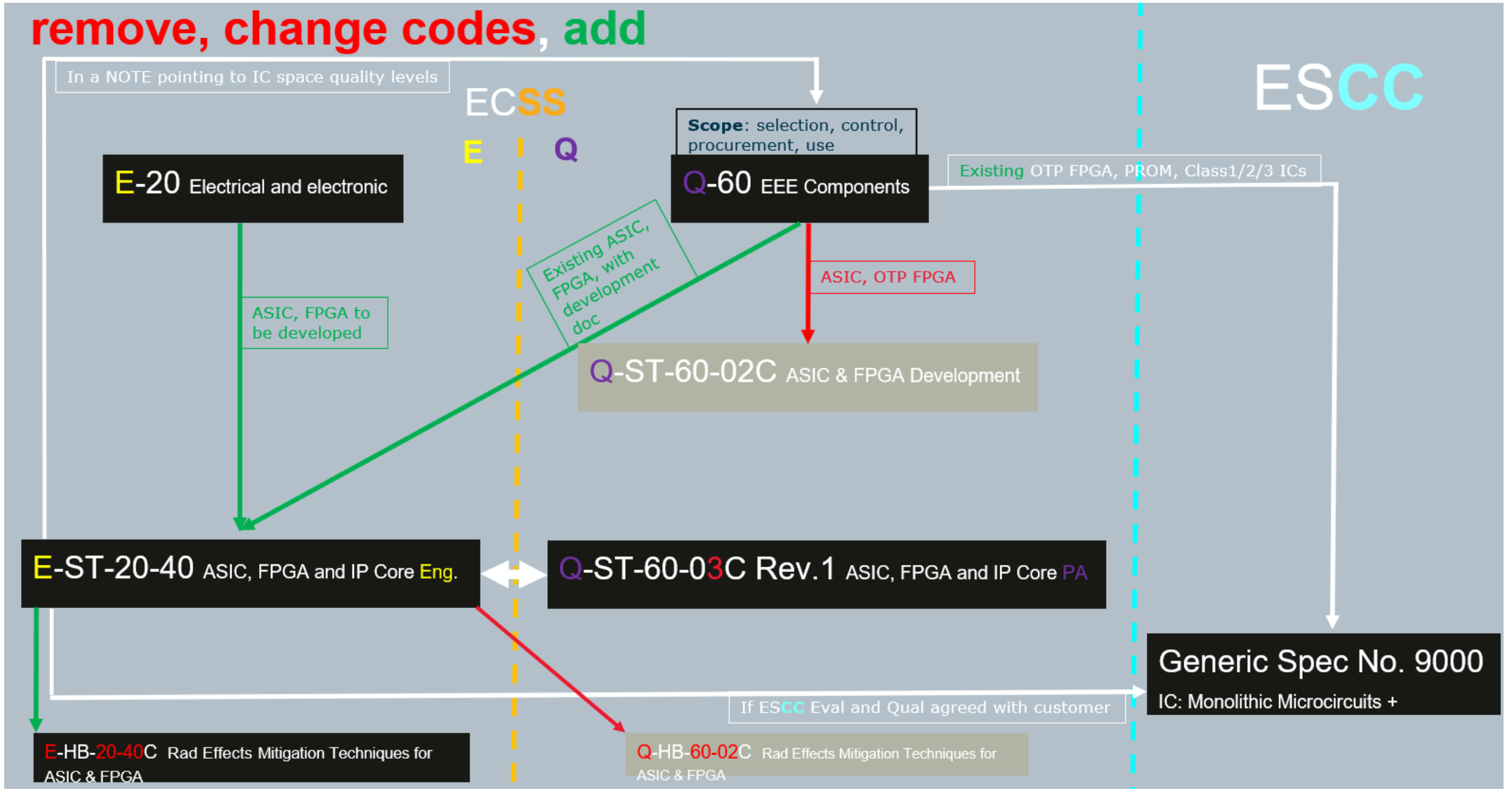
ECSS WG work and outputs

- The WG worked between 2019 to 2023
- The WG members were nominated by ESA, Eurospace, CNES and UK Space Agency.
- The WG members came from from industry (ADS, Ariane Group, TAS, RAL Space), CNES and ESA-ESTEC
- The members were ASIC/FPGAs experts, PA experts, SW experts

- The outputs of the WG are:
  - ECSS-E-ST-20-40 “ASIC, FPGA and IP Core Engineering”
  - ECSS-Q-ST-60-03 “ASIC, FPGA and IP Core product assurance”
  - ECSS-Q-ST-60-02 -> superseded by the 2 above
  - ECSS-Q-HB-60-02 -> Renamed ECSS-E-HB-20-40

The WG decided to redefine some relationship in ECSS and ESCC framework.

ECSS WG work and outputs



What was moved to ECSS-E-ST-20-40 (from ECS-Q-ST-60-02)

All generic DEVICE requirements

What is new in ECSS-E-ST-20-40 (since ECS-Q-ST-60-02)

DEVICE
integrated circuit or an IP Core

NOTE1: A DEVICE can be a digital, analogue or mixed-signal ASIC, a programmed FPGA, a blank FPGA, a microprocessor, and a model of an IC function that is conceived for reuse as an IP Core.

NOTE2 : A DEVICE can also be a group of dice or chiplets interconnected and integrated inside a single package, such as a system-in-package or a multi-chip-module

- IP Core development
- Tailoring by Criticality
- Tailoring by DEVICE type
- Support and Maintenance Plan
- DEVICE development flow with **DEVICE phase reviews**
    - No requirements on phasing between DEVICE reviews and ECSS-M-ST-10 reviews
    - Annex L defines equivalence of phase milestone terminology of ECSSS-M-ST-10 and ECSS-E-ST-20-40

ECS-E-ST-20-40 DEVICE Phase Reviews

ECSS-M-ST-10		ECSS-E-ST-20-40	
Phases	**Reviews**	**Reviews**	**Phases**
A Feasibility	**PRR**	**DEVICE** **Definition** Phase Review **(DPR)**	**DEVICE** **Definition** **Phase**
B Preliminary Definition	**SRR**		
	PDR	**DEVICE** **Architecture Definition** Phase Review **(ADR)**	**DEVICE** **Architecture Definition** **Phase**
		DEVICE **Design and Verification** Phase Review (DVR)	**DEVICE** **Design and Verification** **Phase**
C Detailed Definition	**CDR**	**DEVICE** **Detailed Design** Phase Review **(DDR)**	**DEVICE** **Detailed Design** **Phase**
		DEVICE **Layout** Phase Review **(LPR)**	**DEVICE** **Layout** **Phase**
		DEVICE **Implementation** Phase Review **(IPR)**	**DEVICE** **Implementation** **Phase**
D Qualification and Production	**QR**	**DEVICE** **Validation, Qualification and Acceptance** Phase Review **(VQAR)**	**DEVICE** **Validation, Qualification and Acceptance** **Phase**
	AR		

What was moved to ECSS-Q-ST-60-03 (from ECS-Q-ST-60-02)

- **All PA requirements**
  - Section 6 – Quality assurance system
  - “Clause 4.1.2.b
    - “The organization shall comply with the requirements specified in ECSS-Q-ST-10””
  - Clause A.2.1.a.2
    - “Role, tasks and responsibilities of product assurance personnel in conformance with ECSS-Q-ST-10 and ECSS-Q-ST-20; “
  - Clause 6.1.b
    - “ ECSS-Q-ST-30 clause “criticality classification of functions and products” shall apply

- **All CM requirements**
  - Clause B.2.1.9
    - “ The ADP shall include identification of a configuration management system in conformance with ECSS-M-ST-40

ECSS-Q-ST-60-03 compliance to ECSS Q-branch

ECSS-Q-ST-60-03 does not modify the generic PA requirements (ECSS-Q-ST-10), QA requirements (ECSS-Q-ST-20), Dependability requirements (ECSS-Q-ST-30), and Configuration (ECSS-M-ST-40) previously defined in ECSS-Q-ST-60-02.

ECSS-Q-ST-60-03 translates the requirements of these ECSSes and adapts them to the context of the DEVICE engineering domain defined in E.CSS-E-ST-20-40

What is new in ECSS-Q-ST-60-03 (since ECS-Q-ST-60-02)

- Co-engineering with ECSS-E-ST-20-40
  - Aligned to ECSS-E-ST-20-40 phase reviews (see previous slide)
- Tailoring by criticality
- Reuse of both IP Cores and complete DEVICE – with qualification status assessment and definition of delta-qualification activities in the context of a given project in a DEVICE Reuse File, as well as license/IPR requirements
- Qualification status assessment and maintenance
- Deactivated and Unreachable DEVICE functions
- Metrication programme
- Security Assurance
- Process Assessment and Improvement
- Independent Verification and Validation for Category A

Any questions?

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