EXCEED

trustEd and fleXible system-on-Chip
for EuropEan Defence applications

EXCEED PROJECT presentation – M18 status

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EUROPEAN DEFENCE AGENCY

trustEd and fleXible system-on-Chip for EuropEan Defence applications

- The EXCEED project aims at creating a European supply chain of reconfigurable, flexible and trustable programmable system-on-a-chip family targeting a number of ruggedized and secure defence applications

- EXCEED is a project supported by EDA/EC and is running under the Preparatory Action on Defence Research

EXCEED data
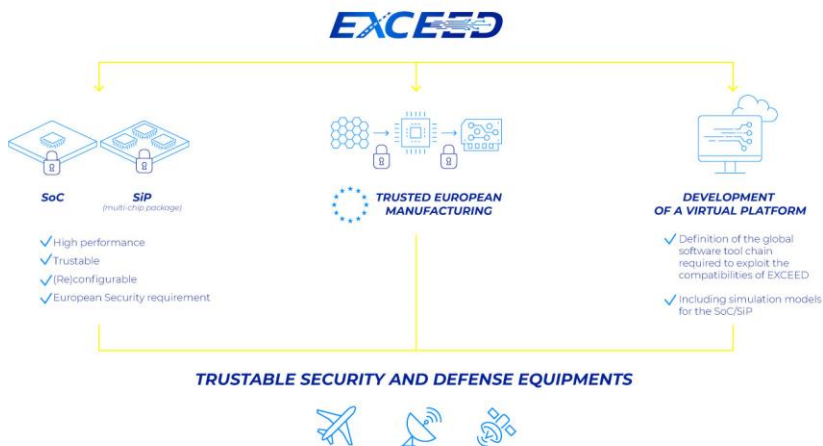
- The EXCEED consortium encompasses a total of 19 participants from 6 EU countries and Norway.
  - Technology providers
  - OEMs
  - Certification companies
- The project, which has a duration of **54 months**, will receive an EU grant of roughly €12 million.

- Further information on partners available on the EXCEED project website: www.exceed-padr.com

EXCEED Objectives (1)

- ***A trusted European supply chain based on a European cost effective and reliable technology: the 28nm FDSOI***

- The EXCEED project will propose technical solution to avoid constraints brought by non-EU countries domination in SoC/SiPs for Defence applications by designing a European FPGA based System on Chip family suited for European Defence requirements.

- To achieve this objective, the EXCEED project will:
  - Define a comprehensive set of requirements and specifications for SoC/SiP devices and related supply chain that considers the military specificities about operating environment, content protection, compliance with EU and National classified information and the various mission profiles.
  - Develop a first prototype and get it tested by OEMs (Original Equipment Manufacturers).
  - Develop synergies and supply chains with other European critical sectors such as Space, Aeronautics and Industrial.
  - Assess the gaps to be fulfilled to overcome the dependence on non-EU technology providers and propose a roadmap for the creation of a trusted European supply chain.

EXCEED Objectives (2)

- The EXCEED workplan structure will follow the steps below:

Feedback loop for the Gap analysis

Use cases and OEMs requirement analysis

Subsystems Architecture Definition and Gap Analysis

System Development Tools

Design, Integration, Manufacturing, Trusted Supply Chain Development

Functional Evaluation in relevant environment

Security requirements

EXCEED impacts

- The project is targeting the following impacts

  - Ensure secure and autonomous availability of high performance and trustable (re)configurable SoC/SiPs to military end-users.

  - Contribute to strengthening the European microelectronics industry and help improve its global position through the implementation of innovative technologies along a new European manufacturing value chain.

  - Demonstrate the potential of EU-funded research in support of EU critical defence technologies, in particular in the domain of (re)configurable SoC/SiPs.

Main achievements after 18 months

Achievements @M18

- Use cases requirements fully specified (from security and technical points of view)
- SoC architecture defined
- Lifecycle management needs specified (SoC in systems)
- Softwares toolchain defined, based on end-users' requirements
- Augmented toolchain roadmap delivered
- Design started
- Trusted SiP studies activities started

Targeted use cases

Tactical Systems and devices use cases

- Military Radios
- Electronics Devices for Dismounted Soldiers
- On-ground signal processor for real- time COMINT
- Unified real-time Homeland Tactical Situation
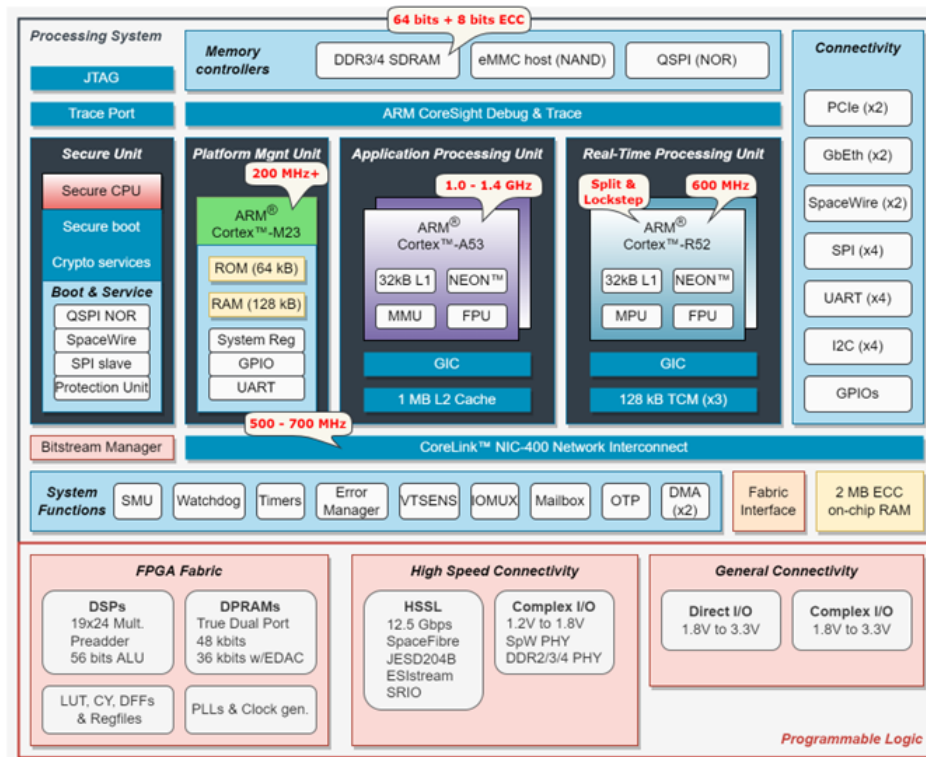- EW digital receiver

Security use cases

- Encryption devices
- Secure PNT applications
- Secure communications among distributed sensors

Airborne embedded computing use cases

- Weapon control in missile systems
- Embedded applications of launcher avionics
- Seekers and sighting applications

EXCEED trusted/secure SoCs Key Features

- **Programmable processing:** dual core APU A53 (Linux OS support), Dual core RTP R52

- **Configurable processing:** field programmable capabilities e.g. LUT, DSP, DPRAM

- **Security:** secure boot, crypto accelerators, OTP key storage, TRN generator, Lifecycle management

- **Connectivity:** e.g., Legacy/high speed connectivity, programmable Direct/Complex I/O

- **Others:** red / black separation, Developed with FDSOI 28nm for low power, leading to a family of SoCs to support all Use Cases requested and identified requirements

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#	Use Case	Secure Subsystem	External Memory Controllers Subsystem	System Function	Programmable Logic Subsystem	Platform Management Subsystem	General Purpose Subsystem	Real-Time Subsystem	I/O Connectivity Subsystem
1	Secure Software Defined Radio	■			■	■	■		
2	IP Encryptors	■	■	■	■		■		■
3	Use of Trusted, re-Configurable Soc/Sip in Secure PNT Applications	■			■				■
4	Electronic Devices for Dismounted Soldier	■			■				■
5	Secure Communication among Distributed Sensors	■	■		■		■	■	
6	On Ground, Signal Processor for Real-time Comms Intelligence	■	■	■	■	■	■	■	■
7	Unified Real-rime Homeland Tactical Situation	■			■	■			■
8	Weapon Control in Missile Systems	■			■			■	■
9	Evaluation of Flexibility, Real-time, Performance And Reliability for Embedded Applications of Launcher Avionics	■		■	■	■	■	■	■
10	Seekers and Sighting Applications	■	■	■	■	■		■	■
11	Signal Processing and de-Interleaving Algorithm Implementation in EW Digital Reception	■		■	■	■			■

Legend
- ■ Secure Subsystem
- ■ General Purpose Subsystem
- ■ Real-Time Subsystem
- ■ Programmable Logic Subsystem
- ■ System Function
- ■ External Memory Controllers Subsystem
- ■ Platform Management Subsystem
- ■ I/O Connectivity Subsystem

EXCEED

Thank you !

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