NEREID

H2020-ICT-CSA: Micro- and Nano-Electronics Technologies
Grant Agreement n° 685559

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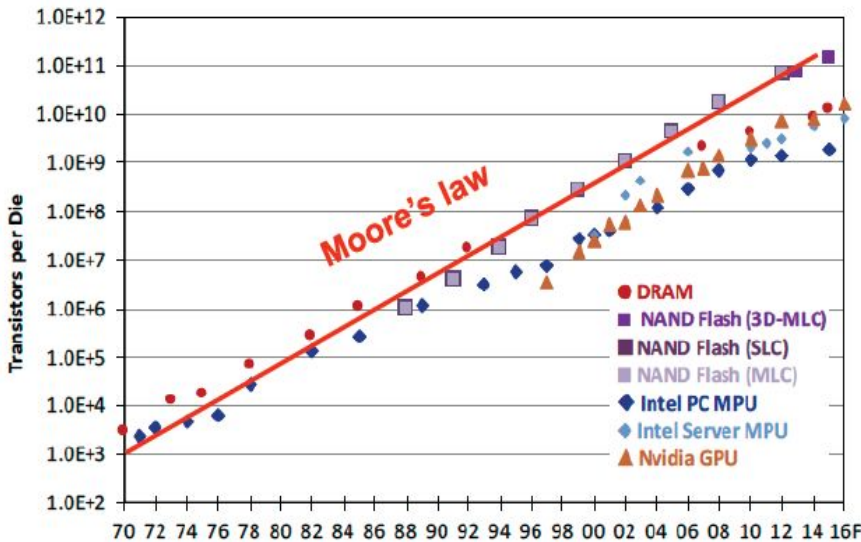
11th MOS AK Workshop

Silicon Valley, December 5, 2018

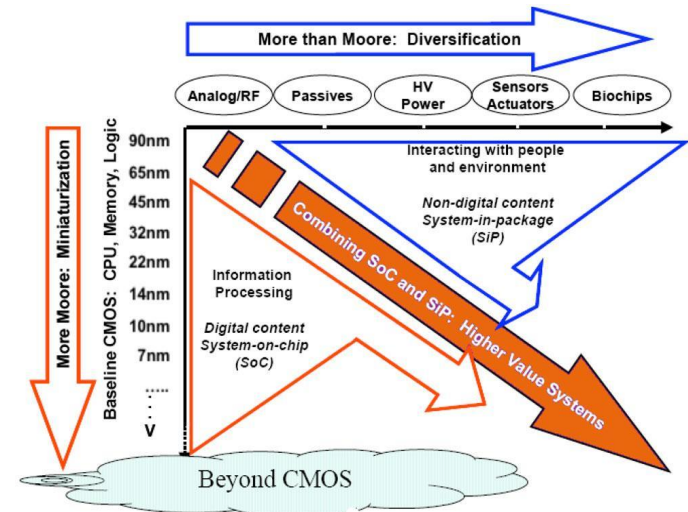Title : *NanoElectronics Roadmap for Europe: Identification and Dissemination*

HORIZON 2020

NEREID Roadmap based on a change of paradigm

From More Moore …   … to …

More than Moore and heterogeneous integration

- From device density …   … to …   … functionality increase
- From device cost driven …   … to …   … system cost driven
- From single figure of merit … … to …   … multiple parameters
- From Technology push …   … to …   … Application pull

… full supply chain

… sustainability

Aim of NEREID Roadmap

-to take into account the specificity of the European industrial and academic landscape and European applications needs
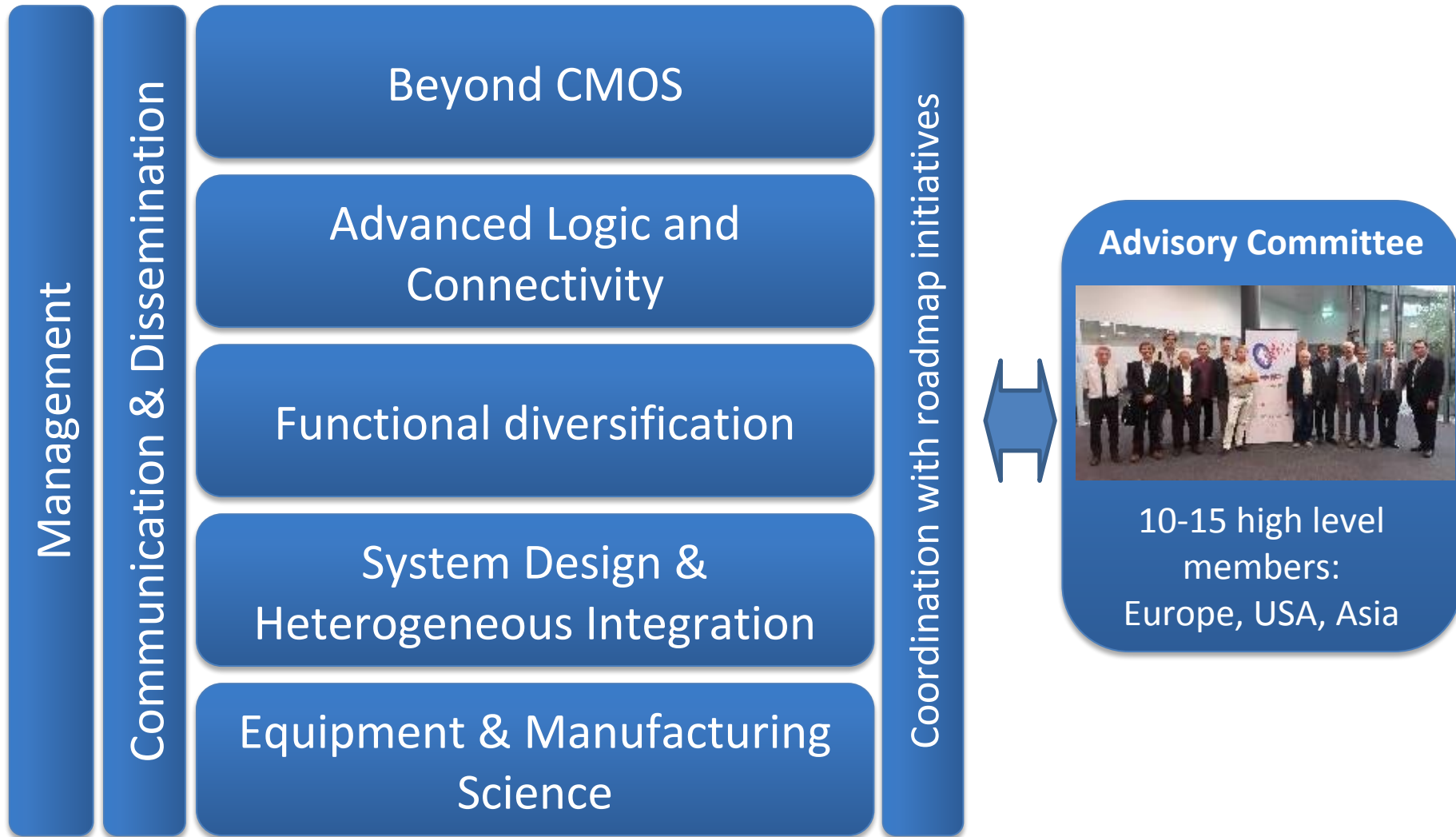
-to be used:

- as input for research programmes of European and national organizations

- to better coordinate academic and industrial research

- For equipment, semiconductors and application development.

NEREID Roadmap Flow

From Applications …

ECS — Collaboration and complementarities — NEREID — Collaboration and complementarities — IRDS

Roadmap

Different Timescale, Topics, Method, Figures of Merit

Different focus: Computing vs non Computing

… to European strategic programs

NEREID Structure & coordination with other regions

Management

Communication & Dissemination

Beyond CMOS

Advanced Logic and Connectivity

Functional diversification

System Design & Heterogeneous Integration

Equipment & Manufacturing Science

Coordination with roadmap initiatives

Advisory Committee

10-15 high level members: Europe, USA, Asia

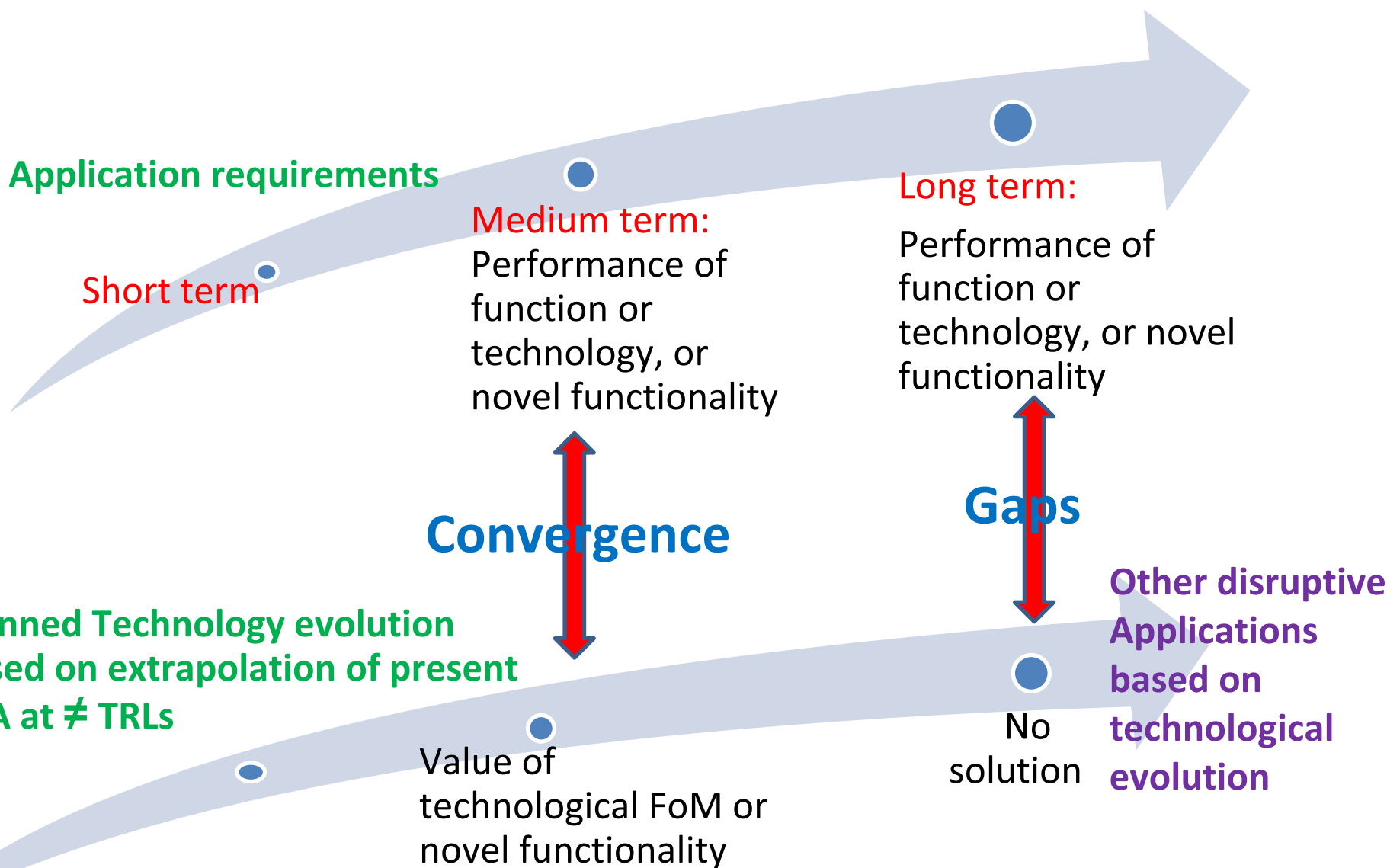# NEREID: Tasks and Topics

WP	Work Package	Tasks
1	Management (INP, SINANO)	1. 1 Coordination (Grenoble INP)
		1.2 Technical Management (SINANO Institute)
2	Beyond CMOS (VTT)	2.1 Emerging devices (VTT)
		2.2 Computing paradigms (ICN2)
3	Advanced Logic & Connectivity (imec)	3.1 Nanoscale FET (INP)
		3.2 Connectivity (LETI)
4	Functional Diversification (LETI)	4.1 Smart sensor (EPFL)
		4.2 Smart Energy (IUNET)
5	System Design & Heter. Integr. (PoliTo)	5.1 System Design (PoliTo)
		5.2 Heterogeneous Integration (Tyndall)
6	Equipm. & Manufact. Science (FhG)	6.1 Equipment and Materials (imec)
		6.2 Manufacturing Science (FhG)
7	Communication & Dissemination (EDAcentrum)	7.1 Set-up of web node and comm. Tools (ECN)
		7.2 Planning of Dissemination events (ECN)
8	Coordination with roadmap initiatives (EPFL)	Advisory Board

NEREID: Industrial co-Leaders

WP	Description	Industrial co-leaders
WP1	Management	AENEAS
WP2	Beyond CMOS	IBM Zurich
WP3	Advanced Logic and Connectivity	STMicroelectronics
WP4	Functional diversification	Infineon (Smart Energy) NXP (Smart Sensors)
WP5	System Design & Heterogeneous Integration	Infineon
WP6	Equipment & Manufacturing Science	ASML & ASMI (Equipments) STMicroelectronics (Manufacturing)
WP7	Communication & Dissemination	AENEAS
WP8	Coordination with roadmap initiatives	

Format of the Roadmap

Application requirements

Short term:

Medium term:
Performance of function or technology, or novel functionality

Long term:
Performance of function or technology, or novel functionality

Convergence

Gaps

Planned Technology evolution based on extrapolation of present SoA at ≠ TRLs

Other disruptive Applications based on technological evolution

Value of technological FoM or novel functionality

No solution

NEREID Roadmap Status

-Organisation of 3 General Workshops:

⇒   Application and Technology Experts (> 100)

=> April 2016, Grenoble; April 2017, Athens ; June 2018, Sardinia

-Organisation of many Domain(s) Workshops:

=> Technology Experts for given Task(s)/WP(s)

-3 International (US, Asia, EU) Advisory Boards

-Collaboration with other International Roadmaps

-Many dissemination activities:

Conferences, web site, leaflets, posters, newsletters, Press releases, etc.

Status of NEREID Roadmap

-Presentation of highlights of the NEREID Roadmap with the Long Term Vision of the ECS SRA at EFECS, Lisbon, on November 21st

-Presentation of some highlights in 3 Speaker Corners at EFECS on November 22nd :
New Paradigms and Technologies for edge computing in future AI applications (Nov.22, 13:20)
Smart Energy for power applications and autonomous IOT systems (Nov. 22, 13:00)
System Design and Heterogeneous Integration (Nov. 22, 10:30)

-Preparation of 1st European IRDS Workshop and Conference, Grenoble-Minatec, April 3-5, 2019, you are invited to attend the Meeting!

Status of NEREID Roadmap

Prefinal Roadmap available on:
https://www.nereid-h2020.eu/roadmap

[NEREID roadmap introduction, recommendation and conclusion](#)
[Advanced Logic and Connectivity -- Nanoscale FETs (T3.1)](#)
[Advanced Logic and Connectivity -- Connectivity (T3.2)](#)
[Functional Diversification (WP4) -- Smart Sensors (T4.1)](#)
[Functional Diversification (WP4) -- Smart Energy (T4.2)](#)
[Functional Diversification (WP4) -- Energy for autonomous systems T4.2)](#)
[System Design and Heterogeneous Integration (WP5)](#)
[Beyond CMOS (WP2)](#)
[Equipment and Manufacturing Science (WP6)](#)

A fruitful European and International collaboration has been developed in NEREID during 3 years leading to a meaningful Roadmap for the EU

Thank you !

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