



DARE MIXED SIGNAL PLATFORMS

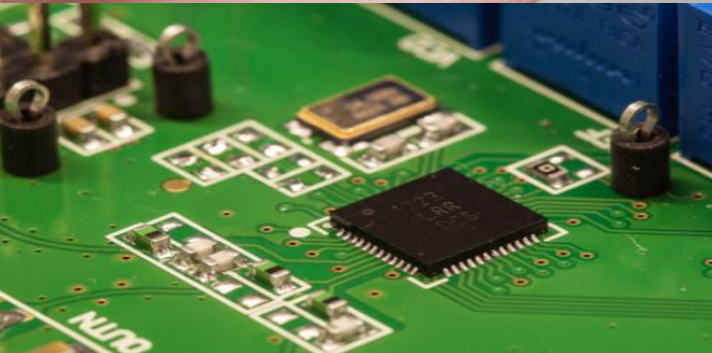
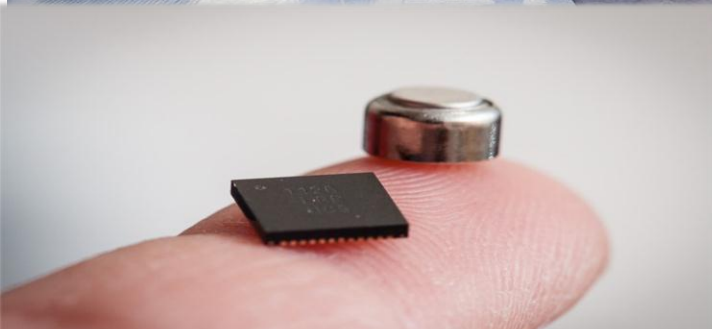
IMEC'S RADIATION-HARDENING-BY-DESIGN SOLUTIONS

STEVEN.REDANT@IMEC.BE





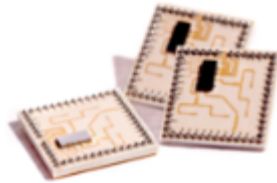
- ▶ Established in 1984
- ▶ Largest independent R&D institute in Europe
- ▶ Total 2013 revenue of 330M€
- ▶ > 2000 people



RESEARCH @ IMEC



Human++
BAN
Life Sciences



Green Radio
Low power
wireless
communication



**Sensor
systems**
for industrial
applications



Energy
Photovoltaics
Power devices
LEDs

Core CMOS

Litho

Devices

Inter
connects

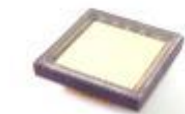


CMORE

MEMS, Sensor
Photonics



**Organic
electronics**

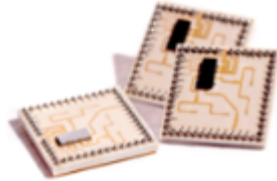


Imaging
Image sensors
& vision systems

IMEC IC-LINK: INDUSTRIAL ARM OF IMEC

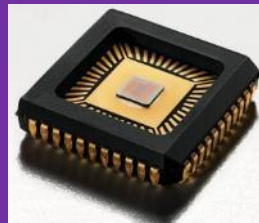


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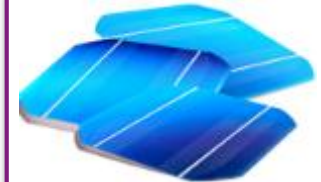


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IC-link**



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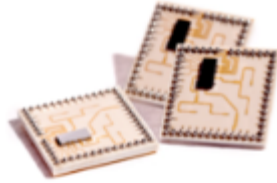


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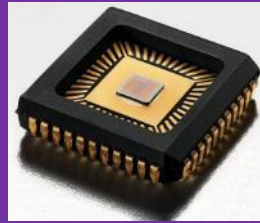


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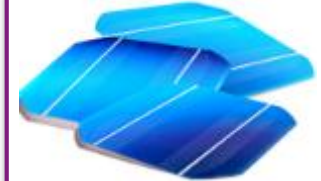


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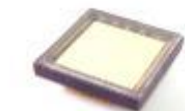


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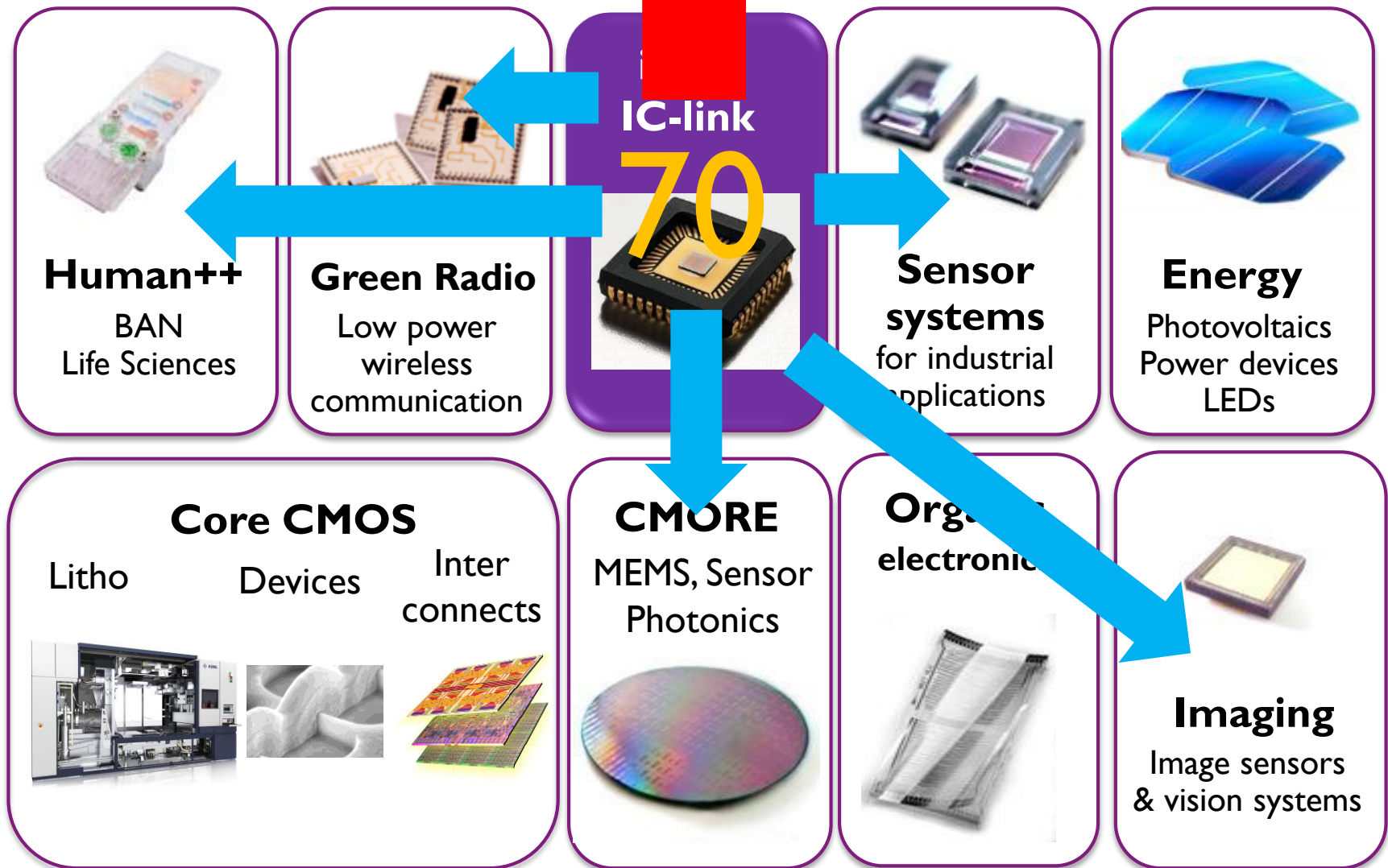


**Organic
electronics**



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IC-LINK: INTERNAL & EXTERNAL SERVICES



IMEC IC-LINK: A SERVICES UNIT

▶ ASIC services:

- MPW and assembly services to universities and companies (called “Europractice”)
- Access to UMC, On Semi & XFAB for volume
- Access to TSMC technologies for prototyping and volume
 - VCA partnership with TSMC
- Prototyping and volume : Assembly, Test & Qualif.



▶ Design services

- Library creation & characterization
- RTL & netlist to GDS2
- Analog design & full custom layout (limited)
- Low power implementation methodologies

▶ PBA services, failure analysis, advanced packaging

▶ >500 tapeouts per year



RHBD & SPACE ASIC ACTIVITIES

Started in the very early 90ies

- ▶ RhBD projects with (then) MMS
- ▶ AGGA, LTMS, PDFE, FRACSYN etc.
- ▶ Fixed Function ASICs – proof of concept

In 2000 started DARE 180 UMC

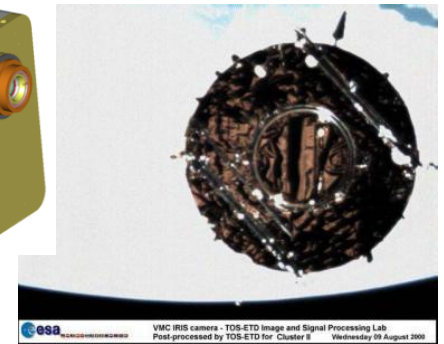
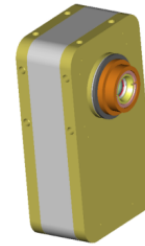
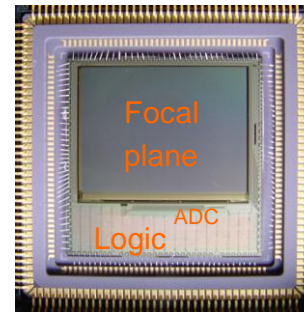
Other imec Space activities

- ▶ GaN
- ▶ Imagers
- ▶ ...

SCIENTIFIC FLIGHT HARDWARE

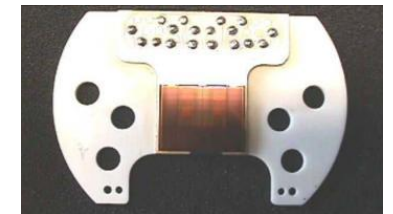
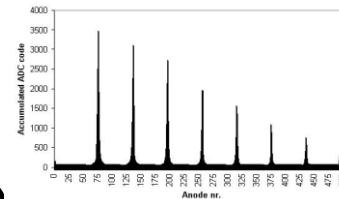
IRIS/VMC (~ 2000):

- ▶ On-chip camera for monitoring
- ▶ Flown on **ClusterII, XMM, ...**



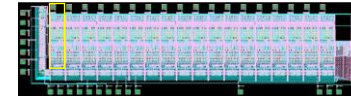
LEDA on **Rosetta** (2004):

- ▶ ROIC for electron spectrometer



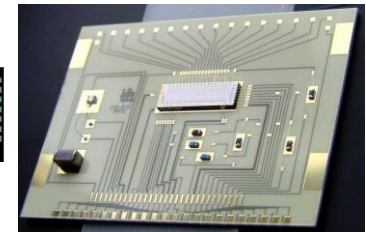
PACS instrument on **Herschel** (2009).

- ▶ 200 Cryogenic ROICs for a far-infrared detector array



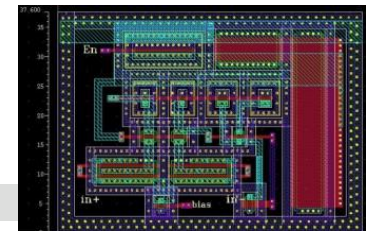
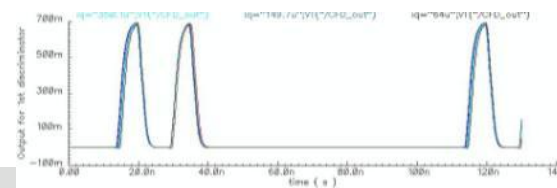
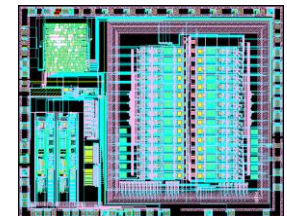
PDFE on NASA's **STEREO** (2006)

- ▶ SEPT instrument



PICAM for **BepiColombo** (~ 2014):

- ▶ ROIC for particle detectors

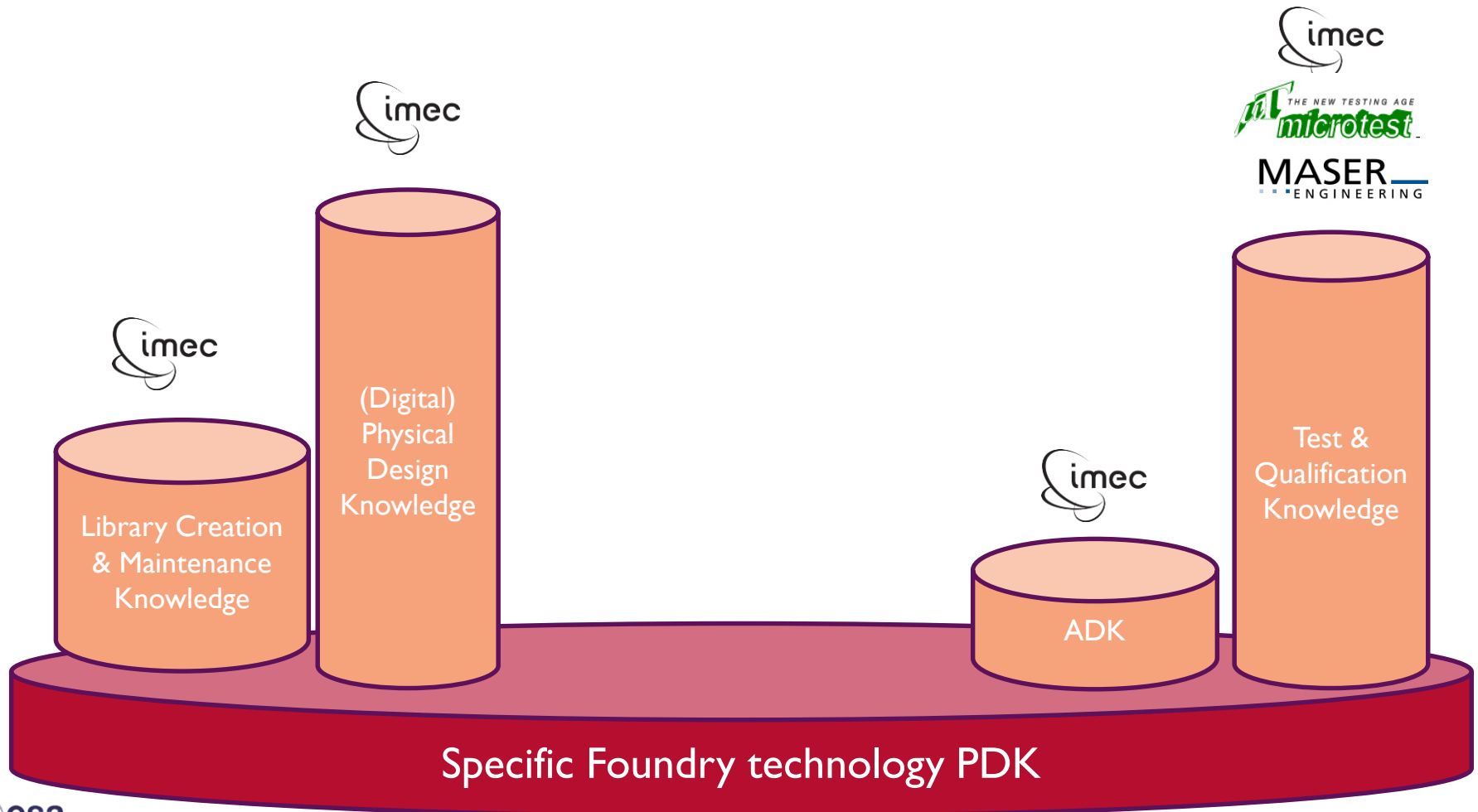


DARE : WE BUILD PLATFORMS

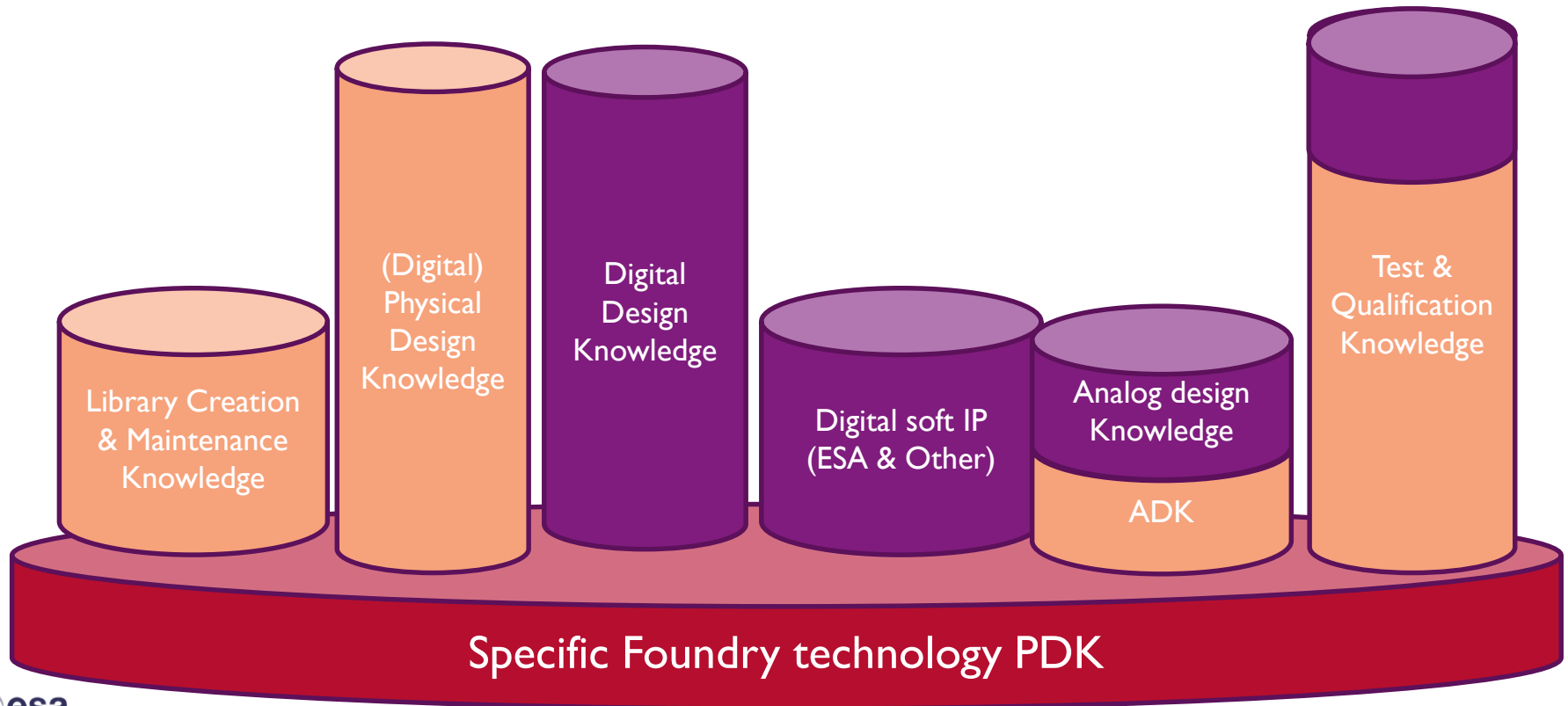


Specific Foundry technology PDK

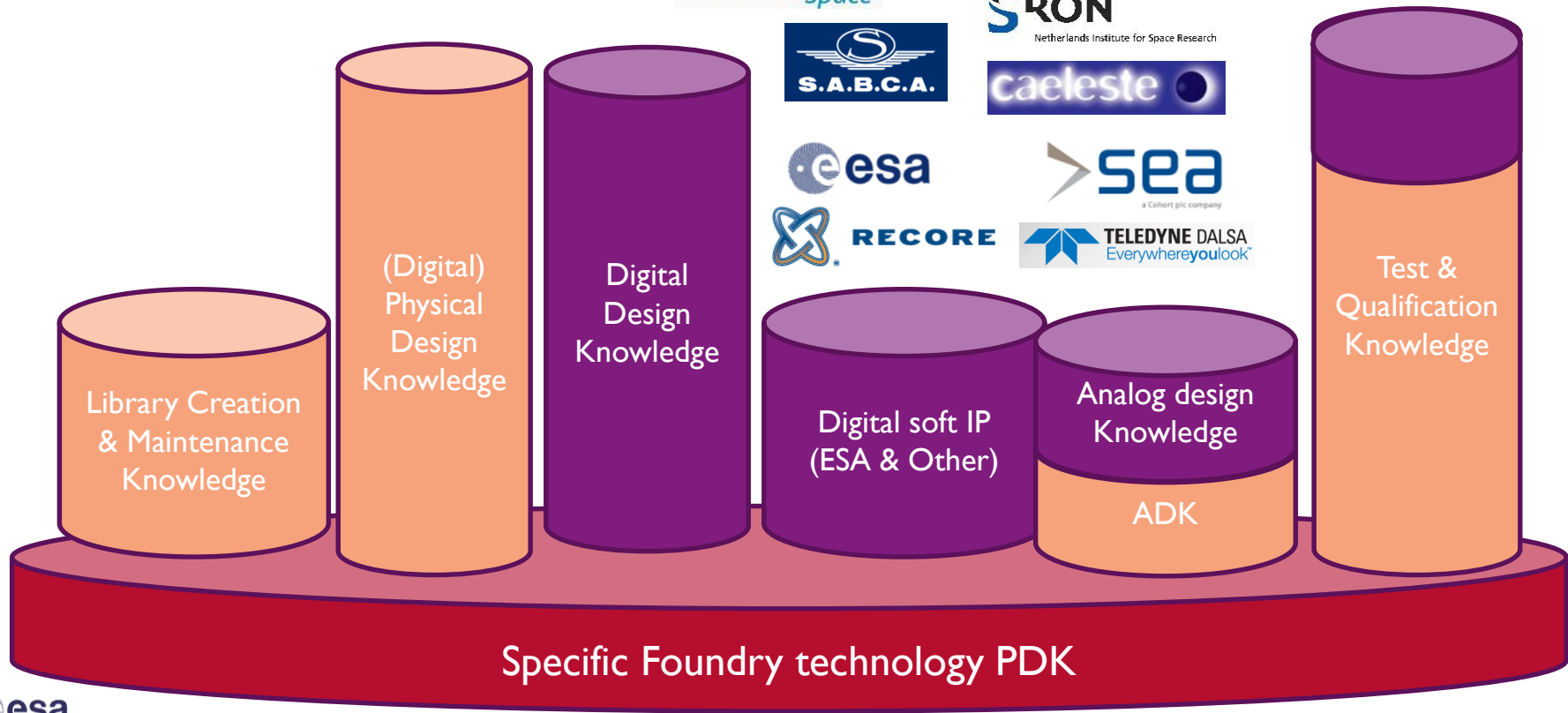
BUILDING UPON CORE COMPETENCIES



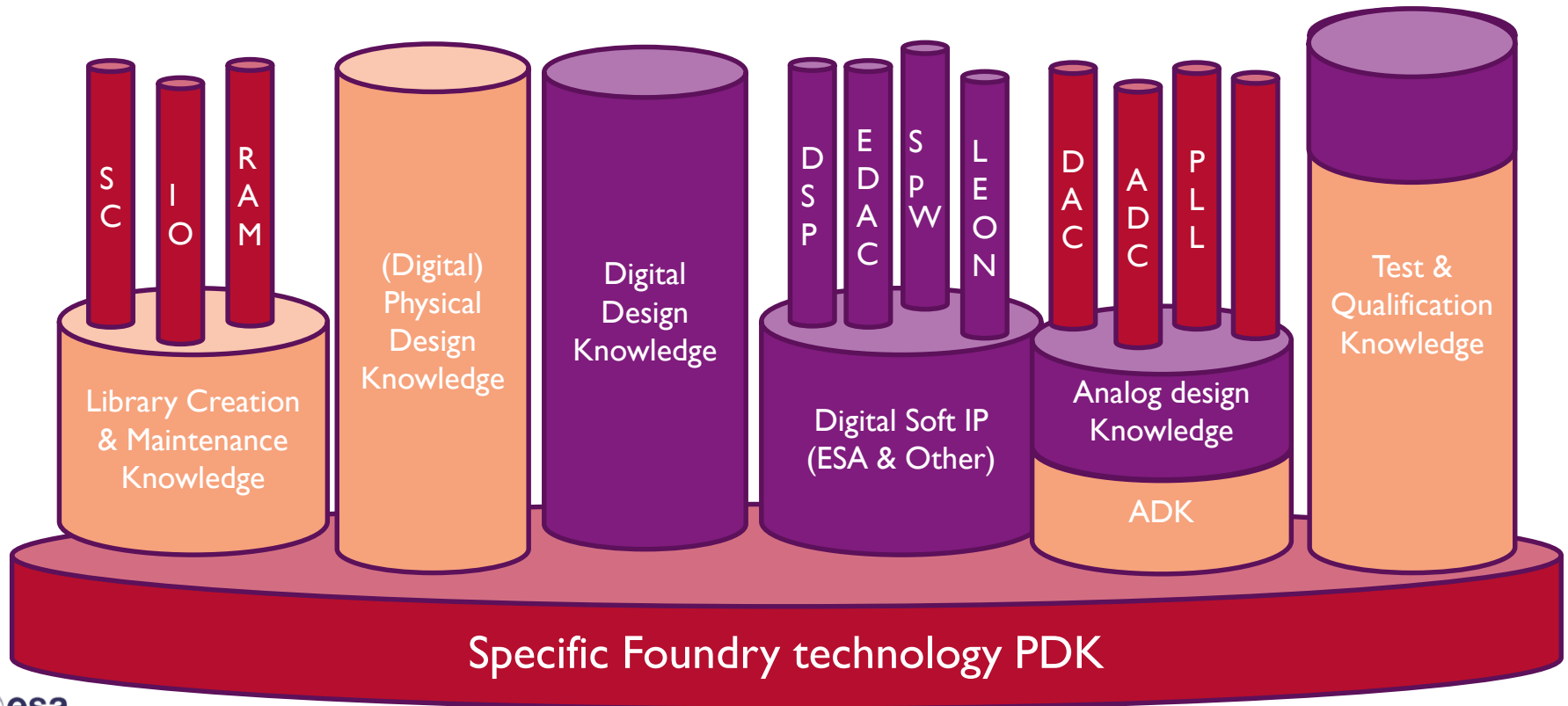
AND OTHER'S COMPETENCIES



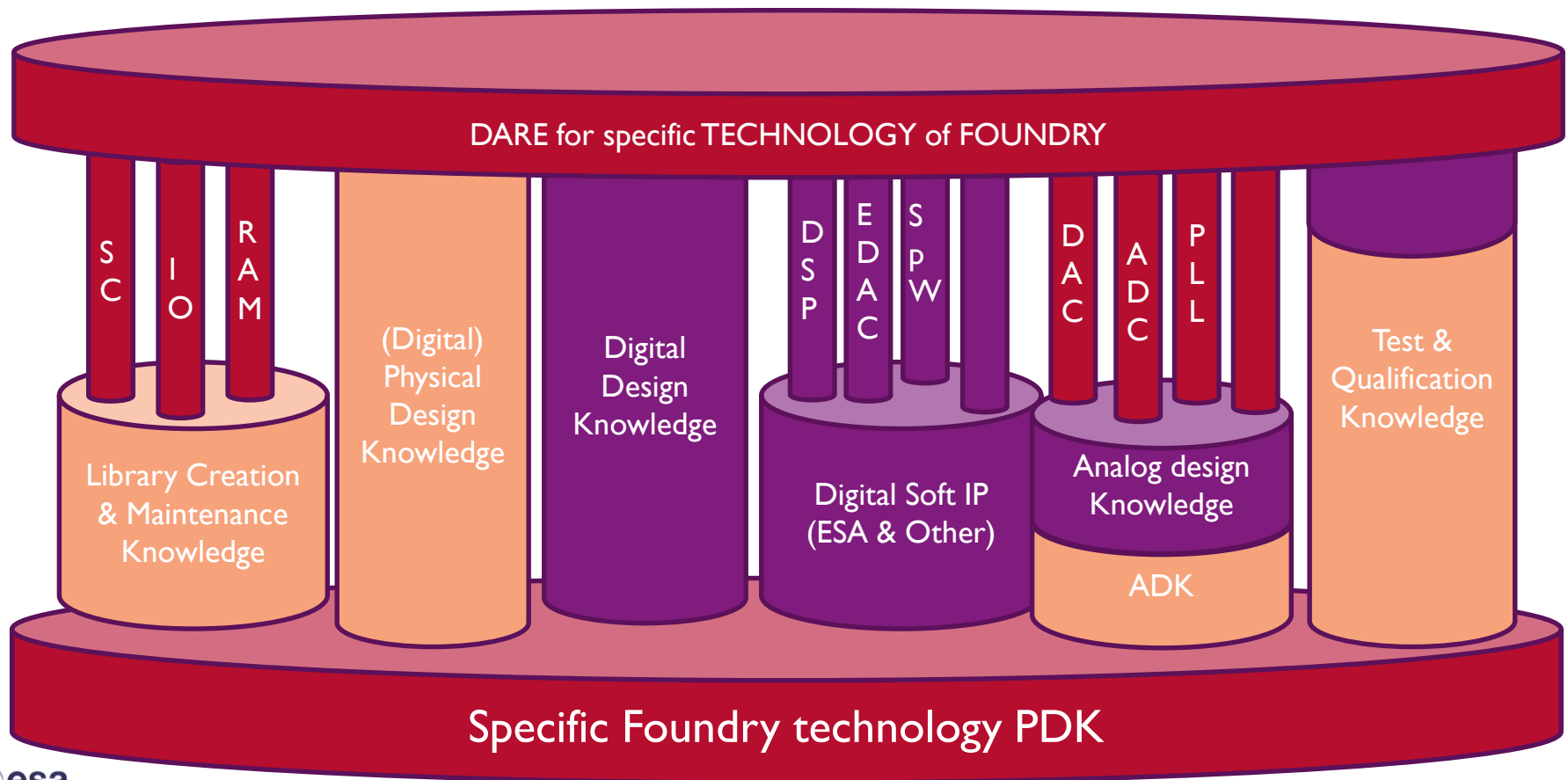
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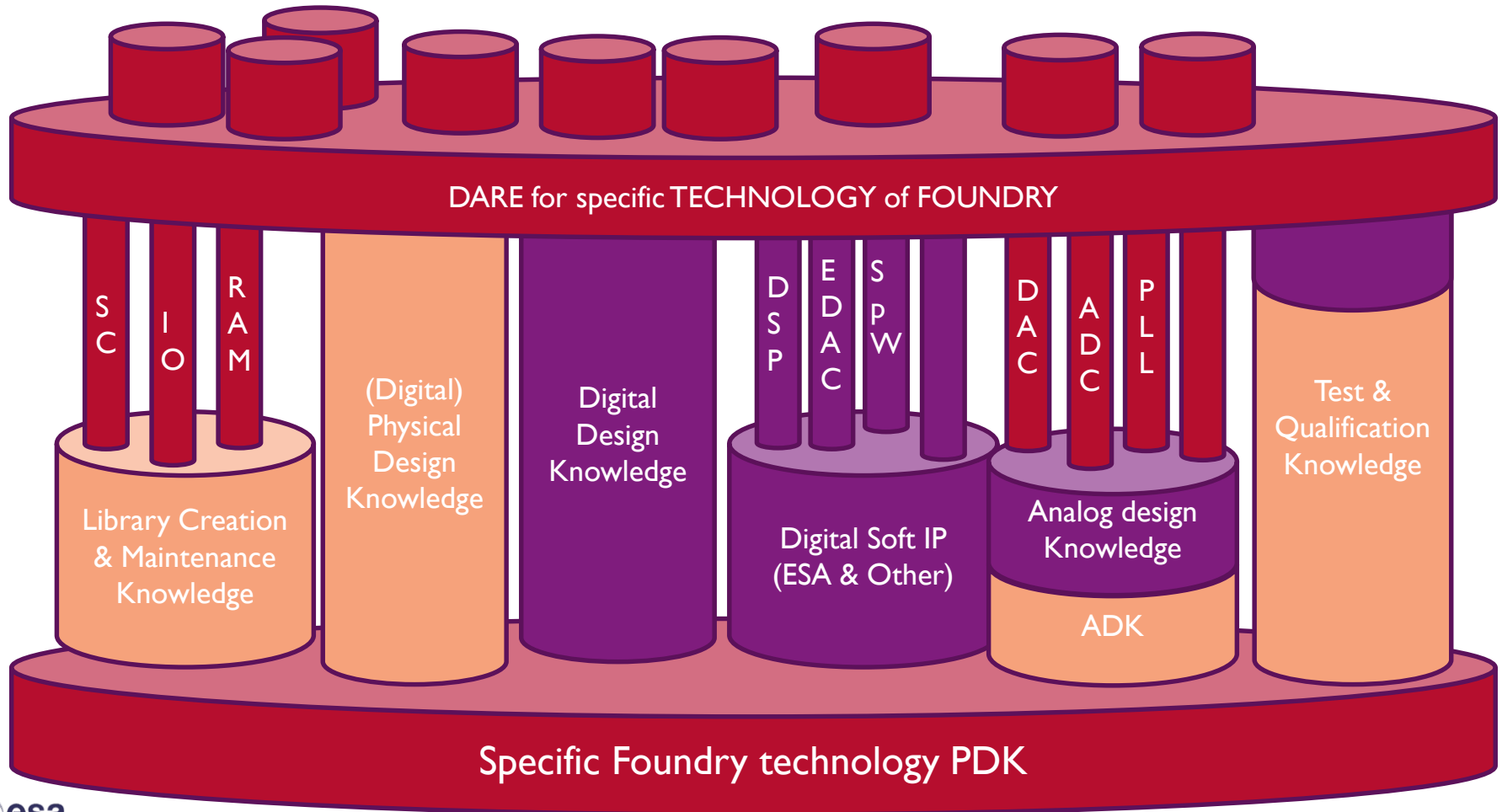
ALL PARTIES DO WHAT THEY DO BEST...



...TO BUILD RADIATION-HARDENED-BY-DESIGN PLATFORMS FOR MIXED SIGNAL DESIGN ...



...ON WHICH COMPONENTS CAN BE BUILT AND QUALIFIED



THIS BRINGS...

Flexibility

- ▶ Cells and analog blocks can be added to a platform by several parties (using ADK or not)
- ▶ Becoming then part of the platform
- ▶ Commercial MPW calendar

Maturity for RHBD solutions for everyone

- ▶ RHBD libraries and IP available to all (cf. commercial IP)
- ▶ Legacy build-up benefiting all

IP Re-use

- ▶ Saving money in MS design, test & qualification

IT NEEDS...

Sharing

- ▶ Radiation data
- ▶ Design methods used

Centralization

- ▶ IP status & cost should be clear
- ▶ Allows for fast ITT response
- ▶ Packaging solutions can be reused

PLATFORMS @ DIFFERENT MATURITY

DARE UMC 180 – including CIS

- ▶ Well supported for mixed signal

DARE UMC 90

- ▶ Small digital core & IO library

DARE XFAB 180 XH

- ▶ Libraries & IP ready by 2015 Q1
- ▶ First Silicon test chip design in 2015 Q1

DARE ON I3T80

- ▶ ADK design in 2014 Q4

TSMC 65

- ▶ RAM compiler for CERN

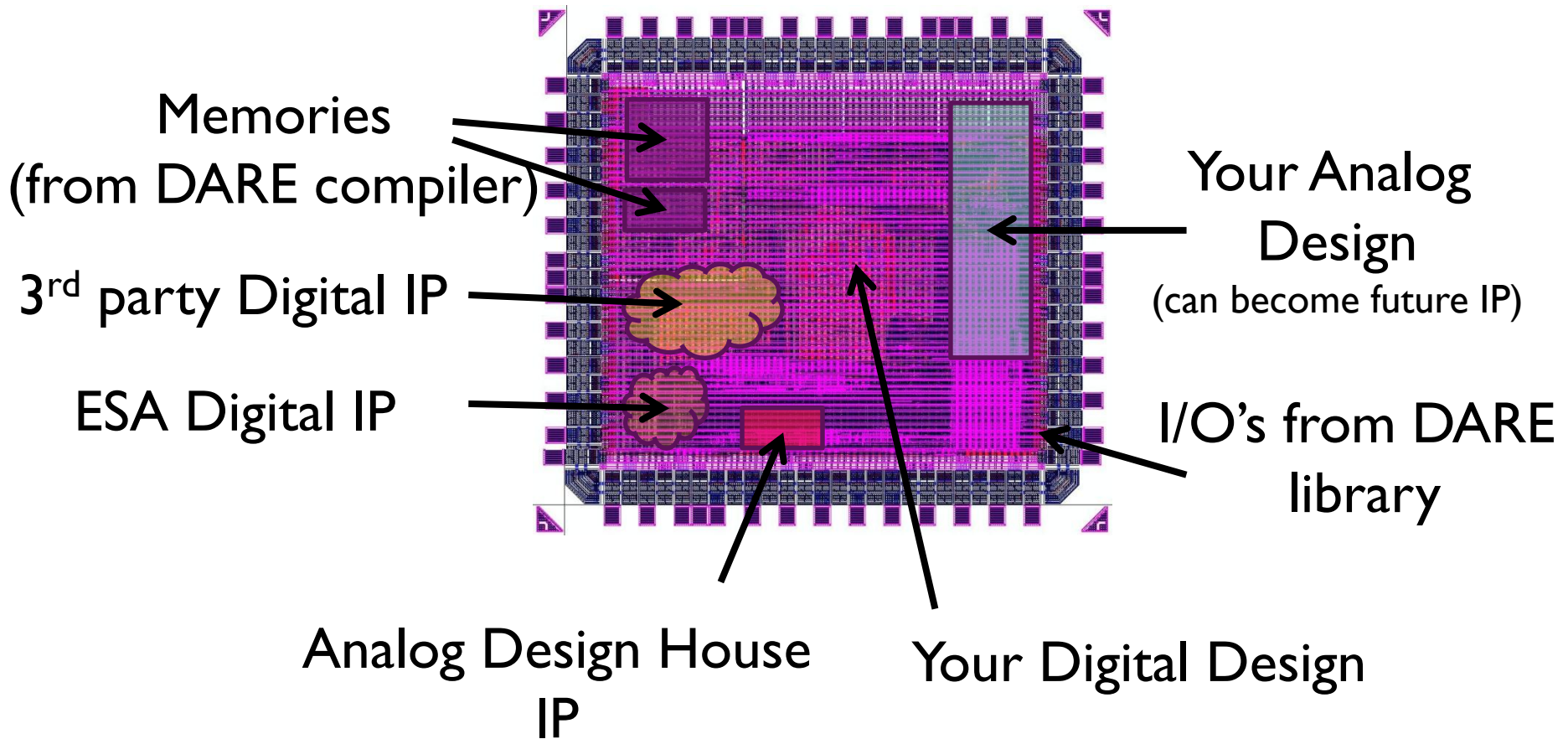
IMEC IS NOT A COMPONENT MANUFACTURER

- ▶ We can serve component manufacturers
- ▶ We can/do serve competitors
- ▶ We do not compete with our customers
- ▶ Investing in component creation is not our business model

IMEC DARE ACTIVITIES ARE PROJECT BASED

- ▶ All activities were defined in SoW's from ESA
 - Not all questions have known answers
- ▶ There is no support/maintenance project
- ▶ Support needs to be paid
 - @design, @testing, @data analysis
- ▶ Imec has no budget to invest
 - Of course we have a wishlist... 😊
- ▶ Any building block additions/enhancements should be allowed to be fed back into the platform
 - And then to find the budget...

SUMMARY: DARE MS SOC PLATFORMS



A platform can have several libraries/IP blocks in it



imecDARE

