

Supply Chain for a mixed-signal ASIC – example of a solution

ESCCON 2011

15.-17.03.2011

Helmut Hegny, Volker Lück

Contact: Helmut.Hegny@tesat.de

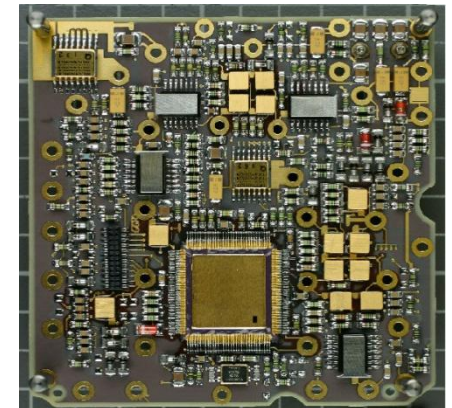
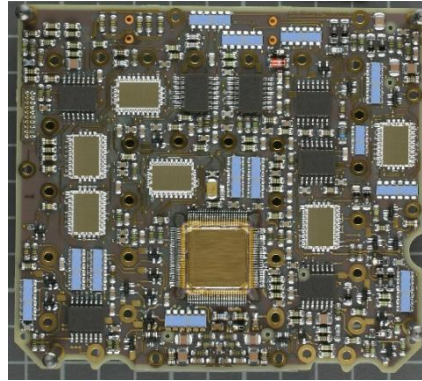


Agenda

- Why mixed-signal ASICs?
- Examples of mixed signal ASICs
- General Supply Chain
- Supply Chain Options & Assessment
- Supply Chain Examples
- Conclusions

Why mixed-Signal ASICs ?

- Higher Performance
- Less Power
- Less Area
- Less Mass
- Less Cost
- Higher Reliability

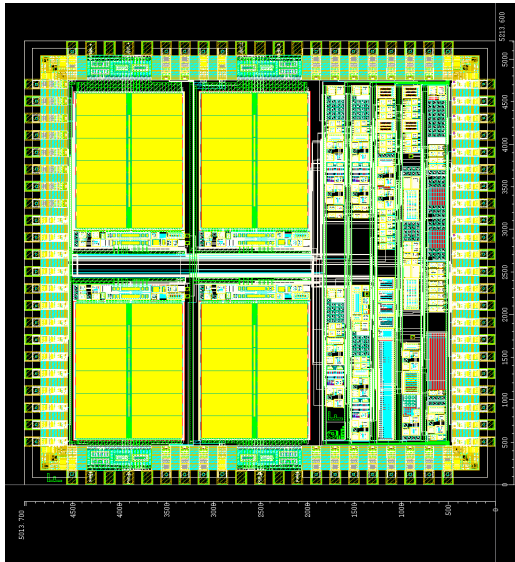


13x ICs → 7x ICs

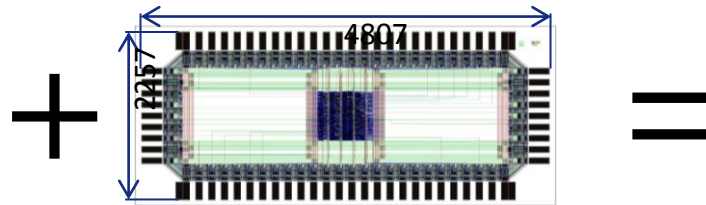
6x resistor arrays → 0x resistor arrays

double side population → single side population

Why mixed-Signal ASICs ?



ON Semiconductor
Analog functions

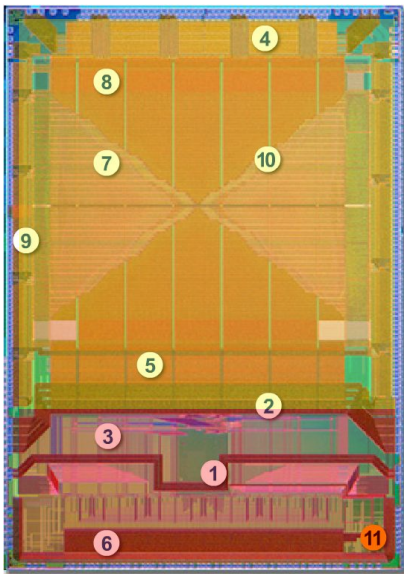


UMC 0.18µ CMOS (DARE)
Digital functions

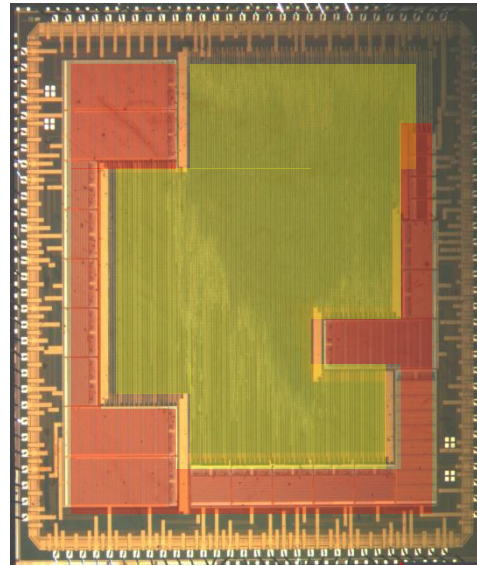
- Higher Performance
- Less Power
- Less Area
- Less Mass
- Less Cost
- Higher Reliability

Project: REDSAT
System: Direct Radiating Antenna
Designer: ARQUIMEA & UC3M
Customer: EADS CASA ESPACIO
Final Customer: HISPASAT

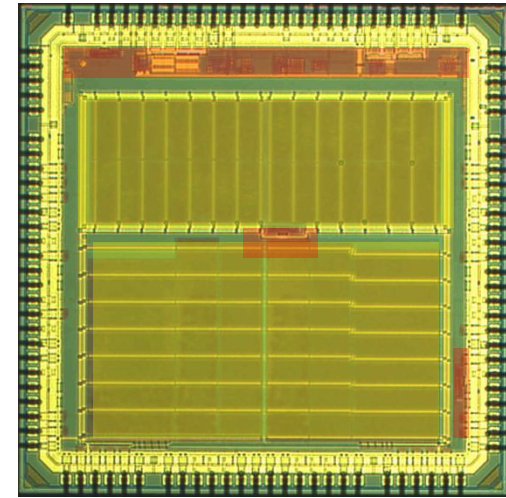
Examples: Mixed Signal ASIC



Actel Fusion
0.13μ CMOS Flash FPGA
Commercial

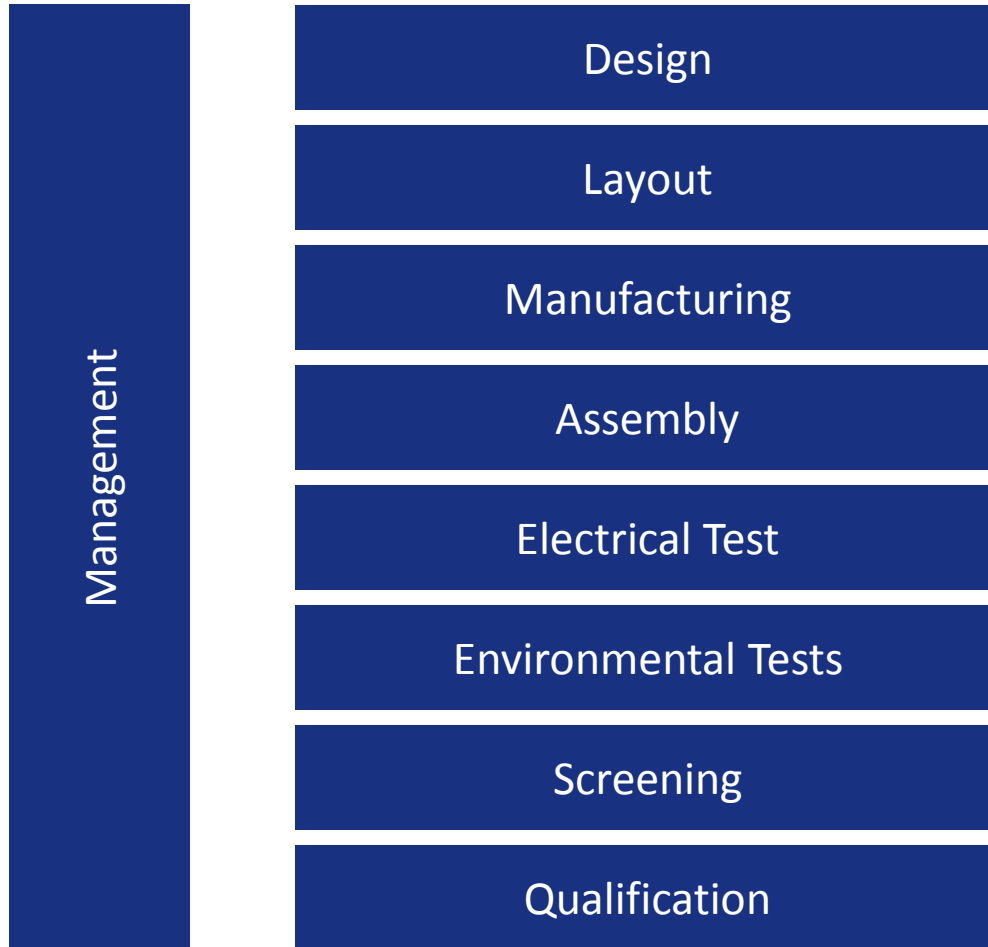


KNUT (Tesat)
UMC 0.18μ CMOS (DARE)
Radiation Tolerant



TLFA1 (Tesat Testchip)
LFoundry 0.15μ CMOS
Radiation Tested

General Supply Chain



Supply Chain Options

Management	IMEC	Tesat	Serma / Arquimea	and others
Design	IMEC	Tesat	TES / Arquimea	and others
Layout	IMEC	TES		and others
Manufacturing	UMC	LFoundry	XFab	and others
Assembly	HCM	e2v	Indra	and others
Electrical Test	Microtest	Serma	IMS	and others
Environmental Tests	Maser	Maprad	TRAD	and others
Screening	Microtest	Serma		and others
Qualification	IMEC	Serma	Hirex	and others




Definition: Supply Chain Option & Assessment Items




Management	IMEC
Design	IMEC
Layout	IMEC
Manufacturing	UMC
Assembly	HCM
Electrical Test	Microtest
Environmental Tests	Maser
Screening	Microtest
Qualification	IMEC



- Design Space (D)
- Cost (C)
- Time (T)
- Risk (Ri)
- Responsibility (Re)



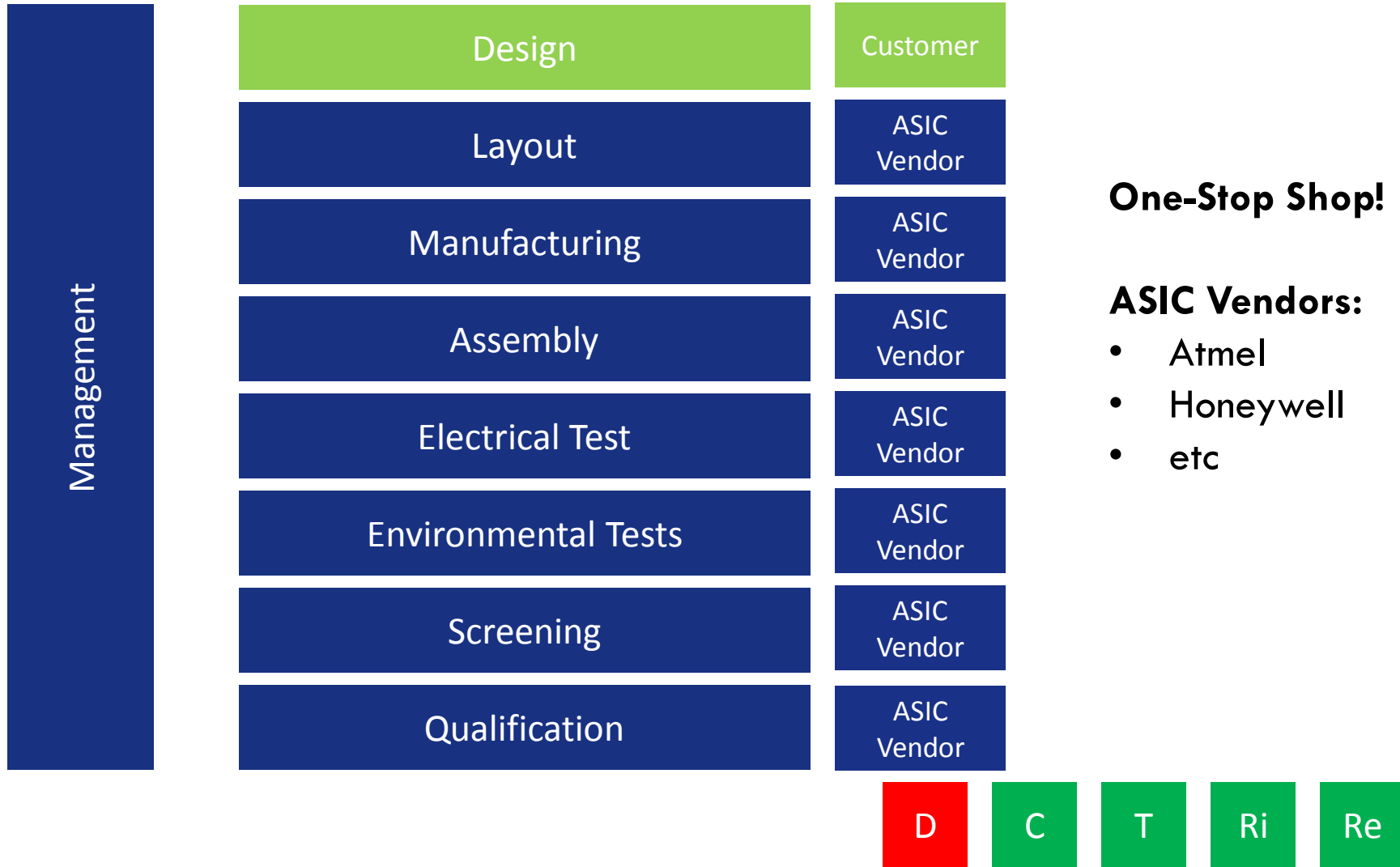
Definition: Assessment Items

- Design Space (D)
 -  firm & fix
 -  limited
 -  flexible

- Cost (C)
 -  high
- Time (T)
 -  medium
- Risk (R_i)
 -  reasonable

- Responsibility (R_e)
 -  Management takes NO Risk
 -  Management takes Risk

Example: Supply Chain „pure digital ASIC“

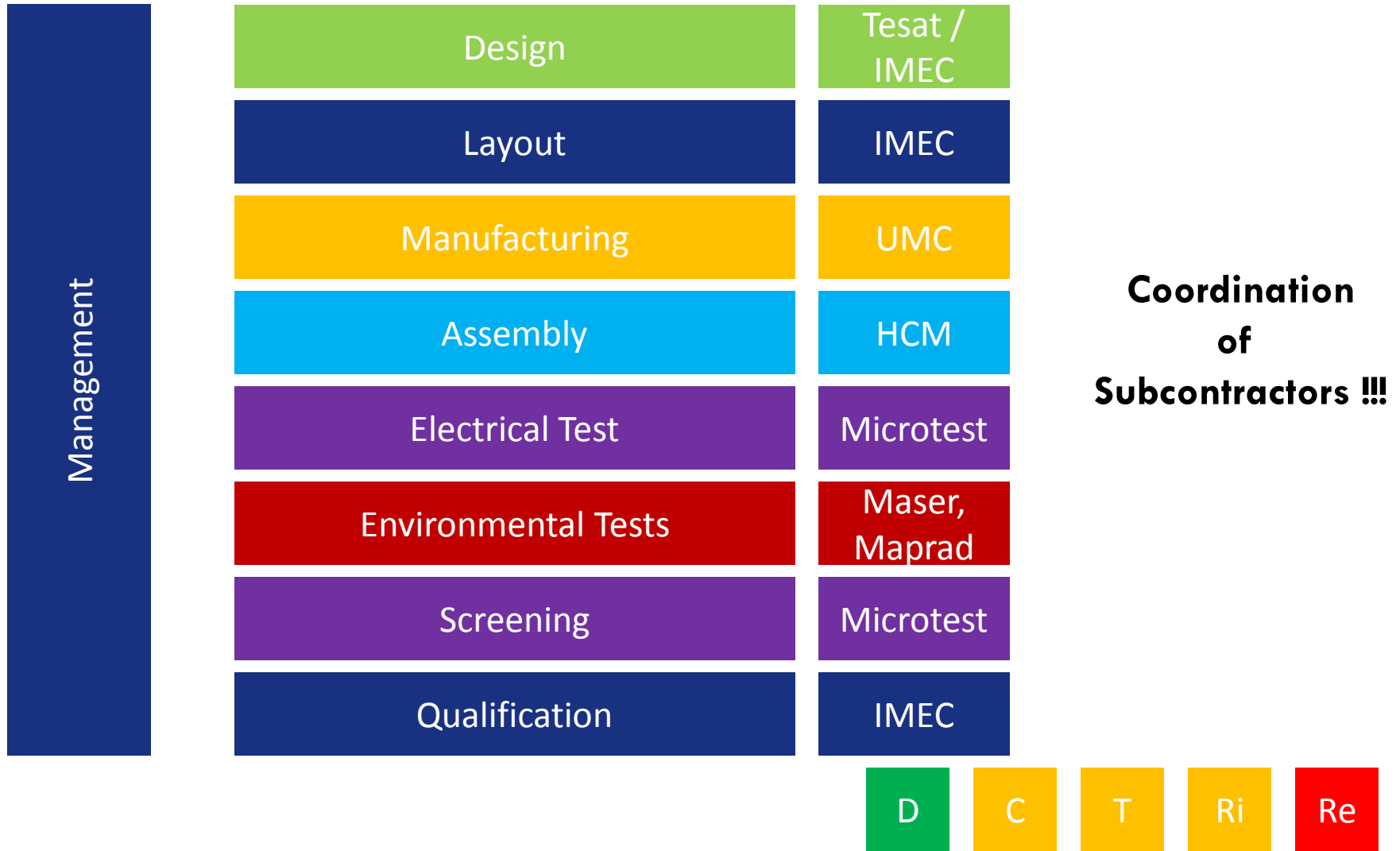


One-Stop Shop!

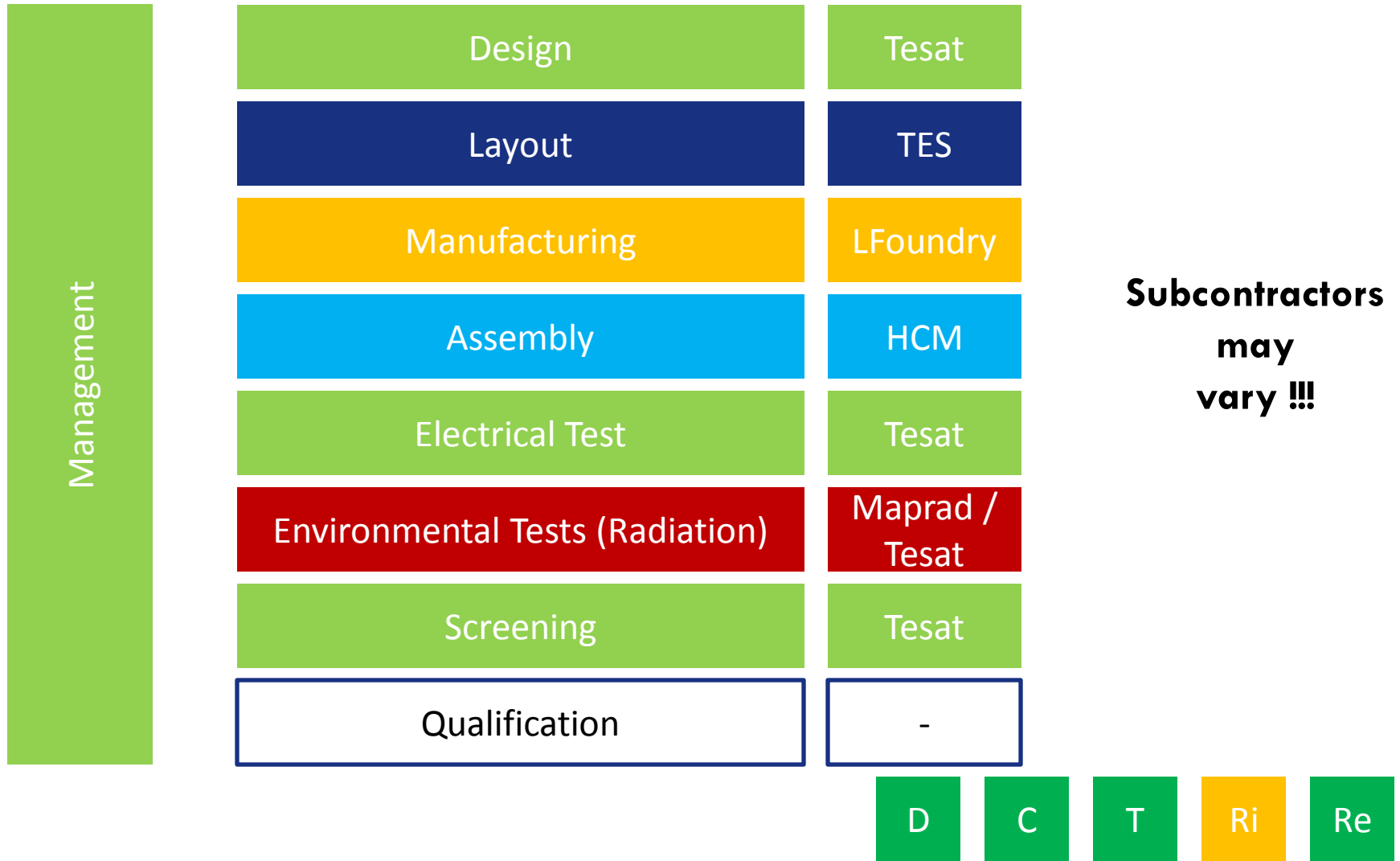
ASIC Vendors:

- Atmel
- Honeywell
- etc

Example: Mixed Signal ASIC KNUT (TESAT)



Example: Mixed Signal ASIC TLFA1 (Tesat)



Supply Chain Options

- Easiest Way: one-stop solution!
(not available, yet)
- Hardest Way: do it yourself!
(time- and resource- consuming)
- Smoothest Way: select a paved way!
(restrictive, no competition)
- Smartest Way: cherry-picking - best fit!
(increased management overhead)



Conclusions

- “One-stop solution” is still a wishful thinking.
- “Paved-way solution” is available (e.g. IMEC/UMC).
- “Cherry-picking” is based on previous experience. You have to feel the pain, first.

- Introduction of standards & solutions to enable easy “cherry-picking” necessary.
- Standards & solutions require investment, at best from institutions (ESA or EU) to make them freely available.

- “Fables” company could make „one-stop-solution“ feasible. Taking on overall responsibility and offer a variety of options.