

Role and interest of SMEs in Space activities Michel Courtois

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What is PMI/SME

Definition of Small & Medium-sized Enterprises

referred to as “SMEs”, in the Recommendation of the European Commission 2003/361/EC of 6 May 2003 (OJ L 124, 20.5.2003, p.36).

Enterprise

An enterprise is an entity engaged in an economic activity.

Staff headcount & financial ceilings determining enterprise categories

Small and Medium-sized Enterprises, are defined as enterprises which:

- Employ fewer than 250 persons and
- Have an annual turnover not exceeding EUR 50 millions or
- An annual balance sheet total not exceeding EUR 43 millions.

What is a PMI/SME

Types of enterprises taken into consideration in calculating staff numbers and financial amounts (i.e. autonomous, partner or linked enterprises)

Linked enterprises are enterprises which have any of the following relationships with each other: detaining a majority of voting rights into another enterprise or equivalent control, such as the right to appoint or remove the supervisory body, or

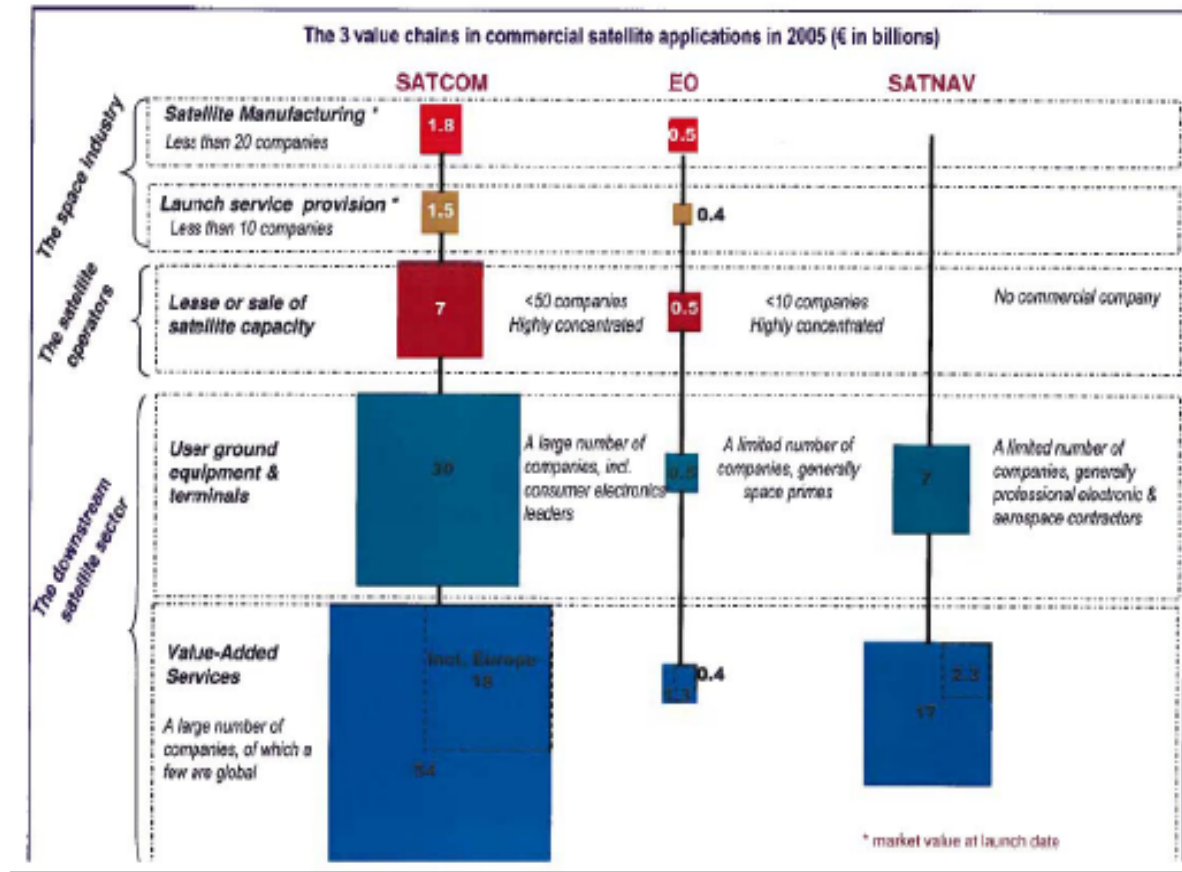
Examples of SME in Italy and their activity

	Space Turnover	Non space turnover	Total	Activity
	2008 + 2009			
Aerostudi S.p.A.			estimated ,€6m	Structures manufacture and analysis
ALMASpace s.r.l.			estimated € 2m	microsats
Alta SpA	9,300,000	1,671,000	10,971,000	electric propulsion
BLU Electronic srl	1,497,600	2,540,400	4,038,000	avionics
CMC S.r.l.		0		Mechanical workshop
COSPAL COMPOSITES Srl	3,330,000	2,316,000	5,646,000	largre ground reflector antennas
DataMind S.r.l.		0		Image processing
Digimat S.r.l.		0		System engineering
Dinamica Srl		0		Design conculting
DTM srl		0		structures, small payload
EICAS AUTOMAZIONE SPA		1,000,000	1,000,000	automatics, downstream nav,
ELTOS S.p.A.		0		Integrated circuits
EPSILON ITALIA SRL	152,240	445,201	597,441	Downstream, microw equipment
Euro.Soft srl		0		EGSE, downstream
Farnia s.r.l.		0		Technology transfer
FlowTherm s.r.l.		0		numerical simulation, structural and thermal
GeoK s.r.l.		0		EO downstream
GeoSolutions SAS di Simone Gianecchini & c		0		EO downstream

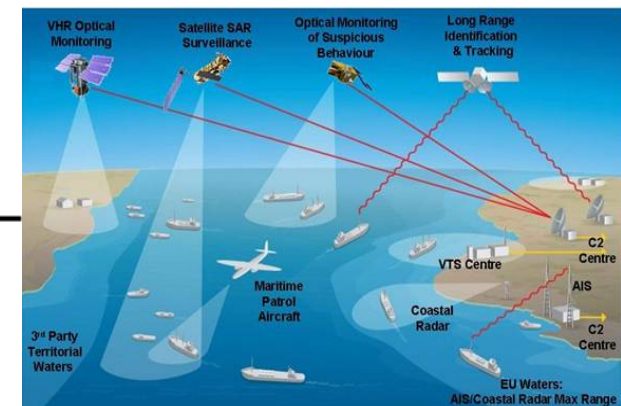
Example of SME in Italy and their activity

GMSPAZIO Srl	760,000	350,000	1,110,000	EO downstream
HIGH ENGINEERING S.R.L.	28,000	0	28,000	CAD support
I.R.S. srl		0		EGSE
I.S.A.R.T. SRL		0		Sowfare, ISV
IMT srl		0		small payloads, cubesats
INFO SOLUTION SPA		0		softwae, including FPGA development
INNOVA Consorzio per l'Informatica e la Telematica	1,400,000	2,144,852	3,544,852	downstream
Interconsulting		0		system engineering
ipt		0		downstream
Jointek s.r.l.		0		fluidic components
MAPRad srl	146,539	251,898	398,437	rad-hard design
matrix SPA		0		electronic design
MDP Material Design and Processing srl		0		Engineering support and test
mec srl		0		microwave development
MEDIA LARIO SRL		0		optical components and coatings
Meteorological and Environmental Earth Observation (MEFO) Srl		0		downstream
NANO-CAT Srl		30,000	30,000	coatings

Innovation from Space EO, TEL, NAV, IAP



- Space creates products and services in strategic sectors, e.g. energy, transport, communications, resources, security, risk management, marine, security, etc
- Potential to be further by using systems in concert to provide “integrated applications”



ESA promotes the use of space systems individually (EOMD, DUE, GSE, ARTES 34, and in concert IAP

EGNOS AND GALILEO APPLICATION PROGRAMMES

EGNOS is a precursor to Galileo that augments GPS and GLONASS, making them suitable for safety-critical applications, such as aviation.

Galileo is expected to spawn a wide range of useful applications, including value-added services for transport by road, rail, air and sea, infrastructure and public works management, agricultural and livestock management and tracking, even e-banking and e-commerce authentication.

Galileo will be a key asset for the provision of public services, such as rescue operations, law enforcement and crisis management.



APPLICATION: GMES



- ESA / EU initiative for global monitoring for environment and security
- Includes Space Component, In-situ Component, Service Component and Data Integration and Information Management
- Space Component includes Space and Ground Segment, both for flight operations and payload data handling
- Integrates dedicated missions, the Sentinels, and cooperative missions, EUMETSAT missions, national and other missions
- European contribution to Global Earth Observation System of Systems (GEOSS)

Success stories, key of success

- Geisler (S) LEON processor, Niche
- Chipidea (Po), Niche
- Fillfactory (Be) (Cypress), APS detect, Niche
- OHB (Ge) Opportunity
- Temex (Spectratime) (Ch), clocks Niche
- Verhaert (Be) payload, S/C Opportunity
- GMV (Es), SW nav, orbito, Niche
- Rymosa (Es), antennas, Synergy
- Technologica (Alter group) (Es), Niche
- Ixea (Fr), Niche
- Cedrat (Fr), Synergy
- ELTA (Fr), SW, Synergy
- Carlo Gavazzi (It) Opportunity
- Officina Galileo (It), Niche

Specific ESA measures

- **Encouragement via dedicated initiatives:**
- **ARCoP:** (Academic Research Co-operation Programme), launched in 1999
- **LET-SME:** where the acronym LET stands for Leading Edge Technologies was then launched to replace ARCoP

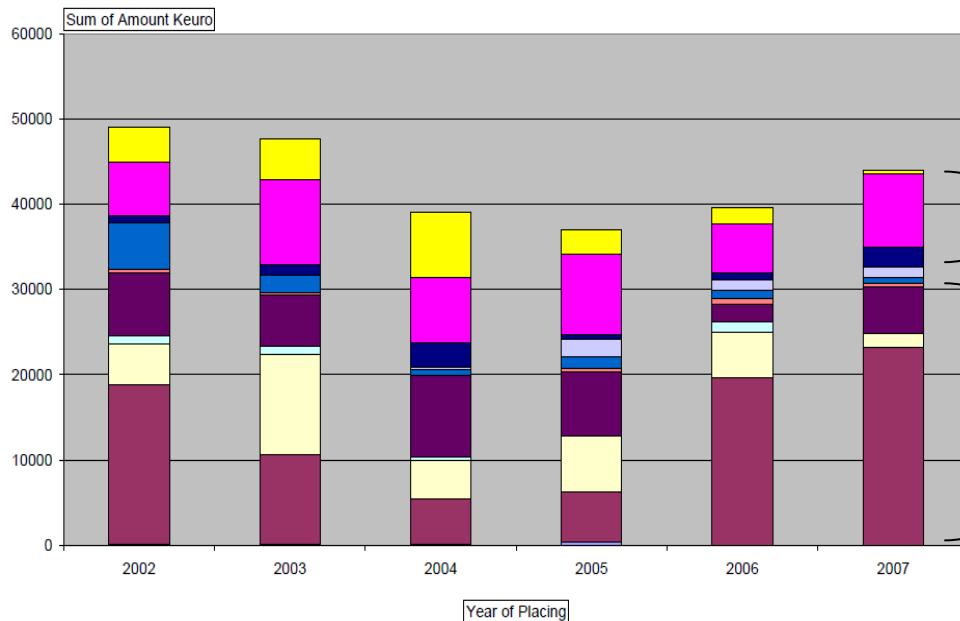
- **ESA Telecom Start-up Project**
- **Initiative Innovation Triangle Initiative (ITI)**
- **Encouragement in Existing Programmes via special Clauses (C1-C4)**

- **SUPPORT TO SMEs' TECHNOLOGY TRANSFER**
- **SMEs' TRAINING and ACCESS TO ESA FACILITIES AND EXPERTS**
- **IMPROVED INFORMATION & POSSIBILITY OF NETWORKING FOR SMEs**

Specific ESA measures

- C = Open Competitive Tender; (Ref. Article 5.1 ESA Contract Regulations).**
- C(1)= Activities in open competition limited to the non-Large-System Integrators.**
- C(2)= Activities in open competition, where a significant participation of non-Large-System Integrators is requested.**
- C(3)= Activity restricted to SMEs & R&D organisations, preferably in cooperation.**
- C(4)= Activities in open competition, subject to the SME subcontracting clause.**

TRP Budget: To whom ?



At least 2/3 of all tenders are in competition

DN/C, DN/S

C, C1, ...C4, C(R)

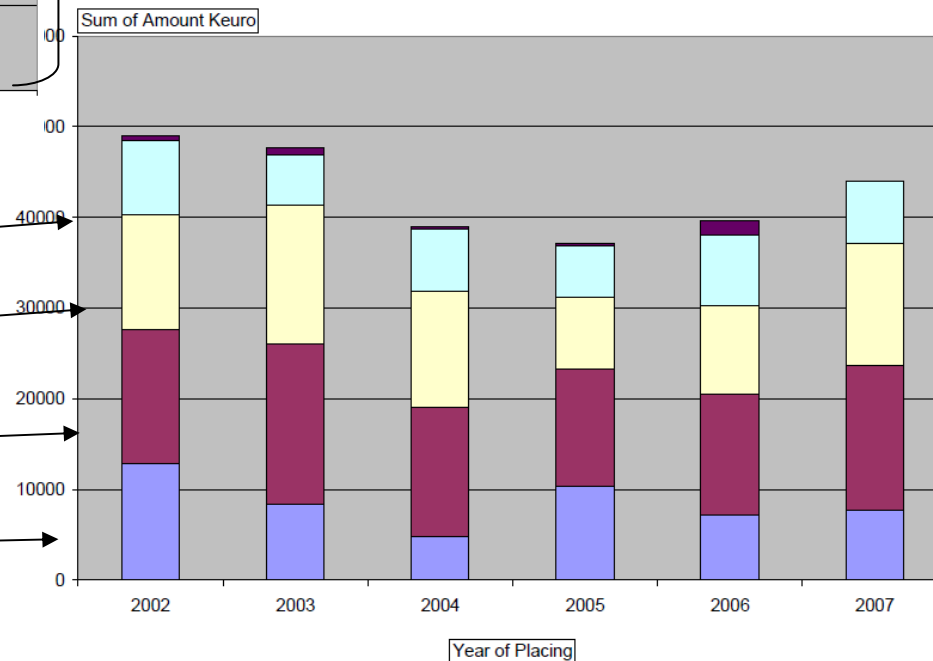
TRP is strongly Research Oriented

SMEs

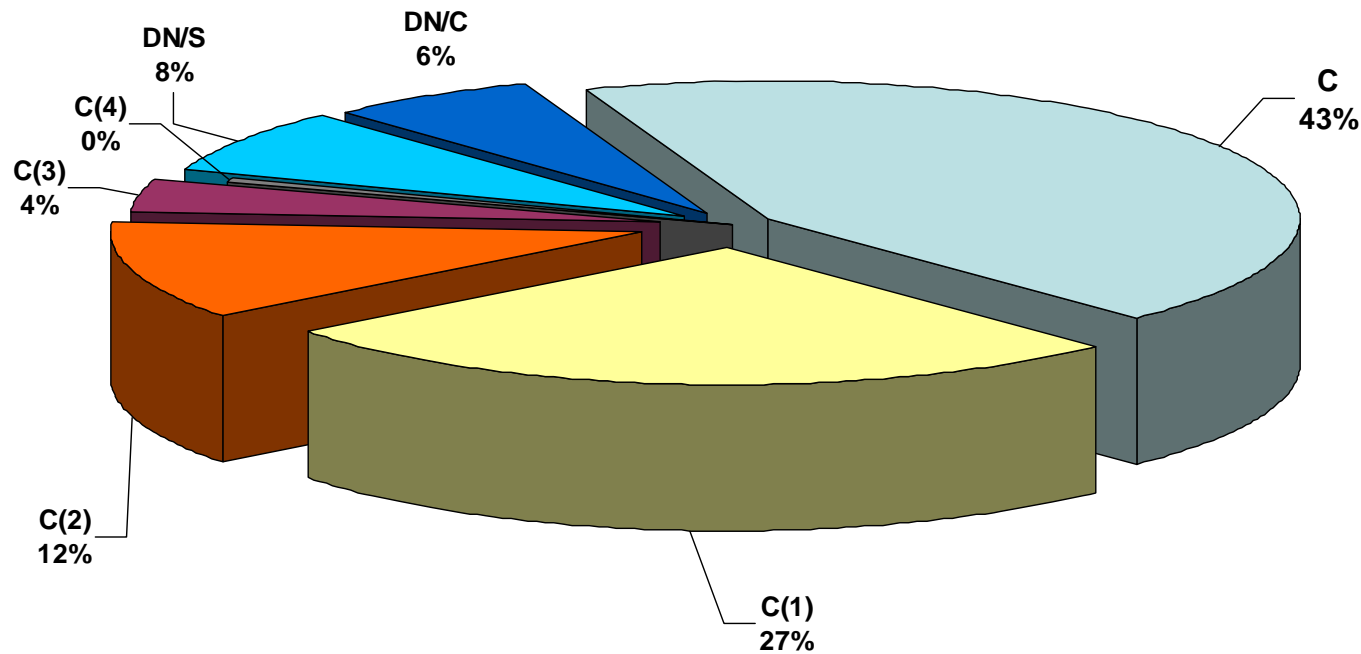
R&D Centres & Universities

Component/Equipment Supplier

LSIs



TRP Procurements approved 2008-2010



- Further increase in open C
- C(4) SME subcontracting clause rarely applied

Involvement in ESA programmes

- SME share 2005 2006 2007 **Total share for 2005-2007**
- Earth Observation 15% 8% 7% **9%**
- Telecommunications 13% 13% 6% **10%**
- Navigation 7% 7% 4% **6%**
- Science 2% 5% 4% **4%**
- Launchers 0% 1% 0% **0%**
- Manned Spaceflight
and Exploration 4% 3% 3% **3%**
- Microgravity 22% 9% 12% **17%**
- TRP 15% 21% 15% **17%**
- GSTP 33% 20% 20% **24%**
- PRODEX 3% 2% 2% **2%**

Volatility of SME status

- **Deimos (E)** founded 2001, SW and systems .It is owned now partly by Elecnor Group energy transport, telecom industry.
- **Verhaert (B)** owned by QinetiQ since 2005
- **OHB (D)** has outgrown SME status (SME in 2000)
- **KT (D)** is now owned by OHB
- **Gaisler Research (S)** is now partly owned by AeroFlex, US(2008)
- **Fillfactory (B)** bought by CYPRESS, US in 2004
- **Betatherm (Irl)** founded in 1983, sensors, bought by Measurement Specialities, US in 2006

Difficulties for SME:

- To keep close contact with primes, for requirements and schedule
- To be aware of programmatic issues
- Various level of success in ESA programmes
- Difficulty to be in C/D phases as seen in statistics
- To be on institutional and commercial markets
- To take benefit of existing non-space knowledge
- Cost of access to technology sometimes highly depending on activity
- Competition with LSI, “make or buy” and high pressure on prices
- Long delays between investments and returns
- Low volumes, tight requirements for qualification to space environment
- Sustainability in long term.

Cost of access and conditions of success

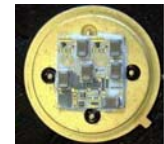
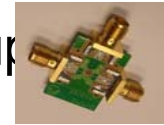
Bases for reflexion:

- Evolution of relations with primes:
- To improve forecast of procurements, to simplify procedures and over-requirements, to enlarge concurrent engineering with SME at the beginning of the project, (Primes not always in line with best practices), to develop LTA.
- Flight HW imposes qualification and strict quality rules at all levels, often unaffordable by SME, lots of paper work, and strong environment requirements.
- Permanent pressure on prices and productivity, low volumes and cyclic demand, need to be backed by a strong group or by a technology with various customer base, also in non-space domain.
- Need to look into synergies with another industrial domain, need for new competitive technology ;(it is “easier” to be more in intellectual services than on pure HW,(ASIC design)), to address value- added services, (processing, calibration of data, algorithms,...)

The Changing European Landscape

Current European Industrial Landscape on Components:

- Scattered teams for development, testing, design, sales, user support
- Small procurement volumes, volatile revenue streams.
- Increased technical requirements from customers.
- Unstable public funding (FP7, GSTP, ESA, CNES, DLR). Levels generally insufficient → patchy funding situation.
- High R&D and maintenance costs (expensive to spin-in).
- **Commercial Viability/ Single Source / obsolescence issues: e.g. 0.5 μm (obsolete in 2009), 0.35 μm (in 2011), 0.18 μm (by 2014).**

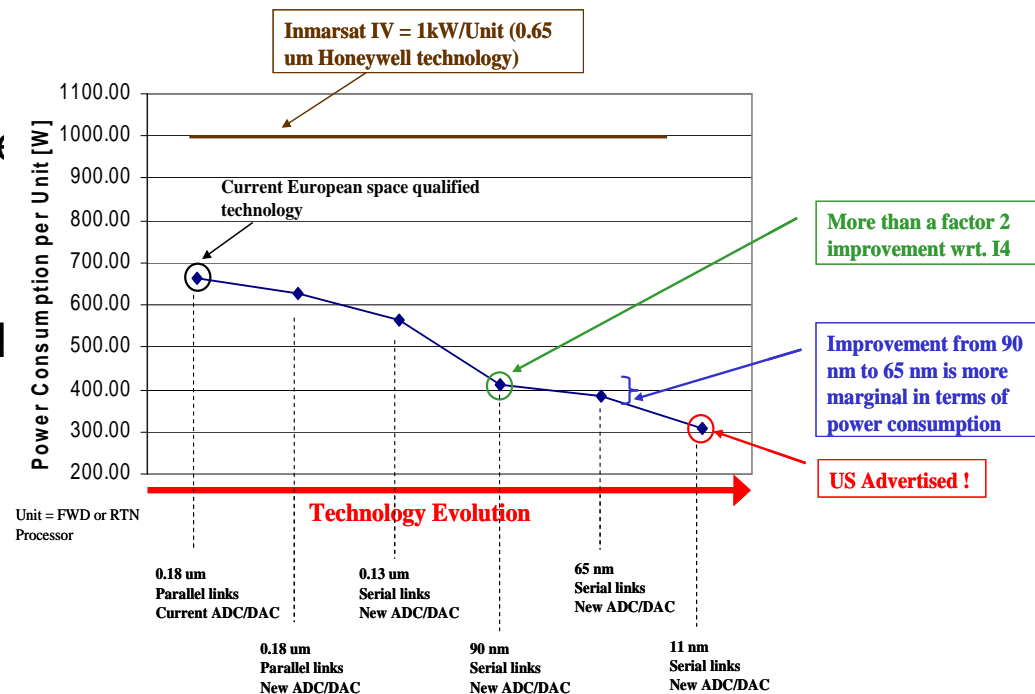


Massive Shift of Industrial Landscape:

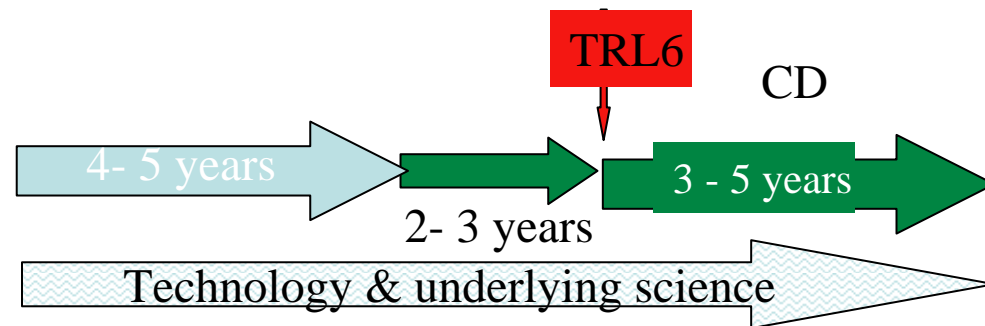
- Obsolescence of components and supply lines, move to DSM
- New Generation FPGAs (> 1 Mio cells)

The challenges, the context

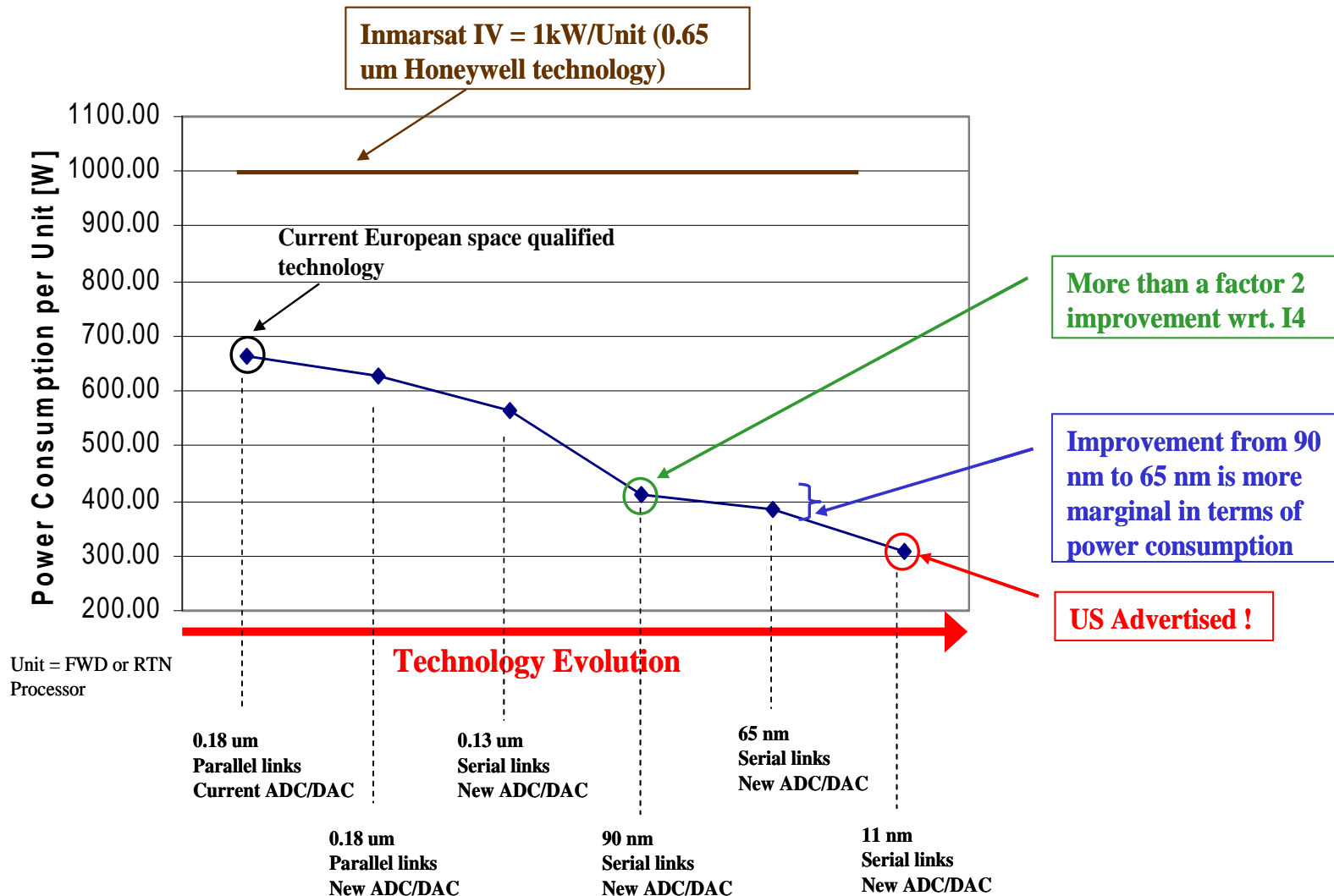
- Moving technology base
- Evolution terrestrial technology faster than technology for space
- De-localisation of technology capabilities,
- Affordability of space dedicated technology?
- System solutions?



4 to – 5 years to decide
 2 – 3 years PDR, TRL-6
 3 – 5 years to launch
 Telecommunications much shorter
 How to ride the right technology wave?



The challenge: evolution of technology base



- Innovation needs basic technology, generic products
- Innovation also in the way technology is assured for space: design, multi-project wafer, building blocks.

Required Capabilities/ Competencies

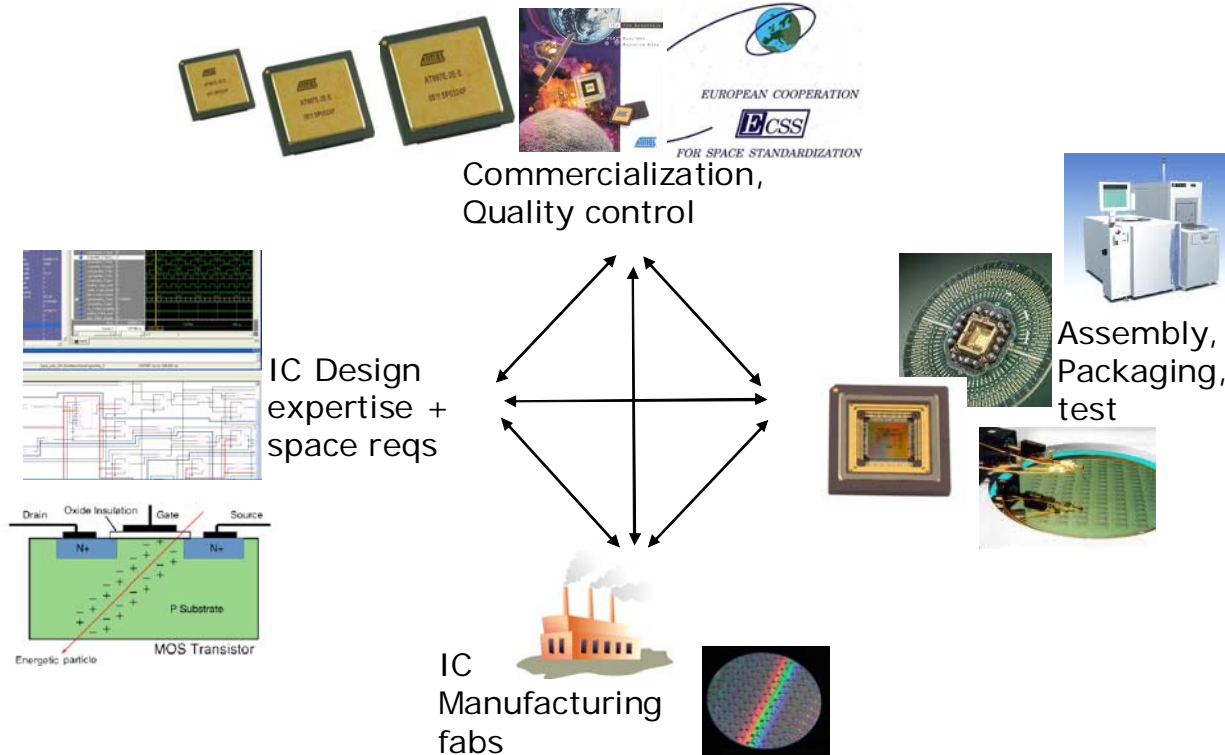
e.g. ATMEL, STm, TESAT, Alter (D, I, F, ES)

e.g. System Integrators (UK, D, I, F)

Equipment Suppliers

CAD vendors

Design Houses



e.g. MHS

SERMA

E2V

HCM

Alter

EGGO

Gaisler

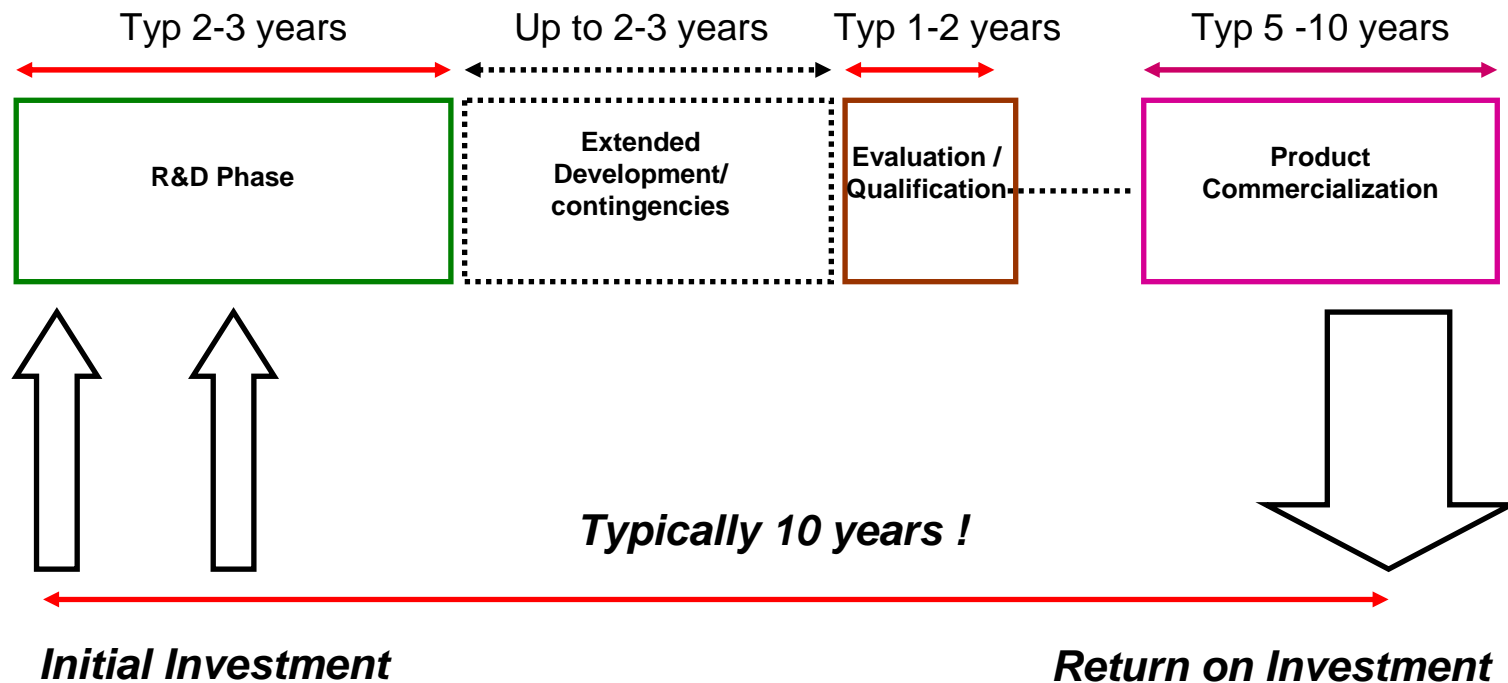
(F, CH, ES, CZ, S)

e.g. LFoundry, STm, XFab, AMS, Infineon, ON, IHP (D, F, I, UK, A, B)

Start cooperation with foundries in Far East.

Typical Strategic New Component Technology Timeline from R&D to Commercialization

Initial investment must be strongly backed-up by Institutional Sector in order to meet the time-to-market requirements of the customers.



Especially Small and Medium-size Component Manufacturers need strong support from ESA and NSA for entering the market successfully

Technology: Target setting



Very thin GaAs MJ cell



Mars Express



SOC



Star tracker



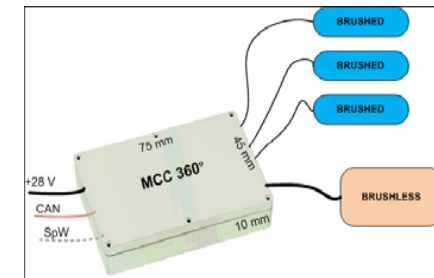
Sun sensor

Thin Film Solar Cells
 Motion Control Chip
 S/C SCOC3 on a Chip
 Sun Sensor on a Chip
 Star Sensor on a Chip
 Integrated avionics
 MINIMAL BOXES
 MINMAL HARNESS
 Advanced Motor Controllers
 Data modulated on power bus
 Die micro-packaging
 Sensor on chip

Mini-MEx



Advanced Motor Controller



- **Micro-systems, MNT are areas for action**
- **From small sats through μ -sats to cubesats (Education, IOD)**

Conclusion

- There is room for improvement, in particular as far as for the participation to ESA programmes;
- Product policy and Building Blocks development are essential;
- Need to address institutional and commercial programmes to increase the volume of production;
- To rely on existing technology competence, if possible linked with non-space activities, Institutes and Primes;
- Embedded SME 's structures are also fragile,(the loss of interest of mother company or the collapse of mother company as seen in last year crisis);
- Long-term investment sustained by public funding, and better understanding of the prime's requirements;
- The evolution of the component landscape and spin-in from non-space activities offers an opportunity;
- The existence of this tissue of competences, together with multiple competence institutes, are the key for space activities.

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Thank you !!