Dual challenges in Research for Thales

From nanotechnology to knowledge management

Thales : A global leader dedicated to security

25 %		50 %			25 %
Aerospace & Space		**Defence**			**Security**
Aerospace	Space	Air Systems	Land & Joint Systems	Naval	Security Solutions & Services

Three core businesses

▸ Aerospace & Space

▸ Defence

▸ Security

€12.7 bn annual revenues

■ A Worldwide Group

▸ 68,000 employees worldwide , presence in 50 countries

World leader for mission-critical information systems

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- ▶ THALES R&D = 2,4 B€ = 18 % Revenues
- ▶ 22500 Engineers & Researchers
- ▶ Of which R&T 17,5 % & Development 82,5 %
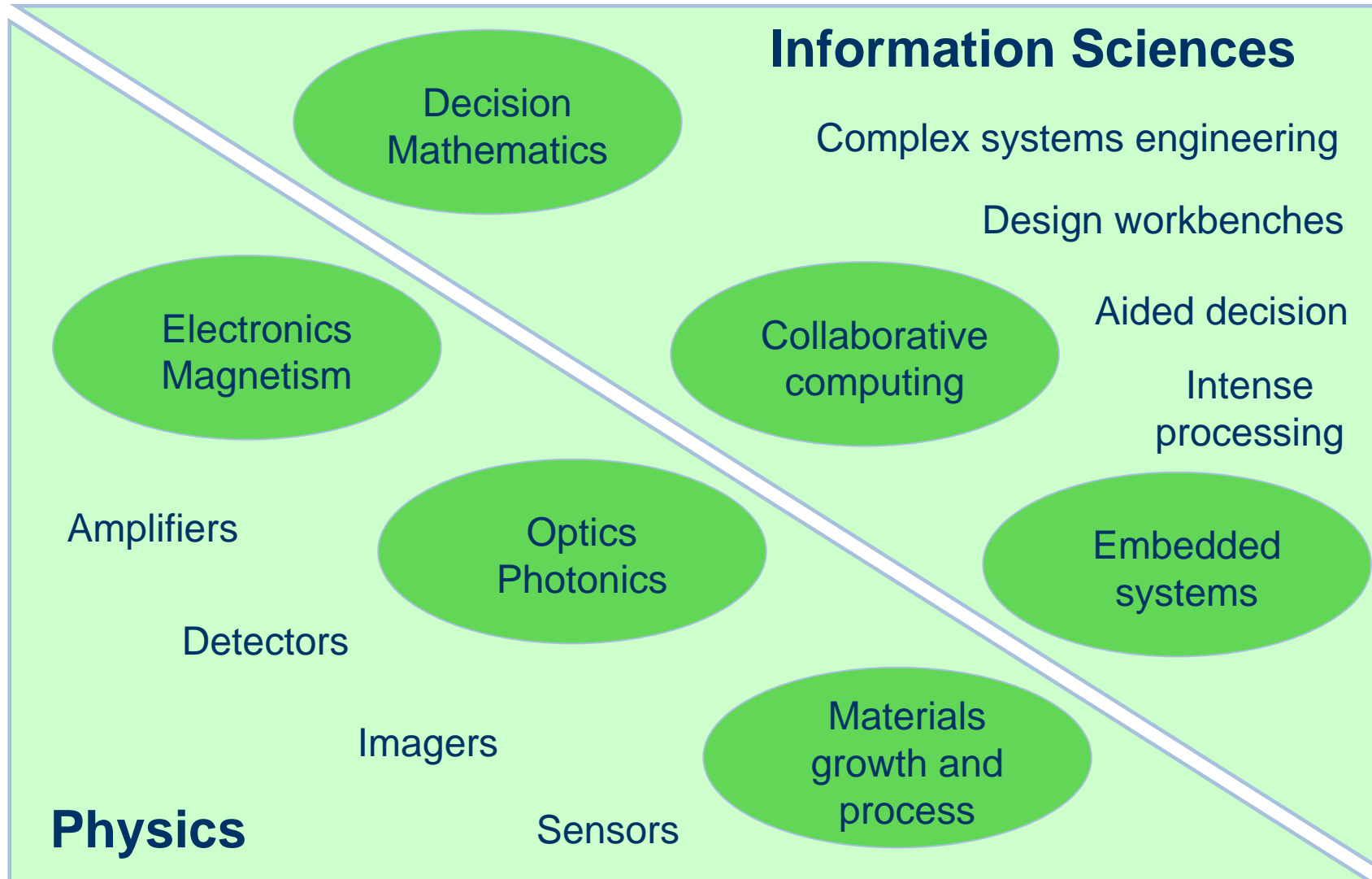- ▶ 300 Inventions / years & 1400 Patents

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Photo: Hans Mehlin

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Thales Research is a bridge between academic world

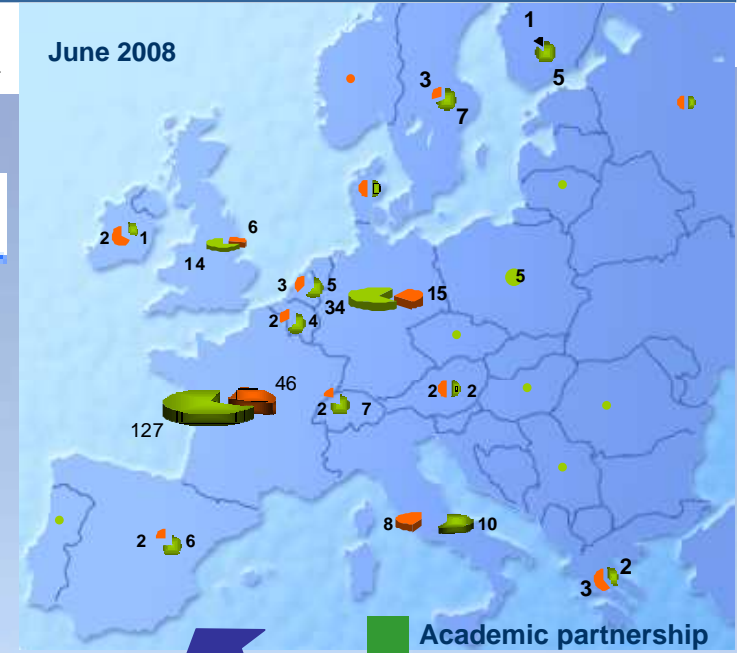and THALES Divisions to create necessary innovations to ensure growth,competitiveness and profitability.

▶ Over 30 cooperation agreements with universities and public research laboratories in Europe, the United States and Asia

Reading

Delft

Singapore

Palaiseau

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Two complementary families of competences

Information Sciences

Decision Mathematics

Complex systems engineering

Design workbenches

Electronics Magnetism

Collaborative computing

Aided decision

Intense processing

Amplifiers

Optics Photonics

Embedded systems

Detectors

Imagers

Materials growth and process

Physics

Sensors

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Academic partnership

Industrial partnership

« Cluster »
System@tic Paris-Région

Scientific Cooperation
Foundation
*« Digitéo » (Information
Technologies)
« Triangle de la physique »*

250 Academic
Cooperations with 140
Partners in 25
countries

100 Industrial
Cooperations with 90
Partners in 17
countries

1 – Ecole Polytechnique   2 – Thales   3 – Institut d'Optique Graduate School 4 – ONERA   5 – Université Paris Sud Orsay   6 – CEA Saclay 7 – Synchrotron Soleil   8 – ENSTA   9 – Supelec   10 – LPN Marcoussis

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Vision

▸ Toward a much more integrated world: interoperability between platforms, military and security …

▸ Ambient intelligence, Internet of « things »

▸ Increased role for satellite

▸ Increased role for Autonomous Systems

▸ Better use of the frequencies

Key issues will be:

▸ Complexity management

▸ Architecture oriented engineering

▸ Interoperability with the world of IT

▸ Technology sourcing

Duality and openness

▸ Importance of components developed for car and games industry, embedded processors & sensors …

▸ Open architecture and open source software is becoming a must almost everywhere

▸ Technological ruptures:

  ▸ **Hardware : nanotechnologies**

  ▸ **Critical Information System**

    ▪ **cloud computing**

    ▪ **Telecom: Web 2.0**

  ▸ **Cognitive Science**

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Time & localisation :

▶ « Absolute » precision

▶ Critical system are using energy, bandwidth and availability for time synchronization

▶ Miniaturized absolute localization/ time reference might totally change system architecture

Nanotechnology :

▶ Thermal management is still a limitation factor

▶ Active thermal properties will overcome clumsy approach for thermal rejection

▶ Combination of material design and nanotechnology might give access to material with high thermal property while combining dynamic control of properties

Information management & Semantic:

▶ Information is more and more available, but the real need is to access to knowledge

▶ 14 billions URL of text indexed by Google

▶ Google News has 4500 sources in English, 500 in French

▶ 15 billion on Internet of 2D images

▶ 2 billion images on Flickr site

▶ Dailymotion: 60 millions videos, YouTube: 100 millions videos seen every day

▶ From search engine to semantic analysis

▶ Extracting intelligence out of a large set of various types of information allowing to better understand complex situations, detect weak signals and help intelligent decision making

▶ Question to be solved is to define solution able to combine Multimodality (text, image & video, speech, data) ; Interoperability; Speed of Treatments & Robustness, Scalability and Security

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Program in cooperation have demonstrated great achievements

▶ Goce or Herschel Planck with a unique combination of expertise and driving forces between agencies , research labs and industry

▶ Dedicated efforts like those are indisputably needed for great challenges that humankind is facing, unlocking secrets of our planet and universe

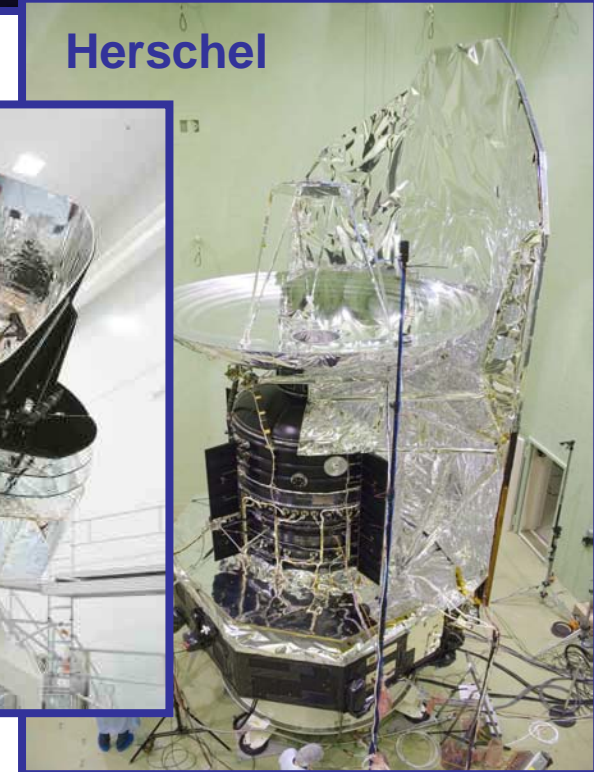**As much as critical are the challenges of open collaboration**

▶ For defense and space major breakthrough will come from spin in of innovation of other sectors

▶ Being local for immediate and diffuse interactions between academic, research lab and industry is a key factor of success

BUT,

does not contradict the need and the benefit of international collaboration

GOCE

Herschel

Planck

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