
P3
save energy
keep track
anticipate
lower cost
save time
stay tuned
improve performance
feel secure
Holst Centre
Open Innovation by IMEC and TNO

February 10, 2011

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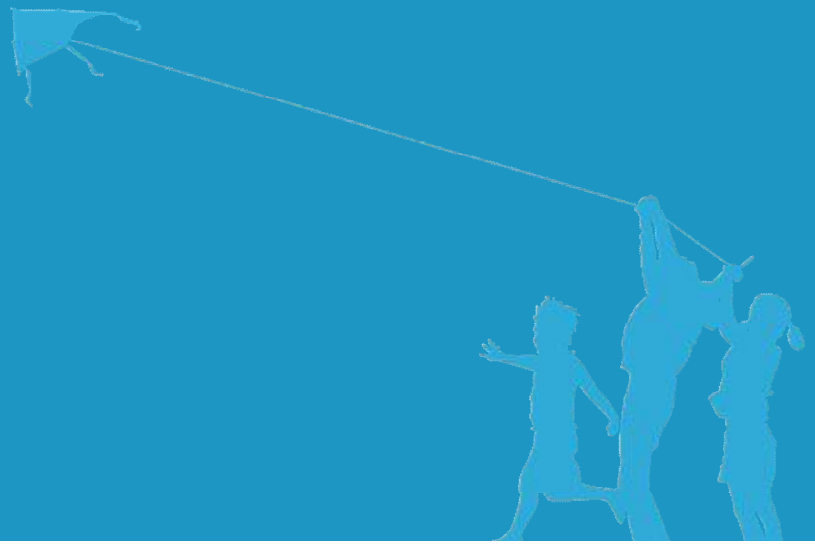
Wireless Autonomous Sensor Technologies

&

Flexible Electronics

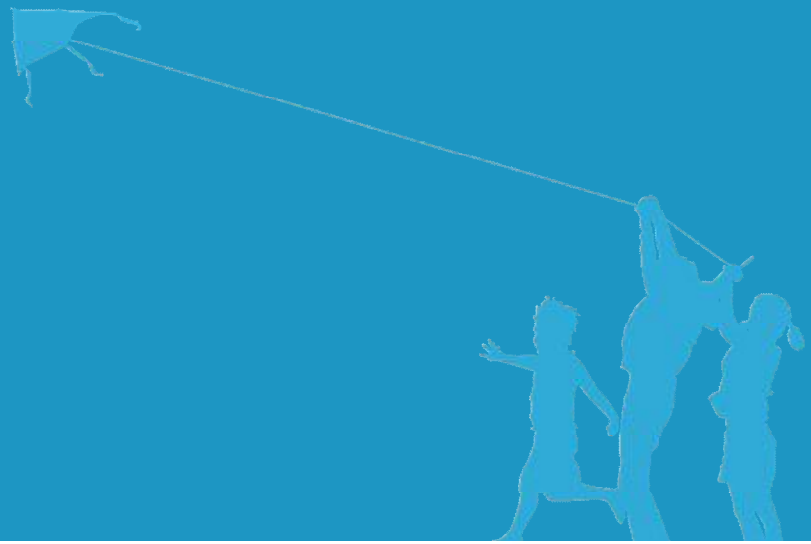


An Open-Innovation Initiative by imec and TNO

Presentation overview

- General overview

- Research focus

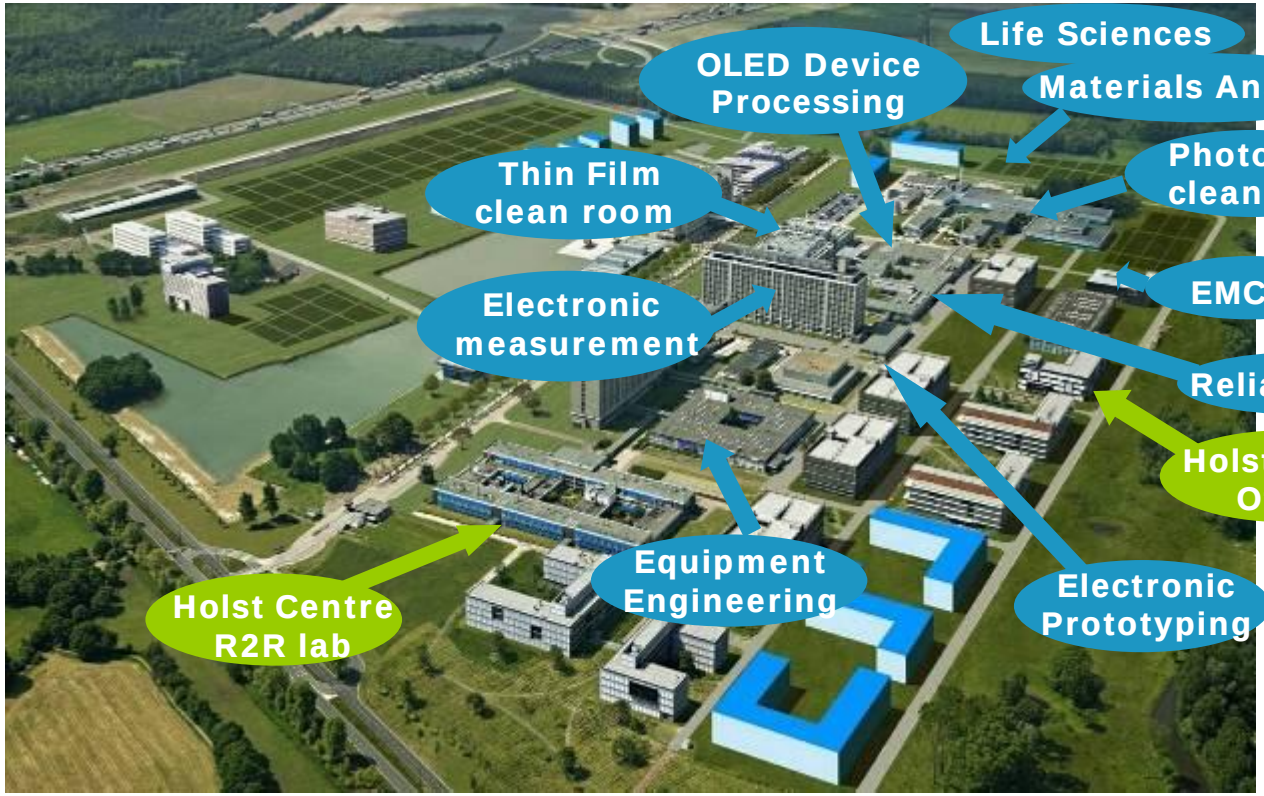


Holst Centre: a solid partner in research

- **Independent, with reputed parents**
  - **Founded by imec (1300 fte, Belgium) and TNO (4500 fte, The Netherlands)**
  - **Established in 2005**
- **Critical mass**
  - **Own staff 150; 25 nationalities**
  - **60 resident researchers from industry and universities**
- **Global network**
  - **Industrial and academic partners**
- **Supported by the Dutch government**
  - **Measured by its international excellence, long-term vision and impact on Dutch economy**

NL Agency
Ministry of Economic Affairs

Located at the hotspot of human-focused innovation

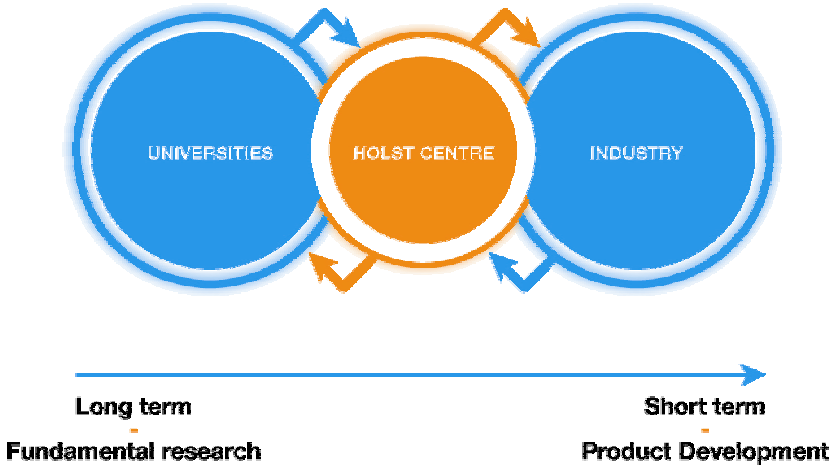


- **Access to state-of-the-art on site facilities (MiPlaza)**
- **Heart of the Brainport region:**
  presence of and attraction pole for high-tech partners and talent
- **Part of the ELAt triangle:**
  cross-border collaborations

Clear focus speeds up innovation

- **Generic technologies, time to market 3..10 years**

- **Bridging the gap between academia and industry**

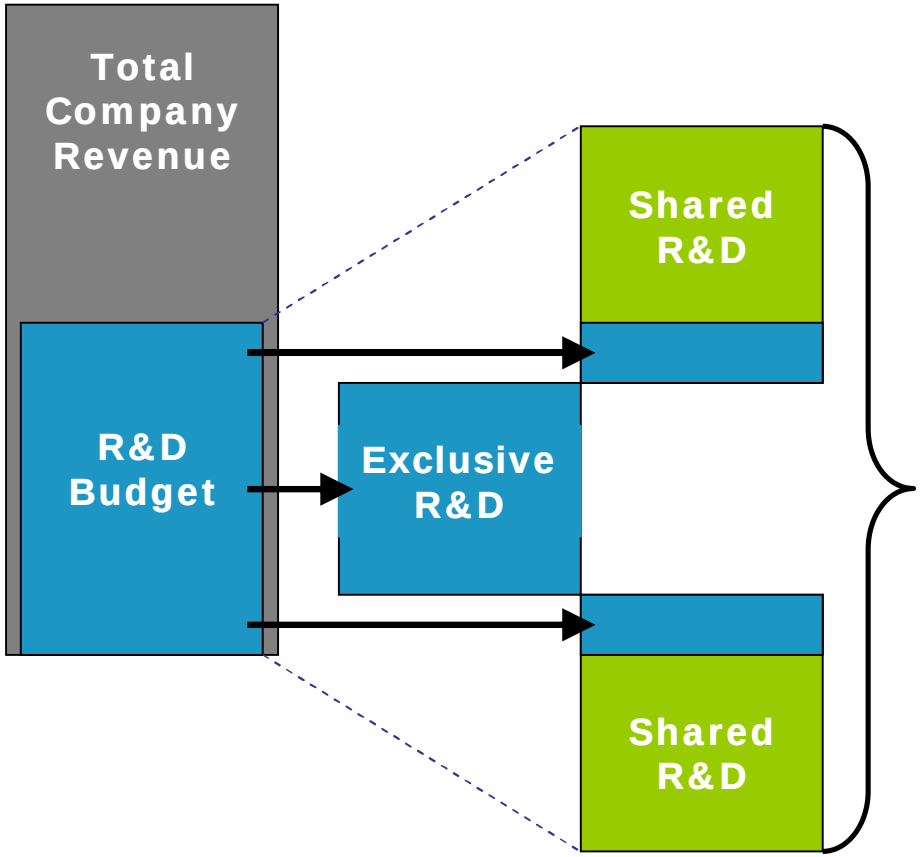


Tackling the R&D costs and risks

Innovation becoming more complex:

we can't stop innovating…

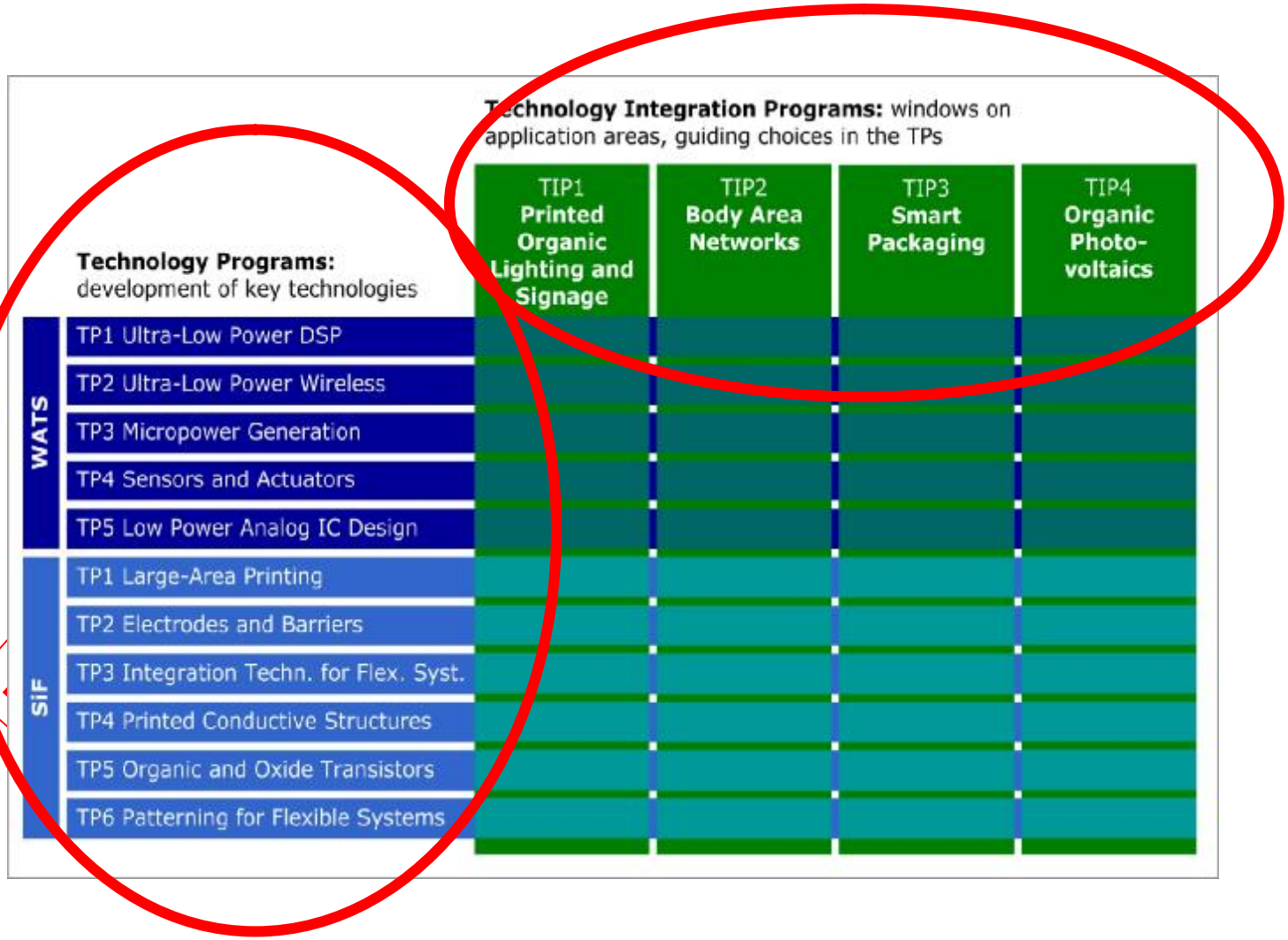
…but we can't bear the costs and risks anymore



Leverage:

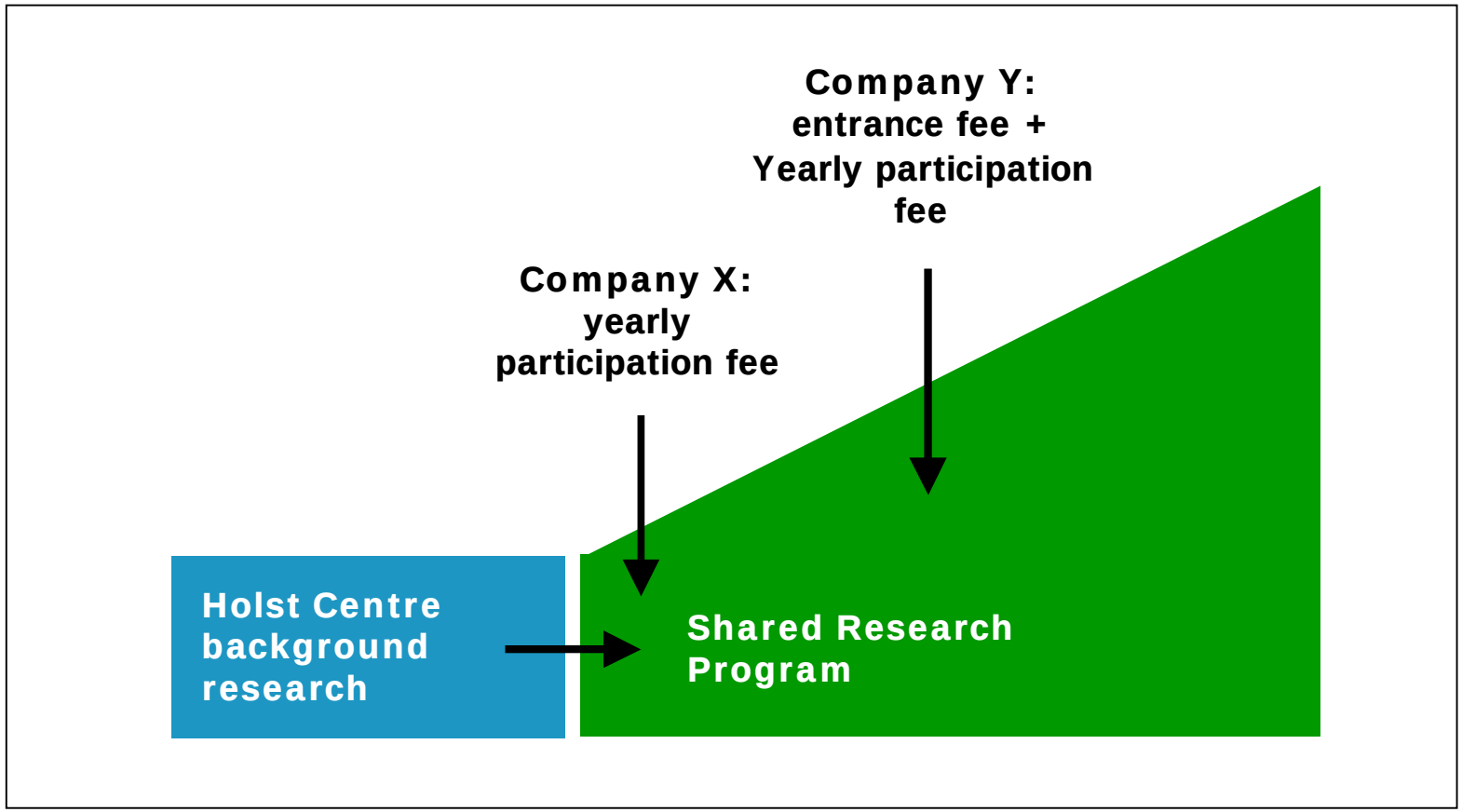
1. **Innovating by combining ideas**
2. **Sharing of facilities and competencies**
3. **Reducing time to market**
4. **Sharing of R&D costs and risks**

Programs aligned with industrial needs



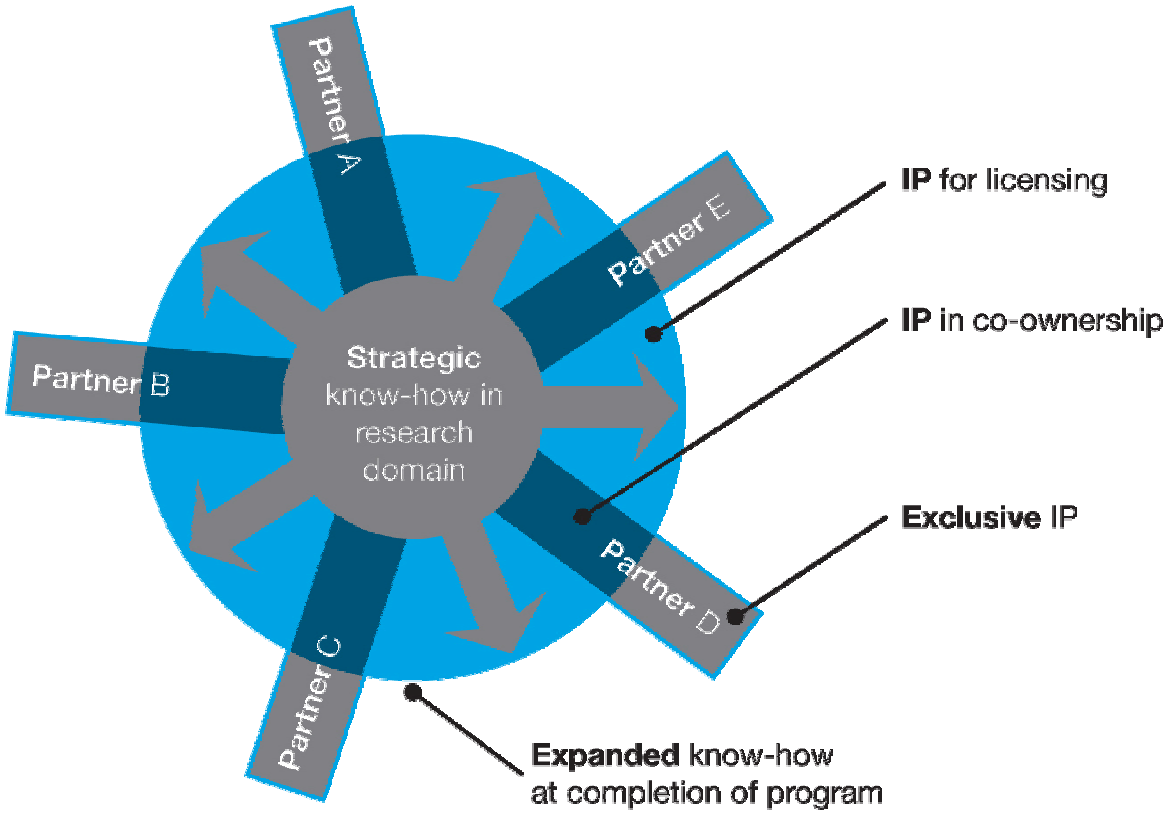
Open consortia

- **Bringing in new partners in line with program needs**
- **Creating fair situation between earlier and later entrants**



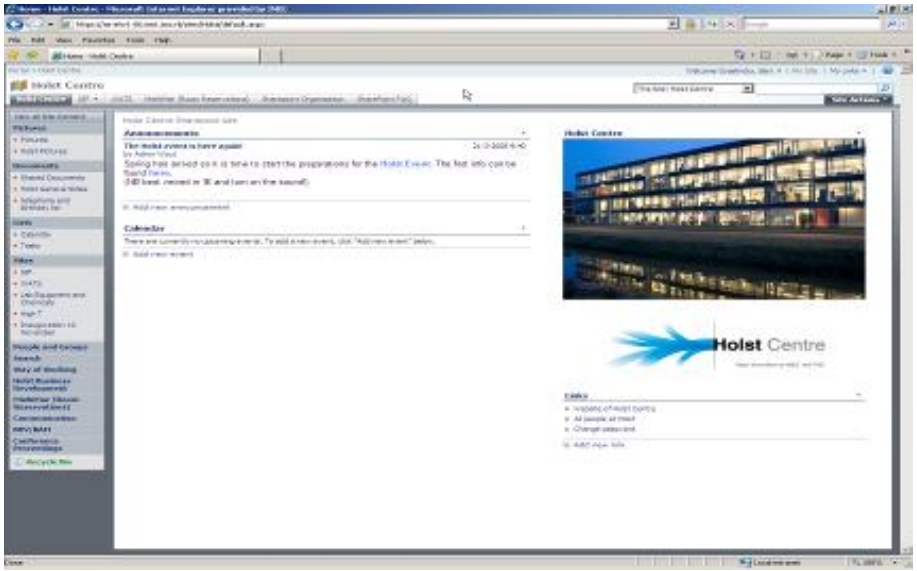
Well defined IP model

- **Add value by collaborating in precompetitive stage**
- **Results are shared between partners**



Partnership Model

- **Residents**
  - Work in Holst Centre teams on topics relevant to partner
  - Participate in team meetings
  - Transfer of know-how to partner
- **Semi-annual partner meetings**
  - Review of technical progress
  - Discuss activities next period
- **One-to-one meetings**
  - Sessions at Holst Centre and at partner premises
- **On-line information sharing on Holst Centre Sharepoint**
  - Quarterly progress reports
  - Technical notes
  - News and background information



Industrial partners from across the value chain

Talent

- 50 % non-Dutch (25 nationalities)
- 50 % PhD degree
- 50 % starter (average age = 36)

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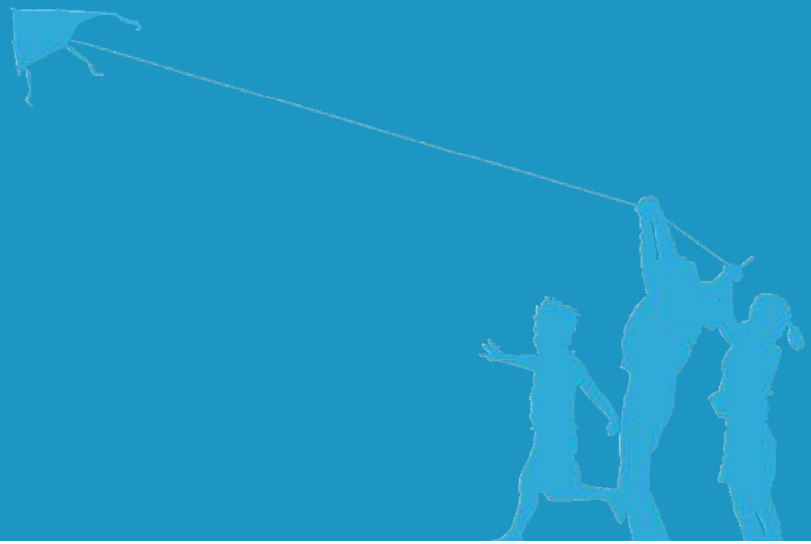


Programs aligned with industrial needs

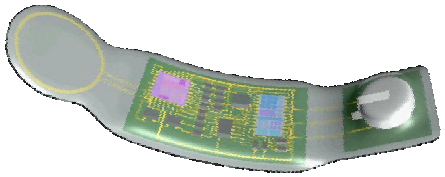
Technology Integration Programs: windows on application areas, guiding choices in the TPs

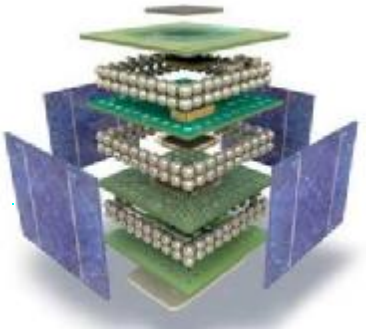
Technology Programs: development of key technologies

		TIP1 Printed Organic Lighting and Signage	TIP2 Body Area Networks	TIP3 Smart Packaging	TIP4 Organic Photo-voltaics
WATS	TP1 Ultra-Low Power DSP				
	TP2 Ultra-Low Power Wireless				
	TP3 Micropower Generation				
	TP4 Sensors and Actuators				
	TP5 Low Power Analog IC Design				
SiF	TP1 Large-Area Printing				
	TP2 Electrodes and Barriers				
	TP3 Integration Techn. for Flex. Syst.				
	TP4 Printed Conductive Structures				
	TP5 Organic and Oxide Transistors				
	TP6 Patterning for Flexible Systems				

Wireless Autonomous Sensor Technologies

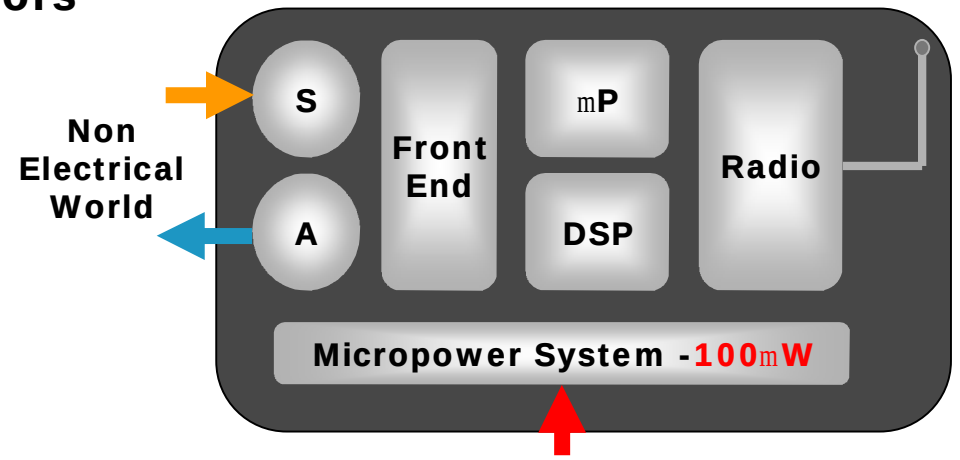
- **Cover all basic building blocks of a wireless sensor node**
  - § Digital signal processing (DSP)
  - § Wireless communication
  - § Micro-power generation and storage
  - § Sensor and actuator technology
  - § Analog IC design





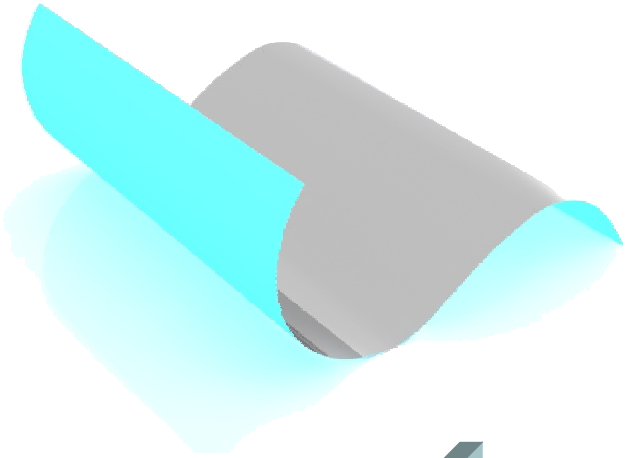
- **Integration in various form factors**
  - § 3D stack
  - § Flexible / stretchable

- **Technology drivers**
  - § Ultra-low power
  - § Miniaturization
  - § Low cost processes

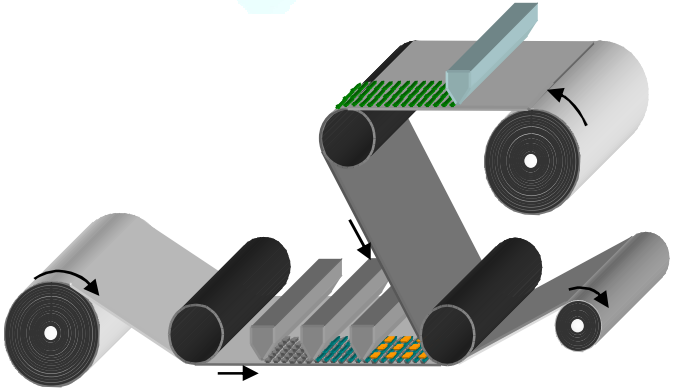


Flexible Electronics

- **Cover all processes to enable fabrication and lamination of functional foils (OLED, OPV, display, RFID…)**
  - § Large-area printing
  - § Electrodes and barriers
  - § Integration technologies for flexible substrates
  - § Printed conductive structures
  - § Organic and oxide transistors
  - § Lithography on flexible substrates



- **Technology drivers**
  - § Large area
  - § Low cost
  - § Compatible with roll-to-roll processing



Programs aligned with industrial needs

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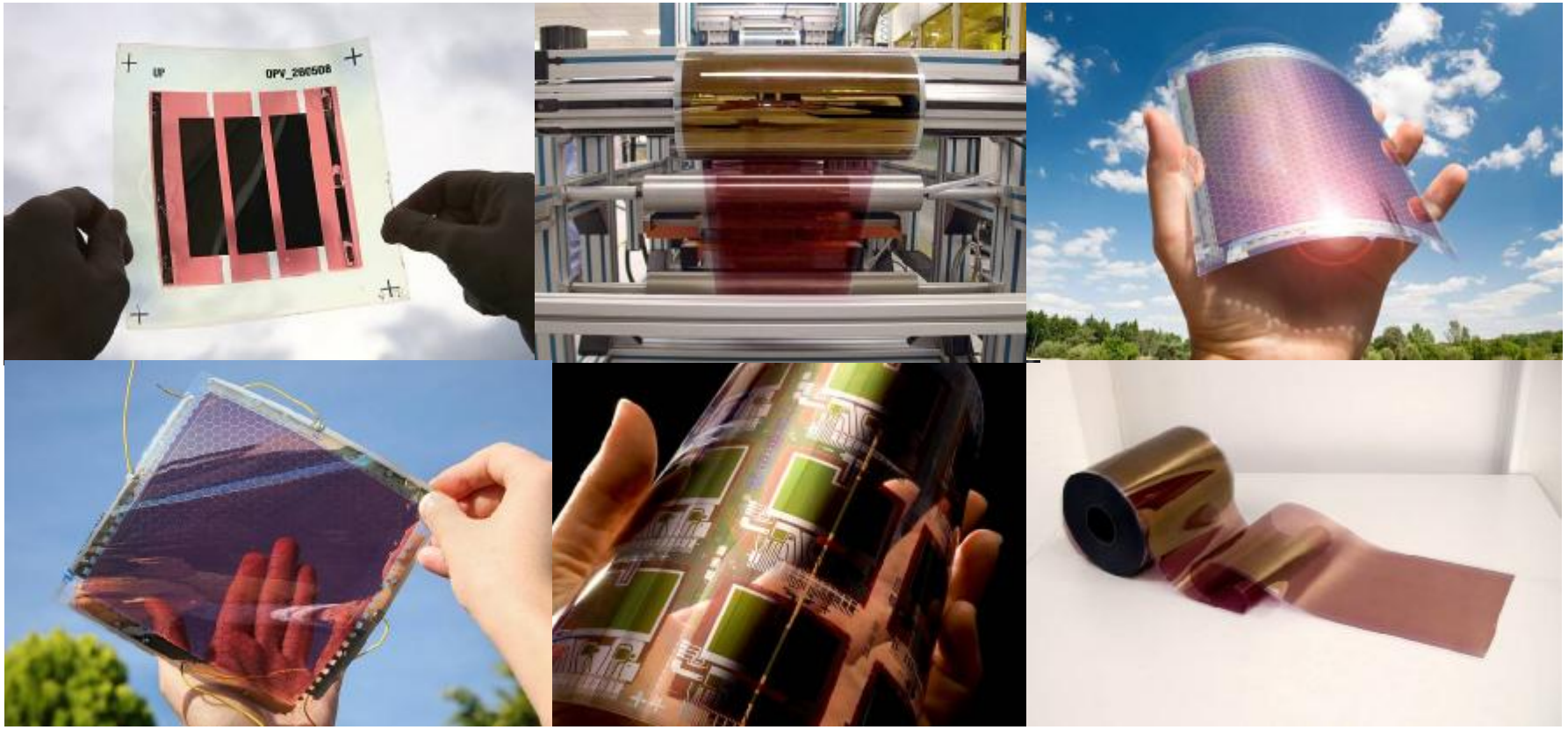
Body area networks: technology demonstrators

Flexible OLED lighting: technology demonstrators

Organic photovoltaics: technology demonstrators



ECN
Energieonderzoek Centrum Nederland

Smart Packaging: technology demonstrator

Holst Centre

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Visit us at

www.holstcentre.com