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# FBK Center for Digital Industry

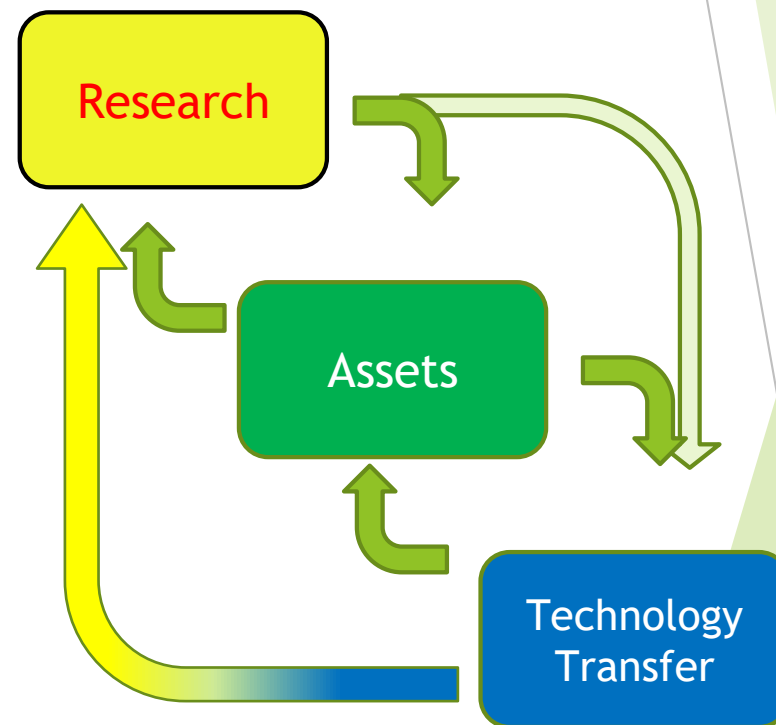
*Alessandro Cimatti*  
*Fondazione Bruno Kessler*  
*Trento, Italy*

# DICenter: Unita' di ricerca e cifre

- ▶ **3D Optical Metrology**
- ▶ **Technologies of Vision**
- ▶ **Machine Translation**
- ▶ **Open IoT**
- ▶ **Data Science**
- ▶ **Embedded Systems**
- ▶ **Software Engineering**
- ▶ **Budget 2021**
  - ▶ Costs 5.6 MEU
  - ▶ Revenues 3.8 MEU
  - ▶ Self-funding 68%
- ▶ **People**
  - ▶ 110 (staff, postdocs, RA, PhD)
  - ▶ 32 staff
- ▶ **ASN**
  - ▶ 7 Associate professor
  - ▶ 8 Full professor

# La ricerca guidata dal Trasferimento Tecnologico

- ▶ *Risolviamo I vostri problemi con la scienza*
- ▶ Fasi
  - ▶ Ricerca su temi di rilevanza pratica
  - ▶ Sviluppo di sistemi maturi, ad alto TRL
  - ▶ Risultati trasferiti sul campo applicativo
  - ▶ Nuovi temi di rilevanza pratica
- ▶ Riutilizzo di asset tecnologici
  - ▶ indipendenza dal dominio applicativo
  - ▶ continuo reinvestimento e manutenzione

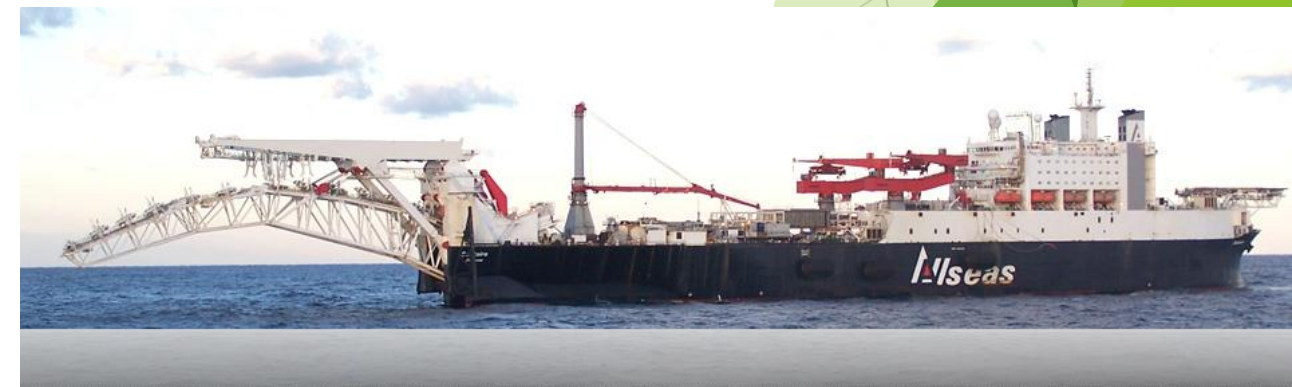


# Principali campi applicativi

- ▶ Industria Digitale
  - ▶ Produzione industriale
  - ▶ con problemi dal punto di vista tecnologico e di processo
  - ▶ Produzione flessibile/on-demand
- ▶ Agricoltura Digitale
- ▶ Beni Culturali

# Settori applicativi

- ▶ Ferroviario
- ▶ Avionica
- ▶ Spazio
- ▶ Oil and Gas
- ▶ Energie sostenibili
- ▶ Biomedicale
- ▶ Manifatturiero
- ▶ Agritec



# Digital Industry: Applicazioni di Riferimento

## ► Sistemi Safety-Critical

- Complex domains where design flaws and runtime errors may have fatal consequences, certification procedures

## ► Sistemi Adattivi e Autonomi

- Systems able to adapt to changing environmental conditions, and to autonomously plan and execute suitable course of actions to achieve run-time objective

## ► Sistemi di Percezione Avanzata

- Modules to support industrial process operations with leading-edge research techniques (DSP, vision, model-predictive control...)

## ► Sistemi di Diagnostica e Predizione

- Integrated platforms for big data analytics for diagnosis, prognosis, and predictive maintenance

Formal  
Verification

Testing

Runtime  
Monitoring

Requirements  
Engineering

Diagnosis

GIS

DSP

Planning

Reverse  
Engineering

Temporal  
Logics

Machine  
Translation

Machine  
Learning

IoT  
Platforms

Visual  
Geometry  
and models

Metrology

Edge Computing  
for IoT

Cartography

BIM

Blockchain-  
Enabled IoT

Scene  
Understanding

Extended reality

Competenze di base

MBD

Monitoring  
Control

Data  
Analytics

Perception  
Prediction

Soluzioni Integrate

Autonomy

Mission Management

Navigation

Payload

Predictive  
Maintenance

Background knowledge

Data  
Collection

Fusion

Progetti Trasversali

AgriTech

Joint Research  
Unit with FEM

SMACT

Competence  
Center on I4.0

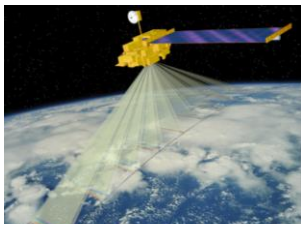
Iniziative Strategiche

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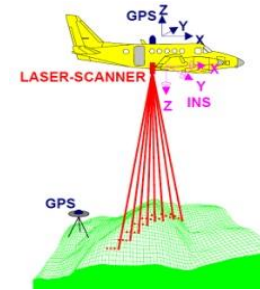
# Focus: Metrologia Ottica per i Beni Culturali



- ❑ 3DOM = 3D Optical Metrology
- ❑ Raccolta dati e modellazione 3D
- ❑ ambiente, città, piccoli oggetti, industria, beni culturali
- ❑ Principali competenze:
  - ❑ Optical sensor calibration / investigation / characterization
  - ❑ Acquisizione dati e analisi (immagini e dati spettrali)
  - ❑ Applicazioni metriche
- ❑ Data: immagini, ranges, GNSS, mappe, etc.

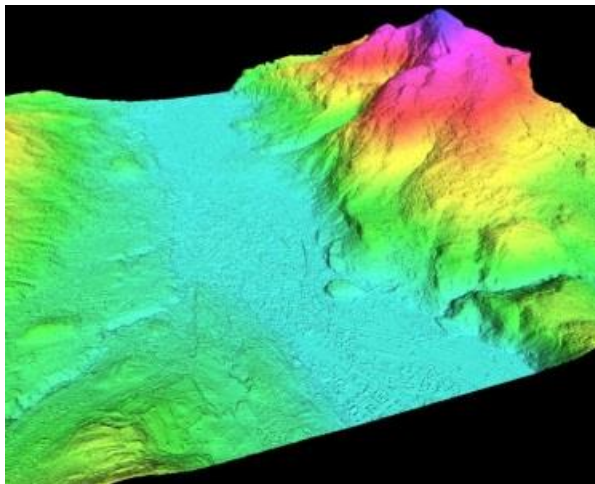
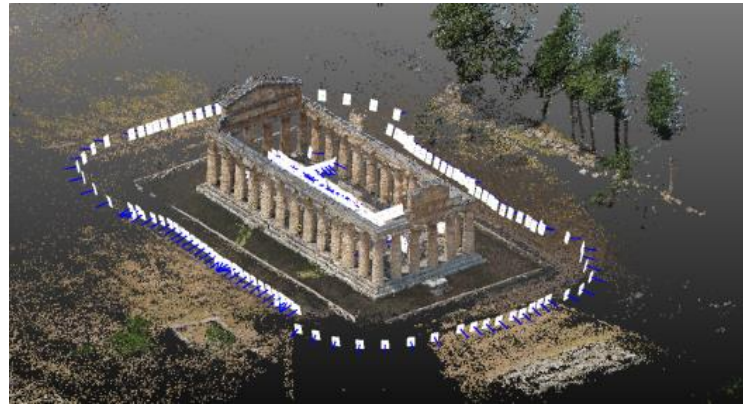
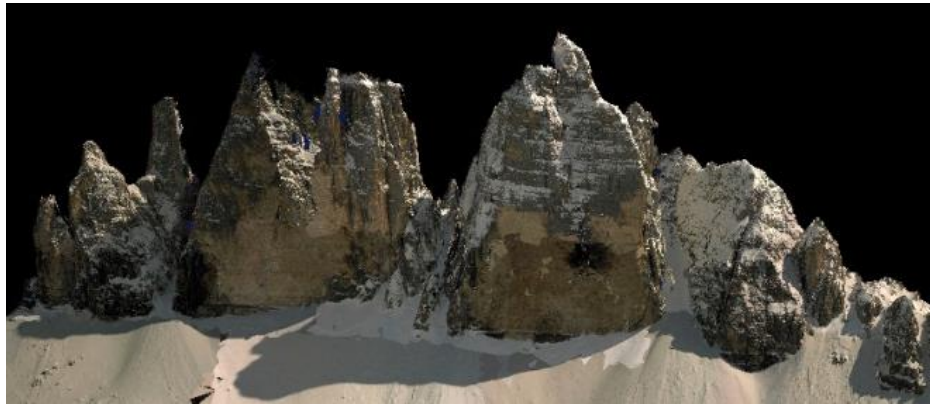


*Sensori passivi*



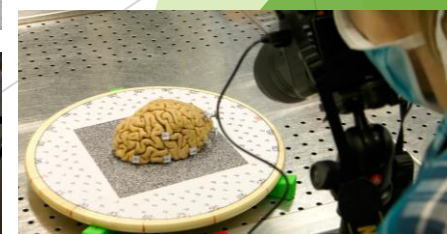
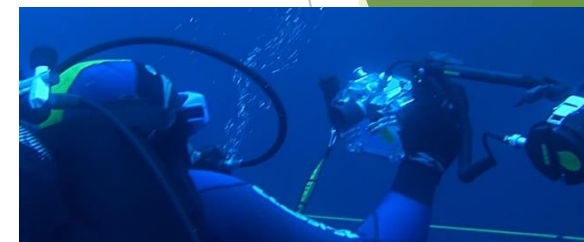
*Sensori attivi*

- **Ricerca applicata** nei campi del 3D surveying, Fotogrammetria, Scansione Laser, Sensing Remoto, Realta' virtuale ed aumentata
- **Campi applicativi:** metrologia industriale, mappatura rapida, cartografia, modellazione 3D, beni culturali, immagini medicali, etc.
- Sviluppo di **metodologie e soluzioni software** per problemi di geomatica / geoinformatica / geospazio



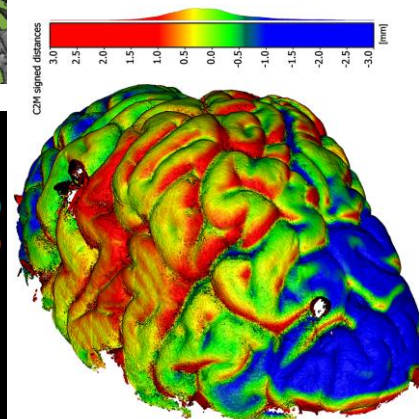
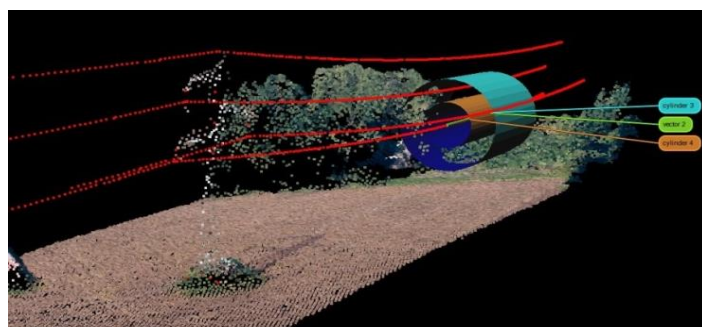
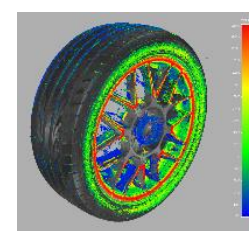
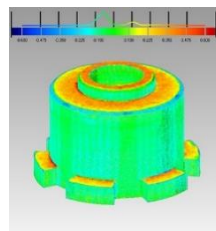
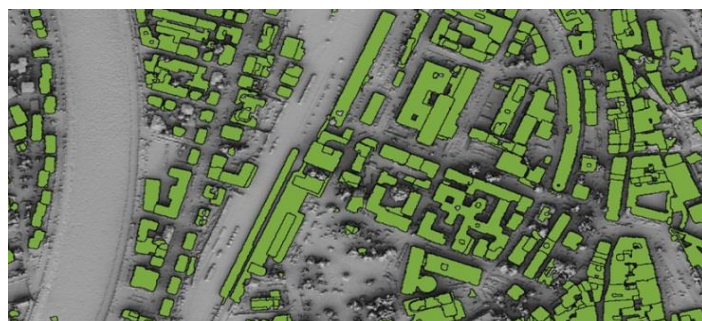
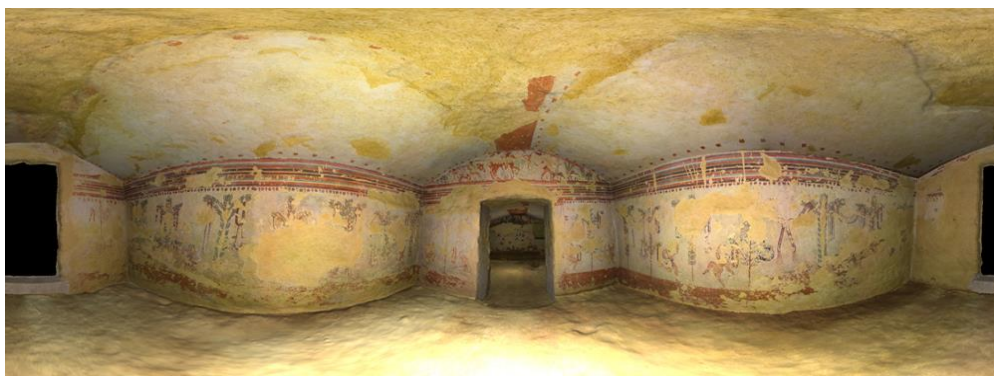


# Acquisizione dati sul campo





# Processing dei dati e sviluppo di soluzione innovative di Geomatica e Metrologia

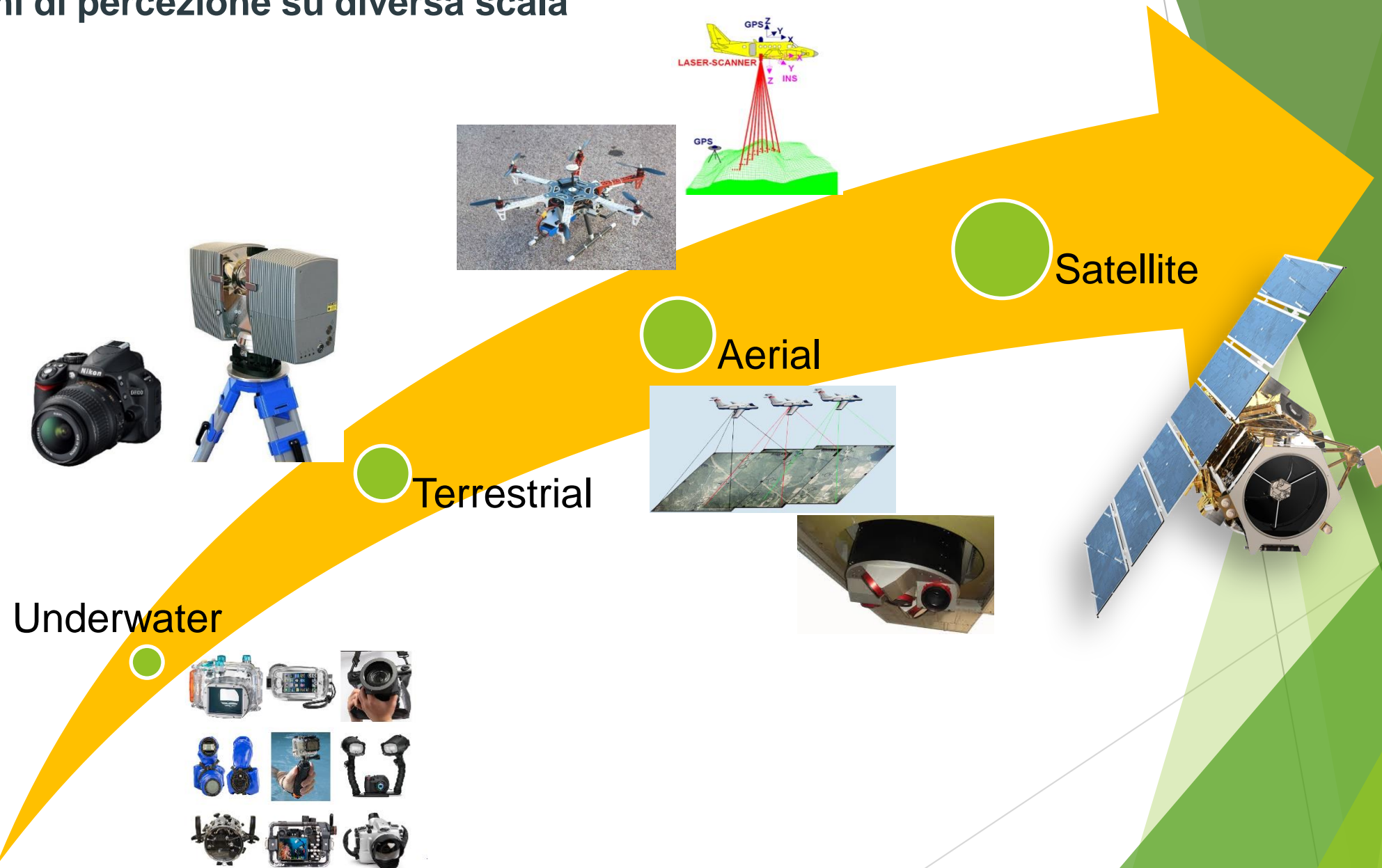




# Trasferimento tecnologico e della conoscenza



# Sistemi di percezione su diversa scala



# Applicazioni Multidisciplinari di Metrologia

## Metrologia Industriale

- Sensor characterization & integration
- Inspection & quality control
- Monitoring delle infrastrutture

## Beni Culturali

- 3D documentation
- Monitoring
- VR / AR
- Underwater

## Monitoraggio Ambientale

- Mapping & cartography
- 3D GIS
- Land Use and Cover (LULC) maps
- Geospatial analyses

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# Grazie per l'attenzione

Contact: Alessandro Cimatti ([cimatti@fbk.eu](mailto:cimatti@fbk.eu))