

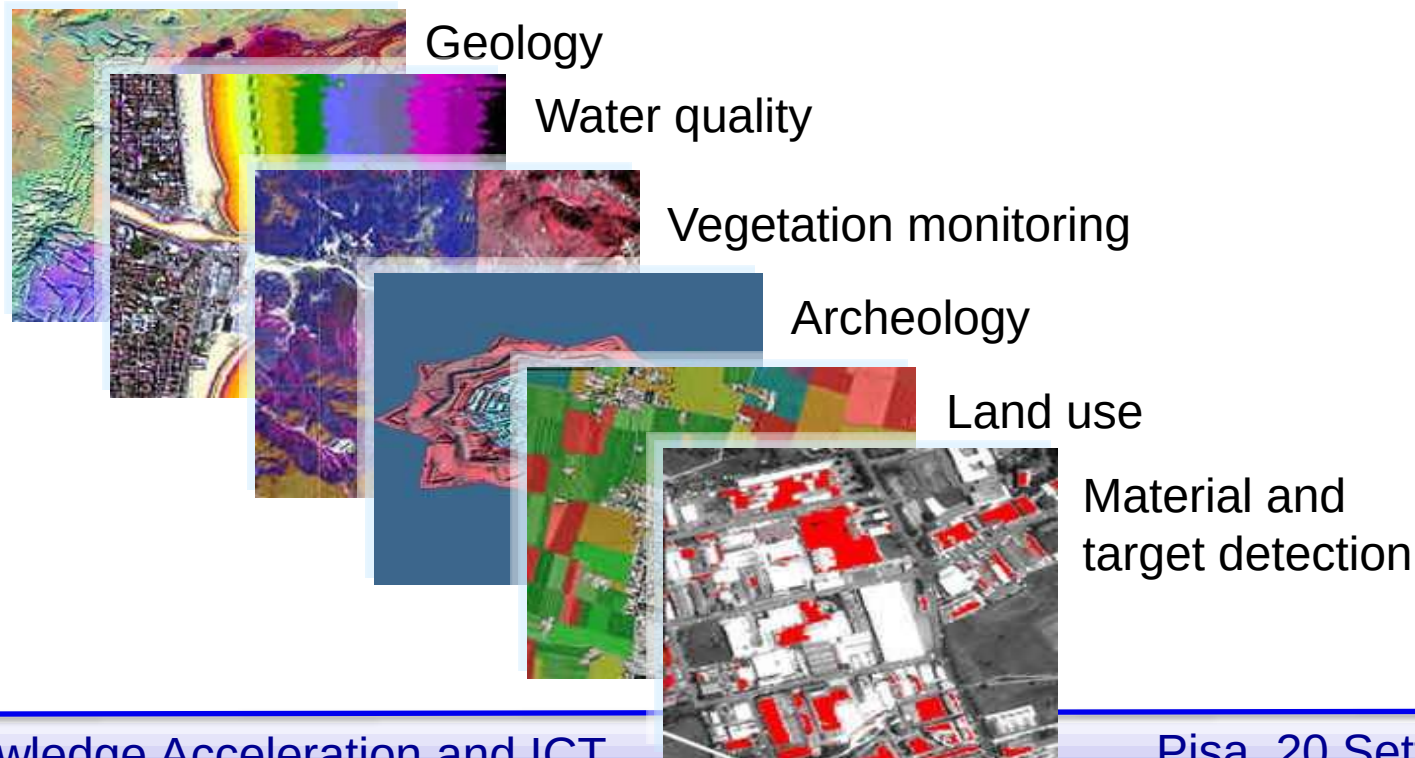


Remote Sensing for environment monitoring and surveillance applications

Prof. M. Diani
RS&IP group
Dipartimento di Ingegneria dell'Informazione
Via G. Caruso – PISA
Email: m.diani@iet.unipi.it
Phone: 0502217532

Remote sensing

- **Remote sensing** is the acquisition of information about an object or phenomenon without making physical contact with the object. Connection with surveillance applications is straightforward.





Integrated systems

- Recently remote sensing has evolved moving towards more complex systems made up by the integration of complementary sensors.

The monitored scene is sensed with different sensors in order to get :

- Detailed spatial information;
- Accurate spectral information;
- Optical properties in different spectral regions;

Platforms are equipped with GPS/INS instrumentation allowing accurate direct georeferencing:

- 3D structures from multiple images
- Context analysis;
- Multitemporal analysis.

Integrated systems

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- **Detailed spatial information;**



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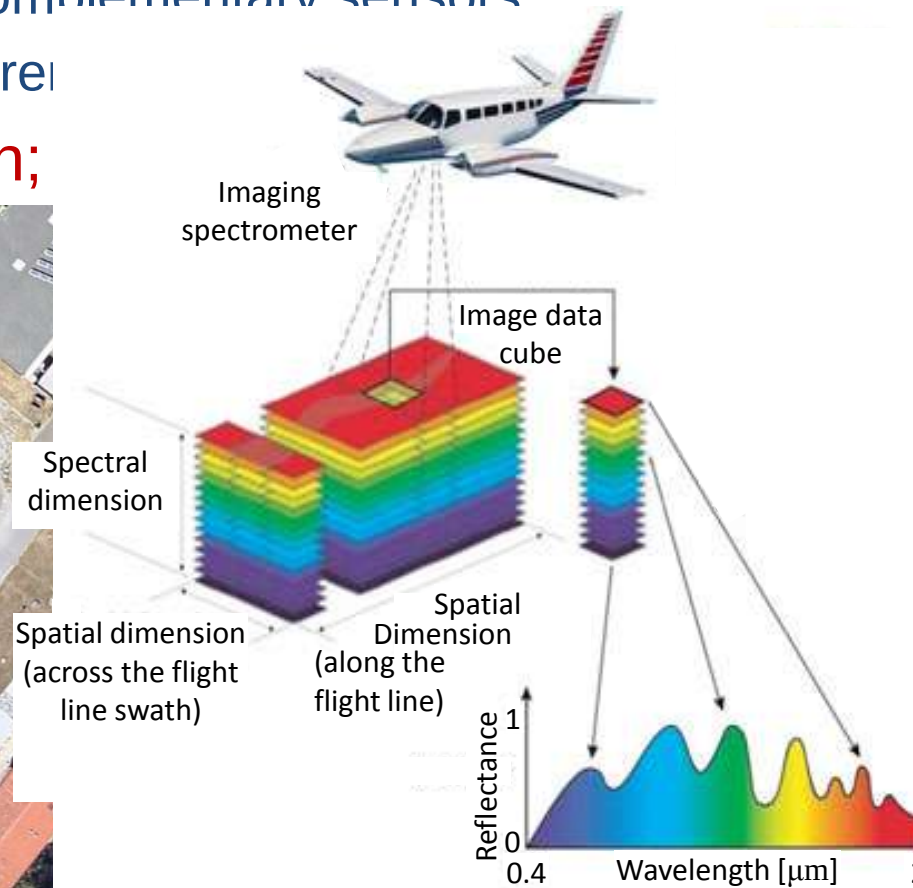
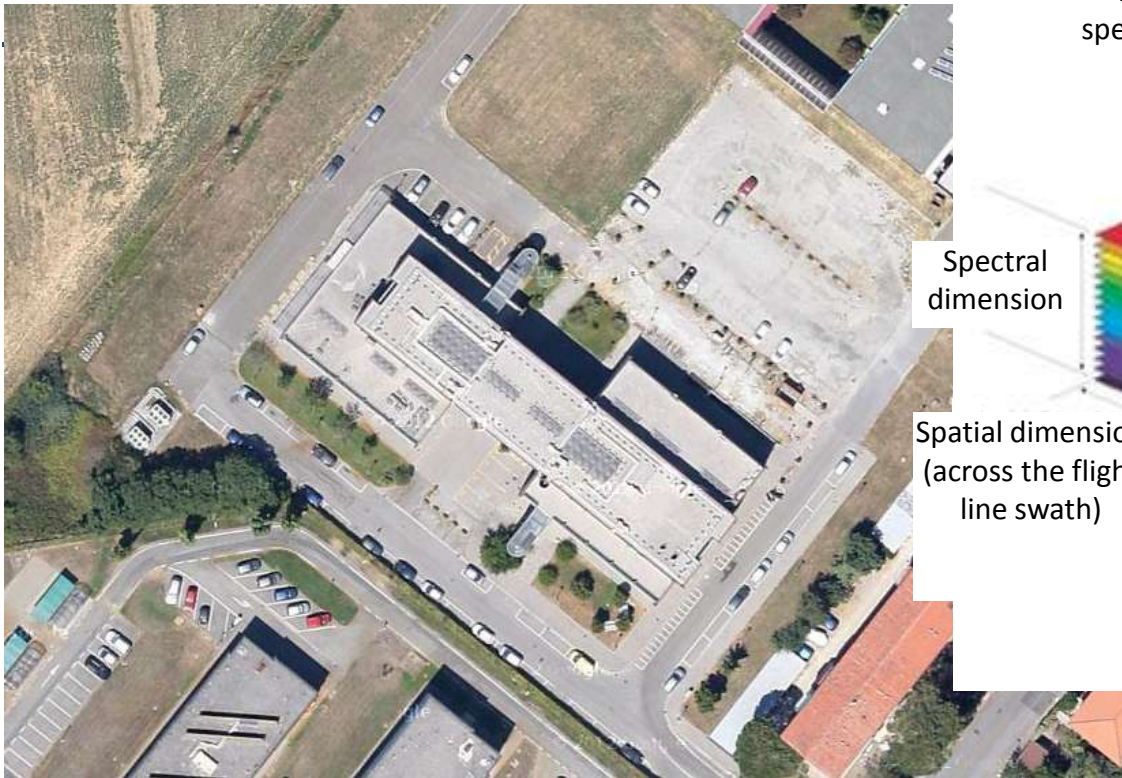
on allowing accurate

Integrated systems

Recently remote sensing has evolved moving towards more complex systems made up by the integration of complementary sensors

The monitored scene is sensed with different

- **Accurate spectral information;**





Integrated systems

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The monitored scene is sensed with different sensors in order to get :

- Detailed spatial information;
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- Optical properties in different spectral regions;

Platforms are equipped with GPS/INS instrumentation allowing accurate direct georeferencing:

- 3D structures from multiple images
- Context analysis;
- Multitemporal analysis.

Integrated systems

- Recently remote sensing systems made up by
- The monitored scene
- Detailed spatial
- Accurate spectral
- Optical properties



plex
get :

Platforms are equipped
direct georeferencing:

- 3D structures from multiple images
- Context analysis;
- Multitemporal analysis.



Now focus is on **integrated systems**

- Recently remote sensing has evolved moving towards more complex systems made up by the integration of complementary sensors.

The monitored scene is sensed with different sensors in order to get :

- Detailed spatial information;
- Fine spectral information;
- Optical properties in different spectral regions;

Platforms are equipped with GPS/INS instrumentation allowing accurate direct georeferencing:

- 3D structures from multiple images
- Context analysis;
- **Multitemporal analysis.**

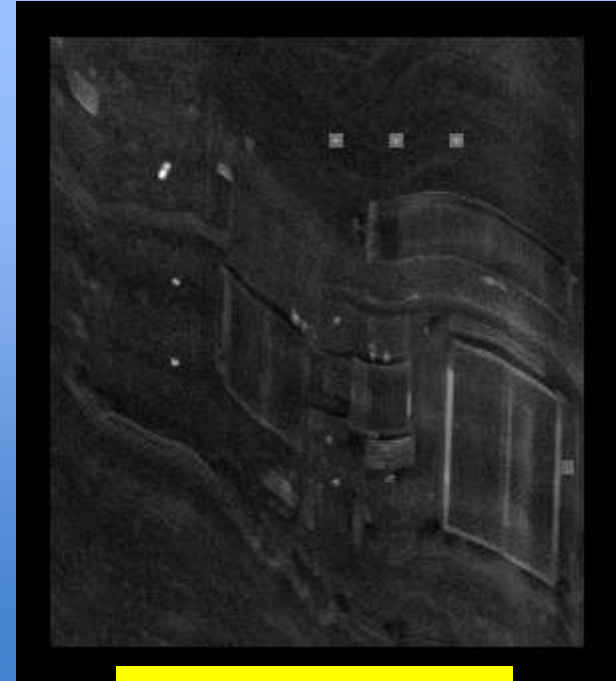
Integrated systems



T0



T1



Change detection

- Multitemporal analysis.

Integrated systems

Time

Spectral dimension



T0



T1



Change detection

- Multitemporal analysis.



Our expertise

- Complex systems demand new signal processing capabilities to automatically handle the huge amount of data and drive the operator to what is really of concern for the application of interest.
 - Preprocessing: redundancy reduction, filtering, noise estimation etc.
 - Spatial analysis (shape, length, width, orientation, etc.)
 - Spectral analysis (finding *spectral anomalies*, detecting a specific material, etc.)
 - Algorithms to build geometry from multiple images (e.g. 3D image reconstruction from the displacement map).
 - Accurate *georeferencing* and *coregistration*.
 - Detection and classification of *changes* in multitemporal images.



The RS&IP Group

Permanent staff

- Prof. G. Corsini
- Prof. M. Diani
- Dr. Ing. N. Acito

Post-Doc Reserchers and contractors

- Dr. A. Rossi
- Dr. S. Matteoli
- Ing. A. Zingoni

+ PHD and master thesis students

Facilities

- Image processing laboratory
WS, SW for image processing, acquisition devices, GPGPU, DSP.
- Remote Sensing laboratory
WS, SW Remote sensing, analysis tools.

Projects funded by or in cooperation with:

- Italian Space Agency (ASI)
- European Institutions (ONERA, TNO, RMA, FFI, FGAN etc.)
- MIUR
- Tuscany Region
- SELEX
- Local companies (IDS, FlyBy, etc.)