The potential of SAR and OPTICAL Sentinel images for the automatic monitoring of redevelopment sites

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Redevelopment Sites

- Redevelopment Sites (RDS) = real estate property
  - That was or is allocated to host an activity apart from housing
  - Whose current condition is against the good management of the site or represents a deconstruction of the urban canvas
Redevelopment Sites : Examples

Old « abattoir » in Wavre

2007

2014
Redevelopment Sites: Examples

Old « dépôt carburant » in Lasne

- 2010
- 2012-13
- 2015
- 2017
- 2018
Redevelopment Sites: Inventory

• 2,213 sites on 3,800 hectares in 2017

• Inventory update – Current methodologies:
  • Systematic review (survey and field visit)
  • Ortho-photos (photo-interpretation by an operator)

→ Need for automatic detection of changes
Answering the Users’ Needs

- Manpower reduction for the update of the inventory of the RDSs
- Easily identify sites that require further (manual) investigation

Information that needs to be provided:
SARSAR Objectives

• To develop a method that provides a report of the changes in an automatic way:
  • For each site
  • Using time-series
  • From satellite images at high temporal resolution

• To demonstrate the added value of SAR images from Sentinel-1
  • Provide high temporal resolution
  • Complement the information from Sentinel-2 multi-spectral images
  • Improve change detection performance
Methodology

- Exploitation of:
  - Sentinel-1 time series (sigma naught, textures, ...)
    Not affected by cloud cover → higher temporal resolution
  - Sentinel-2 time series (spectral indexes, textures, ...)

- Process:
  - Extract feature vectors
  - Rule-based classification → Scenarios
  - Produce report & update state (of each site)

- Implementation in Terrascope:
  - Virtual machine
  - Preprocessed data available
First results

- **Ortho-photos**

- **Sentinel-1**

- **Sentinel-2**
SARSAR Project

- 2 years:
  - April 2019 → April 2021

- 3 partners:
  - **SPW**: Service Public de Wallonie - Direction générale opérationnelle de l'Aménagement du territoire, du Logement, du Patrimoine et de l'Énergie
  - **RMA**: Royal Military Academy
  - **ISSeP**: Institut Scientifique de Service Public - Cellule Télédétection et Géodonnées