WA RRE DOC

Università per Stranieri di Perugia

ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

crea
Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

OneWorld OneWaterCenter
Metropolitan State University of Denver
Denver Botanic Gardens

International Workshop
OPEN/BIG DATA AND CITIZEN SCIENCE FOR MANAGING THE WATER, FOOD, ENERGY AND ENVIRONMENT NEXUS

AWARE & Satellite for Water Leaks detection

Technical Session– Perugia, November 22nd

Elena Francioni

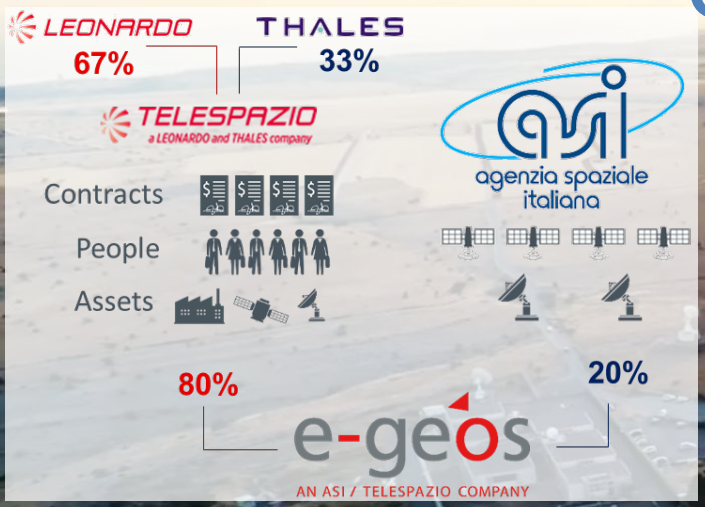
E-GEOS spa

e-geos
AN ASI / TELESPAZIO COMPANY

Outlines

- Company profile
- AWARE platform overview
- Context and Main needs
- The Partnership with ACEA
- Water Leaks Product & Technique

Company profile



e-GEOS is the exclusive commercial worldwide distributor of COSMO-SkyMed

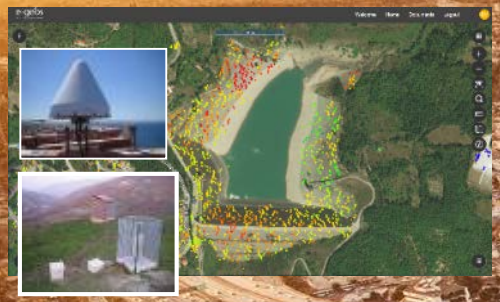
e-geos IS A GLOBAL LEADER IN GEOINFORMATION APPLICATIONS AND SERVICES

DATA OPERATOR | DATA ACCESS HUB | CONTENT DEVELOPER | SERVICES AND PLATFORMS PROVIDER | CONSULTANT

e-geos AN ASI / TELESPAZIO COMPANY

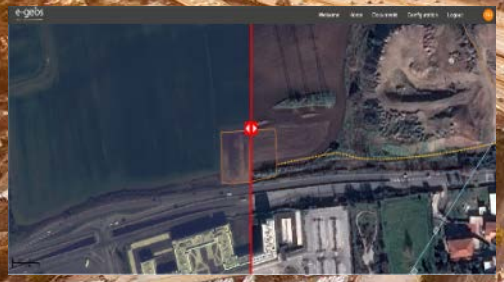
AWARE for a global knowledge of assets & infrastructures

Agile Watching of Assets and Resources



Health

Deformations & movements identification by the use of ***Satellite interferometric products***, ***GNSS monitoring***, ***IoT technology***, ***RPAS video***



Control

Monitoring the assets and infrastructure changes and activities in the surrounding by the use of specific ***Encroachment*** and ***Change detection analysis***, ***spatial analysis***, ***RPAS video,*** high resolution ***cartography*** and 3D models to monitor the surrounding area

Operations

Supporting the day by day management with ***GIS platform*** for continuous data management, integration and analysis

e-geos
AN ASI / TELESPAZIO COMPANY

THE CONTEXT

Water: the most important resource

The need

- **Water Leaks imply significant losses (M€) and waste of a valuable resource** (More than 40 Billion of liters lost every day ww)**.**
- **Water Leaks** are critical in water infrastructure management being very **difficult to be detected** over wide and underground network.

2015/1787/EU: from the retrospective control on the distributed waters, to the prevention and management of risks in the drinking water supply chain

PAST & (NEAR) FUTURE

UP TO NOW:
Random in situ inspection with acoustic instruments

Costly, time consuming, often not solving, based on non-specific consumption data

FROM NOW ON:
Satellite analysis to guide the in situ acoustic campaign

Costs and time reduction, effectiveness, based on the radar response to humidity and on capillarity of water!

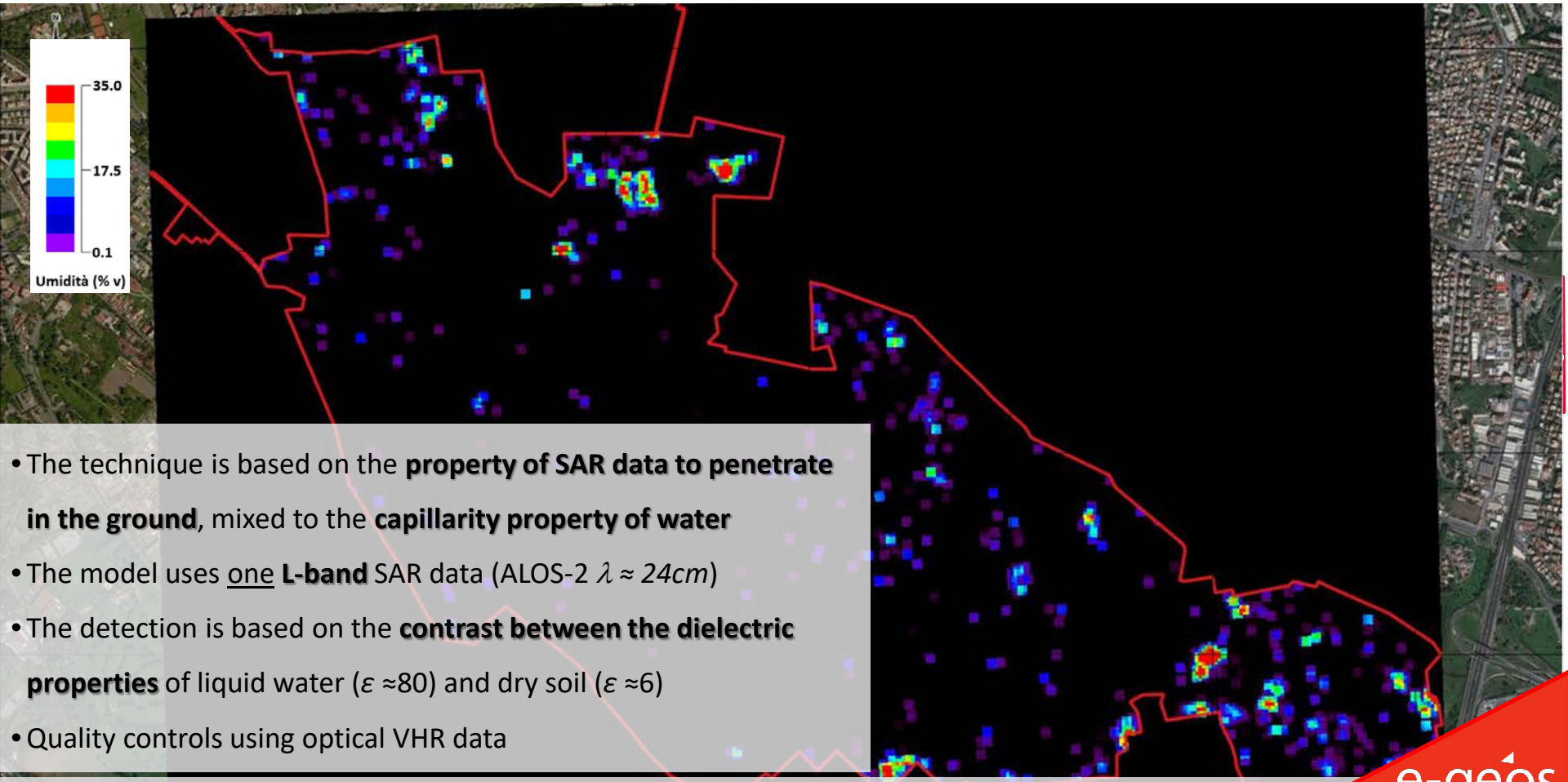
AWARE
Agile Watching of Assets and Resources

THE PARTNERSHIP

- A first prototype has been developed in collaboration with acea
- The prototype has been developed to be immediately **ingested in the operational workflow** of the infrastructure manager
- **ACEA will validate and certificate the results**

e-geos
AN ASI / TELESPAZIO COMPANY

THE TECHNIQUE



- The technique is based on the **property of SAR data to penetrate in the ground**, mixed to the **capillarity property of water**
- The model uses <u>one</u> **L-band** SAR data (ALOS-2 $\lambda \approx 24cm$)
- The detection is based on the **contrast between the dielectric properties** of liquid water ($\varepsilon \approx 80$) and dry soil ($\varepsilon \approx 6$)
- Quality controls using optical VHR data

A **WL map** is generated associating areas with higher moisture level to the aqueduct network.

AWARE
Agile Watching of Assets and Resources

WATER LEAKS DETECTION PRODUCT

Product & main Evidences

- Provision of **qualitative value (H/M/L)** of leaks and of **Quantitative value (l/sec)**
- First estimation leads to an increase of **6+ times of detected leaks**
- A **monthly inspection** is possible vs 1-5 years of in situ inspections
- Rain close in time with satellite acquisition is the only limitation

AWARE

Automation
Analytics
AI
Big Data

Information products

New products specific for infrastructures & assets

Synthetic Reports ready for operations

e-geos
AN ASI / TELESPAZIO COMPANY

elena.francioni@e-geos.it

e-GEOS S.p.A – L.O. Contrada Terlecchie snc – Matera / HQ Via Tiburtina, 965 – Roma