How satellite-based infrastructure intelligence transitioned the unknown to common practice

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Welcome

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Satellite-based infrastructure intelligence

Asterra, formerly known as Utilis, was founded in 2013 with the goal to use SAR images to locate (initially) treated water leaks underground.

Water on Mars: discovery of three buried lakes intrigues scientists

Researchers have detected a group of lakes hidden under the red planet’s icy surface.

Jonathan O'Callaghan
ALOS-2: Advantages of Remote Sensing

L-band, 1.3 GHz

Efficient and accurate survey of very large areas – 3.500km²
SAR Satellites

- All weather capability
- Sensitive to dielectric properties
- Day/night operation
- Subsurface penetration
What is Satellite (RADAR) Imagery?

The received signal

The data pixel values


**AI & Machine Learning**

Asterra started from the foundations of Physics and actual physical properties in the real world.

Due the chaotic nature of SAR, there’s an upper limit of success that can be achieved.

**Introducing AI**
The AI & Machine learning methods took the hundered of thousands cases from all around the world and created a working model yielding better results. To produce a working AI model, you have to have an extensive scientifific properties and proofs.
Worldwide Presence

* Offices in USA (San Diego), UK & Israel
ASTERRA Impact by the Numbers

- Over 430 projects completed in 57 countries
- Carbon dioxide emissions reduced by 14,500 metric tons, equivalent to 12.5M pounds of coal burned
- 21,800 MWh of energy saved yearly
- More than 36,000 leaks verified
- 9200M gallons (5 million m³) water saved every year (equivalent to 33% of the water used by a city of 500K residents)
- 3.5 leaks found per crew day vs. 1.3 found using traditional acoustic methods (on average)

Jan 2017 through Jun 2021
We believe that sustainability is not only part of our business strategy, but that is also guides our mission.

Our products contribute to three of the seventeen goals: 6, 9, 13.

- **Goal 6**: Ensure access to water and sanitation for all
- **Goal 9**: Build resilient infrastructure, promote sustainable industrialization, and foster innovation
- **Goal 13**: Take urgent action
Recover

Leak Detection and Analysis
Leak Detection – Current Approach

- Reactive approach
- Blindly surveying
- Listening/acoustic
- Correlators/Monitors
What is Wrong With the Status Quo?

Searching blindly...
Triage Approach – Satellite Guided Data
Satellite imagery screening tool
Delivery Options

Mobile accessories with your delivery

U-View & U-Collect

Dashboard

- Each delivery comes with one (1) license for each of the following: U-View, U-Collect, and U-Collect online dashboard
U-Collect Online Dashboard

- Project overview
- POI metrics
- Leak metrics
- Weather and forecast
- Fieldwork details
MasterPlan

Pipe Deficiency Assessment
MasterPlan is…

- A GIS data layer to prioritize your pipe replacement
- A tool to guide your deployment of fixed acoustic assets
- An input into a replacement planning model or water system master plan
- A non-invasive indicator of leaking pipes
- Pipe agnostic
- An easy input into all GIS and asset management tools such as Esri and Innovyze

MasterPlan is a real indication of a leak from a real sensor, it is not a prediction or model output
Why MasterPlan?

Capital Planning & Improvement
- Data input to forecast impacts
- Risk-based prioritization of pipe replacement
- Minimize asset lifecycle costs
- Long-term planning

Operations & Maintenance
- Identify problem assets
- Identify areas to deploy fixed assets
- Prioritize areas for inspection

Resilience & Response
- Data input to forecast impacts
- Risk-based prioritization of pipe replacement
- Minimize asset lifecycle costs
- Long-term planning
Product in Detail

Deficiency Levels

- High
- Med-High
- Med
- Low-Med
- Low
EarthWorks
What is EarthWorks?

ASTERRA Product Line

- Satellite-based identification of soil moisture below ground for railroad

How EarthWorks Rail Works

1. Satellite images are acquired
2. Data is analyzed by our patented algorithm
3. Soil moisture maps and analysis are provided to the customer
4. Areas of potential concern are identified
EarthWorks Rail

- Relative underground soil moisture levels around rail and rights-of-way
- Find the problem areas in time to avoid calamity or high-cost repairs
- Find problem areas to use more detailed measurement methods (increasing efficiency)
- reduce maintenance cost
Thank You