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EController
Remote Supervision & Energy Management

4D Renewable plants Decision Support System (4D-REDSS)

Based on satellite & UAVs exploitation

From construction to operation & maintenance: keep the life cycle of plant always under control

The renewables plant management requires to answer the different needs arising in the different phases of the plant life cycle:

>> Engineering and Construction

>> Operation & Maintenance

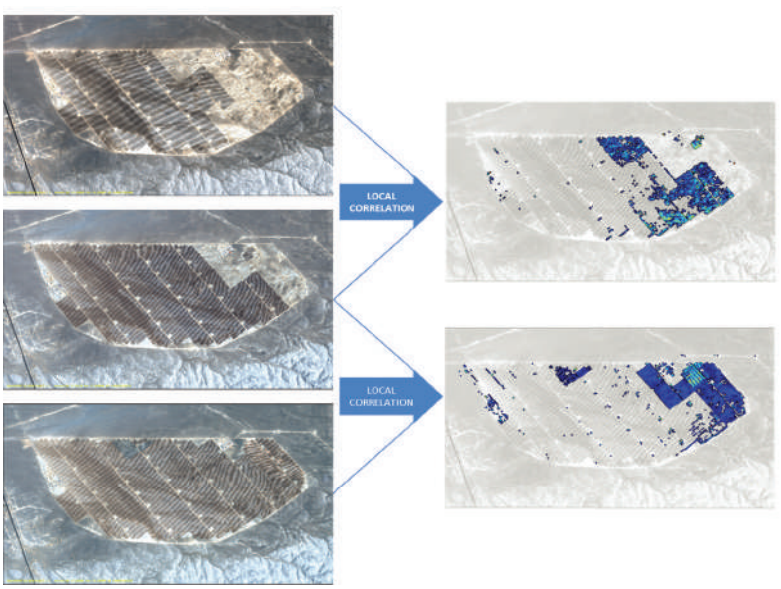
4D-REDSS remotely monitors the construction status of the renewable energy plant and enables users to know the plant status, supporting the decision-making processes.
4D-REDSS collects and process Plant images and videos stemming from satellites and drones, to be exploited for plant diagnostics and predictive analysis linked to EController PREDICO service, displaying all results in a coherent 4D (space + time) user interface.

The 4D-REDSS services consist in:

>> Satellite Low and High Resolution service for monitoring the plant construction status

>> Drone Video Processing for detection of panels, poles, trackers

>> Drone IR Video Processing for hotspot detection



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Key Benefits

>> Cost reduction for plant implementation by means of a better management of the operations
>> Cost reduction in the management of the plant documentation
>> Monitoring of the work progress
>> Supplies high value information for plant diagnostics and predictive maintenance

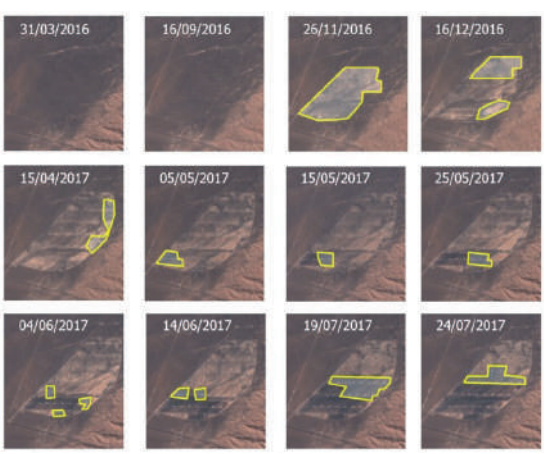
Satellite LR monitoring service

The service monitors the work status during the development phase of new plant, processing Low Resolution (10m at ground) satellite images to evaluate the progress of the entire construction process.

Service Features

Service Time Resolution	>> 5 days (depending on satellite data availability)
Information Provided	>> Satellite imagery of the plant area (10m resolution at ground) >> Construction Process percentage (area completion) >> Detection of the areas changed from the last acquisition

Detection of the areas changed from the last acquisition.
Modification between acquisitions are detected and highlighted.



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Satellite HR monitoring service

The service supplies the customers advanced Key Performance Indicators for the main relevant building phases of new plant, exploiting High Resolution (0.3m - 0.5m at ground) satellite images.
In particular, for PV plants:

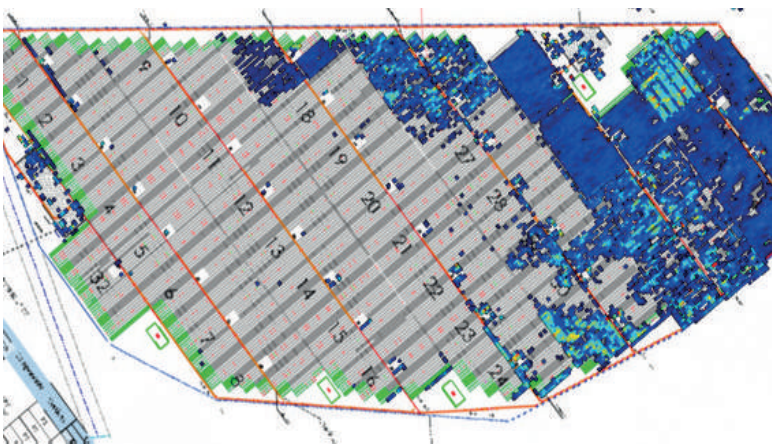
>> number of the pole installed on site
>> number of the trackers installed on site
>> number of the PV panels installed on site
>> number of cabin unit installed on site.

Moreover, the service provides the following information and data:

>> high resolution images
>> Plant changes detections between images acquisitions.
>> images (as overlay on the project table) for the evaluation of the building process.
>> charts of the evolution of the Key Performance Indicators.

Service Features

Service Time Resolution	>> 1 months (depending on satellite data availability and customer need)
Information Provided	>> Satellite imagery of the plant area (0.3m and 0.5m at ground depending on acquisition angle of the satellite) >> Detection of the areas changed from the last acquisition >> Construction Process percentage (area completion) >> Detection of poles, trackers, panels and cabin units installed (in percentage respect to the total)



Changes detections:
the intensity of the colors adopted in the images represents the areas with most important changes detected.

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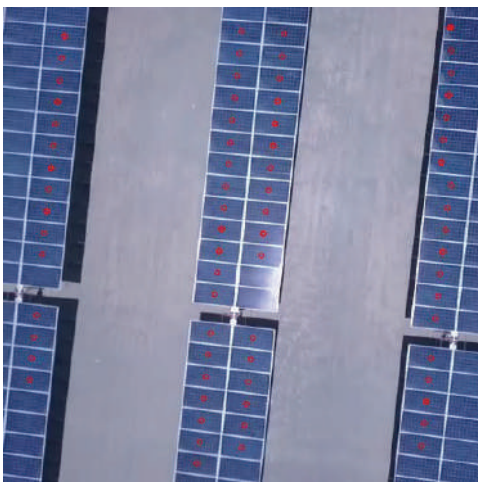
Drone Video Processing

The service detects and counts:

>> number of panels
>> number of poles
>> number of trackers
>> number of cabin units

One or more videos with the evidences of detected panels, poles, trackers, cabin unit depending of the development stages in the video has been taken.



Drone IR Video Processing

The service detects hotspots on the panels of the plant and provides the following information and data:

>> geographic position of the hot spot detected
>> IR imagery of the hot spot detected georeferenced on map

Georeferenced hotspot detection

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