

# SMARTMIRROR®: Making CSP plants smarter and more profitable

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## SMARTMIRROR® CONCEPT (Patent No. WO2018069558)

- Mirror with added-on sensing functionalities
- Sensors are integrated within the mirror and adjusted in-house and continue to be Plug&Play components

## WHY SMARTMIRROR®

- Efficiency of CSP Power Plants relies in the performance of its Solar Field (SF)
- Mirrors are deployed in SF in the order of hundreds of thousands to millions
- Mirrors are responsible for concentrating the sun radiation into the receivers The SF being the critical component of the CSP plants does not provide any real-time information of its own status
- Mirrors could be made SMARTER by factory added-on functionalities
- Mirrors seem to be the right component to provide real-time information on the performance of the SF

## CONSTRAINTS ON SENSOR INTEGRATION

- Mirror manufacturing conditions (>200°C) limits the integration schemes for sensors based on electronic components
- Sensors have to be assembled at the end of the mirror manufacturing
- Mirrors can be manufactured with either a cut out area (drill) or with a built in transparent window

## ILLUSTRATIVE SENSING FUNCTIONALITIES

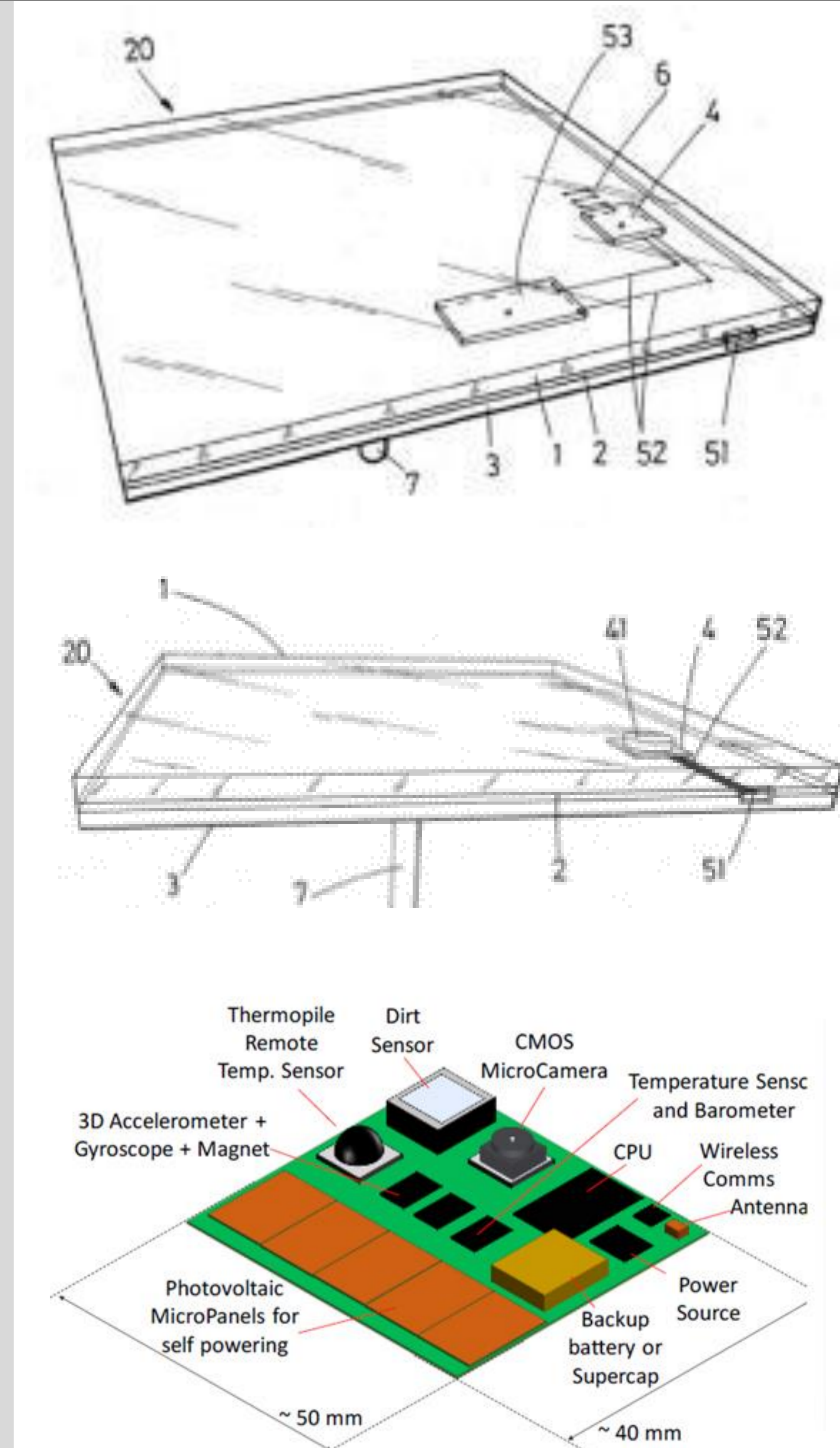
Component Level	System/Plant Level
Mirror soiling/reflectance level	→ Dust mapping / Optimal cleaning scheduling
Mirror orientation	→ Collector alignment / Canting assistance
Sunlight level (shadows)	→ Forecast of passing clouds
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## DEVELOPMENT STATUS

- SMARTMIRROR® based on glass cut out approach with integrated soiling sensors [1] will be tested within SOLWARIS European Project scope
- Patent WO2018069558 (A1)

## POTENTIAL PARTNERSHIPS

- Full potential of the system will be deployed in cooperation with customers and application developers
- Companies developing electronics and embedded sensors will be incorporated as well as EPCs and plant operators



**SOLWARIS**

[1] Scattering sensor embedded in mirrors for continuous monitoring of CSP plants