



## Hamburg (not visitable)

## AUTONOMOUS CONTROL FOR LARGE SOLAR THERMAL POWER PLANTS

*Application in renewable energy generation transferable to logistics*

### SUMMARY

Relocating parts of the central field control to decentralized intelligent drives makes control of heliostats more efficient and reduces communication needs. Switching from hardwiring to an autonomous energy supply can significantly reduce installation costs and make planning much more flexible.

### PARTNERS



### PROJECT DESCRIPTION

- Reduced energy consumption through lightweight mechanical design and innovative drive concepts
- Intelligent, decentralized drive control to improve precision and reduce communication
- Decentralized energy supply from PV cells and intelligent battery storage
- Efficient and reliable wireless communication by combining mesh and star networks
- Increased bandwidth utilization through geographic routing and deterministic synchronous multi-channel communication

### REFERENCES

Project page Trinamic: <https://www.trinamic.com/solutions/research/autor/>

Project page TUHH: <https://www.ti5.tu-hamburg.de/research/sensornet/autor/>

### INDUSTRY 4.0 FEATURES

- Decentralized infrastructure of sensors and actuators
- Wireless, self-managing communication
- Shifting intelligence to individual components
- Cloud-like management of actuators and sensors



Source: DLR

### CURRENT SITUATION

The pro-rated costs of the heliostat field for current large solar thermal power plants (CSP) are in the 30 percent range. Wiring the heliostats for the supply of energy and communication accounts for a significant portion of these costs. A switch to a decentralized supply of energy and wireless communication promises a considerable savings potential. Moreover, planning and innovation cycles can be made significantly shorter and more flexible since no static wiring is required.

### SOLUTION

By using smart drive systems instead of simple actuators, the communication and energy needs of individual heliostats can be greatly reduced. This makes it no longer necessary to install cable connections across the entire heliostat field thereby reducing cost and increasing flexibility. Furthermore, the individual drive can respond much faster since it does not have to rely on permanent feedback from the central field control.

### CONTACT

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### STANDARDIZATION APPROACHES

Some of the standards used: IEEE 802.15.4, EIA-485,  
The following standards are being developed: IHCP (Intra-Heliostat Communication Protocol)