

# R-PODID

## Reliable Powerdown for Industrial Drives

### Challenges and objectives

Periodic shutdowns of industrial plants for maintenance purposes set a considerable industrial cost, while unforeseen failures may have both economic and environmental impact. Moreover, GaN and SiC technologies will become essential in the future of power electronics thanks to their electric and thermal performance, but they suffer reliability limitations.

R-PODID aims to develop an automated, cloudless, short-term fault-prediction for electric drives, power modules, and power devices, that can be integrated into power converters. Thereby, electrical and mechanical faults of machines and of the power converters driving them will become predictable within a limited prediction horizon of 12-24 h.

This will enable a power-saving shutdown of a larger number of production machines during idle times, because a looming failure during the next power-on cycle can be reliably foreseen. It will also enable reliable mitigation of dangerous faults in applications using modern power-devices SiC and GaN devices.

### Technical goals

R-PODID objectives:

- Methodology for fault-prediction model generation from sparse training sets or system simulation by combining AI algorithms and physics models.
- High-performance power electronics with support for embedded AI
- 24 h fault-prediction for Gallium Nitride (GaN) and Silicon Carbide (SiC) based power converters
- 24 h fault-prediction and fault mitigation for electric drives
- Sensors for reliability prediction in power modules

### Expected impact

Supported by 33 partners, innovations within R-PODID are implemented into the power modules and applied in four use cases:

- GaN based Power Modules:
  - Conveyer Belt
  - Industrial Lighting
- SiC based Power Modules:
  - Automotive Traction Inverter
  - Heavy Duty Testbed

R-PODID creates impact on a commercial, environmental, scientific, and social level. On a commercial level, innovations for existing products and legacy installations will increase the competitiveness of manufacturers. New products will be enabled, opening growth opportunities for SMEs. The extension of business models based on R-PODID technology will strengthen the European ecosystem for original equipment and part manufacturers.

The critical goals of CO2 footprint reduction and energy saving will be both supported by R-PODID as a side-effect and as a main target.

**-R-PODID-**

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