

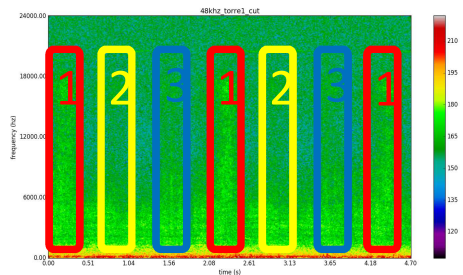
Wind Turbines



MEMS microphones on the tower



LVDTs at the tower base



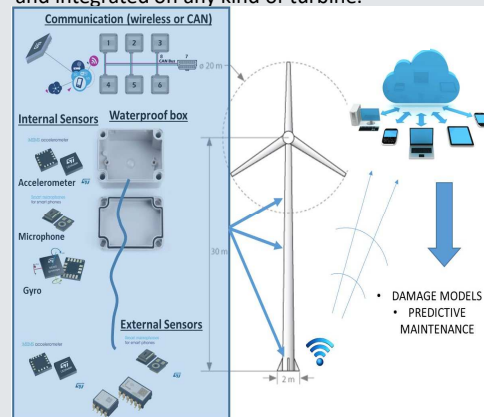
Acoustic emission from 3 blades

Concerning wind turbine monitoring, Sacertis is able to offer a condition-based approach to lead different maintenance strategies, checking the actual condition of the turbine, to decide which activities need to be carried out. One of the most relevant advantages of this approach is that maintenance is performed only when certain indicators give evidence of decreasing performance or upcoming failure; this solution provides more than simple data and monitoring alarms: it delivers quick and reliable information for service crews to take immediate decision.

Sacertis provides all the hardware and the related services for a complete Structural Health Monitoring of Wind Turbines.

While common condition monitoring devices are mainly focused on the drivetrain monitoring, Sacertis products are flexible and they can be easily tailored to suit different needs. To make wind power more competitive, it is necessary to reduce turbine downtime and increase reliability: Sacertis monitoring systems may help in this task by reducing the chances of failures or off-service times, enabling cost-effective operation and maintenance practices, and providing inputs to improve turbine operation and control strategy.

The complete monitoring solution is also applicable to older assets, not yet instrumented with a monitoring system, as the system can be installed and integrated on any kind of turbine.



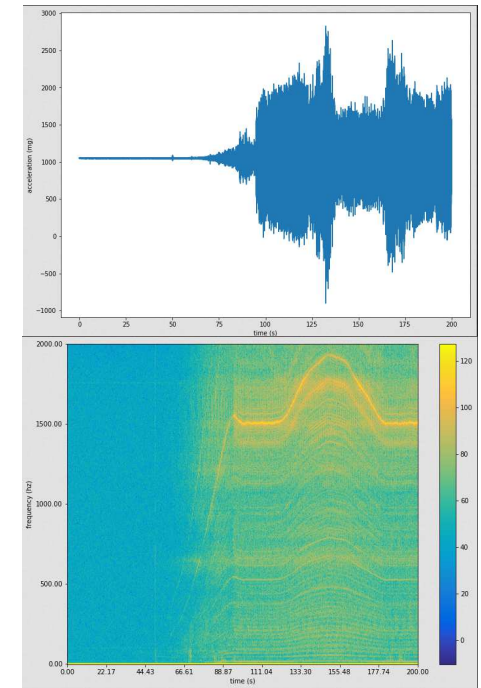
Sacertis may set up the condition-based monitoring system at lower costs compared to those available on the market, with more than satisfactory performances. This system has been developed to integrate different sensors in a suite capable to check potential issues or failures of:

- The foundation-tower base system
- The tower
- The gearbox generator system
- The blades

The peculiarity of the system lies in being composed of low-cost sensors based mainly on MEMS technology, capable of monitoring various physical quantities. The sensors are connected each other with different technologies for data transfer and sensor power supply. The recorded data are initially processed directly on board the sensors, then sent to the cloud, where they can be further processed or made available for subsequent management. These systems have been verified in top University labs and are also supported by an important ecosystem of global world leading companies (AXA, IBM, STMicroelectronics).

For this application, the sensors which can be installed are accelerometers, microphones, crack sensors and clinometers, all of them based on MEMS technology; data coming from external sensors providing an analog output can be also collected, like displacement pots or LVDTs; the data acquisition system creates a flow towards a gateway sending measurements to the cloud where any kind of analysis or alarm generation can be agreed with the turbine service manager.

Compared to other systems available on the market, two of the most obvious advantages of Sacertis system are scalability and flexibility. On one side, it is possible to scale the system thinking of applications that involve the installation of a few sensor units, as well as the use of several hundred devices, capable of measuring many different physical quantities. It is therefore possible to customize a monitoring system able to combine different sensor kinds (clinometers, accelerometers, crackmeters, stress sensors etc.) to obtain a complete wind turbine health map.



Time history and time/frequency representation of the drivetrain vibrations recorded at startup

