

# COMPOSITION

## Condition Monitoring and Asset Tracking for Industry 4.0

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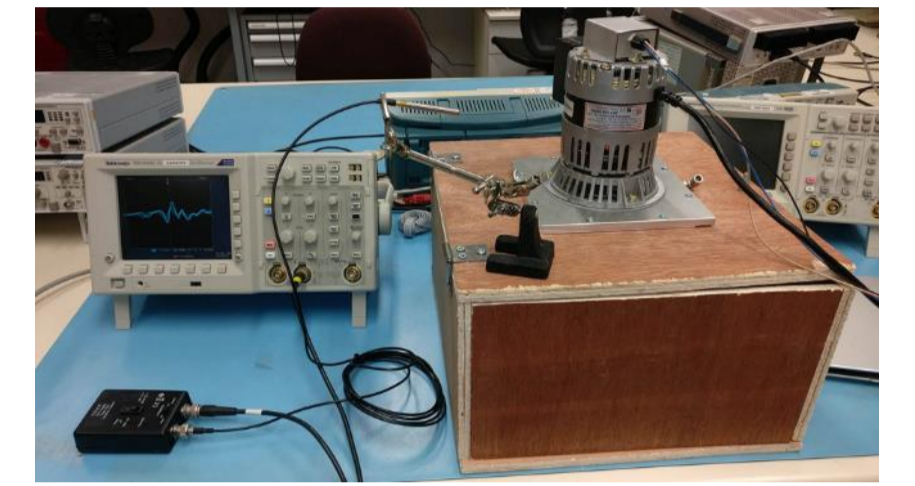
### Use Case 1 Condition Monitoring

- When the fans in the Reflow oven breakdown the high value material in the oven has to be scrapped.
- This is achieved by gathering sensed data to enable predictive maintenance
- Acoustic sensing provides clear and early detection of a fan going faulty and is easily retrofitted without modification.
- Prototype system deployed that gathers acoustic data to predict fan failure using a raspberry Pi based acoustic sensor system.

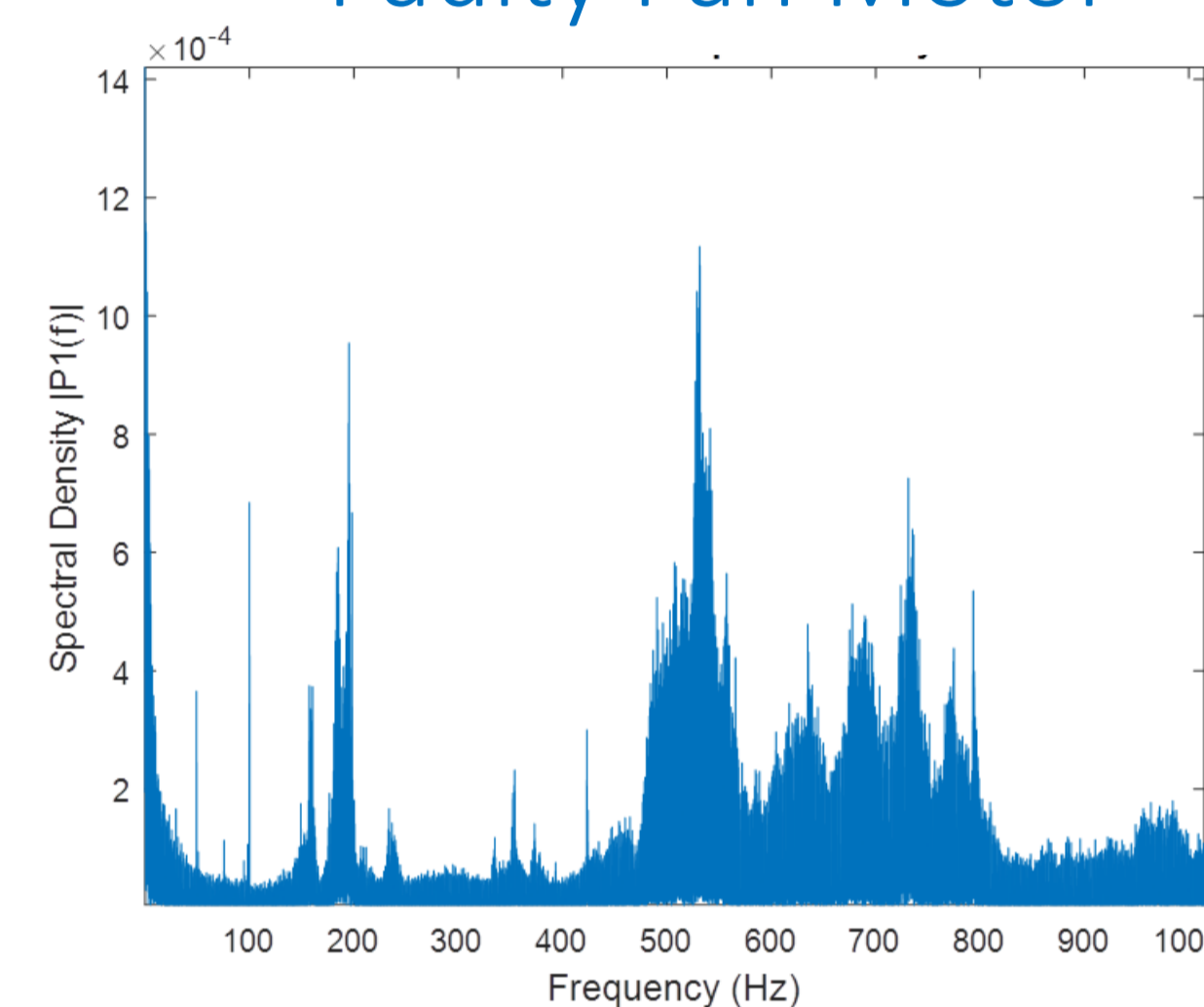
#### Prototype Acoustic Sensor



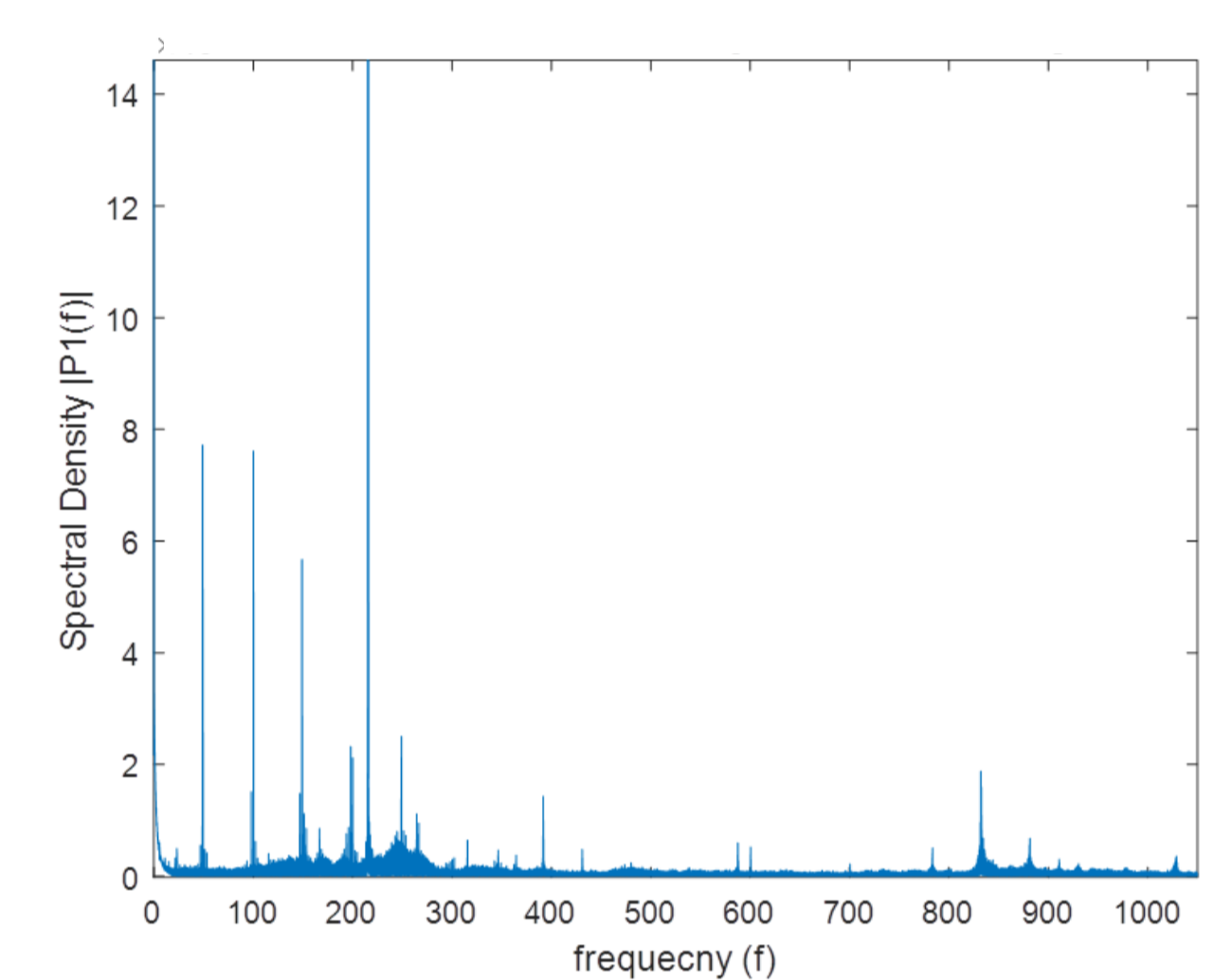
### Reflow Oven Condition Monitoring



#### Faulty Fan Motor



#### Good Fan Motor



### Use Case 2 Asset Tracking

- Tracking material to maintain workflow efficiencies and recover lost material has a significant cost saving in manufacturing facilities.
- Small size, very low power “location devices” (tags) are required to track the location of high value material.
- No ideal technology, UWB and BLE selected with developmental challenges

### Impact

- Savings in the region of €10 to €20K are possible with early detection of faulty fans in a solder flow oven
- Material tracking throughout its production life time can save in the order of €100K

### Next Steps

- The next step for condition monitoring is to move to an energy harvested Wireless Acoustic Sensor enabling easy deployed, maintenance free sensing.
- Focus Energy Harvested BLE asset tracking. Technologies under investigation include, Indoor solar, Vibrational, Thermoelectric, Inductive charging, etc.

### UWB and BLE Technology Selected

Technology	Power	Accuracy	Maturity
BLE	👍	👎	👉
UWB	👎	👍	👎

### High Value Material Examples

