

Calibrations in LEAN manufacturing environment

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VAISALA



The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR Participating States

Tomi Pietari

MSc, Engineering Physics

17 years in Vaisala, Test engineer, Sensor development engineer,
Production technologies

Current responsibilities

- Calibration development for Operations
- Accredited Measurement laboratory
- Maintenance

Content

Vaisala – short presentation

Vaisala Operations – presentation of operational mode

Vaisala and humidity measurements

Three reasons why fast calibration cycles are important

A serene sunset scene over a body of water. The sun is low on the horizon, casting a warm, golden glow across the sky and reflecting on the calm water. In the foreground, there are several large, smooth, reddish-brown rocks partially submerged in the water, surrounded by tall, green reeds. The background shows a distant shoreline with trees and hills under a hazy sky.

Observations for a Better World

Vaisala

VAISALA

Employs
1600
professionals
worldwide



EMEA
69%

Americas
23%

APAC
8%

Has over
30 offices in **16** countries



38%
of Vaisala
people work
outside Finland



Serves
customers
in over
150
countries
annually

2016 net sales
319.1 million
euros

EMEA
29%

Americas
44%

APAC
27%

2016 R&D
investments
over
11%
of net
sales

20%
of employees
work in R&D
activities

Committed to using
100%
renewable
energy by
2020





Leading Technologies

Discovering novel techniques and technologies in sensing, analysis, prediction and information delivery

Thin-film technologies

Silicon micromechanics

Optics

Radio and Microwaves

Acoustics and Ultrasonics

Software

Numerical Modeling

Artificial Intelligence and Statistics



Vaisala Production System

Excellence in high-mix low-volume

VAISALA

We Deliver.



More than **6,000**
Products
and over
50,000
items in them



900
engineering
changes
in products
annually



year-long
product
life cycles



500+
Production
machines



2
Factories
400
Employees

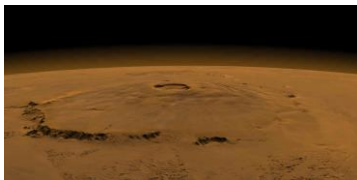
400+
Suppliers

More than **1000**
shipments
weekly

Serving
Customers
in over
150
countries
annually



Humidity measurement applications



Climate Change



Renewable Energy



Digitalization & Big Data



Future of Mobility



Energy Efficiency



Well-being & Health



Resource Efficiency



Circular Economy



Urbanization



Sustainability Awareness

Calibrations

- Scientifically proven – operationally optimized calibrations
- Traceable to SI units
 - Processes defined, competent personnel, uncertainty defined and unbroken chain of calibrations
- Fully automated – from start to certificates

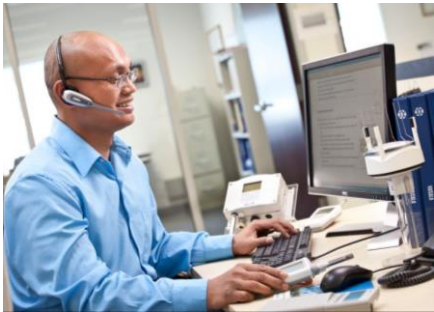
Reasons to reduce calibration time

1. Delivery time requirements
2. Capacity – cost efficiency
3. Dynamic applications

1 – Delivery time requirements

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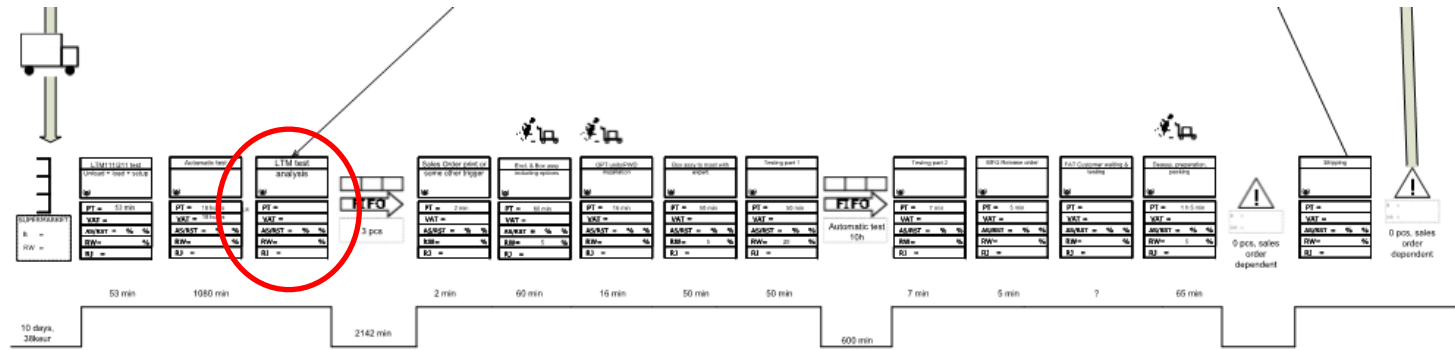
Production process



2 – Capacity and cost efficiency

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Flow & value stream



- Value stream commonly used term in LEAN manufacturing describing how production process creates value
- Process step times, process inventories, value creation time, process time, tact time
- Balancing of the steps creates optimal flow
- High mix – low volume → Flexibility requirements

Testing and calibration process in VSM

- Typical method to improve production flow is to break it into sub steps
 - including Calibration and testing
- One piece flow whenever possible
 - Requires optimization of process times, calibration, assembly, testing

Investments

- In order to make economically viable business, we need to understand the product cost
- Machine time is a part of factory cost
- Save 1,5h calibration time – for 1000 units 1500h machine time → one man-year!
- We can save a lot of investments reducing the calibration time
- We must not compromise performance

3 – Dynamic applications

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Example of atmospheric sounding profile



Nature of measured processes

- We are measuring dynamic processes
 - Weather
 - AC control
 - Industrial control
- Should long term effects always be included in calibration?

Conclusions

- Process speed important for manufacturing
 - Improves delivery capability and performance
 - Improves efficiency
- Capacity
 - Customer demand changing towards faster cycles
 - Requires speed and flexibility of processes
- Nature of applications sometimes support more dynamic processes in calibration

Thank You!

