FALCON

Feedback mechanisms Across the Lifecycle for Customer-driven Optimization of iNnovative product-service design

Special Track Session: Smart specialization & service innovation

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Patricia Ortiz Ugalde

FALCON

7 September 2017

RESER 2017

Agenda

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Feedback mechanisms Across the Lifecycle for Customer-driven Optimization of iNnovative product-service design

1. Consortium partners
2. Project headlines
3. Datapixel Business Case – High tech products
4. Exploitation strategy

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1. **Consortium partners**
2. Project headlines
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Consortium partners - Europe

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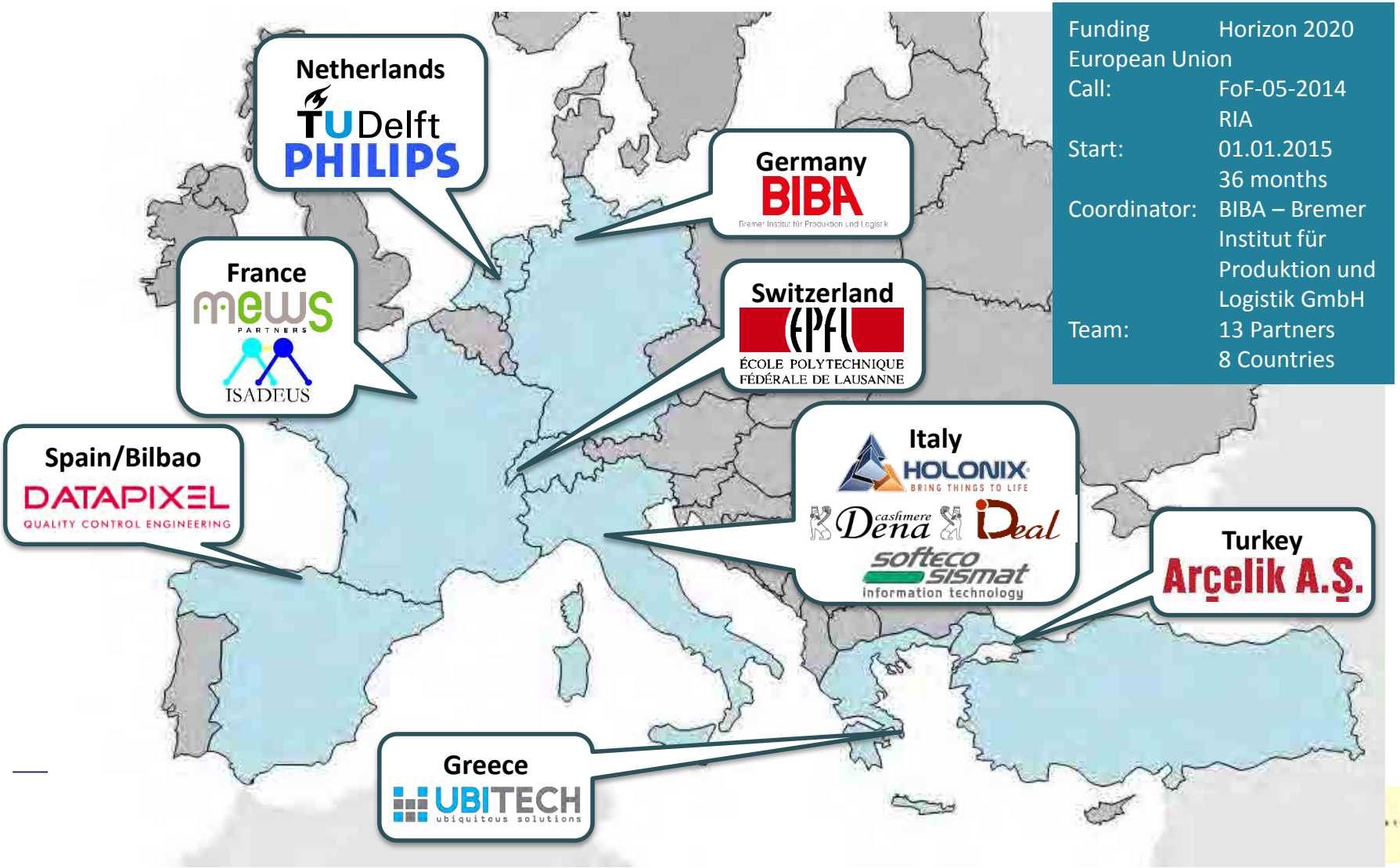

Funding	Horizon 2020
European Union	
Call:	FoF-05-2014 RIA
Start:	01.01.2015
	36 months
Coordinator:	BIBA – Bremer Institut für Produktion und Logistik GmbH
Team:	13 Partners
	8 Countries

Consortium partners - Europe

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TU Delft

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

RTD

BIBA

BIBA - Bremer Institut für Produktion und Logistik GmbH

softeco sismat information technology

HOLONIX

Solution Providers

iDeal

UBITECH ubiquitous solutions

cashmere Dena

arçelik

End-Users

PHILIPS

DATAPIXEL QUALITY CONTROL ENGINEERING

Vinci Consulting

Innovation Management

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Consortium partners - Datapixel

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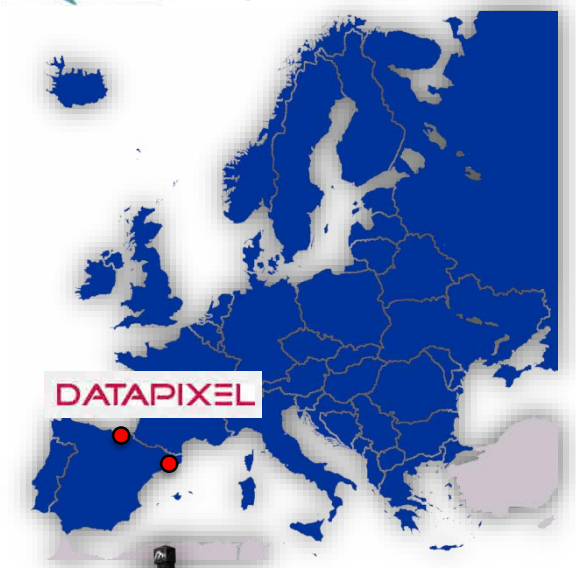
Type: SME Company

Creation and Location: Founded in 1999 and international headquarters located in Barcelona (Spain)

Core Business: Designing, developing and manufacturing systems and solutions based on artificial vision and dimensional metrology in industrial applications.



INTEGRATED METROLOGY SOLUTIONS BASED ON HIGH PERFORMANCE CONTACTLESS SYSTEMS

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Consortium partners - Datapixel

Products and services

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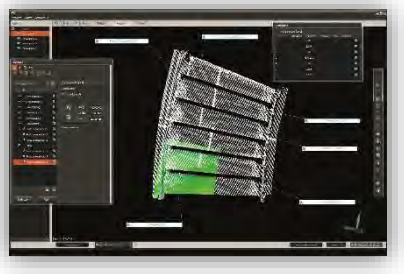
- Implementation of inspection and quality control systems in production line by means of robotised systems and 3D vision digitalised sensors



- Software and processing applications and analysis of 3D point clouds and optical sensors data

- Consultancy, design and specific development of customized dimensional and geometrical inspection systems for the aeronautical, automation and electronic sectors

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Project headlines - Vision

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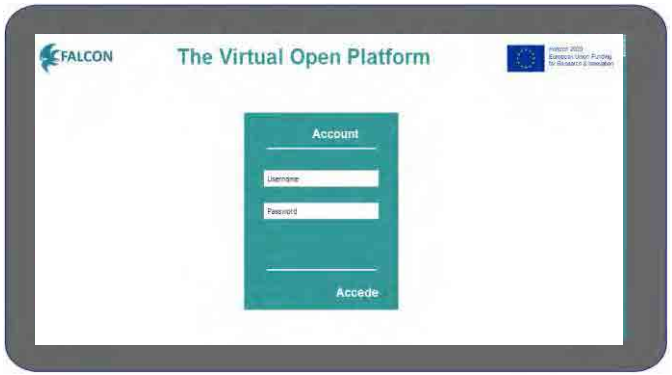
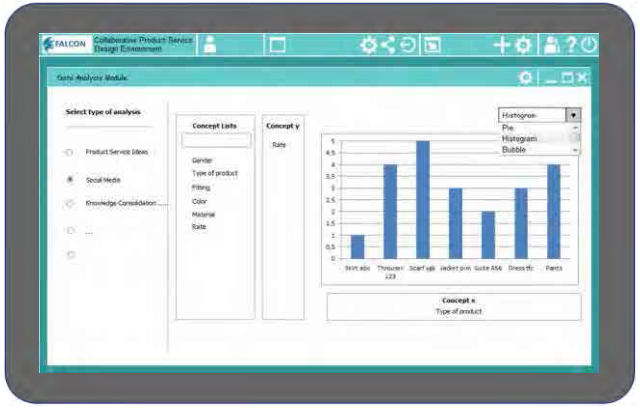
- FALCON will define and deploy an **Open Virtual Platform for Product/Service** Design, Manufacturing and Lifecycle Management
- The FALCON platform will be capable of merging and incorporating two (currently emerging) knowledge sources:
  - **Social media** related feedback (customer feedback from forums, Facebook, etc.)
  - Usage data from **product sensor technology** (from data loggers, product related services, wireless connectivity…)
- **The FALCON platform will provide a multi-systems approach to allow a seamless integration into heterogeneous business IT landscapes.**
- **The FALCON platform will incorporate new simulation techniques and benefit from a semantic representation of PLM information for cross-sectorial search**





Project headlines - Objectives

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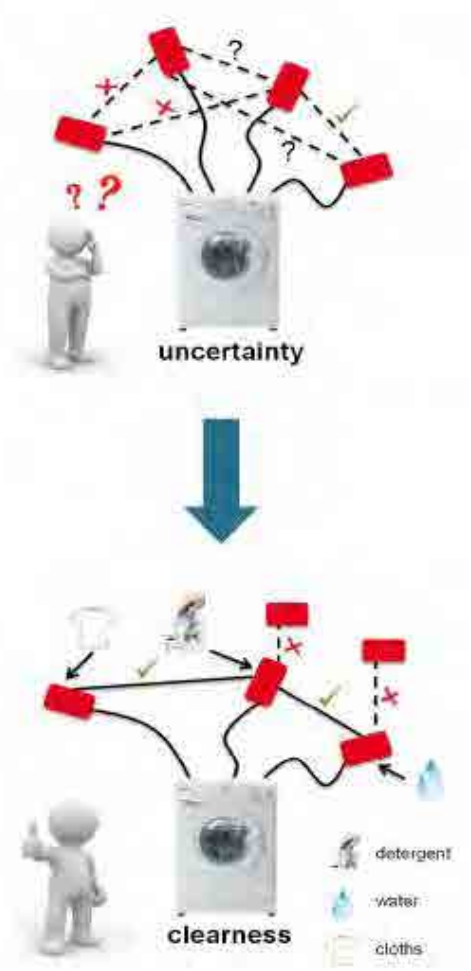
- **OBJ1**: To address product-service information collection through Collaborative Intelligence and Product Embedded Information Devices.
- **OBJ2**: To enable product-service knowledge representation, exploitation, openness and diffusion.
- **OBJ3**: To strengthen collaboration and new product-service development through new feedback and feed forward mechanisms.
- **OBJ4:** To support innovative product-services design using manufacturing intelligence.
- **OBJ5:** To improve product-service lifecycle assessment approaches.



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Project headlines – FALCON approach

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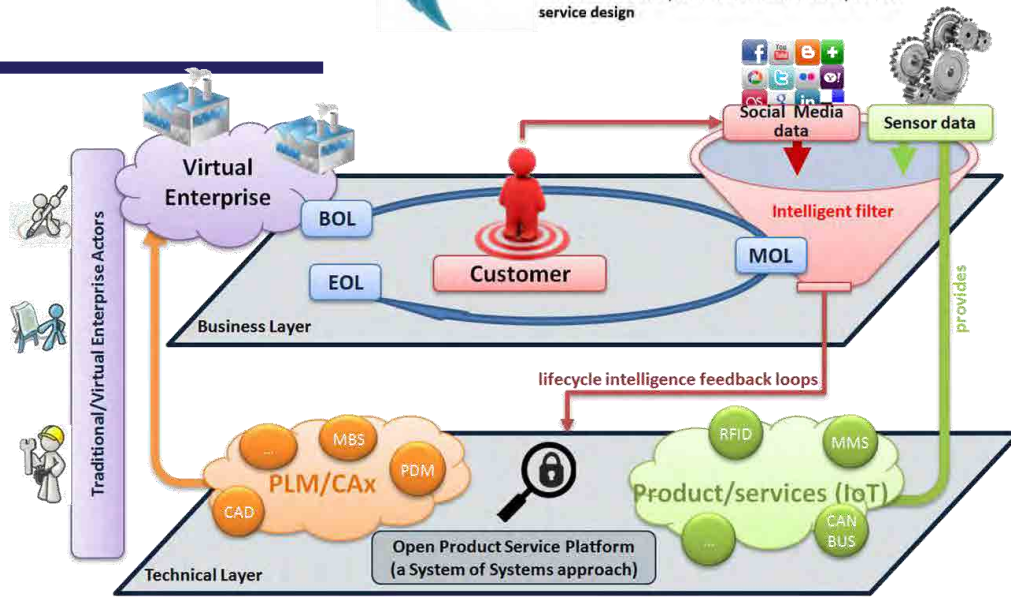
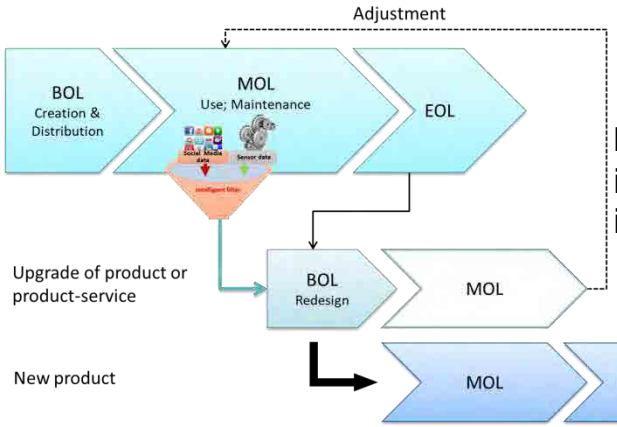
- FALCON's mission is to investigate how and which sources of PUI (Product Usage Information) can be used to (re-)design or improve PSSs (Product Service Systems)
- Sources of PUI are CPS/IoT, social media and equivalents
- The project is developing the FALCON Virtual Open Plattform (VOP) for collaborative PSS (re-)design, improvement, manufacturing and lifecycle management
- The FALCON VOP facilitates the use of PUI in design, simulation, forecasting, LCA and other applications





PUI loops investigated in FALCON

Project headlines – Business scenarios

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White Goods

arçelik

Healthcare Products

PHILIPS

cashmere Dena

Clothing Textiles

DATAPIXEL
QUALITY CONTROL ENGINEERING

High Tech Products

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Datapixel Business Case – High tech products

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Background

- Large **Demand of Dimensional Quality Control Solutions** easy to be **customized** and i**ntegrated** within production processes
- Technological Challenge will be easier to achieve with the **integration** of **feedback mechanisms within Product-Service Lifecycle**
- Need to improve **Information** management by DATAPIXEL in its Product-Service Lifecycle. The information is **unstructured** for **being exploited**

Business Motivation

- **Increase the Competitiveness of Metrology Solutions** improving their functionalities and ease to use. (developing new software modules, customised interfaces, non standard solutions…)
- **Reinforce Client "loyalty"** offering more effective metrology services
- **Improve** the **Calibration**, **Maintenance & Verification** processes and **Enhance Machine Programming** and **Report Content Definition**
- **Increase in sales** of a 5% in the first year of usage of the Falcon Solution

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Datapixel Business Case – High tech products

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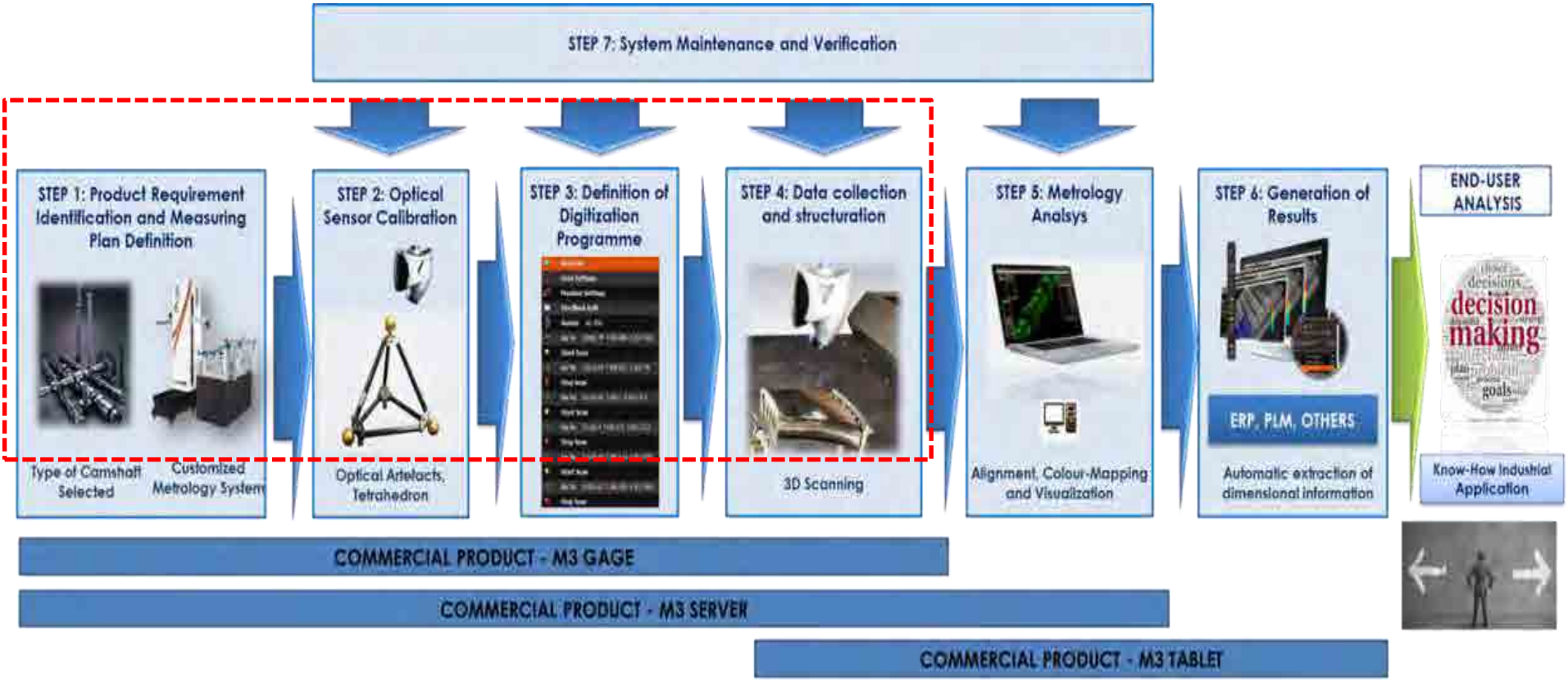
AS-IS Scenario



Datapixel Business Case – High tech products

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AS-IS Scenario

Datapixel Business Case – High tech products

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AS-IS Problems and/or limitations

Limitations related to the Calibration and Maintenance & Verification Processes

- Both processes are **scheduled in a theoretic calendar** with a specific number of calibrations/verifications per week/month/year.
- It is not the best way to proceed due to the **very high demand on accuracy required in metrology** analysis (tolerances measured in microns) which forces to control as much key parameters as possible.
- This approach is **not able to detect modifications in the measurement environment or minor errors/defects** in the metrology equipment in real time.

Limitations related to the Machine Programming and Report Content Definition

- The **time** dedicated **to define an efficient digitalisation programme** as well as an **optimum measurement report** are **limiting factors** for developing integrated metrology solutions .
- These **bottle-necks** should be faced in order to improve the capacity to design more efficient machine programmes with new functionalities after the **analysis** of the **feedback collected** by the experience of the clients.

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TO-BE Scenario

Advanced Calibration and Verification & Maintenance processes scheduled in a **dynamic calendar adapted to the feedback filtered by FALCON VOP** coming from

- **PEIDs – Product Embedded Information Devices**
- **Enterprise and Legacy Systems**

The integration of FALCON VOP will allow **improving the performance of scanning process** through the **identification of the need to verify the state of operation of the metrology equipment** applying the **maintenance & verification protocol** in due time as well as to **apply correction approaches or decisions to compensate the deviations in the environment of measurement**

Datapixel Business Case – High tech products

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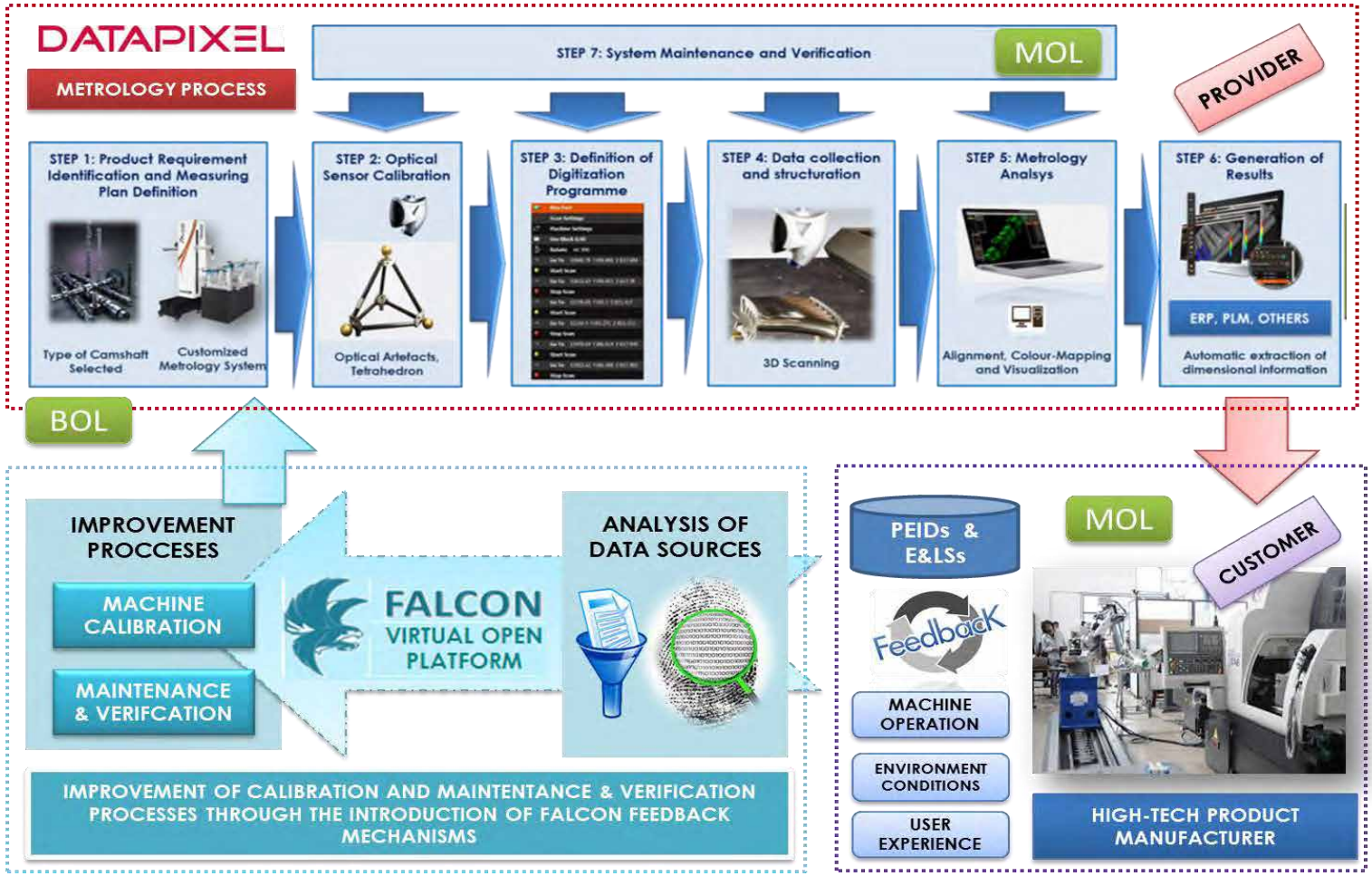

Datapixel Business Case – High tech products

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Product services

FALCON will:

- Permit to **collect in real time** the information from the **M3 software** (log files). **PS1, PS2, PS3**
- Provide a collaborative environment where DATAPIXEL's departments will be able to discuss, visualize data, solve problems and create new product and services. **PS1, PS3**
- Permit to **have access to clients' feedback**, opinions and suggestions about products and services. **PS3**
- Enable the **scheduling of the maintenance activities in advance** and avoid sudden failures and contingencies. **PS2**
- **Reduce the response time** when machine's malfunctioning. **PS1**

PS1: **Metrology equipment** utilization **analytics and diagnostic tool**, as new service for equipment operation improvement

PS2: **Intelligent preventive maintenance** and failure forecasting tool

PS3: **Customers' feedback** appraisal to develop and provide new products and services for specific industrial sectors

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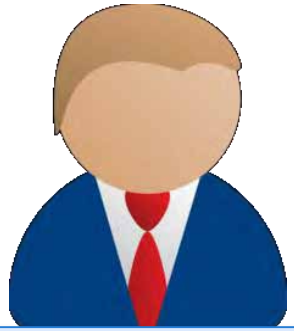
Jenny Pixel

Helpdesk Support



Tobi Data

Product Manager

Jenny wants :

Q1: To get the machine's historical evolution from CCC's log files.

Q2: To identify the quality of the current calibration (max. & min deviation of values over time) and environmental conditions at CCC.

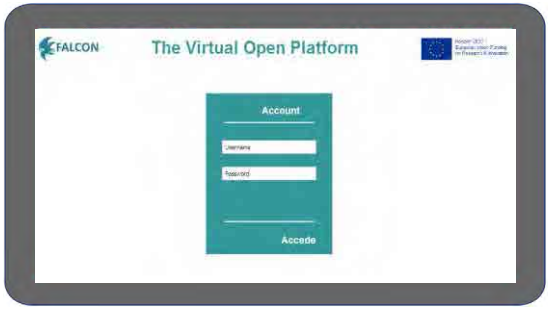
Q3: To discuss an identified systematic failure with Tobi to identify next calibration or action.

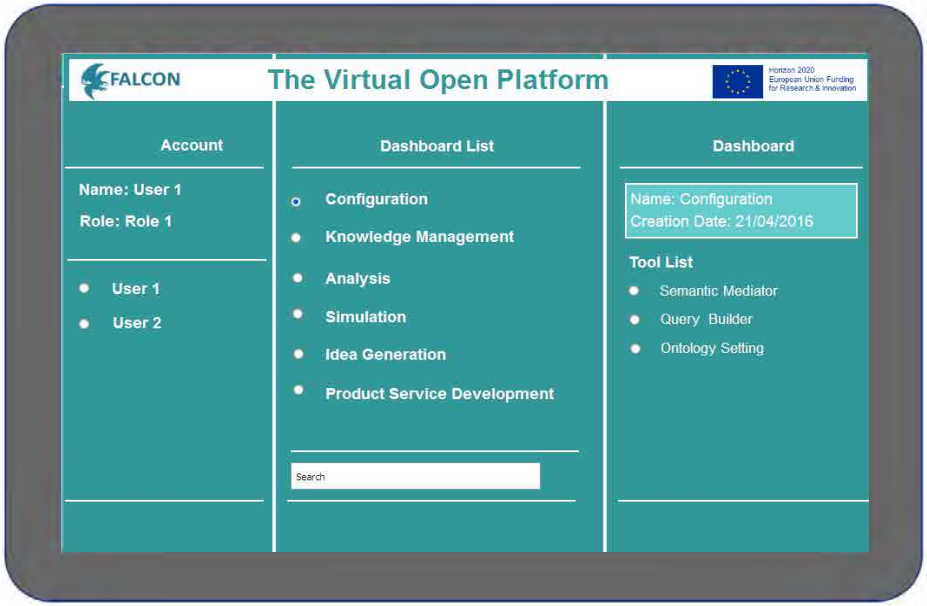
Datapixel Business Case – High tech products

Helpdesk Support

She logs into the FALCON VOP

She gets a personal view on her FALCON widgets





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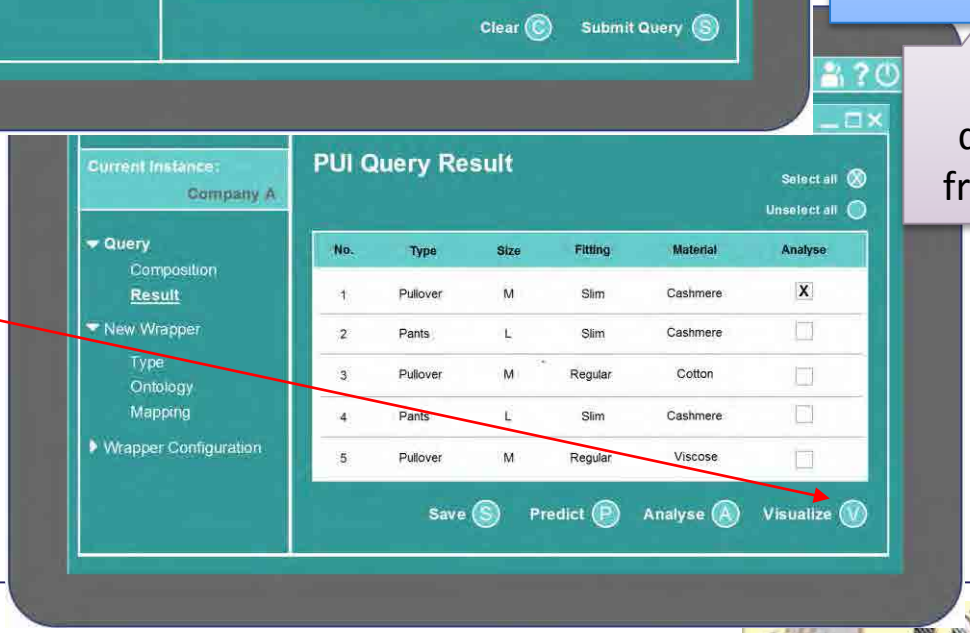
Helpdesk Supp

Opens PUI Query Manager and selects concept “calibration” and repository “CCC log files”

After finishing she selects Visualisation to show the results



CCC
- o Log files
- o Help-desk

Includes environmental & technical data error-category basic machine info

CCC

Structured questionnaire from HELPDESK

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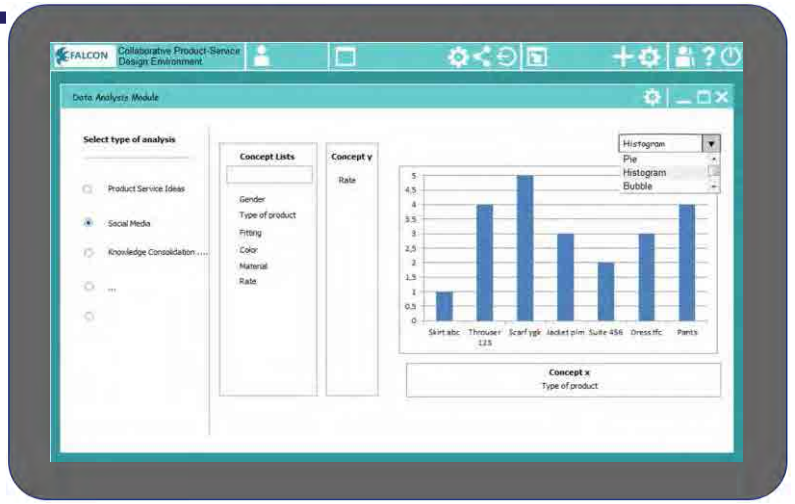
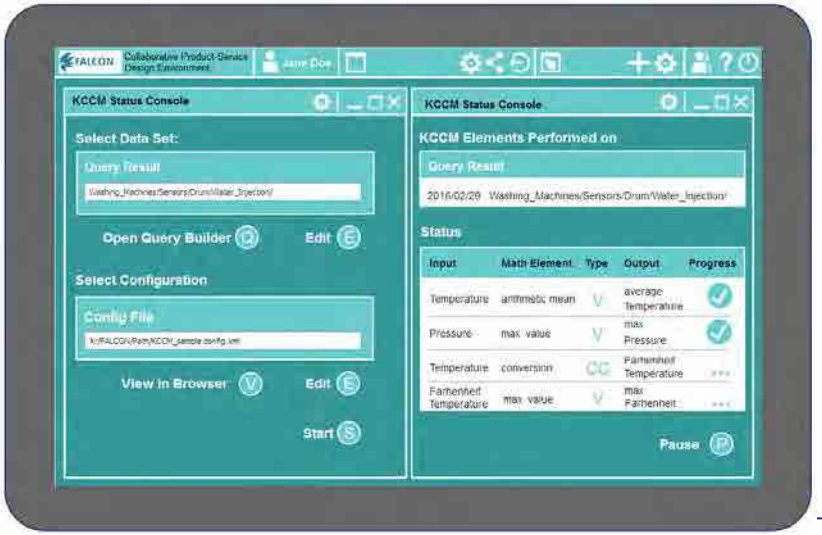
Helpdesk Support

Visualisation Module appears & she selects “histogram” for visualisation of measurements evolution

Selects “frequency” operation with input value “per week”

KCCM





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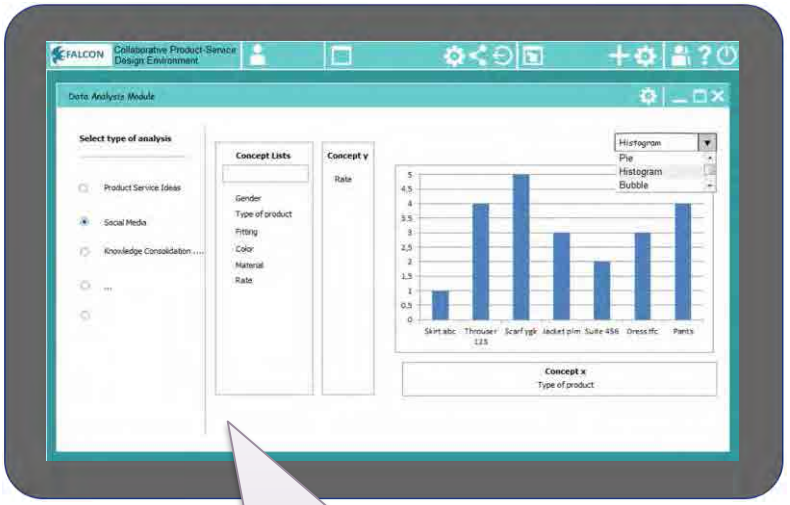
Helpdesk Support

Visualisation curve with “the evolution of the metrology system per week“ appears

Goes back to PUI Query Manager widget



Visualisation includes

- Customer
- Site
- Machine
- Period (last Week; Month Quarter)
- Required parameters

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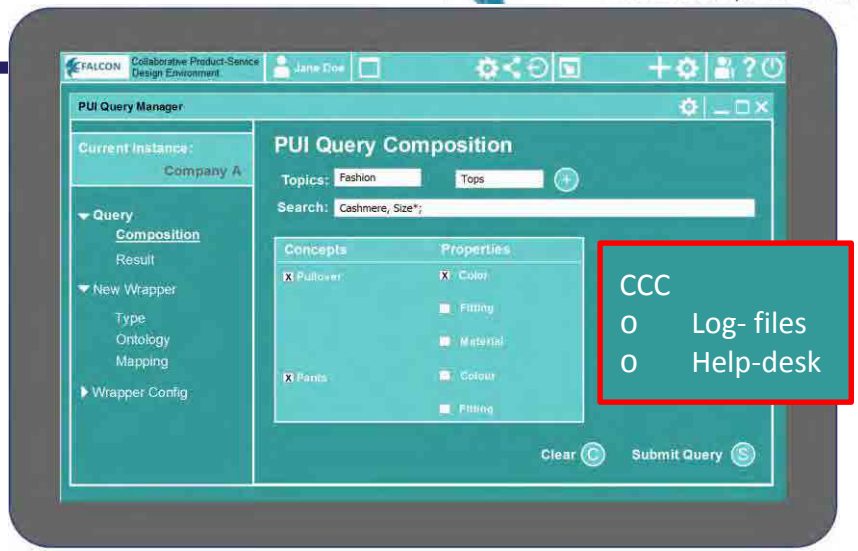
Helpdesk Support

Opens Query builder and selects all concepts relevant for calibration quality and repository “CCC Log-files”



CCC
- o Log- files
- o Help-desk

Selects a predefined calculation sequence for calibration quality in KCCM module

KCCM

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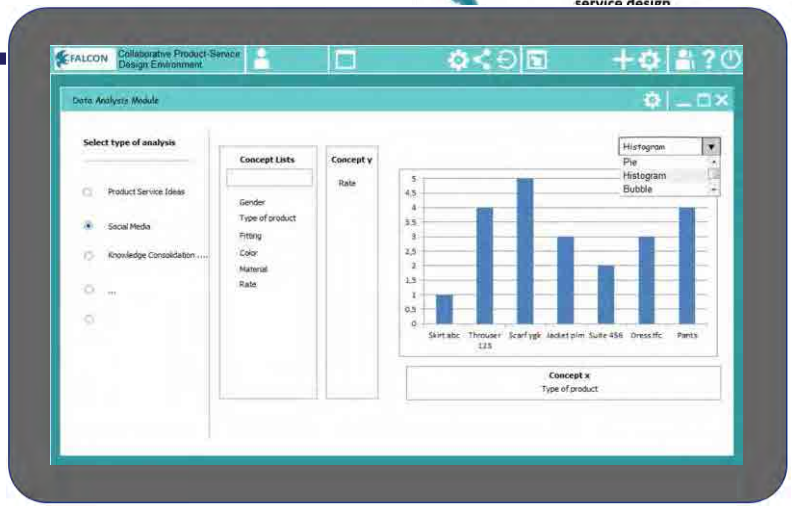
Helpdesk Support

Visualisation Module appears with “calibration quality”:

- Min. deviation
- Max. deviation
- Median and
- other interesting results



Goes back to Query builder widget and selects “Temperature” and repository “CCC Log-files”

KCCM

CCC
- Log- files
- Help-desk

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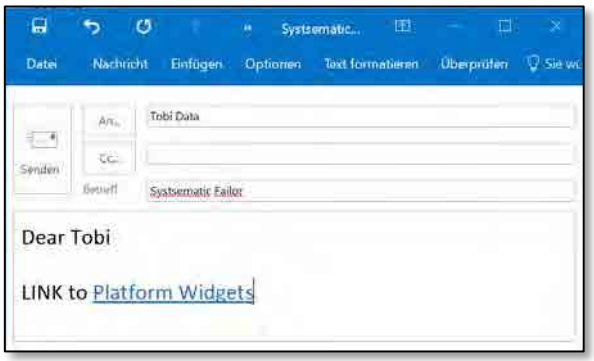
Helpdesk Support

She gets two Visualization Widgets for comparison

Identifies a “wrong pattern” & sends mail to Tobi with Link to platform



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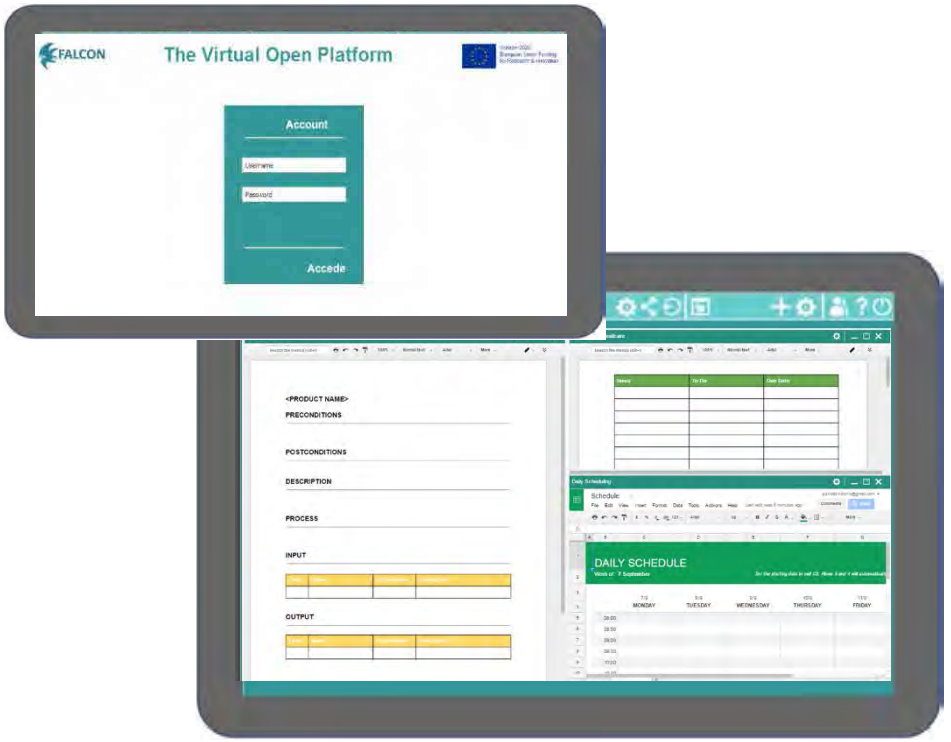
Product Manager

He logs in the VOP platform

He opens link in personal view of VOP



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Product Manager

Helpdesk Support

The two visualisations appear and can be compared. By using the FALCON VOP CPSDS Jenny and Tobi analyse the charts in collaboration from different locations

He decides it is necessary to carry out a new calibration

She call CCC to notify that a worker of the maintenance and calibration team will go and arrange the best date

Fill in questionnaire with the incident and solution

Agenda

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Exploitation strategy

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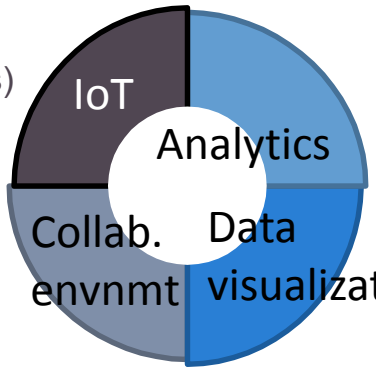
Competitors/ecosystem analysis

Thingworx (PTC)
IBM Watson IoT (IBM)
IBM analytics (IBM)
Talkwalker (Talkwalker)
Sensor cloud (Lord sensing)
Zatar (Zebra Technologies)
Brandwatch Analytics (Brandwatch)
Microsoft Azure (Microsoft)
AGGREGO (Semsoft)
Atos Codex Analytics (ATOS)
Exalead (Dassault Systèmes)
SAP HANA Cloud Platform (SAP)
Tableau
Semsoft
Spigit (IDEA MANAGEMENT SOFTWARE)
Ideascale
Sas
Hype (HYPE ENTERPRISE)
iObeya (KapIT)
Yellow



IoT Analytics, a market research firm, estimates that they are more than 360 IoT platforms providers.

Social listening platforms cover other objectives : competitor benchmarking, marketing management, influencer identification, reputation management…

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Exploitation strategy

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Topic	FALCON	IBM analytics	Thingworx (PTC)
Multi-sources (both structured and unstructured)	Yes both	Yes both	Only structured
Collaborative features	Yes, but stand alone module for the moment?	Yes, through « box » tool	Not communicated
Easy to use by an end-user	Yes, through widget and personalized interface	The interface itself is not intuitive and not user-friendly	Data vizualization is not part of the platform (to be customized by an integrator)
Flexibility to add a new data source	Yes, through ontology	Not communicated	Yes but for structured data only? Connect an object or an IT system (CRM..) is the same
Maturity / Robusteness	Only POC (Proof of Concept), feasibility demonstration	high-grade product, sophisticated (too much?)	
Performance/scalability	-	Not communicated	Simple server: pluged to 10 millions objects. Scalability ensured by adding additional servers

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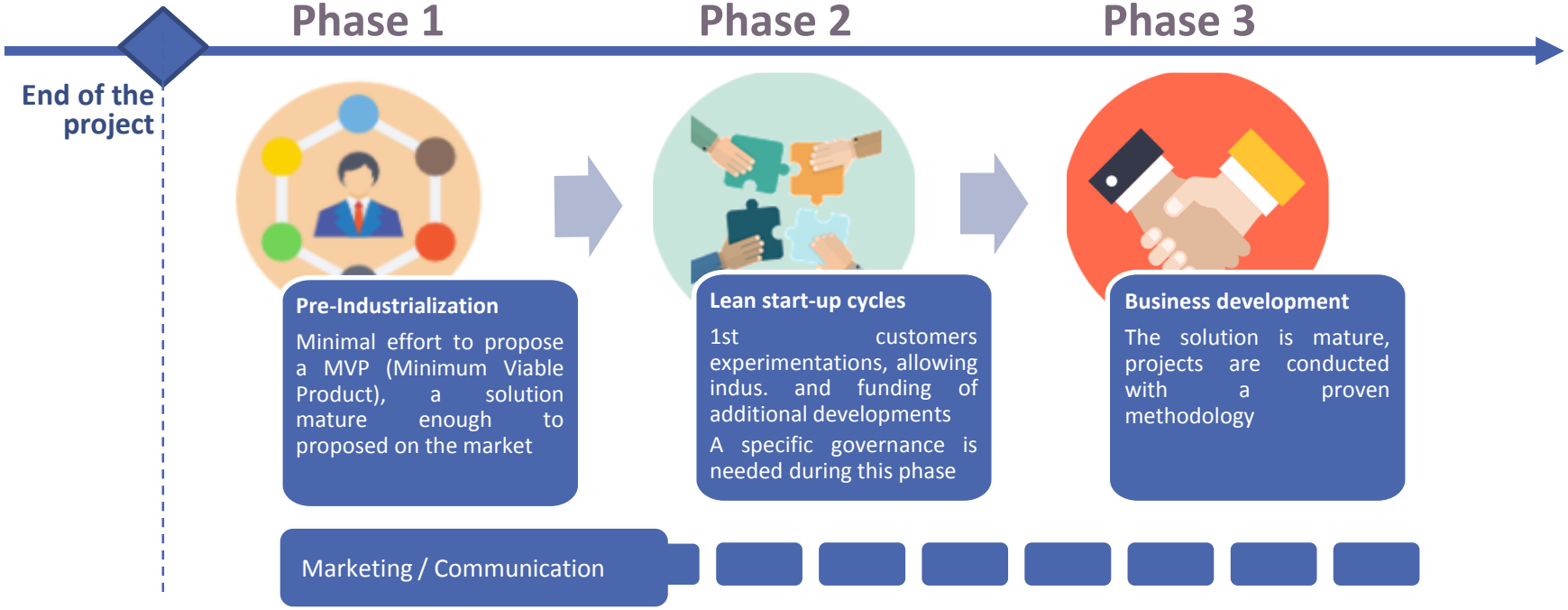
Exploitation strategy

- What is going to be done after the end of the project?
  - First adoption of modules will be carried out with the help of a selected group of real customers



Exploitation strategy
FALCON MVP in a Nutshell

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- FALCON is a **collaborative innovation platform** that exploits product usage information from embedded sensors and social media data with user friendly functionalities
- **Sharing usage knowledge among multidisciplinary teams** boosts the innovation process, creating, upgrading and re-redesigning products and services
- **Key features**
  - Data acquisition and aggregation from **social media, sensors, embedded devices** and **legacy systems,**
  - **Prediction of customer behaviour** based on PUI,
  - **Usage pattern detection** and preparation of **simulations**,
  - Highly adaptable to 3rd party SW to **include new functionalities**,
  - Interlink product usage data sources with **Open Data** initiatives,
  - Enriched **Knowledge Based Engineering (KBE)** models with Product Usage Information ,
  - **Collaboration for geographically distributed teams** through parametrized widgets in a common workspace.

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Thanks

Patricia Ortiz Ugalde
portiz@innovalia.org
Silvia de la Maza
smaza@innovalia.org