

# DATA.ZERO

## Newsletter August 2023



**DAT4.Zero** has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No. **958363**

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*FAIM2023*

Human in the Data-driven Zero Defect Manufacturing loop: Case Examples from Manufacturing Companies.



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# About DAT4.Zero

**DAT4.ZERO** (“Data 4.0”) is a project supported by the European Union. The project has 20 European partners who work to improve quality in European factories. Innovative technologies will gather and analyse data from manufacturing processes and give businesses greater control of what happens during production.

As a result, European companies will achieve greater competitiveness in global markets.



– Contact us if you want to eliminate manufacturing defects in high-value, low-volume production contexts.

Odd Myklebust  
Project Coordinator, DAT4.Zero  
Vice President Research, SINTEF



# Best paper award FAIM 2023



Emrah Arica (SINTEF Manufacturing) and co-authors Manuel Fradinho Oliveira (KITAR), Torbjørn Pedersen (IDLETECHS), Felix M. (KITAR), and Odd Myklebust (SINTEF Manufacturing) received the best paper award for:

**“Human in the Data-driven Zero Defect Manufacturing loop: Case Examples from Manufacturing Companies”.**

Their paper discusses the role of operators in a data-driven Zero-Defect Manufacturing systems with use case examples from DAT4.Zero and the use case companies ENKI, Dentsply, Benteler and FERSA.

The award was received during the 32nd International Conference on Flexible Automation and Intelligent Manufacturing, FAIM2023, in Porto, Portugal, hosted by the Polytechnic Institute of Porto.

[Read the abstract here](#)

# Events

The 2nd **General Assembly** of the **DAT4.Zero** project took place in Milano **Italy** on **May 9<sup>th</sup>- 11<sup>th</sup>**. This face-to-face meeting provided an opportunity for the entire consortium to gather and discuss the progress of the project.

This meeting marked an **important milestone** for the DAT4.Zero project, as it brought together the entire consortium after a challenging start impacted by the Covid-19 pandemic restrictions.

[Photos from our meeting](#)



The **SEA4DQ 2023 workshop** will be held on December 4<sup>th</sup> in San Fransisco, USA.

SEA4DQ 2023 is the **third workshop** of the series and discusses novel software engineering and AI techniques that address data quality issues of modern systems.

The question we aim to investigate in this years' workshop is:

***How can software engineering and artificial intelligence (AI) help manage and tame data quality issues?***



# Events

## Webinar on Zero Defects

Simplify and SINTEF joined forces for this free webinar on Zero Defects bringing together the world of services and the world of manufacturing.

The webinar ended with an open discussion and interesting questions about Zero Defects and how to achieve it.

[Read more about the webinar](#)



## Our first general assembly in Norway

We held our first face-to-face general assembly in Raufoss Industrial Park, at MTNC – Manufacturing Technology Norwegian Catapult Centre.

We also went on a tour of Benteler's facilities by Davar Heyman, who gave us some insights into the manufacturer's advanced production systems.

[Read more about the general assembly](#)



# Articles

[Read Article](#)

## Towards zero-defect manufacturing

This article was published in [Norwegian Sci-Tech News](#), March 2023. It is written by SINTEF for DAT4.Zero. Below is a brief digest of the article:

As consumers, we have all experienced buying faulty items, whether they be smart phones, washing machines or cars. Researchers now believe that this is a thing of the past.

Computers were integrated into Industry 3.0 to reduce the use of manual labour. Industry 4.0 represents the next stage in this process. The focus is now on increasing the levels of communication and automation used in production processes with the aid of massive amounts of data – so-called Big Data. The aim is to provide consumers with products of higher quality – faster.

“We’re heading towards a future offering zero-defect manufacture – at least in the most modernised manufacturing sectors”, says Project Manager Odd Myklebust at [SINTEF](#).



# Articles

[Read Article](#)

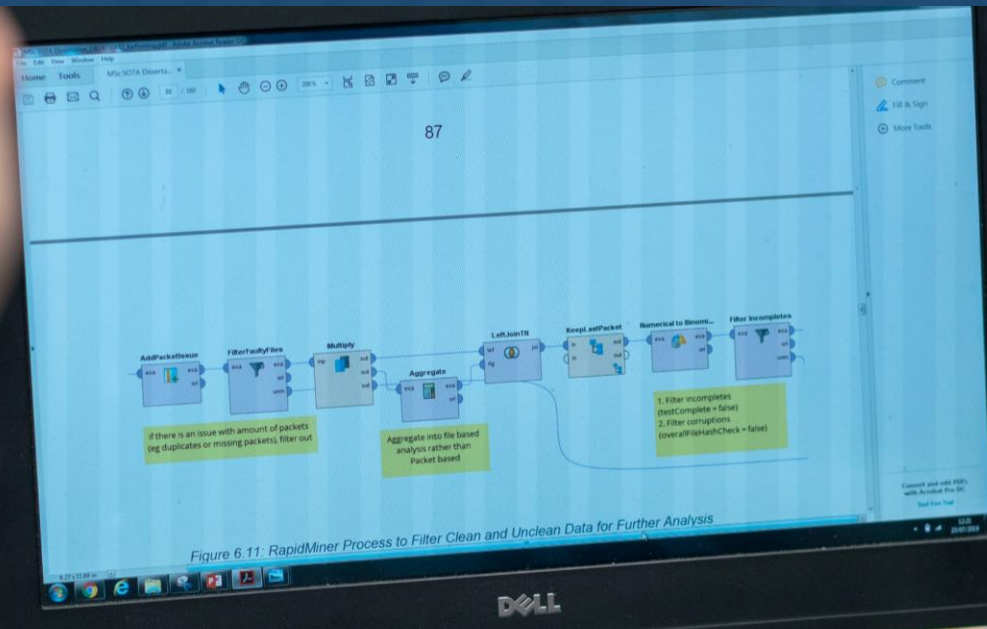
## Making models robust for industrial use

This article were written by Frank Westad, Idletechs AS, June 26<sup>th</sup>, 2023.

One challenge in modelling and predicting industrial processes is to make the models robust with respect to changes in the environment, process, and initial conditions. Non-robust models can lead to poor prediction accuracy and process monitoring in given situations, and it becomes hard to know if the process is under control.

We advocate for using methods that allow a view into both the sample and variable space for finding sample groups and outliers, making it possible to interpret the partial correlation of the variables/features and confirm findings with domain-specific knowledge, theory and causality.

In most cases, the main reason for a non-robust model/process is other sources of variation. Therefore, the model should be validated by stratifying the samples according to qualitative meta-information. In this way, the most important sources of variation can be assessed.





# Articles

[Read Article](#)

## Revolutionizing In-Line Measurements of Aluminium Extrusions

The article were written by Dr. Waiel Elmadih from Taraz Metrology.

### Why is it important to measure the shape of aluminium extrusions during manufacturing?

If manufacturers are able to measure the shape in real-time, they can identify any errors in the desired shape and make adjustments immediately, reducing waste and improving the quality of the final product.

However, **measuring the shape of aluminium extrusions is no easy feat**. The extrusions are hot, shiny, and move rapidly through the manufacturing process. Traditional methods of measuring the shape, such as using contact probes or cameras, are often slow, unreliable and can cause damage to the extrusions.

The **proposed solution** by the DAT4Zero project is to use **advanced laser line scanning technologies** to measure the shape of the extrusions repeatedly and in real-time as shown in Figure 2, without touching the part at all. By using high-speed laser scanners and advanced software, the lasers can measure the shape of the extrusions with extreme precision and accuracy, without causing any damage to the extrusions.



# Publications

## 2023

### **A global survey on the current state of practice in Zero Defect Manufacturing and its impact on production performance**

**Authors:** Giuseppe Fragapane (SINTEF), Ragnhild Eleftheriadis (SINTEF), Daryl Powell (SINTEF) and Jiju Antony

**DOI:** <https://doi.org/10.1016/j.compind.2023.103879>

**Journal:** Computers in Industry, Elsevier

### **A Systematic Review of Secure IoT Data Sharing (proceedings)**

**Authors:** Thanh Tran (University of Oslo), Phu Nguyen (SINTEF) and Gencer Erdogan (SINTEF)

**DOI:** DOI: 10.5220/0011674200003405

**Book:** Proceedings of the 9th International Conference on Information Systems Security and Privacy

### **Migrating monoliths to cloud-native microservices for customizable SaaS**

**Authors:** Espen Tønnessen Nordli (TietoEvry), Sindre Grønstøl Haugeland (TietoEvry), Phu H. Nguyen (SINTEF), Hui Song (SINTEF), Franck Chauvel (Axbit AS)

**DOI:** <https://doi.org/10.1016/j.infsof.2023.107230>

**Journal:** Information and Software Technology

# Publications

## 2023

### **Software Engineering and AI for Data Quality in Cyber-Physical Systems/Internet of Things – SEA4DQ'22 Report**

**Authors:** Phu H. Nguyen (SINTEF), Sagar Sen (SINTEF), Beatriz Bretones-Cassoli, Nicolas Jourdan, Maria Chiara Magnanini (Politecnico di Milano)

**DOI:** <https://doi.org/10.1145/3573074.3573103>

**Journal:** SIGSOFT Softw. Eng. Notes 48

### **Development of an adaptive quality control loop in micro-production using machine learning, analytical gear simulation, and inline focus variation metrology for zero defect manufacturing**

**Authors:** Daniel Gauder (KIT), Johannes Gölz (KIT), Niels Jung (KIT), Gisela Lanza (KIT)

**DOI:** <https://doi.org/10.1016/j.compind.2022.103799>

**Journal:** Computers in Industry

### **A Systematic Review of Data Quality for CPS, IoT, or Industry 4.0 Applications**

**Authors:** Phu Nguyen (SINTEF), Sagar Sen (SINTEF), Enrique Garcia-Ceja, Arda Goknil (SINTEF), Karl John Pedersen (DNV GL), Abdillah Suyuthi (DNV), Dimitra Politaki, Harris Niavis (Inlecom Innovation) and Amina Ziegenbein (PTW TU Darmstadt)

**DOI:** <https://doi.org/10.1145/3593043>

**Journal:** ACM Computing Surveys

# Latest tweets



**DAT4.Zero**  
@DAT4Zero - Follow

Our General Assembly occurred in Italy May 9th-11th, allowing the entire consortium to gather face-to-face. The interaction provided valuable opportunities for networking, sharing insights, and strengthening collaboration among the partners. #Polimi #Enki #DAT4Zero



2:44 PM - Jun 19, 2023

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How do you make models robust for industrial use?

One challenge in modelling and predicting industrial processes is to make the models robust with respect to changes in the environment, process, and initial conditions.

Read the article here



dat4zero.eu  
Making models robust for industrial use - DAT4.Zero  
One challenge in modelling and prediction of industrial processes is to make the models robust with respect to predicting the product quality...

8:24 AM - Jun 30, 2023

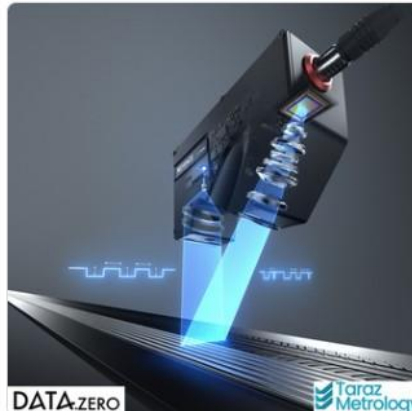
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Measuring the shape of aluminium extrusions is no easy feat. The extrusions are hot, shiny, and move rapidly through the manufacturing process.

However, we can use advanced laser line scanning technologies to measure the shape in real-time: [dat4zero.eu/revolutionizin...](#)



12:50 PM - Jun 27, 2023

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We have just published our global ZDM survey! 120 respondents from international businesses replied. We investigated the impact of ZDM strategies on production performance, amongst other findings. [dat4zero.eu/zdm-survey-com...](#) #manufacturing



dat4zero.eu  
ZDM-Survey Published in Computers in Industry, Elsevier - DAT4.Zero  
This survey mapped the current state of practice of ZDM in companies, the barriers in implementing and applying ZDM, and the impact on the...

11:10 AM - Apr 19, 2023

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Congratulations to Emrah Arica and his co-authors on receiving the best paper award for their article "Human in the Data-driven Zero Defect Manufacturing loop: Case Examples from Manufacturing Companies" at FAIM2023. #ZDM #DAT4Zero #FAIM2023

[dat4zero.eu/faim-2023-best...](#)



9:13 AM - Jun 23, 2023

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