SHIFT LABS

THE SWEDISH NETWORK FOR SUSTAINABLE DIGITALISATION AND HUMAN-CENTRIC FACTORY TRANSFORMATION

SHIFT LABS

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Peter Andersson

Research scientist, PhD
RISE Research Institutes of Sweden

- Industrial digitalisation and AI
- Data management and analysis

AI-ShiftLabs – Supporting Swedish industry

- The Swedish network for sustainable digitalisation and human-centric factory transformation
- Tailored for manufacturing, small and medium-sized enterprises (SMEs) with up to 3000 employees
- Providing expertise from research institutes and academia to "Test before invest".

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Sweden – Production · Established 2016

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Ukraine – Production · Established 2017

- Approx. 60 employees across Sweden and Ukraine
- Manufacturing based in Borås, Sweden – complemented by a dedicated engineering and production unit in Ukraine

Certificates:

ISO 9001:2015

ISO 14001:2015

AS-EN 9100 (in process, Q2 2026)

Focus areas:

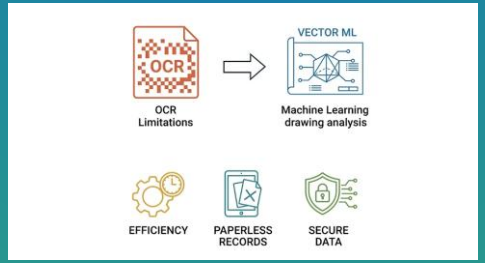
- Defense
- Telecom/Radar
- Optics
- Medtech

Components/materials:

- Main focus complex parts.
- Aluminium/Stainless Steel/Titanium/Brass.
- Batch sizes: 100 – 10.000 parts (also prototypes when needed)

Challenge and internal innovation

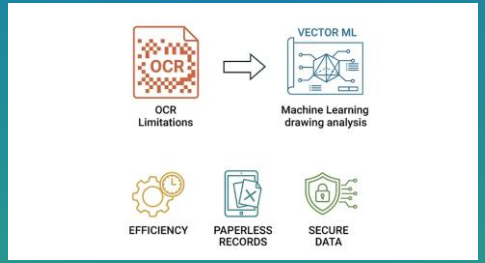
- **Need:** Optimizing drawing handling and object-specific quality inspection on the shopfloor
- **Initiative:** An in-house digital QA tool created by Mykola Kantsir using conventional software development and with support from Large Language Models "Vibe Coding"
- **Limitation:** Extracting tolerances and metadata from CAD PDFs via traditional OCR yields inconsistent results



Our joint project

•**Purpose:** Establish a highly efficient, paperless, and secure quality control workflow ”directly at the machine”

• **Goal:** Run a hands-on research experiment to replace or augment traditional OCR with vector-based machine learning – suitable for analysis of CAD drawing information



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Able to provide significant opportunities in translating research into tangible benefits for industry and contribute to sustainable growth in the various regions.

Examples of services and activities:

1. Upskilling activities in AI, Robotics, IoT, Connectivity, Digital Twins, and Cybersecurity
2. In-depth analysis of digitalisation and AI maturity in manufacturing processes; Smart maintenance, production planning, quality assurance
3. Support in testing and implementing technical solutions before investment

Target group: Manufacturing small and medium-sized enterprises (max 3000 employees)

Email
caroline.jarebrant@ri.se
urban.thuresson@ri.se

LinkedIn
@ShiftLabs

Website
shiftlabs.eu

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CLUSTER

CONFERENCE

20 MAY 2026

From Drawings to Data

Template generation and tolerance validation using machine learning on the CNC shopfloor

MYKOLA KANTSIR

Gaston Components

Mykola Kantsir

CNC Programmer and Mechanical Engineering Technician
Gaston Components

- Master's in Mechanical Engineering, CAM programming and internal IT projects
- Manufacturing digitalization, Industry 4.0, IoT and data analysis

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Quality assurance on the CNC shopfloor is still a paper job

- Drawings live as static PDFs — no structured data inside.
- QA templates are recreated by hand for every new part.
- Operators write measured values on paper, then someone retypes them.
- Traceability between drawing, part and measurement is fragile.
- First Article Inspection (FAI) prep takes hours per new part.

FAI PREP

Hours

per new part — every time.

RE-TYPING

Paper → ERP

Every value, transcribed by hand.

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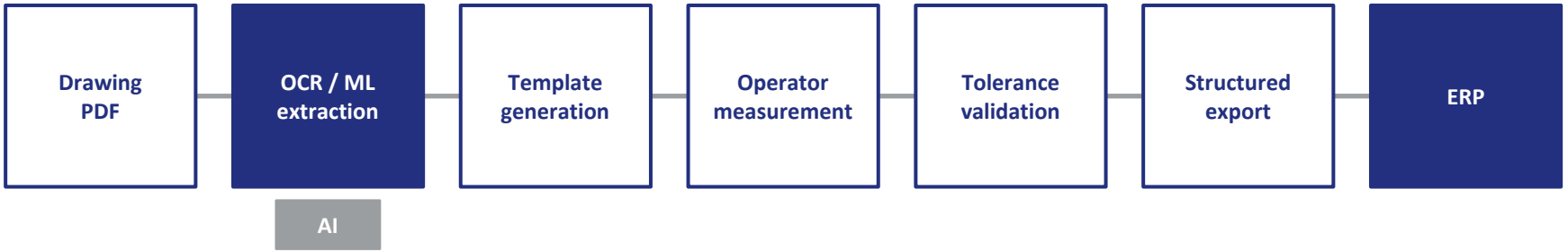
From PDF drawing to ERP-ready QA data — one digital flow



- Every step is digital and traceable.
- AI accelerates setup; the operator stays in the loop.
- Supports paperless QA from First Article onward.

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The operator's view — drawing and measurements in one place

- Digital drawing with numbered dimensions.
- Side panel with the generated measurement list.
- Real-time tolerance check (in / out / nominal).
- Direct link from value to source dimension.

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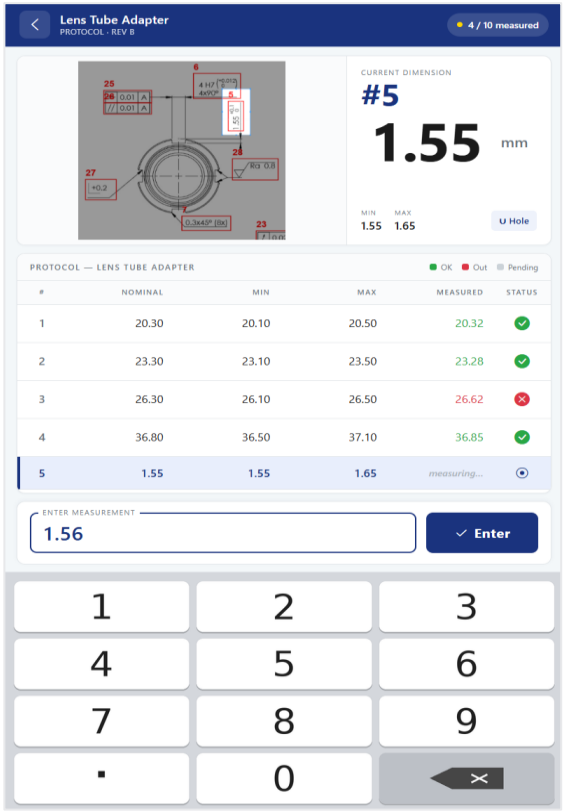
Same workflow, on the machine — no walking back to the desk

- Tablet-optimized layout for shopfloor use.
- One-tap value entry, large hit targets.
- Each measurement linked back to the source dimension.
- Protocol confirmation step before export.
- No printed drawings, no paper protocols.



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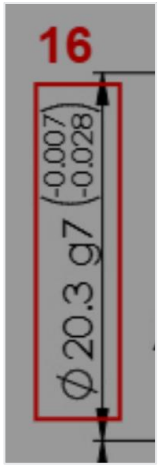
OCR removes the typing, the operator keeps the judgment

- OCR extracts dimensions, tolerances and metadata from PDFs.
- ML helps where OCR alone is not enough (vector / raster).
- The operator validates every result — human in the loop.
- Less manual data entry, fewer transcription errors.
- Every validated drawing improves the dataset.

PDF region



Structured fields

```
nominal:     20.3
min:         20.272
max:         20.293
type:        diameter
iso_class:   g7
page:        1
number:      16
articleId:   2733
```

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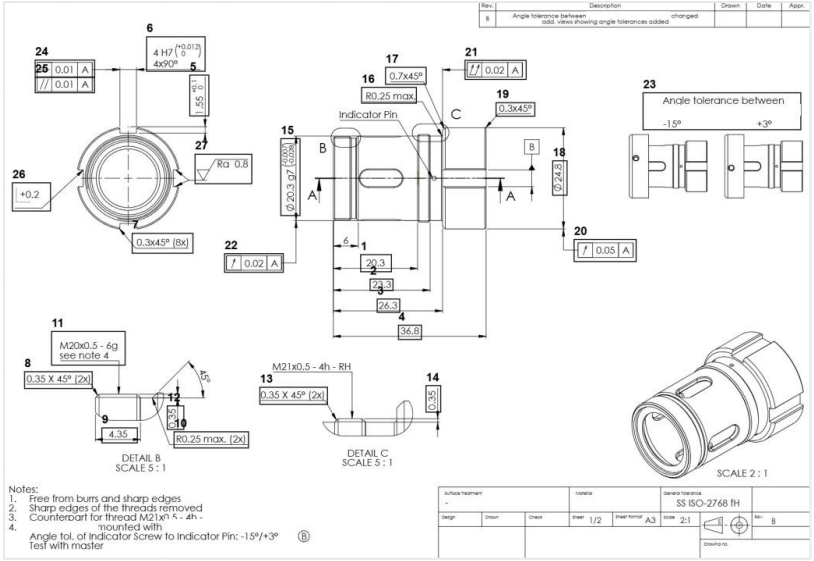
Traceable, structured QA data, ready for downstream systems

- CSV / JSON / PDF outputs per measurement protocol.
- PDF overlays with numbered dimensions match metadata.
- Every measurement traceable to drawing, part, operator, time.
- Direct path to ERP — no manual re-typing.
- Foundation for FAI certificates and audit trails.

Sample PDF overlay



Structured export

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{ "articleId": 2733,
  "dimensions": [
   {"number":1, "nominal":20.3, "min":20.1, "max":20.5},
   {"number":16,"nominal":20.3, "min":20.272,"max":20.293}
  ]}
```

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What the dataset and the platform unlock next

Smart metadata recognition	Manufacturing analytics	Predictive quality	CMM + HID integration	On-premise deployment
Customer, Article, Revision, Material and Tolerances read straight from the drawing.	Trends, deviations and process stability.	Flag drift before parts go out of tolerance.	Direct import from CMM and digital hand tools.	Local AI for defense and regulated customers.
01	02	03	04	05

SUMMARY

Digital, traceable, paperless —

already running on a real shopfloor.

KEY TAKEAWAYS

- PDF → AI → operator → ERP, linked end-to-end.
- Tablet-friendly, operator-centered workflow.
- AI for speed; humans for judgment.
- Traceability built in, not bolted on.

Mykola Kantsir · Gaston Components · mykola.kantsir@gaston-components.com

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Email
caroline.jarebrant@ri.se
urban.thuresson@ri.se

LinkedIn
@ShiftLabs

Website
shiftlabs.eu

Mykola Kantsir · Gaston Components
mykola.kantsir@gaston-components.com

@Gaston Components AB

gaston-components.com

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Projektpartners

Mälardalen University
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Chalmers University of Technology
KTH
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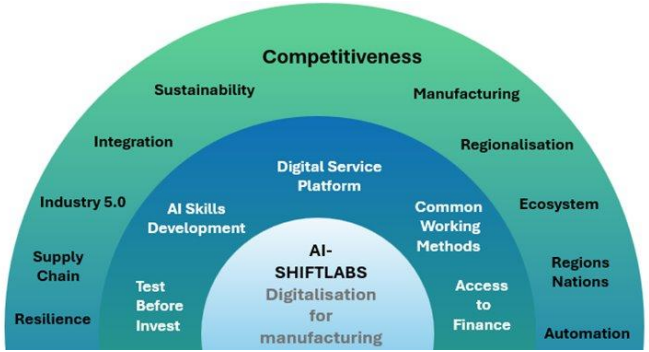
RISE – Research Institutes of Sweden
EIT-Manufacturing
University of Skövde
Linköping university
Linköping Science Park
Industrial Development Center West Sweden



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