

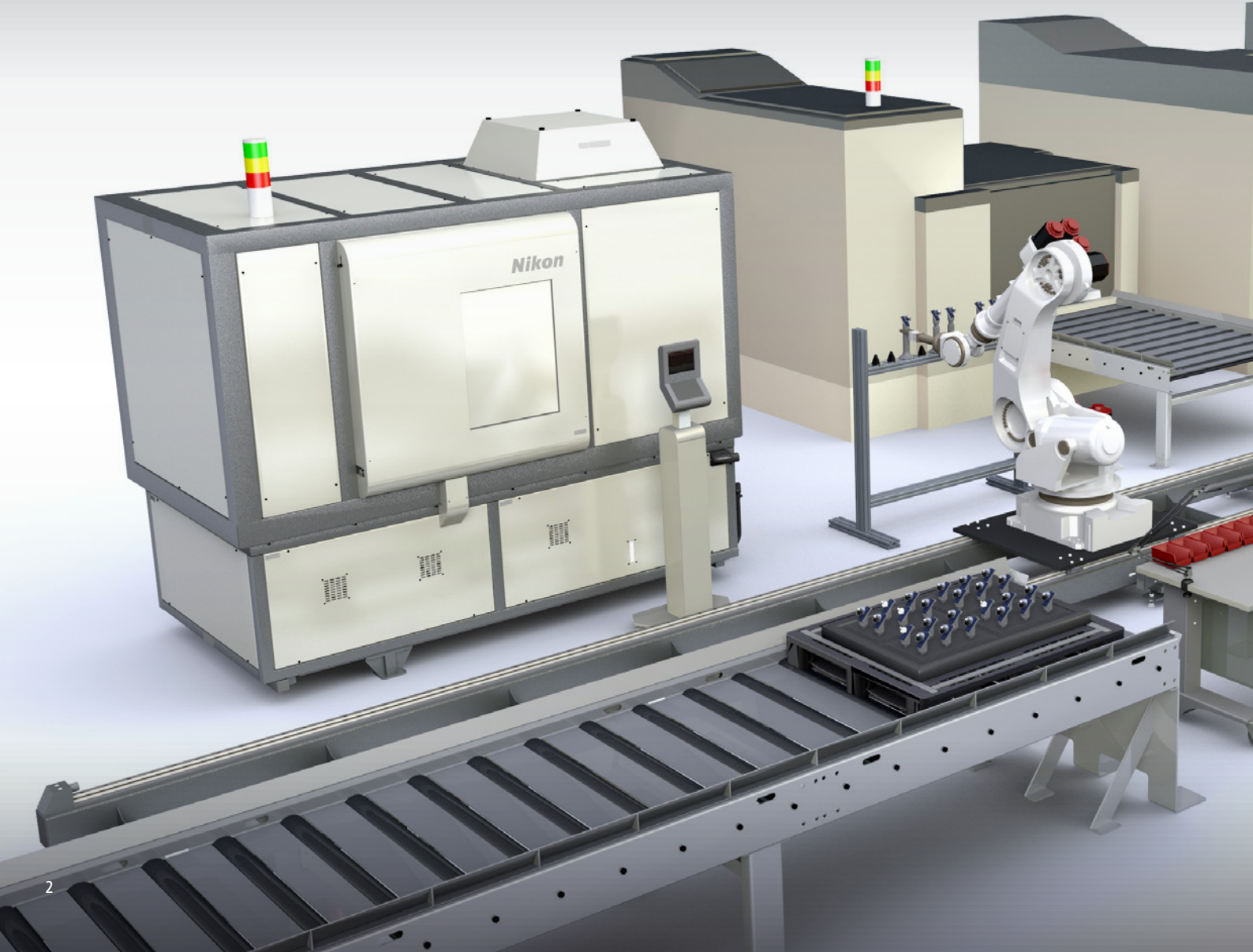
# AUTOMATED CT

FULL CONTROL OF YOUR PRODUCTION PROCESS

NIKON METROLOGY | VISION BEYOND PRECISION

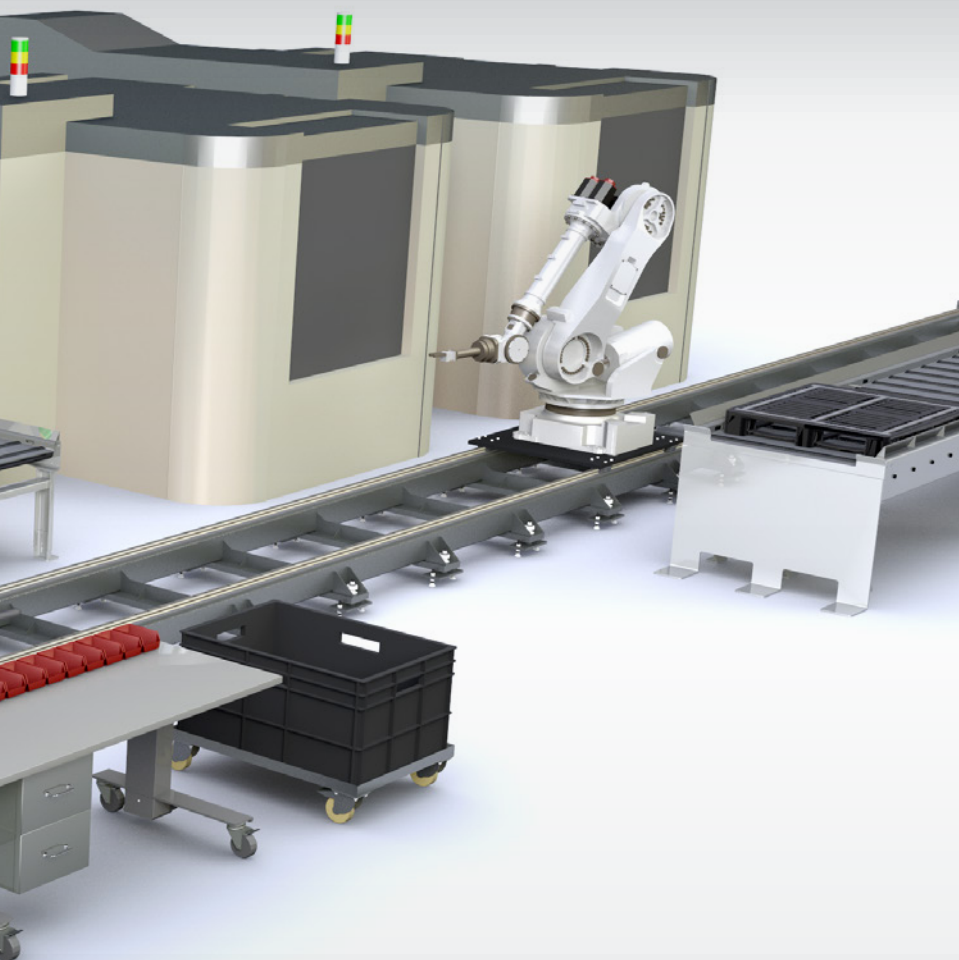
# INDUSTRIAL CT READY FOR PRODUCTION

THE FASTEST INSIGHT INTO PRODUCT QUALITY



An important challenge to manufacturers is to increase product quality, which can be achieved through 100% part inspection. Traditionally, X-ray Computed Tomography (CT) has been a valuable tool mainly used in research or prototyping labs to evaluate failures or spot defects; a proven engineering tool that was generally considered as too slow to be used on a production line.

That is, until now! Recent advances in high-flux rotating targets for X-ray sources, coupled with easy automation of CT scanning and analysis techniques allow samples to be scanned, reconstructed and evaluated in time measured in minutes with micron accuracy. This opens the gate to a broad span of automation inspection applications, varying from simple pass/fail inspection to full in-line automated CT inspection with feedback to the production process.



## The smart factory



Industry 4.0: Smart manufacturing for the future by automation and data exchange.

Within a smart factory manufacturing systems communicate and cooperate with one another and humans. Technology is used to monitor system status and perform corrective actions using decentralized decision making. In-line measurement provides immediate feedback, enabling optimisation of the manufacturing process in real-time. Supply chains benefit from superior cost efficiencies, better quality products and higher productivity.

## Automation benefits



**Increase  
productivity**



**Reduce  
costs**



**Improve  
quality**



**Closed-loop  
manufacturing**



**Centralized  
data**



**Deskill complex  
tasks**

# BATCH CT INSPECTION

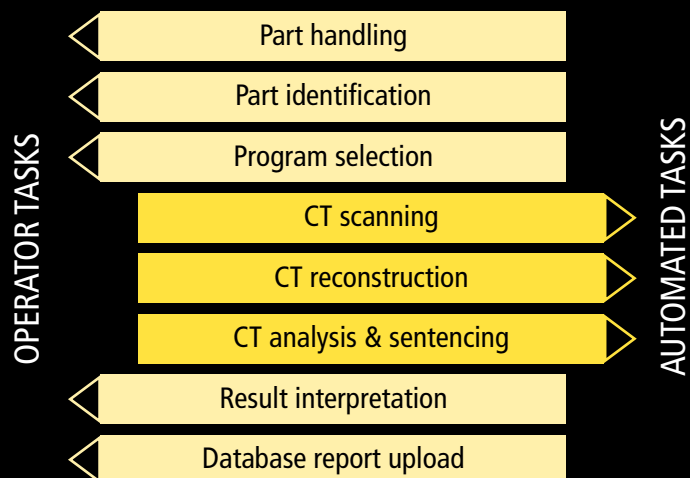
## Automated routines ensure consistency

In failure analysis or quality control laboratories where batches of samples need inspecting, Nikon Metrology CT systems are designed with automation in mind.

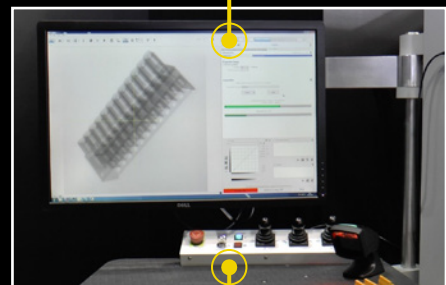
As standard, Nikon Inspect-X software allows users to save scan profiles which can be recalled at a later date. The CT scan profiles define the parameters for the X-ray conditions, manipulator position and imaging settings, along with reconstruction and volume analysis parameters. This ensures repeatability of the complete CT process by eliminating the need for parameter selection by operators.

### Benefits

- No programming skills required
- Consistent results
- Inspect-X loads appropriate analysis and reporting programs
- User is free to do parallel tasks such as sample preparation



CT scanning



CT reconstruction



CT analysis & sentencing

# SEMI-AUTOMATED CT INSPECTION

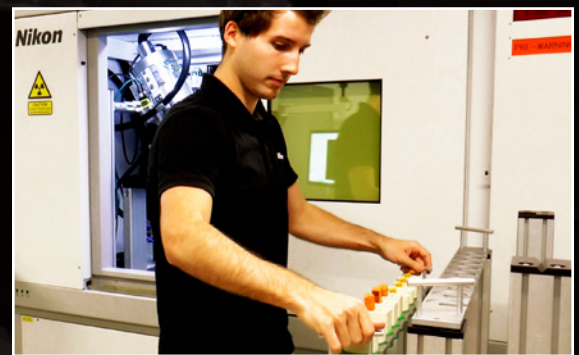
## Reducing operator involvement

In a production environment where fast inspection tact-time is required, semi-automated CT inspection systems are a solution that leave only one manual task involved with CT inspection; part handling. Parts can be loaded by the operator individually or as a rack of multiple parts that are moved individually to the CT scan position by an internal loading system.

By communicating with production databases the CT system can automatically recognize the part to be inspected, and adjust all parameters accordingly, further removing possible operator error. Inspection results can be written back to the database for further analysis or to preserve data history.

### Benefits

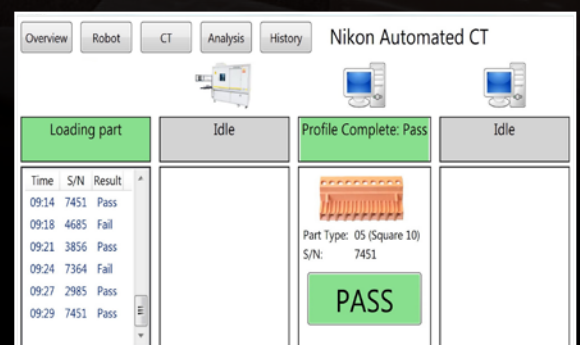
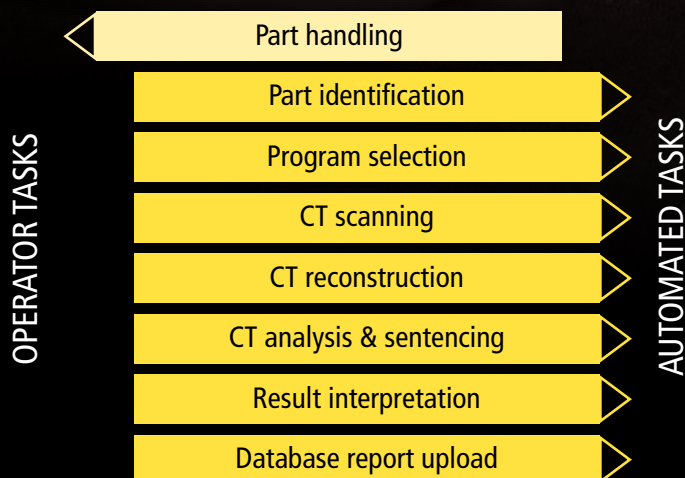
- Custom, simplified user interface (UI) guides the user through the complete process
- Basic operator skills needed
- Part identification by bar or QR code reader
- Integrated with manufacturing database
- Repeatable process
- Process control (SPC)



Loading the sample part holder in the CT system



Each sample is automatically picked up by the manipulator



Custom UI overviews the complete inspection process

# IN-LINE CT INSPECTION

## 100% part inspection

The in-line CT inspection system is a solution for fully automated production environments where critical parts with complex internal geometries or material structures need to be inspected. As such this is the ideal inspection solution for companies that implement "Industry 4.0" methodology on the shop floor.

With no user input the complete CT inspection process is automated; part identification codes are scanned and handled through the database and robots load/unload from conveyors and position parts in the CT system via an automated door. The part is then automatically scanned, analyzed and sentenced according to the database recipe.

The entire process can be completed in under a minute, with possibility to scan multiple parts at once to further increase tact-time. For longer tact-times scanning and analysis of parts can occur in parallel.

## Benefits

### Improved quality control

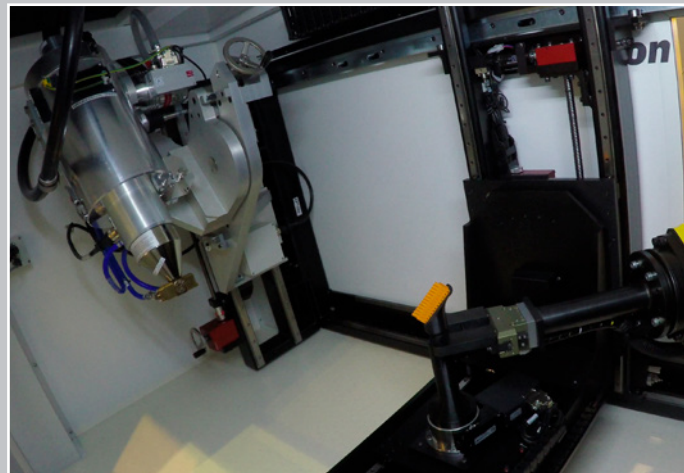
- 100% inspection
- Rapid detection and feedback of process variation
- Eliminates operator influence on metrology

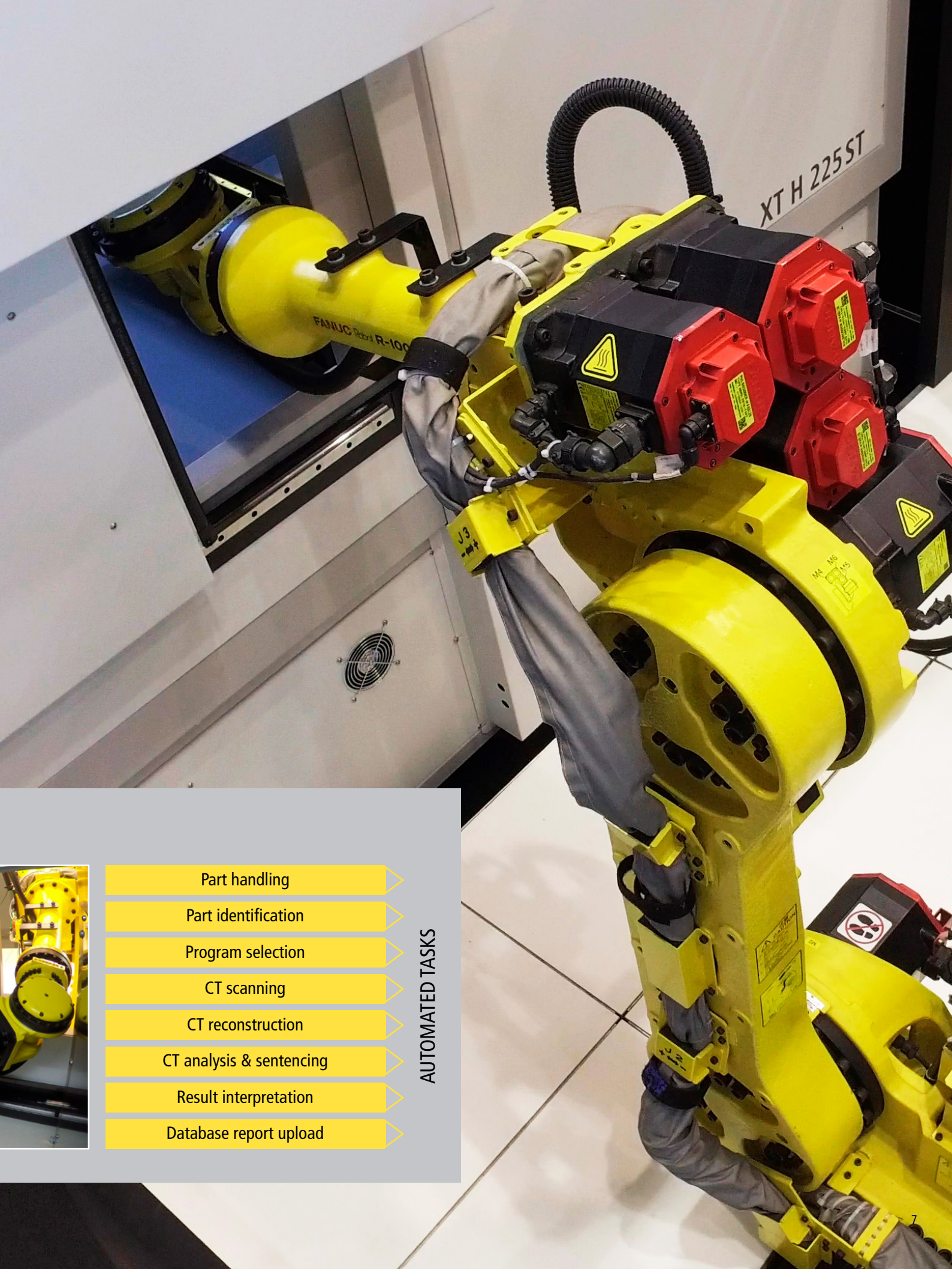
### Increased efficiency

- Control and optimize production in real-time
- Eliminates transporting parts to and from the measurement room
- Maintain the continuous flow of production

### Complete traceability

- Central database with all manufacturing information
- Store inspection results for every manufactured part





XT H 225 ST

FANUC Robot R-1000

J3

M4 M6  
2x15



- Part handling
- Part identification
- Program selection
- CT scanning
- CT reconstruction
- CT analysis & sentencing
- Result interpretation
- Database report upload

AUTOMATED TASKS



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