



CAN ROBOTS SOLVE ALL YOUR PROBLEMS ?

AUTOMATION AND ROBOTICS IN MANUFACTURING

ai³



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MANUFACTURING INDUSTRY CHALLENGES



WORKFORCE AVAILABILITY



2,189 Positions Available



1,477 Positions Available



417 Positions Available

The manufacturing skills gap in the U.S. could result in 2.1 million unfilled jobs by 2030, according to a new study by Deloitte and The Manufacturing Institute. The cost of those missing jobs could potentially total \$1 trillion in 2030 alone.

MANUFACTURING INDUSTRY CHALLENGES



WORKFORCE AVAILABILITY



PRODUCTION RATE VOLATILITY



“Boeing announced it would temporarily halt production of the 737 Max...” - Business Insider

“Boeing aims to nearly double 737 MAX production by end of 2023” – Reuters

MANUFACTURING INDUSTRY CHALLENGES



WORKFORCE AVAILABILITY



PRODUCT DEMAND VOLATILITY



QUALITY



Rating Formula - Rationale

SCORE	RATING	RATIONALE
100%	Gold	Consistent with World Class performance
93% - 99.9%	Silver	Allows a Yellow in Group 1 or 2 or a Red in Group 3
85% - 92.9%	Bronze	Allows a Red in Group 1 or 2 or 2 Yellows in Group 3
78% - 84.9%	Yellow	Would not allow a Red in Group 1 or 2
77.9% or less	Red	Default



MANUFACTURING INDUSTRY CHALLENGES



WORKFORCE AVAILABILITY



PRODUCT DEMAND VOLATILITY



QUALITY



DELIVERY



OTD



MANUFACTURING INDUSTRY CHALLENGES

WORKFORCE AVAILABILITY

PRODUCT DEMAND VOLATILITY

QUALITY

DELIVERY

EH&S – ERGONOMICS



AUTOMATION AND ROBOTIC SOLUTIONS



COBOTS → FULLY AUTOMATED
WORKFORCE AVAILABILITY



AUTOMATION AND ROBOTIC SOLUTIONS

COBOTS → **FULLY AUTOMATED**

FLEXIBILITY

PRODUCT DEMAND VOLATILITY



AUTOMATION AND ROBOTIC SOLUTIONS

COBOTS → FULLY AUTOMATED

FLEXIBILITY

STABLE, ACCURATE, REPEATABLE

QUALITY



AUTOMATION AND ROBOTIC SOLUTIONS

COBOTS → FULLY AUTOMATED

FLEXIBILITY

STABLE, ACCURATE, REPEATABLE

SIZED FOR RATE – ADAPTABLE TO RATE

DELIVERY



AUTOMATION AND ROBOTIC SOLUTIONS

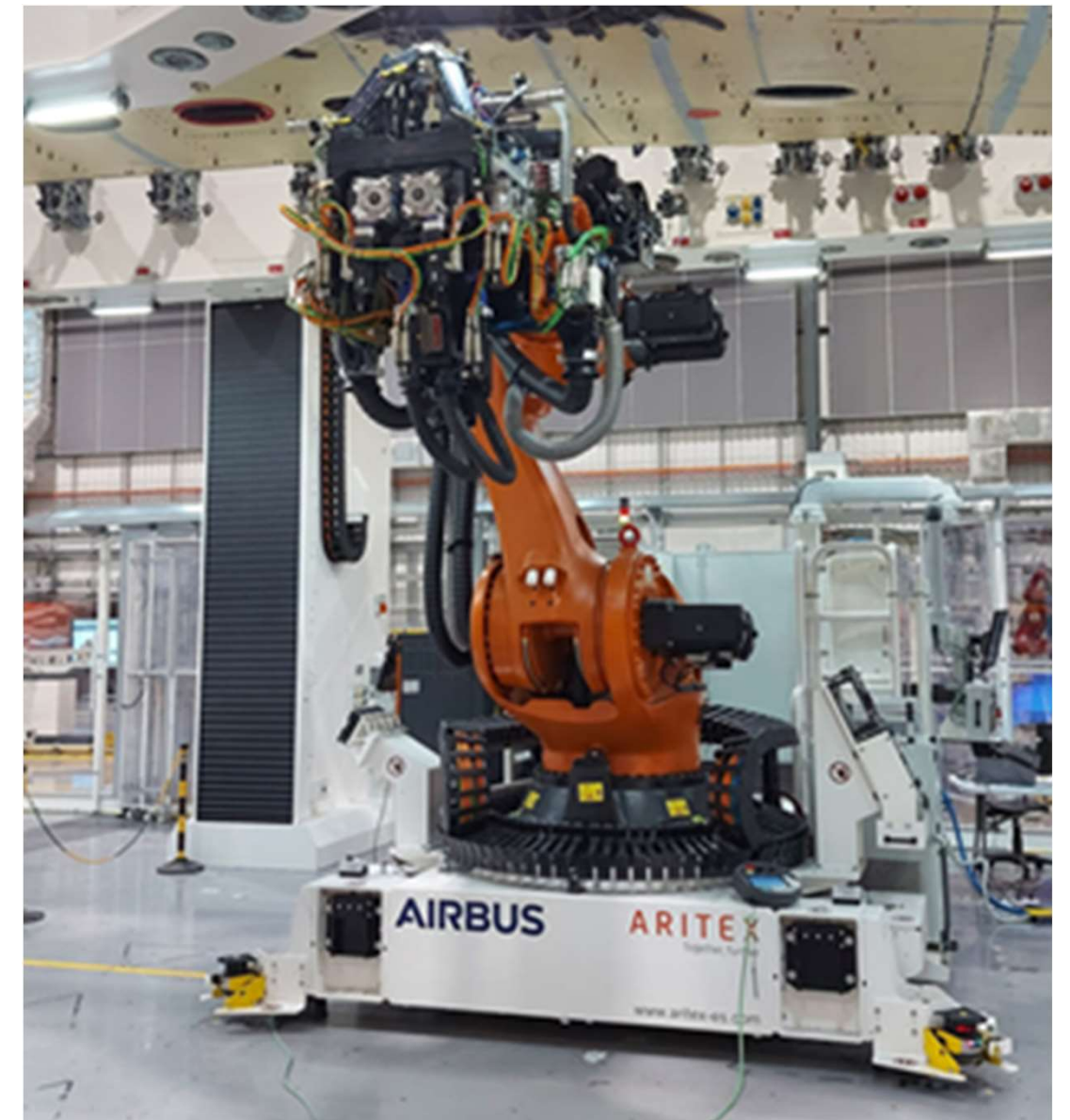
COBOTS → FULLY AUTOMATED

FLEXIBILITY

STABLE HIGH ACCURACY – HIGH REPEATABILITY

SIZED FOR RATE – ADAPTABLE TO RATE

HEAVY, HIGH FORCES, AWKWARD POSITIONS, REPETITIOUS
EH&S – ERGONOMICS



KEYS TO A SUCCESSFUL AUTOMATION SYSTEM

CULTURE & BUY-IN



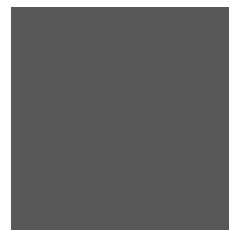
KEYS TO A SUCCESSFUL AUTOMATION SYSTEM



CULTURE & BUY-IN



COLLABORATION



KEYS TO A SUCCESSFUL AUTOMATION SYSTEM



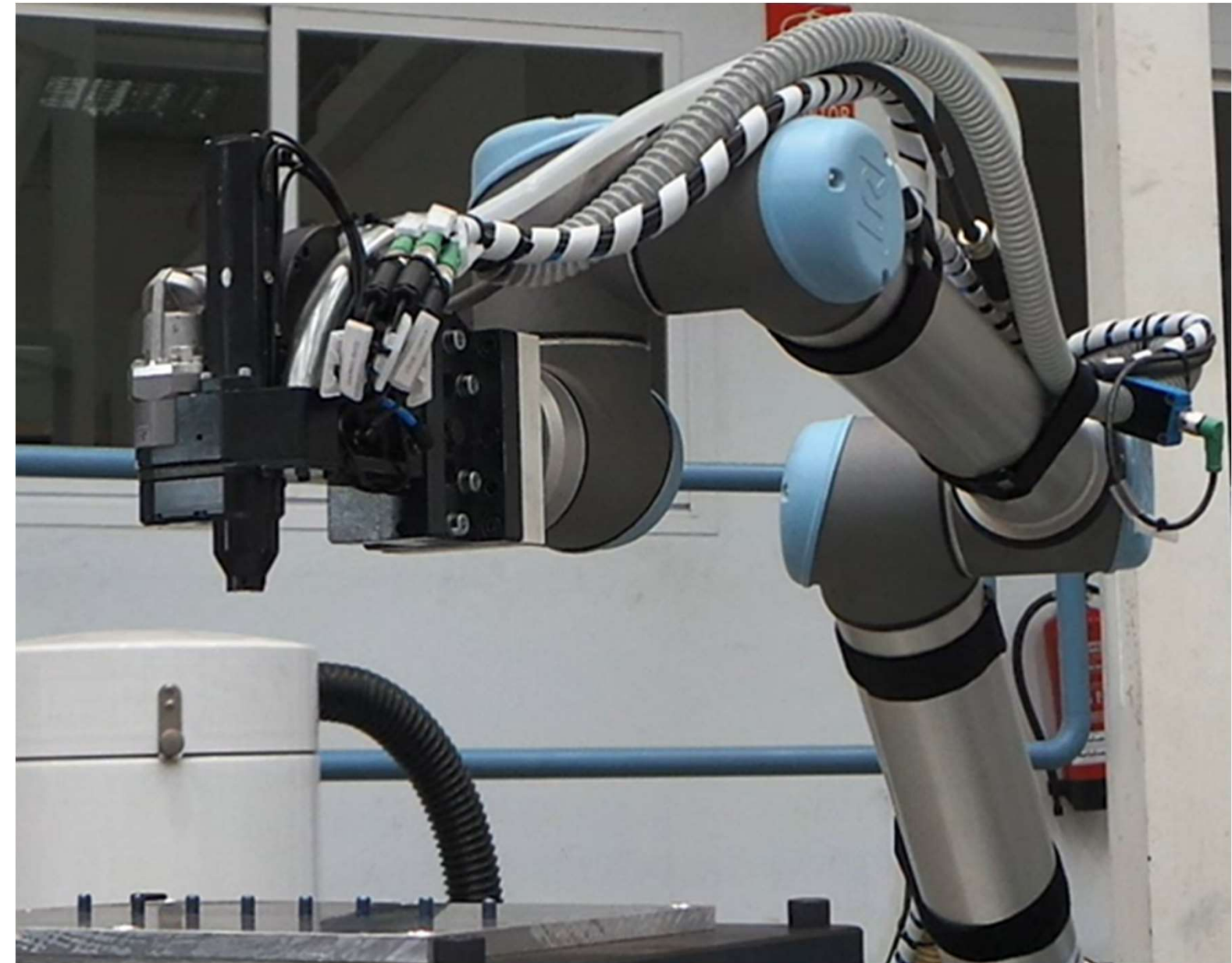
CULTURE & BUY-IN



COLLABORATION



ACCOUNT VOR VARIABILITY



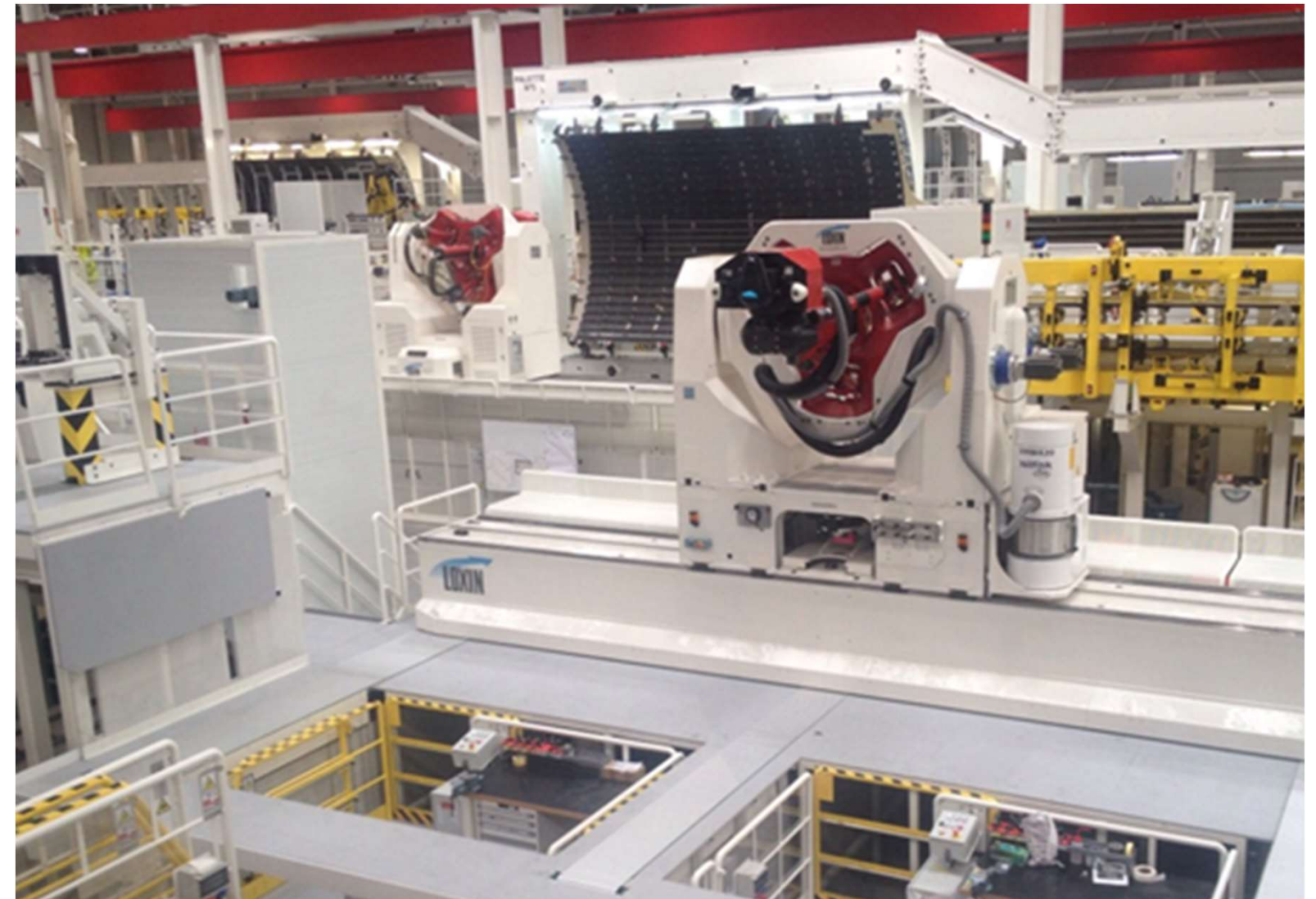
KEYS TO A SUCCESSFUL AUTOMATION SYSTEM

CULTURE & BUY-IN

COLLABORATION

ACCOUNT FOR VARIABILITY

AUTOMATE FOR VALUE: 85%, 95%, 100%?



KEYS TO A SUCCESSFUL AUTOMATION SYSTEM

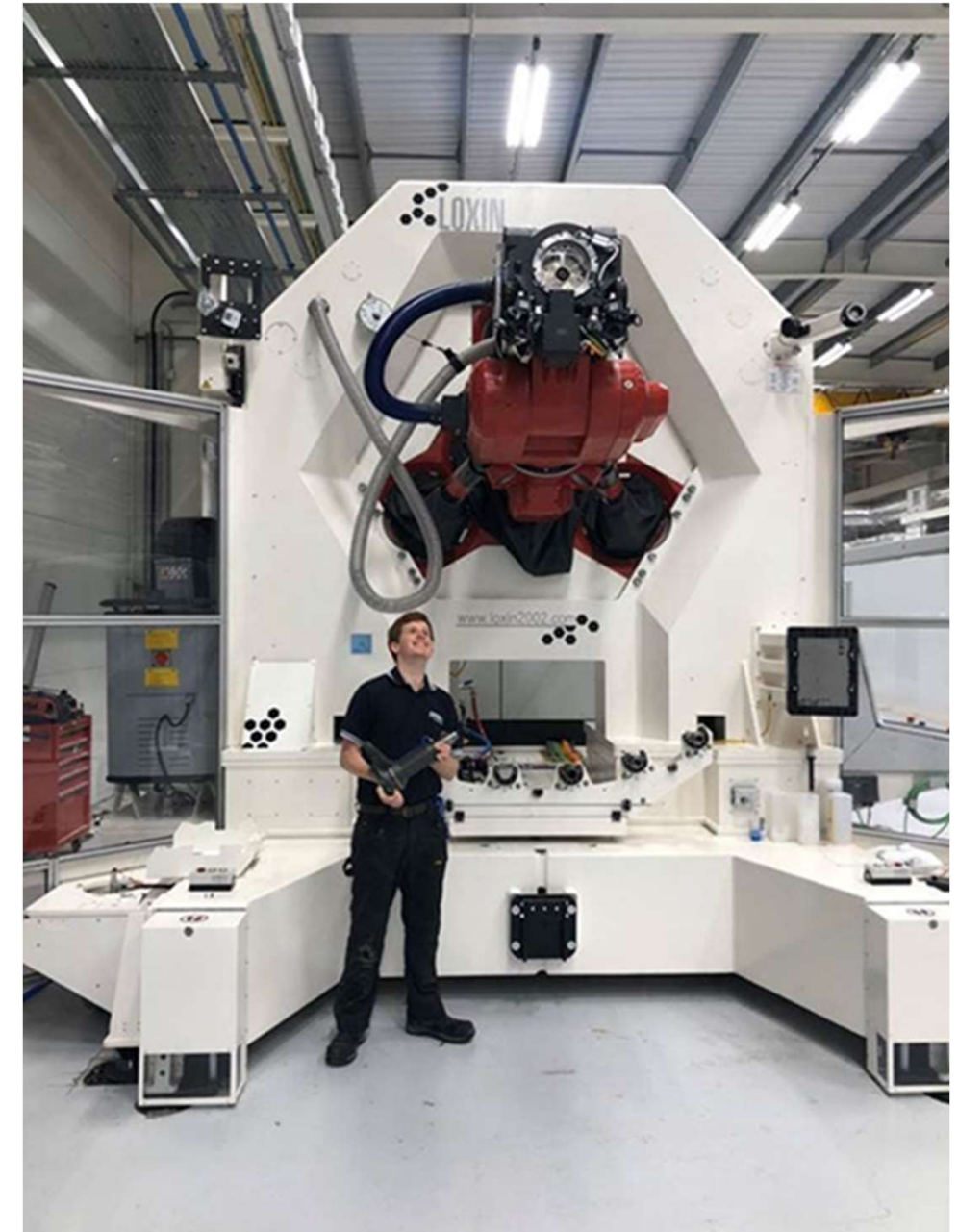
CULTURE & BUY-IN

COLLABORATION

ACCOUNT VOR VARIABILITY

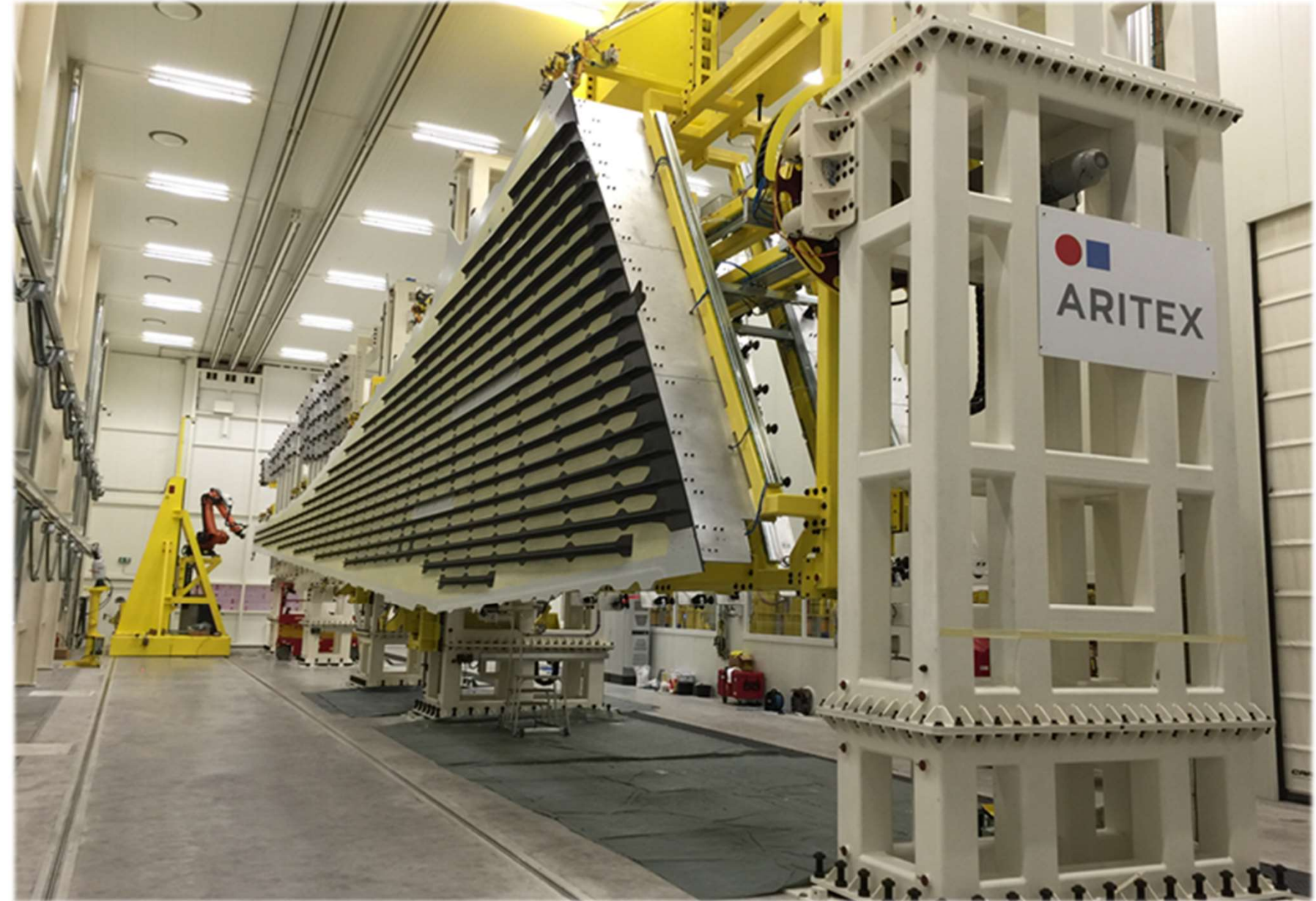
AUTOMATE FOR VALUE: 85%, 95%, 100%?

**DON'T DO DEVELOPMENT IN AN
ALREADY CONSTRAINED
PRODUCTION ENVIRONMENT**



TRENDS IN MANUFACTURING AUTOMATION

**MORE AUTOMATION AND
ROBOTICS - INDUSTRY 4.0**



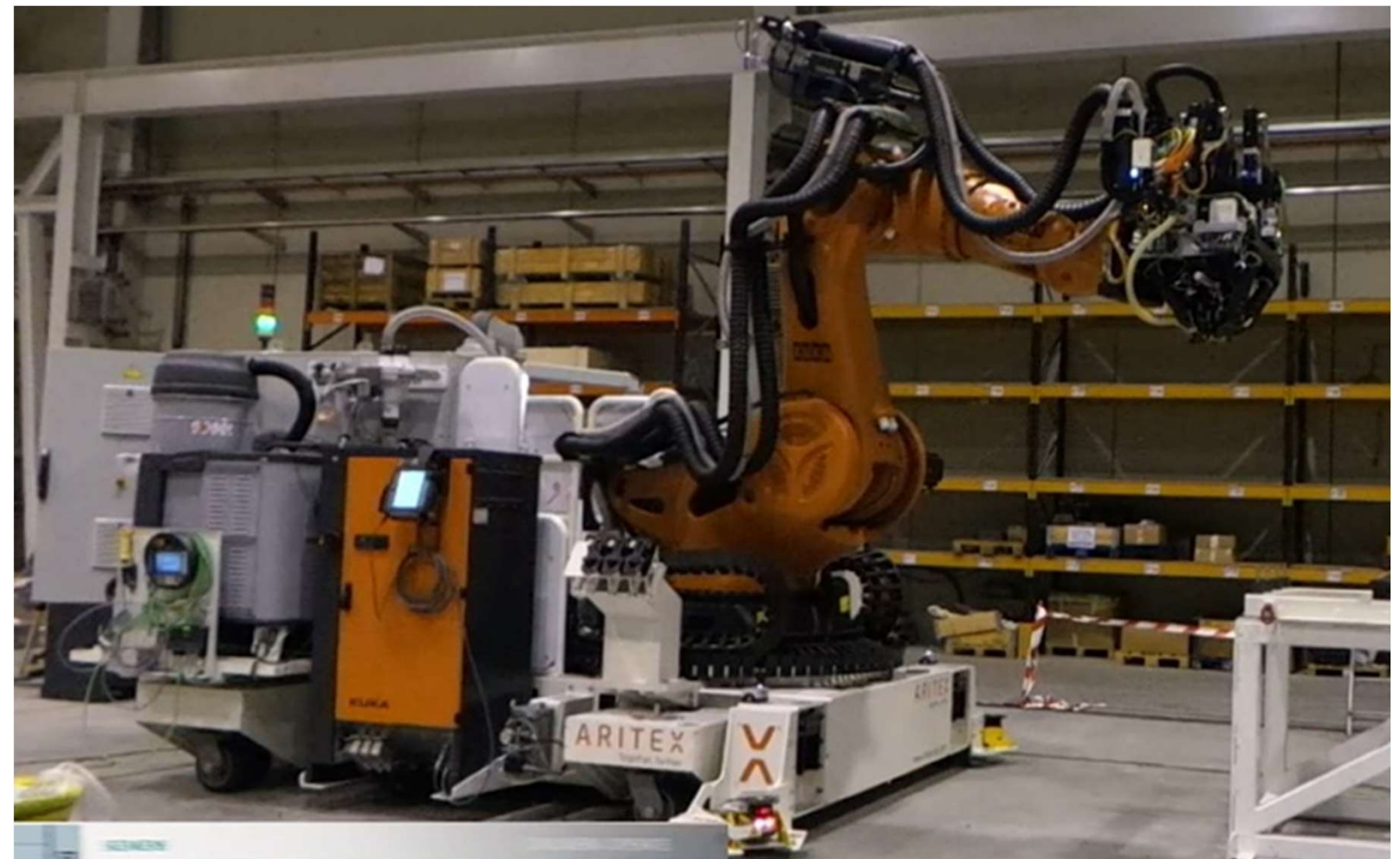
TRENDS IN MANUFACTURING AUTOMATION



**MORE AUTOMATION AND
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FLEXIBILITY



TRENDS IN MANUFACTURING AUTOMATION



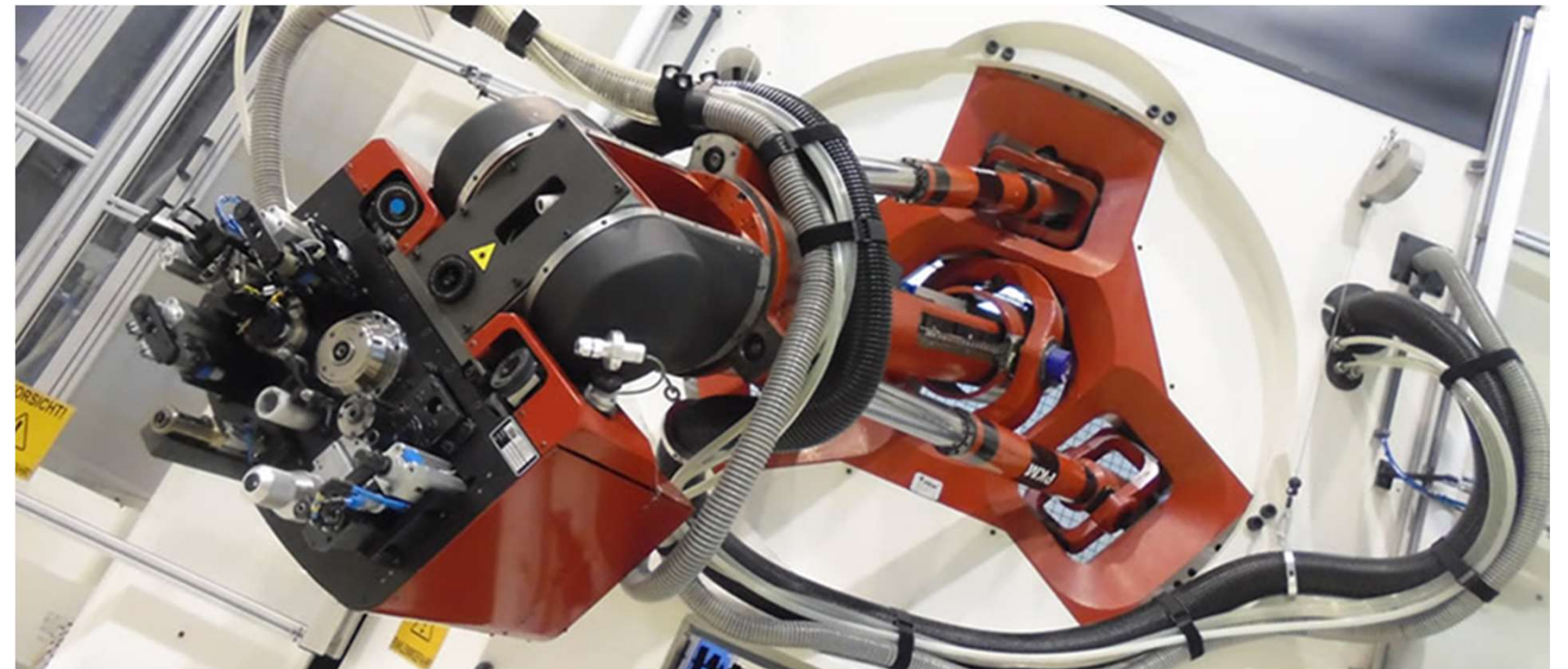
**MORE AUTOMATION AND
ROBOTICS - INDUSTRY 4.0**



FLEXIBILITY



ONE ROBOT - MANY JOBS



TRENDS IN MANUFACTURING AUTOMATION

**MORE AUTOMATION AND
ROBOTICS – INDUSTRY 4.0**

FLEXIBILITY

ONE ROBOT – MANY JOBS

VISION SYSTEMS: 2D & 3D



TRENDS IN MANUFACTURING AUTOMATION

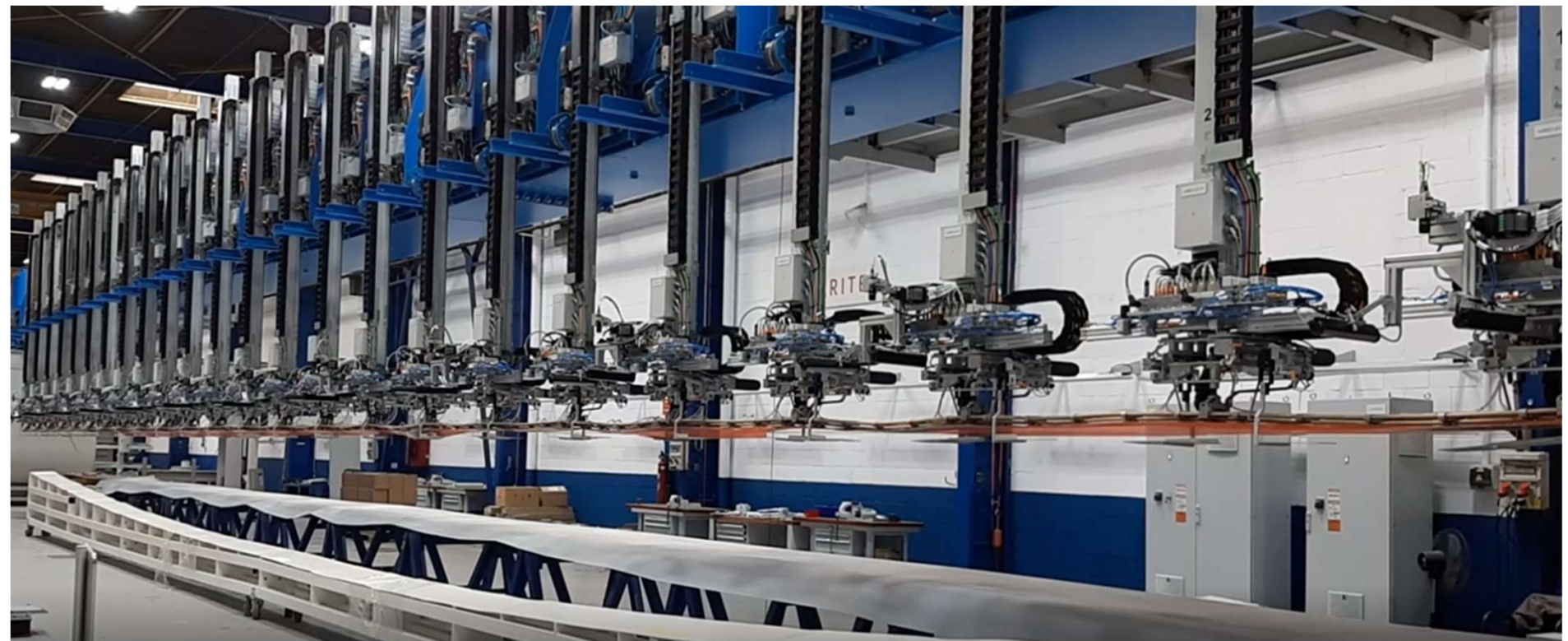
**MORE AUTOMATION AND
ROBOTICS – INDUSTRY 4.0**

FLEXIBILITY

ONE ROBOT – MANY JOBS

VISION SYSTEMS: 2D & 3D

**GREENFIELD – DESIGN FOR
AUTOMATION**



CAN ROBOTS SOLVE ALL YOUR PROBLEMS ?

**TO REMAIN COMPETITIVE, AUTOMATION AND
ROBOTICS SOLUTIONS SHOULD BE GIVEN
SERIOUS CONSIDERATION:**

BUSINESS MODEL / BUSINESS PLAN

STRATEGIC PLAN

TACTICAL EXECUTION

CONTINUOUS IMPROVEMENT

VALUE STRATEGY – EXIT PLAN

THANK YOU

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