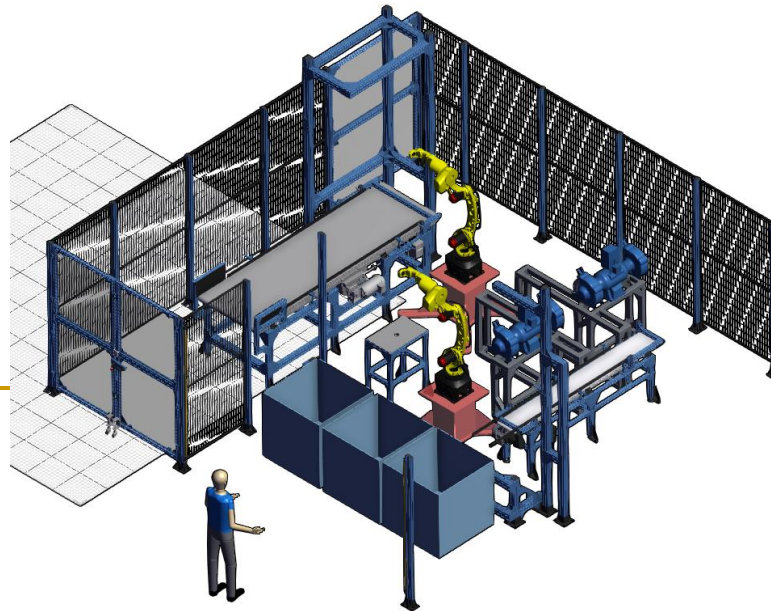




DONSCO
INCORPORATED

INTEGRATED SUPPLIER OF CAST PARTS

Dual Robot With 3D Bin Picking System



Date: 01/10/2024

Engineers: Gabriel Bertini, Duane Shearer,
Caleb Fires, and Ryan Strohl

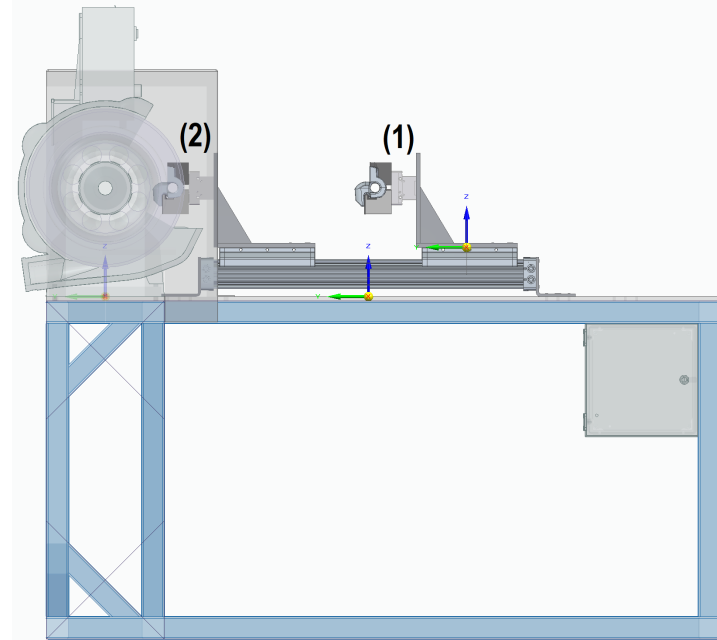
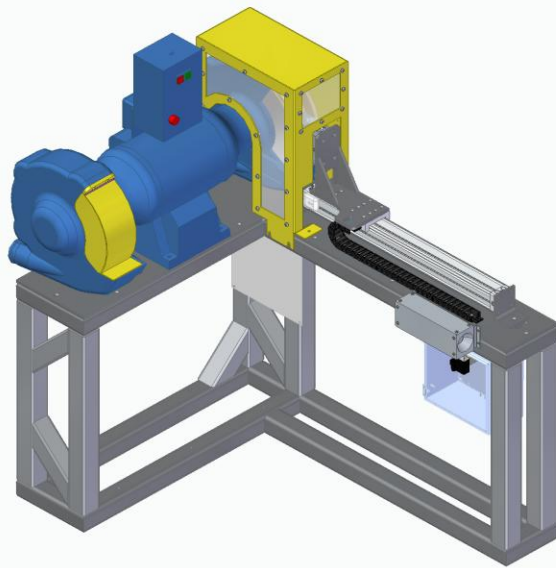
Phase 1 (Manual Cell)



DONSCO
INCORPORATED

INTEGRATED SUPPLIER OF CAST PARTS

- Manual cell with operator loading and unloading slide
- Tact time of 18 seconds to hit 24,000 parts a month
- Diamond profile wheel conformed to part geometry



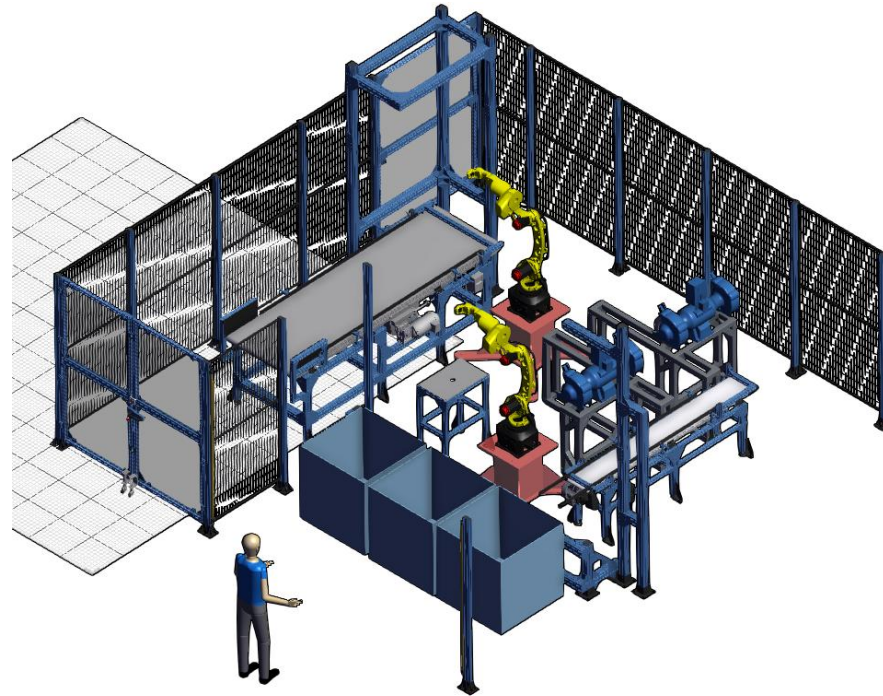
Phase 2 (Automated Cell)



DONSCO
INCORPORATED

INTEGRATED SUPPLIER OF CAST PARTS

- Modified grinding operation to enable lights out manufacturing
- Tact time of 15 seconds for 48,000 parts per month

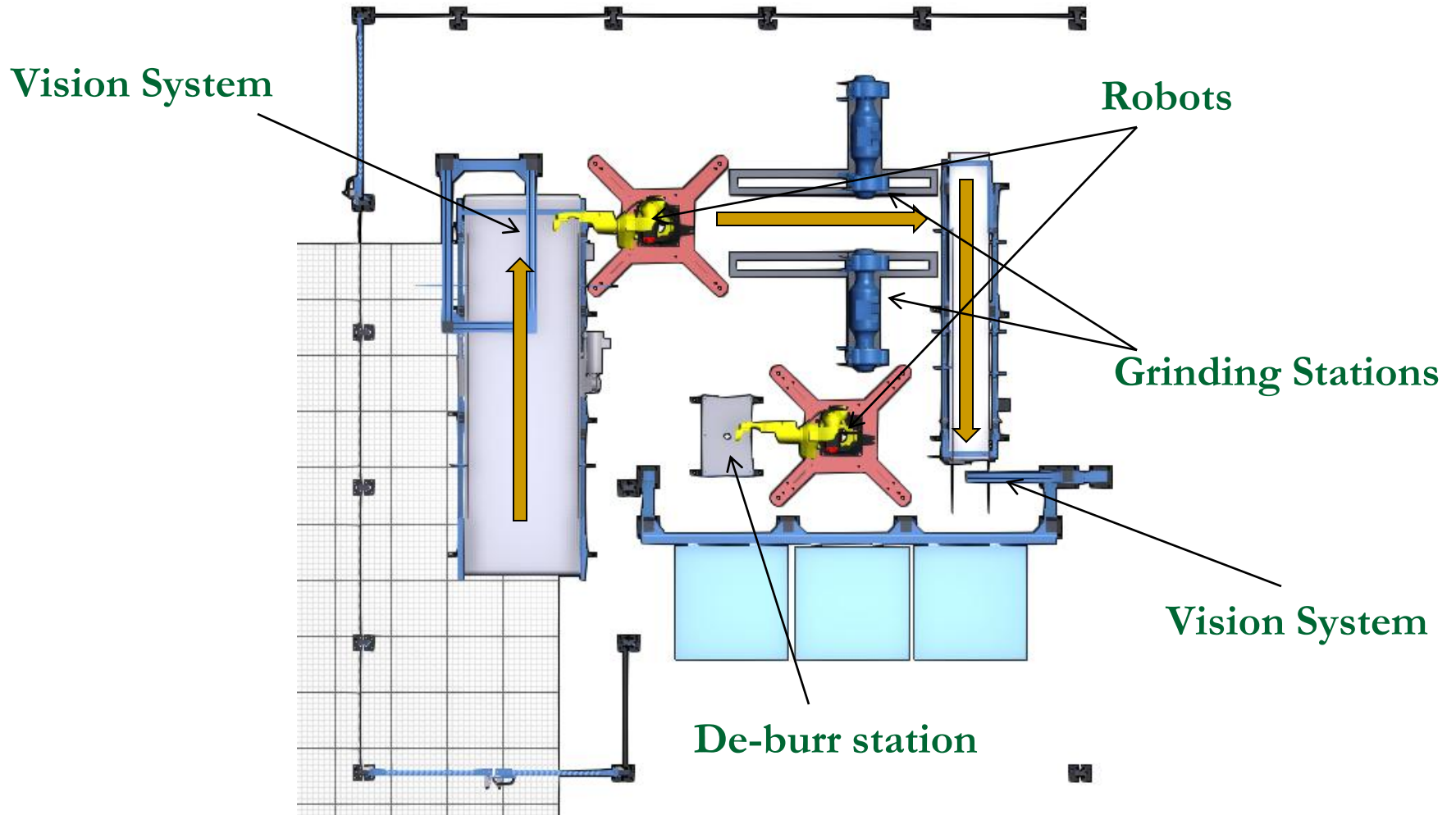


Phase 2 (Automated Cell)



DONSCO
INCORPORATED

INTEGRATED SUPPLIER OF CAST PARTS



Mech Mind Vision



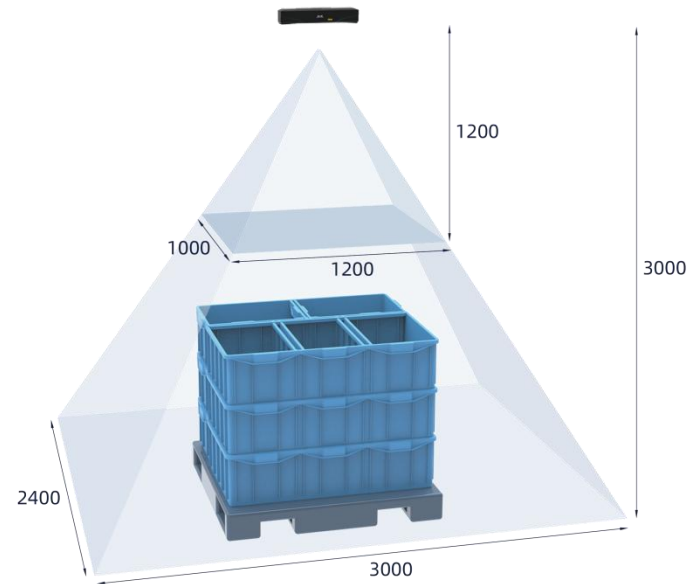
DONSCO
INCORPORATED

INTEGRATED SUPPLIER OF CAST PARTS

- Mech-Eye LSR L Industrial 3D Camera
- Laser based vision system



Mech-Eye LSR L
Industrial 3D Camera



Field of view (mm)



• Camera specifications

Product name	Mech-Eye Industrial 3D Camera	
Model	LSR L	
Object focal distance ^[1]	1500 mm	3000 mm
Recommended working distance	1200-1800 mm	1800-3000 mm
FOV	1200 × 1000 mm @ 1.2 m	
	3000 × 2400 mm @ 3.0 m	
Depth map resolution	2048 × 1536	
RGB resolution	4000 × 3000 / 2000 × 1500	
Point Z-value repeatability (σ) ^[2]	0.5 mm @ 3 m	
Measurement accuracy (VDI/VDE) ^[3]	1.0 mm @ 3 m	
Typical capture time	0.5-0.9 s	
Weight	Approx. 2.9 kg	
Baseline	Approx. 380 mm	
Dimensions	Approx. 459 × 77 × 86 mm	
Light source	Red laser (638 nm, Class 2)	
Operating temperature ^[4]	-10-45°C	
Communication interface	Gigabit Ethernet	
Input ^[5]	24 V \equiv 3.75 A	
Safety and EMC	CE / FCC / VCCI / UKCA / KC	
IP rating ^[6]	IP65	
Cooling	Passive	

Mech Mind Vision

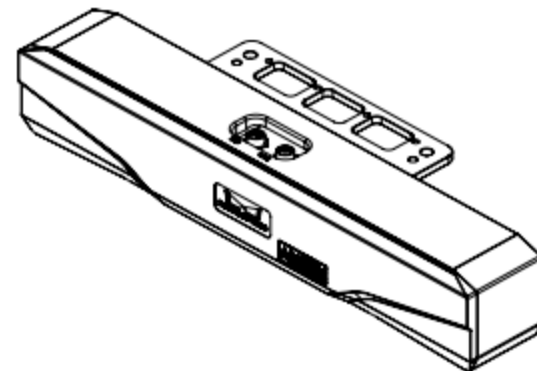
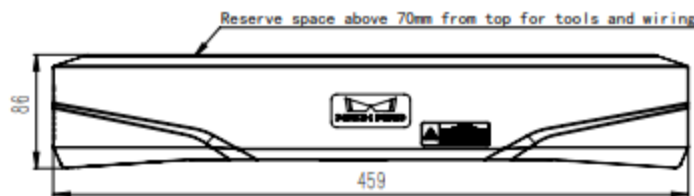


DONSCO
INCORPORATED

INTEGRATED SUPPLIER OF CAST PARTS

- Chose Mech-Mind over other companies for various reasons

- Cost
- Capabilities
- Ease of use



Dual Robot



DONSCO
INCORPORATED

INTEGRATED SUPPLIER OF CAST PARTS

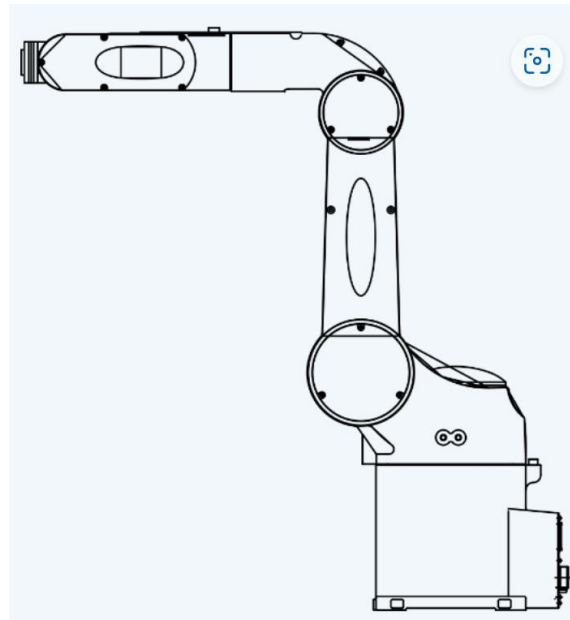
- Thorough research into all top robotics companies
- Vetted out all robots down to one company because of payload, reach, speed, and price

UR10e



12.5 kg (27.5 lbs)

1300 mm (51.2 in)



Dual Robot



DONSICO
INCORPORATED

INTEGRATED SUPPLIER OF CAST PARTS

M-10iD/12



Max. load capacity
at wrist: 12 kg



Max. reach:
1441 mm

FANUC

Robot			Max. load capacity at wrist (kg)	Reach (mm)	Controlled axes	Repeatability (mm)	Mechanical weight (kg)	Motion range (°)						Maximum speed (°/s)						Moments (N-m)/Inertia (kg-m ²)			Protection		
Series	Version	Type						J1	J2	J3	J4	J5	J6	J1	J2	J3	J4	J5	J6	J4 Moment/Inertia	J5 Moment/Inertia	J6 Moment/Inertia	Average Power consumption (kW)	Body standard/optional	Wrist & J3 arm standard/optional
M-10	iD	12	12	1441	6	±0.02**	145	340 (370)	235	455	380	360	900	260	240	260	430	450	720	26/19	26/19	11/3	1	IP54/ IP65	IP67

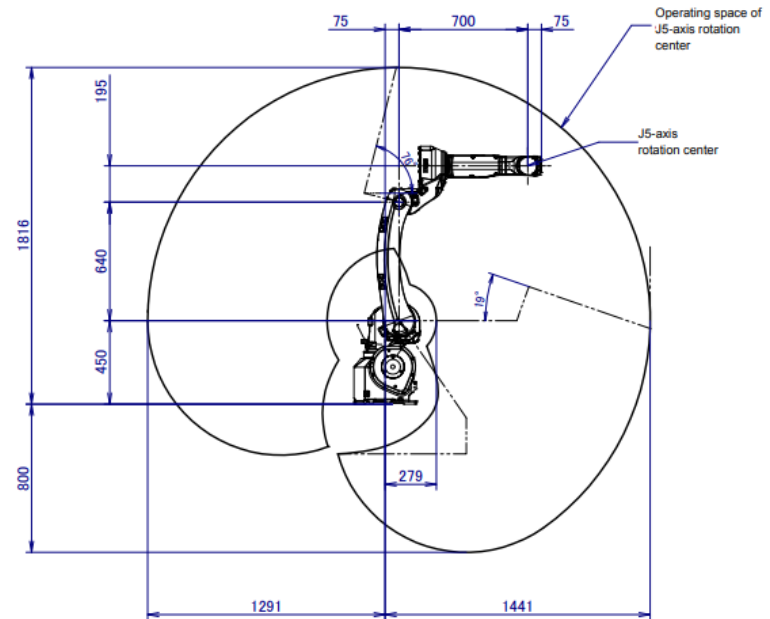
● standard ○ on request - not available ** Based on ISD9283

M-10iD/12

Hollow Wrist



M-10iD/12



Challenges and Changes



DONSCO
INCORPORATED

INTEGRATED SUPPLIER OF CAST PARTS

- Lead times, issues with supplier, and incorrect parts
- Vision systems lack of capabilities to identify parts to knock off risers and gates
- Wiring and electrical
- Floor placement in a given space
- Anticipated issues with robot programming and controls

Quantifying Success



DONSCO
INCORPORATED

INTEGRATED SUPPLIER OF CAST PARTS

- No more than 1 fault a day
- Meet or beat the designed tact time
- Successfully utilize vision system to 100% pick rate
- Be able to operate lights out with no faults
- Create a success pathway for future projects