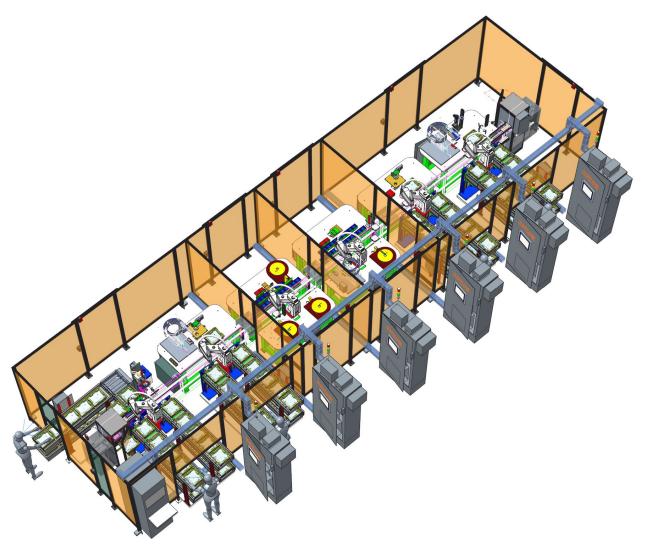


+Vantage Case Study: Assembly Lines

Diesel Fuel Injector Assembly Line



• Parts:

• Diesel Fuel Injector

• Customer Problem:

- Super tight tolerances as low as 2 micron requiring 100% inspection after each assembly process
- The manufactured components required a method of data acquisition & part traceability
- The manufacturing process was too labor intensive for material handling
- The manufactured components required measurement inspections for validation of assembly.

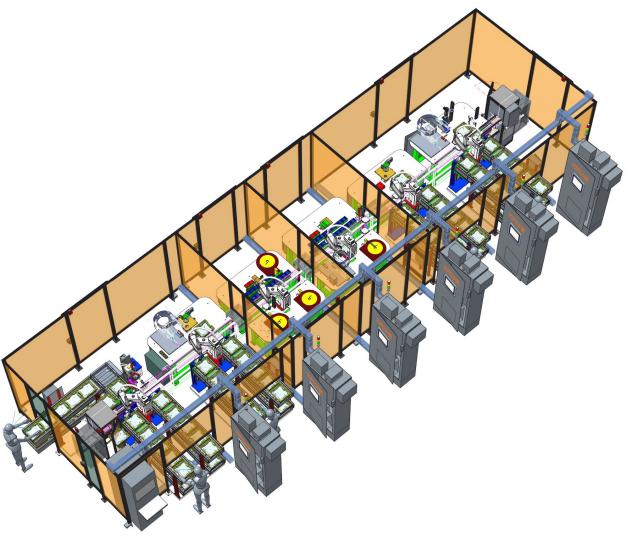
The project:

• This system consists of six (6) main cells and one conveyor system transferring customer assembly pallets from cell to cell. Each cell utilizes a robot for automatic part handling and handles a different aspect of the parts assembly. Assembly parts are either introduced through cell from bowl feeder or pallets on incoming gravity conveyors. To address traceability the parts barcode is read at the start and at the end of automatic process. Then finally the system was connected to the customers factory information & integrated to provide seamless data to the process.

Process:

- 1. (1) Flexlink Conveyor
- 2. (9) Gravity Roller Conveyors
- 3. (3) Bowl Feeders
- 4. (6) Robotic Integration & EOAT
- 5. (4) Contact Probe Inspections
- 6. (4) Vision Inspections
- 7. (1) Laser Marker
- . (1) Cell full integrated, debugged, and assembled

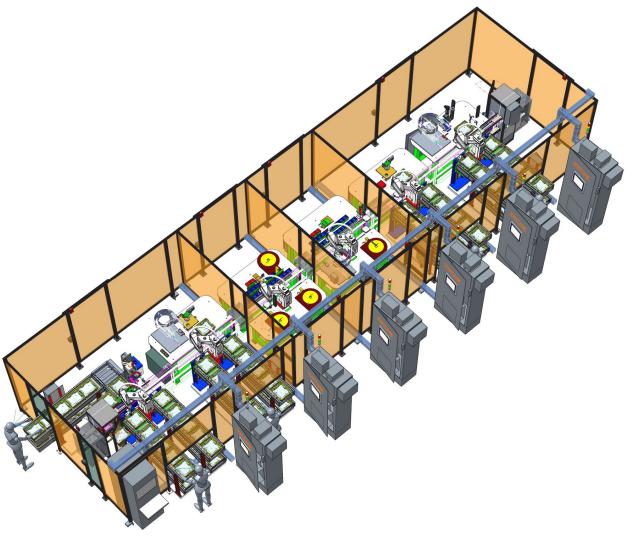




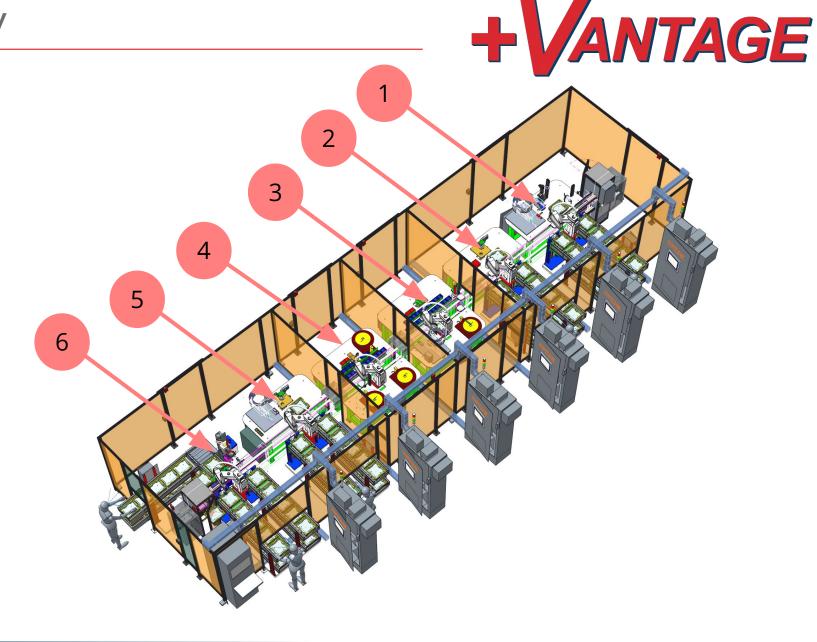
• Components:

- AMC Flexlink Conveyor
- Gravity Roller Conveyors
- Powered Zone Conveyors
- Adept SCARA Robotics
- Custom EOATs with Pneumatic Gripper
- Custom EOATs with suction cup
- Cognex Vision Inspection
- Solartron LVDT Probes
- Telesis Fiber Laser Marker
- Custom Bowl Feeders
- Safety interlocks
- RTGC32 Controls Structure

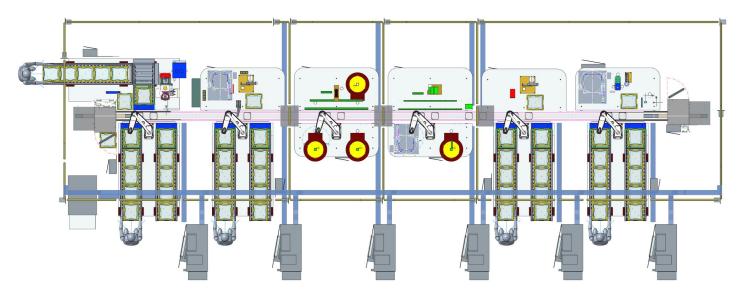




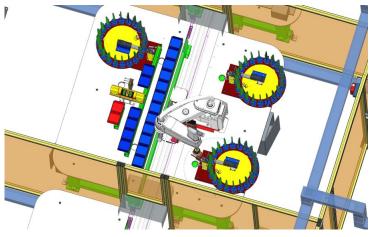
- Cells:
 - Cell 1
 - Incoming Vision Inspection
 - Spring Vision Inspection
 - Spring Contact Probe Gage
 - Spring Assembly
 - Cell 2
 - Body Vision Inspection
 - Body Assembly
 - Cell 3
 - Body Contact Probe Gage
 - VOP Contact Probe Gage
 - VOP Assembly
 - Cell 4
 - Pin Contact Probe Gage
 - Cell 5
 - Pin Assembly
 - Orientation Vision Inspection
 - Cell 6
 - Laser Marking
 - Part Packout



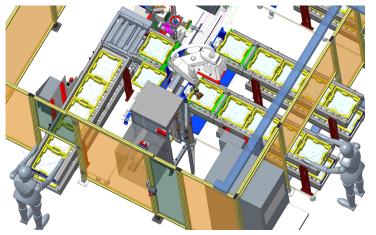




Layout



SCARA Robotics Material Handling



Automated Assembly, Inspection and Laser Marking System









Core Product Overview



Inspection



Vision, Laser, Pneumatic, Dynamic, Torque, as well as Classification and Identification

Engineering & Service



Let the +Vantage team's decades of experience solve your manufacturing challenges

Automation &



Fully automatic systems to streamline your manufacturing process and increase production

Assembly Systems



Manual and semi-automatic multi-station assembly systems for pressing, torqueing, & riveting

Automation Made Seamless

Systems



Custom design or upgrade/retrofit existing lines with the latest sensors and manufacturing technology

Industrial



Contact and non-contact gages for precision measurements. In-line and audit room.

Global Customer Reach



1,500

250

12

MACHINES BUILT

YEARS COMBINED EXPERIENCE

SYSTEMS INSTALLED IN +12 DIFFERENT COUNTRIES





USA (HQ)

12651 Newburgh Rd Livonia, MI 48150 tel: +1 734 432 5055 Canada

London, ON Canada tel: +1 226 234 1515 Mexico

Micro Parque Finsa Eje 2 #470-2 Ramos Arizpe, Coah. 25210 tel: +52 1 844 270 9389 China

14/F Suncome Cimic Tower 800 Shangcheng Rd Pudong New Distric Shanghai. 200120

tel: +86 137 7103 2628

Company Overview



Company Size

- 70 Employees Globally
- 100,000 sq. ft in Livonia
 - Additional office space globally

Certifications

- ISO 9001:2019
- Coherix System Integrator
- Fanuc Authorized Integrator
- Q-DAS ASCII Certification
- Schunk Official Partner
- Solartron Orbit 3 Integrator



Project Management

+Vantage - Action Item Deck



ID	Task Name		Duration	Start	Finish	Predecessors	% 2 Complete	1 Mar'21 Apr'21 May'21 Jun'21 Jul'21 Aug 7 14 21 28 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 4 11 18 25 1
1	Camcor 2	00752 - Base Shaft Assembly System	116 days	Fri 2/19/21	Fri 7/30/2		18%	¥
2								
3	Open J	lob	3 days	Fri 2/19/21	Tue 2/23/2		100%	<u></u>
4		eive PO	1 day		Fri 2/19/2		100%	
5		al kick off meeting		Mon 2/22/21	Tue 2/23/2		100%	<u> </u>
6	Assi	gn a Job Number to the Project in QuickBooks	2 days	Mon 2/22/21	Tue 2/23/2		100%	
7	Sen	d PO Acknowledgment	2 days	Mon 2/22/21	Tue 2/23/2	4	100%	
8								
9		nical Engineering		Wed 2/24/21			62%	•
10	Proj	ect in Engineering Cue	3 days	Wed 2/24/21	Fri 2/26/2	15	100%	
11	Crea	ate Approval Drawings and submit to Customer	21 days	Mon 3/1/21	Mon 3/29/2	10	100%	Eng
12	follo	ign approved by Customer - Design updates by Danilo wing feedback and discussions with Camcor ** Critical Path no***	7 days	Tue 3/30/21	Wed 4/7/2	11	0%	Eng_App
13		plete mechanical design	5 days	Thu 4/8/21	Wed 4/14/2	12	0%	
14		ase commercial items and build details	3 days	Thu 4/15/21	Mon 4/19/2	13	0%	
15			/-				-	T T T T T T T T T T
16	Flectrie	cal/Pneumatic Engineering	42 days	Thu 4/15/21	Fri 6/11/2		0%	
+VANTAGE on Nem Deck Rev 1 9-18-2017		ical design and submit for Approval	15 days	Thu 4/15/21	Wed 5/5/2	13	0%	Elec
		ved Customer approval for Electrical/Pneumatic design	3 days	Thu 5/6/21	Mon 5/10/2	17	0%	
		utility information with Camcor	0 days	Mon 5/10/21	Mon 5/10/2	18	0%	₹ 5/10
		se electrical build		Tue 5/11/21	Fri 5/14/2	19	0%	
		amming		Mon 5/17/21	Fri 6/11/2		0%	Prog
ss if appl								
ss if appi	icable)	sembly	73 days	Tue 4/20/21	Thu 7/29/2		0%	
		facturing	35 days	Tue 4/20/21	Mon 6/7/2	14	0%	Mnfq
n Eston) (3/18 Shawn Shawn sent some older owsome around 126 N. Iculated 12.5 Kn. Big rent data. Danilo said age and the Vantage		ve Electrical/Pneumatic items	5 days	Mon 5/31/21	Fri 6/4/2	20FS+10 days	0%	
		ve parts from Customer for Setup and Runoff	0 days	Tue 6/1/21	Tue 6/1/2	24FS-5 days	0%	→ 6/1
		ve press from Customer	0 days	Tue 6/1/21	Tue 6/1/2	24FS-5 days	0%	6/1
		nbly	19 days	Tue 6/8/21	Fri 7/2/2	24	0%	Ass'y
		ate programming and debug	19 days	Mon 7/5/21	Thu 7/29/2	28	0%	,De
they are n	ot machining							
Eston. Shawn to see if e retainers we can send		at Vantage	1 day	Fri 7/30/21	Fri 7/30/2		0%	
		Off	1 day	Fri 7/30/21	Fri 7/30/2	29	0%	TRI TRI
		mer Acceptance	1 day	Fri 7/30/21	Fri 7/30/2	29	0%	·
		ackage/Ship	2 days		Tue 8/3/2		0%	
wondering if in process part are held within all will be +/- 0.01 mm 1 mm. They are done in		n	1 day	Mon 8/2/21	Mon 8/2/2		0%	<u> </u>
			1 day	Mon 8/2/21	Mon 8/2/2		0%	Tie
		/21)	1 day	Tue 8/3/21	Tue 8/3/2	137	0%	

Camcor 200752 Timing Plan.mpp

item	Operation	Item Description	Key Contact for Item	Actions	Date Open	Target Close date	Actual Close Date	Comments (and note effectiveness if applicable)
5	Press	max expected press force for retainer	Shawn		3/8/2021	3/12/2021		(X/10 Shawn working to get this info from Eston) (X/18 Shawn set some older sittle waiting for info - will fly again) (X/24 Shawn sent some older 2016 and X/10 data - loads are VEXF four - some around IZS N, difference - Shawn set ill flying to get current data. Danilo and Shawn could send sample parts to Varlage and the Varlage could send parts fly flowes. Per Shawn they are not machining parts row - would need to get parts from Eston. Shawn to see if the carry of the share of the Varlage could send parts to get the set of the Varlage could send parts for more. Per Shawn they are not machining parts row - would need to get parts from Eston. Shawn to see if the carry of Shaffle from Eston and some relativers we can send to Promesse).
9	Eng	Shawn to look at in process tolerances for journals - Danilo is considering to use Vees to support journals during press.	Shawn		3/10/2021	3/12/2021	3/24/2021	(3/18 4 1 current blerance. Varitage is wondering if in process spec could be that all disameters on one part are held within higher telearces (per Borbly Large pursual with 6+ 4:0.01 mm and smaller inside pursuls can be 4:0.1 mm. They are done in different operations. Bobby indicating concern with shart bending. Critical item to get press force info - see item 5 so analysis of potential bending can be performed) (3/24 will close-see item 5 and 15).
11	Feeding system	Vantage using Feeding Concepts for feeding systems. Request deviation from Camcor spec that was sent 3/12. PO has been placed.	Shawn		3/18/2021	3/19/2021	2040004	(3/18 Shawn will investigate. Vantage has developed this project with Feeding Concepts before specification was received.) (3/24 Deviation approved to use Feeding Concepts - commercial issue - Vantage did not have machine spec revision in quoting stage)
12		Bobby requesting to look at feasibility to check retainer height 0/-	Danilo/Todd		3/18/2021	3/31/2021		(3/24 request in in Proposal department - should have by next week)
13	Feeding system	1/2 cubic feet retainers and coffee can of balls	Shawn		3/18/2021	4/1/2021		(3/24 Shawn working with Eston to try and get parts)
14	Shipping/ install info	Shawn requesting info re. shipping and utilities	Shellie/Zach	UKA Leaving Life Leaving of Costing? Special Voltage Section Size Vendor Commer Geology Requirements Voltage Section Size	3/22/2021	7/23/2021		(See email sent 3/22/21 from Shawn, Utility information can be provided sooner after electrical design)
15	Eng	FEA Study for press operation	Danilo	Ref Item 5 and item 9				(3/24 Danillo did Preliminary FEA study on current design based on 20Kn and 12.5Kn. If 20Kn force applied, will deform shaft. 12/5Kn would not deform shaft. Is below max yield)

Project: Camcor 200752 Assembly System



Automation Made Seamless

Proud Partners of:



Robotics













Vision Systems













Marking
Systems
DATALOGIC
THE VISION IS YOURS



MECCO°





PLC



SIEMENS





Torquing/Press ing

































































































On-Site Service & Support

+VANTAGE

100% Dedication to Customer Service

Global Support On-Site Representatives

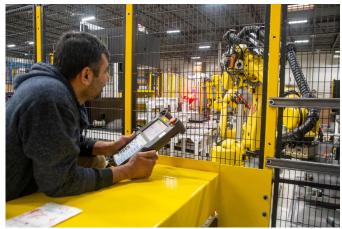
Quick Response Unit and Down Time Recovery

Remote Log In Service in a Moments Notice

24/7 Service Support

On-site Contracts Available

Highly Trained Staff of Engineers & Technicians







USA

12651 Newburgh Rd Livonia, MI 48150 tel: +1 734 432 5055

Mexico

Micro Parque Finsa Eje 2 #470-2 Ramos Arizpe, Coah. 25210 tel: +52 1 844 270 9389

Canada

London, ON Canada tel: +1 226 234 1515

Thank You for Reading! Zero Defects

China

14/F Suncome Cimic Tower 800 Shangcheng Rd Pudong New District Shanghai. 200120 tel: +86 137 7103 2628



Automated Inspection

Quality Assurance