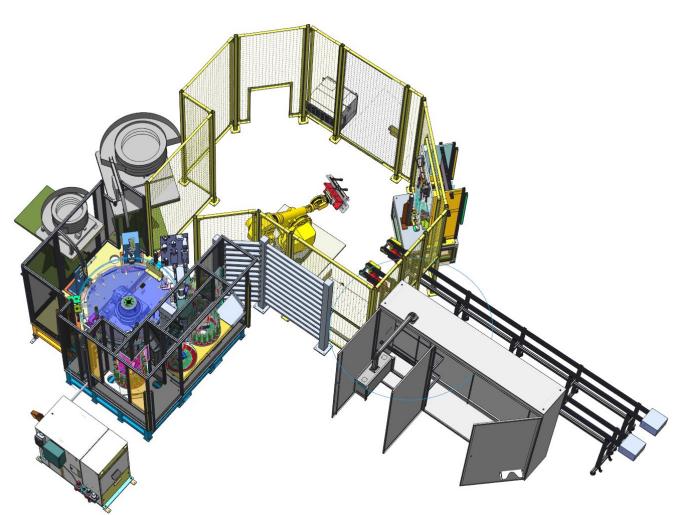


+Vantage Case Study: Assembly Lines

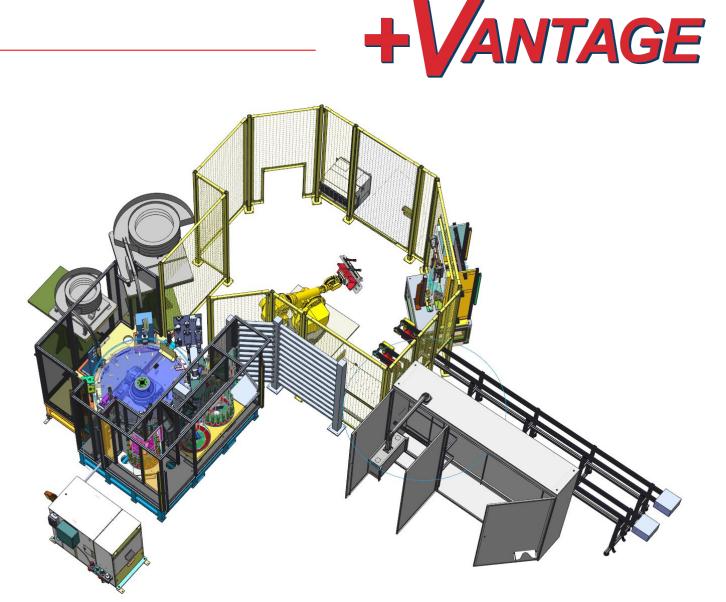
Fully Automatic Balance Shaft Assembly System

1

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- Parts:
 - Balance Shaft
- Customer Problem:
 - Cycle time & production demand was too high for manual process
 - The assembly process was too labor intensive for material handling
 - Multiple high force presses required
 - Multiple torque operations required
 - Multiple subcomponents needed to be bulk fed into the system to allow for hours of unmanned production
- The project:
 - This system consists of complete automatic assembly of Balance shaft. Through a multistage assembly process Washers, Gears, Sprockets, Bearings and various components are assembled onto Balance Shaft. Balance shafts are loaded onto an exit conveyor completely assembled and ready for installation
- Process:
 - 1. Indexing Table
 - 2. Robotic Material Handing
 - 3. Servo Presses
 - 4. Automatic Torque Drivers
 - 5. Assembly Verification
 - 6. Cell full integrated, debugged, and assembled



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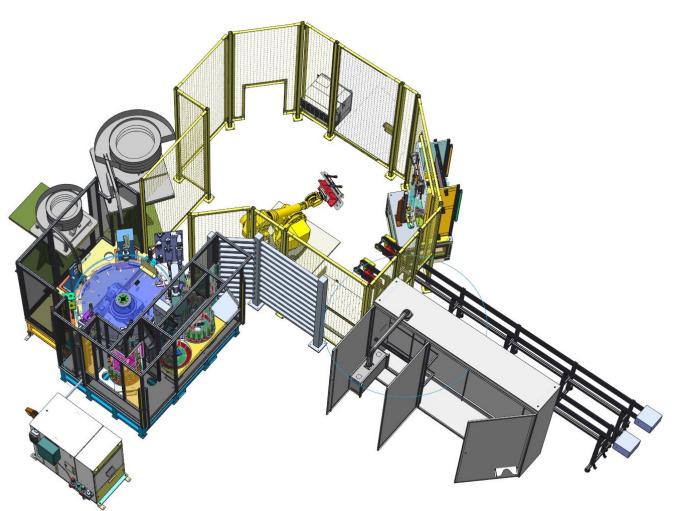
- Components:
 - Powered Conveyor
 - Stelron Indexer
 - Fanuc Robotics
 - Custom EOAT
 - FEC Servo Press
 - FEC Torque Drivers
 - Futek Torque Sensor
 - Allen Bradley Servo Motors
 - Feeding Concepts Bowl Feeders
 - IAI Servo Drive
 - Cognex Vision Inspection
 - Safety interlocks

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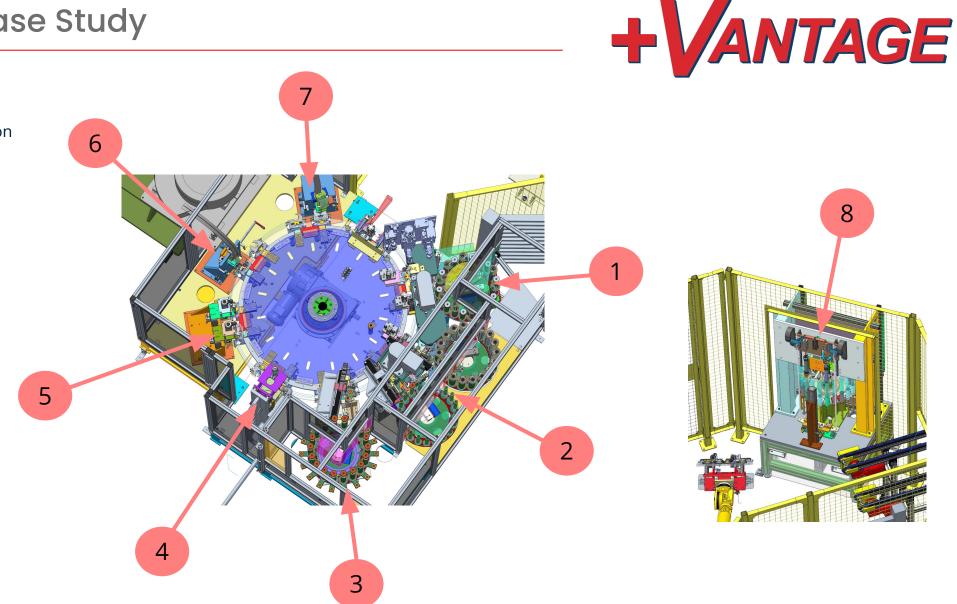
• Allen Bradley Controls Structure



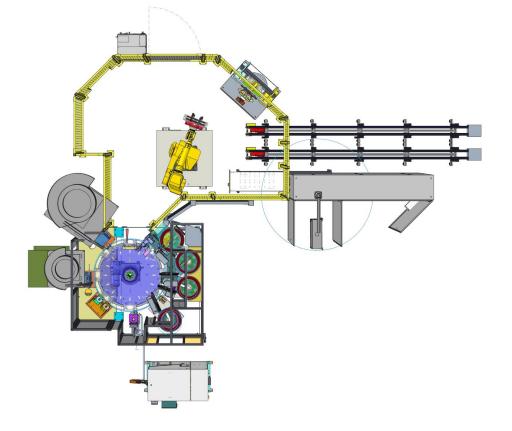


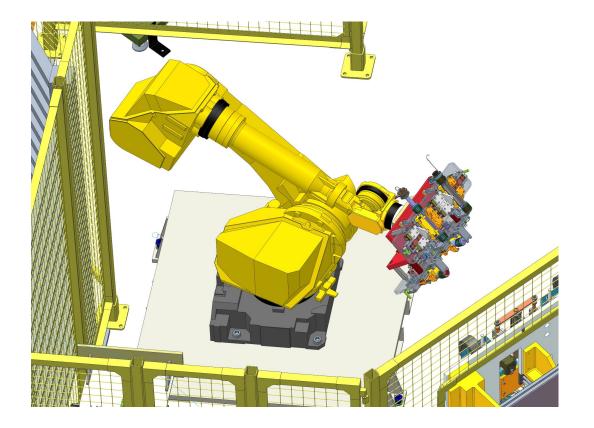
• Processes :

- 1. Washer Assembly Station
- 2. Input Gear Assembly Station
- **3.** Sprocket Assembly station
- 4. Torque Station
- 5. Torque inspection Station
- 6. Pin Assembly Station
- 7. Pin Assembly Station
- 8. Bearing Assembly Station









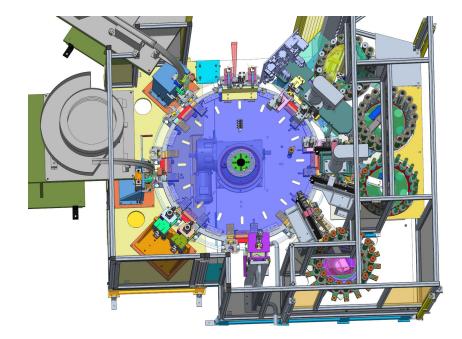
Robotic Material Handling

Layout

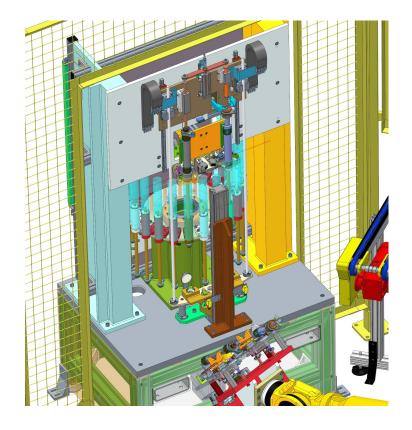
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Automatic Assembly

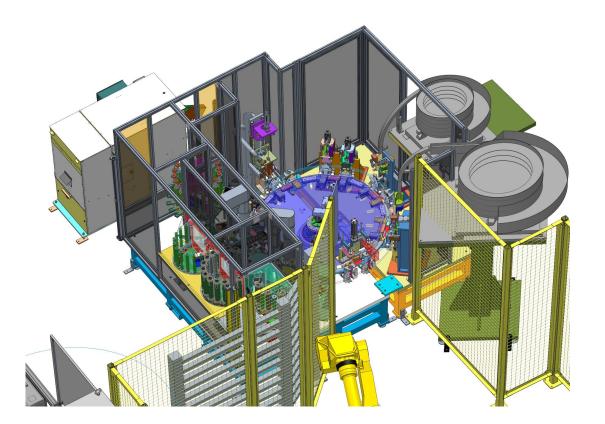




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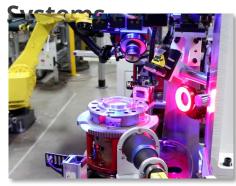




Core Product Overview



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

12

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tel: +52 1 844 270 9389

Pudong New Distric Shanghai. 200120 tel: <u>+86 137 7103 2628</u>



Automation Made Seamless

tel: +1 734 432 5055

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



+VANTAGE

% 21 Mar'21 Apr'21 May'21 Jun'21 Jun'21 Jun'21 Jun'21 Aug'21 Complete 7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 4 11 18 25 1 8

Camcor 200752 Timing Plan.mpp

100%

Start

116 days Fri 2/19/21 Fri 7/30/21

3 days Fri 2/19/21 Tue 2/23/21

Finish

Duration

Project Management

								4 R	eceive PO	1 day	Fri 2/19/21	Fri 2/19/21	100%				
									itial kick off meeting			Tue 2/23/21 4	100%	1			
								6 As	ssign a Job Number to the Project in QuickBooks	2 days	Mon 2/22/21	Tue 2/23/21 4	100%	T			
								7 S	end PO Acknowledgment	2 days	Mon 2/22/21	Tue 2/23/21 4	100%				
								8									
								9 Med	nanical Engineering	39 days	Wed 2/24/21	Mon 4/19/21	62%				
									roject in Engineering Cue			Fri 2/26/21 5	100%	*			
									reate Approval Drawings and submit to Customer			Mon 3/29/21 10	100%	-	Eng		
									esign approved by Customer - Design updates by Danilo			Wed 4/7/21 11	0%		Eng Ann		
								fo	esign approved by Customer - Design updates by Dahlio Ilowing feedback and discussions with Camcor ** Critical Path ming**	/ days	Tue 3/30/21	wed 4///2111	0%		Eng_App		
									omplete mechanical design	5 days	Thu 4/8/21	Wed 4/14/21 12	0%		*		
									elease commercial items and build details			Mon 4/19/21 13	0%				
								14 15	elease conimercial items and build details	Judys	1110 4/15/21	100114/10/21 15	0.10				
									trical/Pneumatic Engineering	12 .1	Th 4/45/04	Fri 6/11/21	00/				
								16 Elect					0%		¥	Flux	
					1				ical design and submit for Approval		Thu 4/15/21		0%			Elec	
+V	antage -	Action Item Deck	Project:	Camcor 200752 Assembly System				+VANTAGE	ved Customer approval for Electrical/Pneumatic design			Mon 5/10/21 17	0%				
1	antago		Troject.	Canton 2007027 (BBCHIBI) Cyclent	_			The second	utility information with Camcor			Mon 5/10/21 18	0%			5/10	
Revis	sed 3/24/21							Q064 Action Item Deck Rev 1 9-18-20	17 se electrical build	4 days	Tue 5/11/21	Fri 5/14/21 19	0%				
									amming	20 days	Mon 5/17/21	Fri 6/11/21 20	0%			Prog	
	2020		Key Contact for	or	12100200	Target Close	Actual Close										
ite	tem Operation	n Item Description	Item	Actions	Date Open	date	Date	Comments (and note effectiveness if applicable)	sembly	73 dave	Tuo 4/20/21	Thu 7/29/21	0%				
-					-				facturing		Tue 4/20/21		0%			Mafa	
			1			1	1						0%			Minig	
			1			1	1	(3/10 Shawn working to get this info from Eston) (3/18 Shawn	ve Electrical/Pneumatic items		Mon 5/31/21		0%				
								still waiting for info - will try again) (3/24 Shawn sent some older	ve parts from Customer for Setup and Runoff		Tue 6/1/21		0%			♦ 6/1	
								2018 and 2019 data - loads are VERY low - some around 126 I	 ve press from Customer 	0 days	Tue 6/1/21		0%			→ 6/1	
								Danilo talked with Promess and they calculated 12.5 Kn. Big	nbly	19 days	Tue 6/8/21	Fri 7/2/21 24	0%			Ass'y	
5	Press	max expected press force for retainer	Shawn		3/8/2021	3/12/2021		difference Shawn still trying to get current data. Danilo said Shawn could send sample parts to Vantage and the Vantage	ate programming and debug	19 days	Mon 7/5/21	Thu 7/29/21 28	0%				Debug
								could send sample parts to Vantage and the Vantage could send parts to Promess. Per Shawn they are not machinin								1.00	
								parts now - would need to get parts from Eston. Shawn to see it	at Vantago	1 day	Fri 7/30/21	Fri 7/30/21	0%				_
								he can get 5 shafts from Eston and some retainers we can sen	d var		Fri 7/30/21		0%				Runoff
								to Promess)	71				0%				Kulloli
			1		1		1		mer Acceptance	1 day	Fri 7/30/21	Fri 7/30/21 29	0%				h l
									11 C				1000				
								A REAL PROPERTY AND A REAL PROPERTY AND A REAL PROPERTY.	Package/Ship		Mon 8/2/21		0%				
								(3/18 +/1 current tolerance. Vantage is wondering if in proces	s n		Mon 8/2/21		0%				1
								spec could be that all diameters on one part are held within tighter tolerance) (Per Bobby Large journal will be +/- 0.01 mm		1 day	Mon 8/2/21	Mon 8/2/21 33	0%				The second se
		Shawn to look at in process tolerances for journals - Danilo is						and smaller inside journals can be +/- 0.1 mm. They are done in	/21)	1 day	Tue 8/3/21	Tue 8/3/21 37	0%				Ship
9	Eng	considering to use Vees to support journals during press.	Shawn		3/10/2021	3/12/2021	3/24/2021	different operations. Bobby indicating concern with shaft									
								bending. Critical item to get press force info - see item 5 so			1						
								analysis of potential bending can be performed) (3/24 will close	-	1 1 1 1 1		CONTRACTOR OF CONTRACTOR					£
								see item 5 and 15)		No.							
			_								_						
																	1000
	Franking	Vantage using Feeding Concepts for feeding systems. Request						(3/18 Shawn will investigate. Vantage has developed this project with Feeding Concepts before specification was received.) (3/2	et de la constant de			State of the second second					
11	Feeding	deviation from Camcor spec that was sent 3/12. PO has been	Shawn		3/18/2021	3/19/2021	3/24/2021	Deviation approved to use Feeding Concepts - commercial issu									
	ayawin	placed.	10000					 Vantage did not have machine spec revision in quoting stage) 		6. 61							
										1000							
12		Bobby requesting to look at feasibility to check retainer height 0	DaniloTodd		3/18/2021	3/31/2021		(3/24 request in in Proposal department - should have by next	the last section of the la	A DESCRIPTION OF							
12		0.3	Calmor rodd		5 10/2021	3-3112021		week)		and the second se	1000						
			1		-	-	-				and the owner where the party is not the party of the par	Statement of the local division of the local					11/1- Cartalian
										100 million (1997)							
13	Feeding	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)		C							
	system														and the second se	Cardina and	
									and the second s						and the second se		
									The second s								
14	Shipping/	Shawn requesting info re. shipping and utilities	Shellie/Zach	STA Leaving ETA Landing at Crating? Special Vellage Electrical Vellage Service Size	3/22/2021	7/23/2021		(See email sent 3/22/21 from Shawn. Utility information can be	A REAL FRANCE								
	install info			and a second sec				provided sooner after electrical design)	and the second se						100 March 100 Ma		
					-												
			1											And in case of the local division of the loc		and the second se	
15	Eng	FEA Study for press operation	Danilo	Ref Item 5 and item 9		1	1	(3/24 Danilo did Preliminary FEA study on current design base on 20Kn and 12.5Kn, If 20Kn force applied, will deform shaft.	0						The other designment of the local division o		and the second division of the second divisio
10	Eng	I LA Study for press operation	Danno	Por nem 5 and nem 5				12/5Kn would not deform shaft. Is below max vield)									and the second se
						1	1										
			-				1				-	And in case of the local division of the loc					

ID Task Name

Open Job

Possing Pr

Camcor 200752 - Base Shaft Assembly System

Automation Made Seamless

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Kawasaki Robotics KUKA JAJ Quality and Innovation



Marking Systems DATALOGIC THE VISION IS YOURS KEYENCE

MECCO

TELESIS

VIDEOJET.

Allen-Bradley

SIEMENS

PLC





Ingersoll Rand

Torquing/Press

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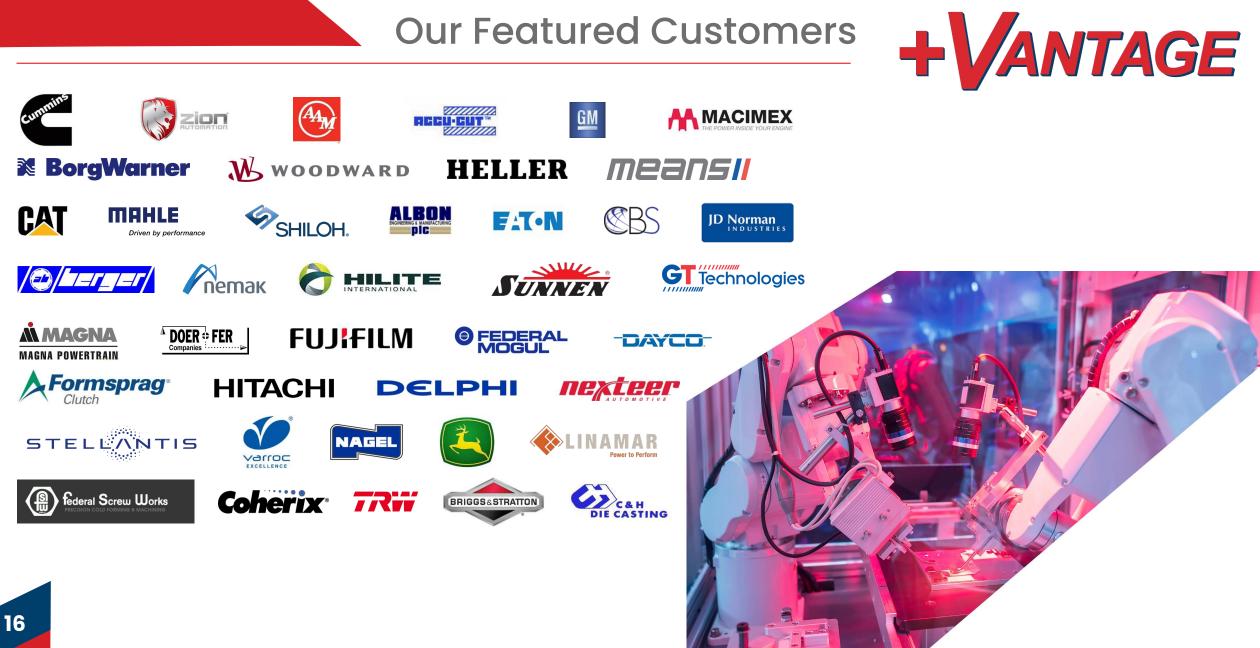
Atlas Copco





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On-Site Service & Support

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

17

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On-site Contracts Available

Highly Trained Staff of Engineers & Technicians











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Automated Inspection

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

Thank You for Reading! Zero Defects

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