

Infusing the Internet of Things into Undergraduate Engineering and Technology Programs: Industry 4.0

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Definition

The Internet of Things (IoT) is the merging of the cyber world with the physical world without direct interaction through the use of sensors and sensing technology. Objects or living beings are identified through this sensor network, thereby enabling them to transfer data across the information network.

Industry 4.0 involves the application of the Internet of Things to manufacturing (Smart Factory).

Industry 4.0

- Industry 1.0: the application of manufacturing machines that are not human powered, but water and steam powered
- Industry 2.0: the movement to mass production driven by electrical power and labor specialization
- Industry 3.0: the automation of manufacturing utilizing information technology and machine automation
- Industry 4.0: the merging of the cyber systems with the physical systems

The Virginia State University Story

- Cyber Systems: SAP Business Suite, Siemens PLM software, Orbis OMPS software, SAP Predictive Analytics 2.0, SAP HANA (in-memory computing)
- Physical Systems: 3D Printing, factory automation equipment, RFID, friction stir welding, production robots, CNC technology
- Creating an Industry 4.0 lab to be used by classes and for research
- Partnerships: SAP, CCALS, CCAM, Northrup Grumman, Siemens, Orbis, Festo



CCALS

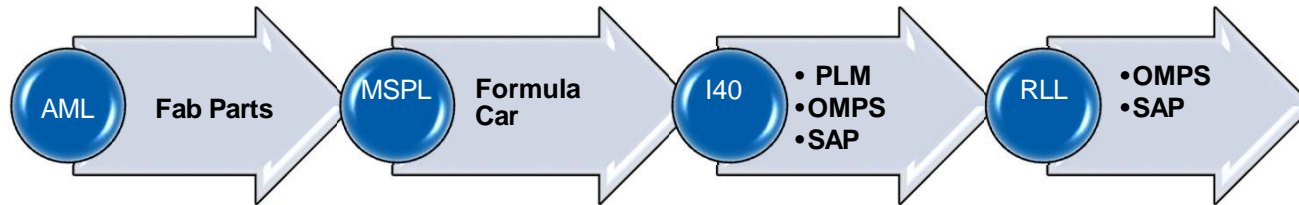
- Commonwealth Center for Advanced Logistics Systems
 - Public/private research consortium
- Virginia State University was a founding university member
- Projects:
 - Industry 4.0
 - Partnership with SAP, Orbis, and Festo
 - Initial lab at VSU
 - Virginia Port Authority
 - Port operations optimization
 - VSU senior capstone projects

Industry 4.0 Program Goals

- Value mapping in manufacturing
- Supply chain and value chain simulation
- Data to decision demonstration
- Diffuse IoT capabilities throughout the curriculum
- Expand sensor network development into IoT
- Connect student projects with IoT
- Integrate big data concepts and technology
- Build on our Enterprise Resource Planning foundation

VSU's Industry 4.0 /I-o-T World-view

Vision at Virginia State University			
	Equipment	Software	Degree Programs
Advanced Machining Lab (AML)	NX, CNC Mill, CNC Lathe	PLM and OMPS/SAP	MfE, CpE, MET
Maker Space Product Lab (MSPL)	PLM, Mill, Drill Press, CAD	Labview, Bluehill (Instron) PLM and OMPS/SAP	MET, MfE, INLT, CSci
Industry 4.0 Manufacturing Lab (I40)	Robots, CMM, 3DPrinter Friction Stir Welder	Labview, Friction Stirlink PLM and OMPS/SAP	CpE, MfE, EET, INLT
RFID Logistics Lab (RLL)	RFID, Inventory Handling Systems	OMPS/SAP	INLT, MfE



Thank You !!!

