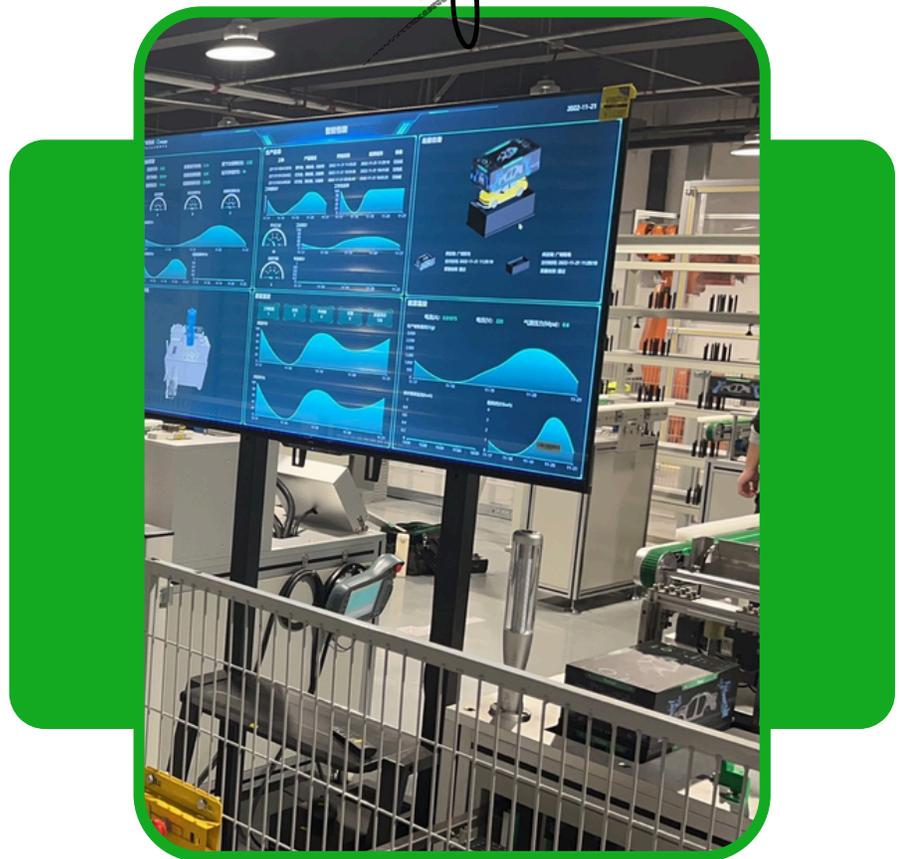




# Smart Automation Manufacturing *system*

EMERGING  
TECHNOLOGY  
BUILT ON  
OPEN-SOURCE  
TECHNOLOGY

INDUSTRIAL  
GRADE FOR  
EDUCATION



**UFACTORY**  
PREFERRED EDU  
INTEGRATOR

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**WOMEN  
OWNED**

## WHY OSPRI & O/S

ROS (Robot Operating System) based open-source technologies are changing the calculus in robotics—lowering acquisition costs, reducing programming complexity, and accelerating innovation. Open-Source (O/S) technology is democratizing robotics by putting advanced automation within the affordable reach of small businesses and educators, bringing robotics learning closer to 1:1.

OSPRI's focus is on delivering emerging technologies in automation and the cost benefits to educators. OSPRI equips educators with systems that are driving innovation and the future of robotics.

According to the SBA, there are 36.2M Small Businesses in the United States. The US Bureau of Labor Statistics forecasts that 600k will automate at least one process by 2030. The US Chamber of Commerce forecasts that 96% will automate by 2035, whether AI or automation.

O/S technology is driving down cost, increasing innovation, and putting robotics and automation within the reach of small businesses. O/S robotics will be the engine that automates small businesses.

The SBA and US Chamber numbers point to significant job growth in robotics and automation on an astonishing level. This is a great opportunity for students to learn how O/S systems work to advance the current and future growth of Small Businesses, the lifeblood of the American economy.



"We power educators with open-source robotics labs that cut costs, remove proprietary barriers, and prepare tomorrow's workforce for the technologies shaping the future."



# SCOPE



## System DNA

**SAM: Smart Automation Manufacturing** system

4 Axis CNC Machining

AI Machine Vision, QC Inspection (PyTorch, YOLO v.11)

Robotics

AGV and Conveyance

Sensors: optical, proximity, pressure...etc.

Real Time Data Analytics Dashboard(s)

Manufacturing Execution System

Raw Materials In

Finished Goods Out

Sorting, Palletizing and/or Pick-n-Place for Downstream Fulfilment

Wearable Technology for Health & Safety Monitoring



# SYSTEM VISION



## **Modular System for Micro-Learning: CNC Machining, Logistics, and AI-based Machine Vision/QC Platform for Education, Research, and Innovation. Industry 4.0+**

A comprehensive, modular platform designed to bring cutting-edge automation technology into the hands of students, faculty, and researchers. This all-in-one system integrates industrial robotics, AI-based machine vision, CNC machining, and smart logistics palletizing—providing a real-world environment for hands-on learning, prototyping, and research in manufacturing, automation, and supply chain systems.

Built with education and research in mind, this system will enable students to explore the full scope of Industry 4.0 technologies—from robotic control and computer vision to precision part manufacturing and intelligent warehouse logistics. The systems architecture will support multiple disciplines, including mechanical engineering, electrical engineering, computer science, industrial technology, and supply chain management.



# MICRO & CAPSTONE LEARNING

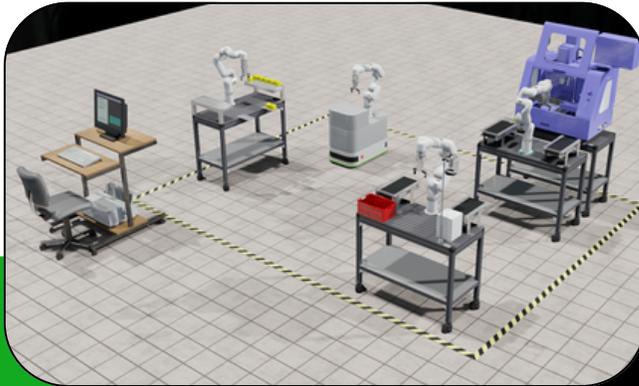


The **Smart Automation Manufacturing (SAM)** system is engineered as a modular, educational inventory, robotics, automation, machining & QC production platform that supports micro-learning—allowing students to engage with specific, focused areas of automation technology in a hands-on, scalable format. Each module is designed to function independently or as part of a larger, integrated workflow, making it ideal for progressive learning, interdisciplinary coursework, and project-based research.

By isolating core components of modern automation—robotics, AI-based machine vision/QC, CNC machining, conveyance, automated guided vehicle (AGV) technology, and smart logistics—the system enables students to build foundational knowledge in each domain before advancing to integrated system-level understanding.



# MICRO & CAPSTONE LEARNING



## MODULAR LEARNING AREAS

- **Manufacturing, 4 Axis CNC Machining**

Allows students to design and manufacture parts using precision machining. Ideal for CAD/CAM training and prototyping experience.

- **Quality Control, AI-Based Machine Vision**

Offers hands-on experience with AI-powered optic sensors, enabling object recognition, defect detection, and dynamic process adjustments.

- **Inventory Management**

Simulates intelligent process and fulfillment operations. Raw materials and post-production inventory management.

- **Robotics**

Focuses on multi-axis robotic control, motion programming, pick-and-place operations, and controller integration.

## SMART AUTOMATION CAPSTONE

### Integrated Systems Module

Combines all modules into a unified workflow—demonstrating real-world factory automation and enabling advanced experimentation in system orchestration, data analytics, and integration. Preloaded Production QR Codes for production, manufacturing, and automation process examples - from raw material to finished good. “Point & Click” Production for dignitary visits or student demonstrations.



# WORK PLACE SAFETY

## HR SAFETY PLANNING ANALYTICS



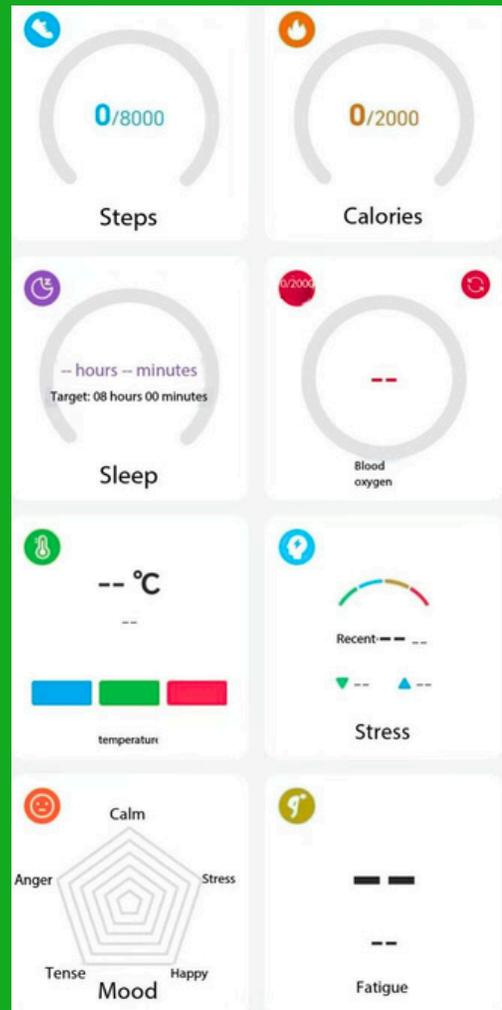
### Health & Safety Analytics

This is a unique component that OSPRI can add, which has growing relevance in industrial automation. Through customer software development, we can provide wearable devices to collect anonymized real-time data, monitoring (worker/student) health and safety.

The application can be designed to gather a wide range of physiological and environmental data.

The data collected can be analyzed to identify trends, predict risks, and inform workplace safety policies. Students can explore data and design policies that address proactive safety management to help create a safer, healthier, and more productive work environment.

To the right are some sample data points.





# SYSTEM CONCEPT



Inventory Management: Raw Materials Manufacturing Station: CNC, Robotics-Based Machine Tending. QC Station: AI based machine vision. PyTorch Framework with Ultralytics Yolo v11. Inventory Management: Finished Goods. AGV Station: Programmable Automated Guided Vehicle. 3x 86" Digital Smart Boards with Real Time Analytics for Each Station and Wearable Technology to Measure Health & Safety Analytics

**SAM**

1. UFactory Industrial Robotics
2. 4 Axis CNC
3. AI Based Machine Vision
4. Inventory Mangement
5. Conveyor System
6. Production Analytics
7. Software Development
8. Analytics Dashboards
9. Point & Click Production



**SAM+**

1. UFactoryIndustrial Robotics
2. 4Axis CNC
3. AI Based Machine Vision
4. Inventory Mangement
5. AGV Integration
6. Production Analytics
7. Software Development
8. Analytics Dashboards
9. Point & Click Production
10. Health & Safety Analytics

### Budgetary Considerations

Pricing inclusive of Robotics, a CNC, Sensors, AI-based Machine Vision, Conveyors, Smart Boards, Software Development, Programming, Installation, training, and support. Optional Hardware, software development, smart devices, sensors, and an Automated Guided Vehicle Station are also available. Prices are subject to change over time due to the cost of goods, materials, or other scope changes.



### General Scope

We appreciate the opportunity to present this proposal for the OSPRI Smart Automation Manufacturing system. This custom system comprises the latest automation technologies and will deliver value for advanced student training, workforce development, and small-business and community outreach and workshops. Best of all, you'll get software updates, with no renewals, and we'll be here to support you - ensuring industrial training relevance for years to come.