Section 1: Job Role Identifier Section

Role Title: Collaborative Robotics Specialist

Role Impact: Pioneer

Summary Scope

Who can get a robot working safely side by side with a human? Who can get robotics systems to break free of their foundations and perform work throughout the manufacturing environment, releasing them from their cages? A Collaborative Robotics Specialist works to implement collaborative robotics platforms and train new operators in their use throughout the manufacturing environment. They design and implement collaborative automation systems to improve worker safety, increase production volume, and enhance precision, or replace repetitive manual tasks in areas that would still require human workers in close proximity. In their role, they work to assess, design, program, and integrate collaborative robotic systems into existing manufacturing or automation cells and tie into peripherals, such as vision systems, end-effectors, controllers, and additional support equipment. They are able to provide automation capability to manual tasks that are pseudo-repetitive and may not qualify for hard automation. The collaborative robotics systems they deploy unlock new productivity in the manufacturing space without the large investments typically associated with traditional automation and robotics efforts. These aren't the robots taking away jobs, rather these are the robots making even small manufacturers more productive and supporting workers in their daily tasks.

Outcomes

- Increased performance levels and capabilities of technical production staff
- Efficiency gains and improved safety potential derived from upgraded manufacturing or automation cells
- Increase in data connectivity via physical and digital integration with previously "offline" or "legacy" machines and production systems; increase in integrated collaborative robotics systems throughout the manufacturing environment
- Cost-effective evaluation, design, and selection of end of arm tooling (EOAT) and support systems, such as vision systems or sensors, for collaborative robotic applications
- Successful system integration of collaborative robots with peripherals, such as cell or system automation controllers, welders, fastener guns, material dispensers, or other equipment
- Increased knowledge capital of operations best practices, safety, and process improvement by creating documentation of collaborative robotics application setup, operation, and maintenance

Domain Profile

1. Digital Manufacturing
2. Digital Design
3. Digital Thread

Generation Knowledge Range

G1G2G3

Generation Work Focus

G2G3

Generation 5-Year Work Focus

G3

Business Case Contribution

A Collaborative Robotics Specialist delivers key time and cost savings results via systems designs and capability development focused on factory automation and worker productivity enhancement through collaborative robotics integration. Improved resource efficiencies, decreased costs over time, sustained process improvements and advancements, improved worker safety and ergonomics, and cost efficiencies through the enhancement of legacy equipment with collaborative robotics or new installations are all areas of tangible business value contribution.

Section 2: Key Responsibilities

Activities

1. Setup collaborative robotics systems to increase production cell volume and/or precision in high throughput or repetitive operations
2. Integrate collaborative robotics systems with peripheral equipment, such as vision systems, controllers, sensors, and other process support equipment
3. Provide technical support of collaborative robotic systems, including installation, calibration, test, operation, and maintenance
4. Investigate system failures or unexpected problems
5. Program and debug robotics and control system programs
6. Train and support production personnel in the operation of collaborative robotics systems
7. Document collaborative robotic system integration, application development, maintenance operations, and changes
8. Measure, process, and interpret sensor data in support of collaborative robotic system integration
9. Design end of arm tooling for material / part handling

Accountabilities & Decisions

1. **Safety with Innovation:** Have I maintained or enhanced safety and operation regulations as I accelerate innovation by deploying and supporting collaborative robotics systems?
2. **Business Case – Now and Next:** What effective short- and long-term business case do I contribute to when I estimate the cost and impact of collaborative robotics solutions?
3. **Collaboration of Work, Worker, and Equipment:** Have I effectively engaged with and applied the requirements and capabilities of the process, the people, and the machines?
4. **Engagement and Expertise:** How much employee engagement and increased capability am I contributing to? How well am I coordinating and enabling the engineering work and activities of others supporting or engaging with collaborative robotics systems?
5. **Leveraging Legacy Assets:** Am I developing strategies for long- and short-term adoption of collaborative robotics technologies in our environment including augmenting, supplementing, or enhancing legacy equipment ahead of full replacement or new installations?

Interactions

1. **Production:** Train and support production personnel in the operation of collaborative robotics systems
2. **Maintenance:** Support maintenance personnel in maintenance of collaborative robotics systems
3. **Designers:** Collaborate with designers to develop end-of-arm tooling and provide design feedback to optimize products for automation tasks
4. **Floor Coordinators/Supervisors:** Work with shop floor coordinators to determine what tasks are most suitable for automation or support from a collaborative robotics system
5. **Suppliers:** Work with control system, peripherals, and equipment suppliers to support integration of collaborative robotics systems and development of platform-based solutions
6. **Financial and Program Management:** Contribute to business case development and identify opportunities for cost-effective solution elements

Success: Mastering Situational Factors Business, Technical & Organizational	
✓	**Parallel Short- and Long-Term Efforts**
	Data Compliance, Management, Privacy & Security
✓	**Automation**
✓	**Biomimicry & Sustainability**
	Advanced Analysis
	Engaging Digital Twins
	Customer Centrism
✓	**New Data Connectivity**
	Org. Business Ecosystem & Stakeholder Networks
✓	**Workforce & Talent Platforms**
✓	**Culture & Leadership**
	Ties to Digital Thread
	Bridge Building
✓	**New Capabilities & Frontiers**
✓	**Visibility & Innovations**

Section 3: Role Positioning

		More	Hybrid	Less
Line of Sight	Creates Vision/Innovates			
	Drives Organization to Vision			
	Aligns/Influences/Localizes Vision			
	Develops Plans			
	Operationalizes/Details/Directs Plans			
	Delivers Tasks Within Plans			
	Direct Customer Contact			
	Indirect Customer Contact			
Peer Context	Leadership/Management			
	Individual Body of Work/Specific Context			
	Functional Work Team Member			
	Project Work Team Member			
	Implementer			
	Delivery Expert			
	Program Leader (Formal/Informal)			
	Integrator/Coordinator			
	Coach			
	Evaluator			
	Influencer			
	Networker			
	Thought Leader			
Life Cycle | Business Process	Strategy & Innovation			
	Business Planning & Forecasting			
	Product Development & Research			
	Product Life Management			
	Product Design			
	Product Engineering			
	Production			
	Connected Product			
	Supply Chain			
	Product/Service Delivery & Support			
	Customer Experience			
	Org. Management & Optimization			
	Talent Management & Optimization			
	Tech Management & Optimization			
	Employee Engagement			
	Network Engagement			
	Product Quality Improvement			
	Process Quality Improvement			
	Financial Management			

Section 4: Competencies

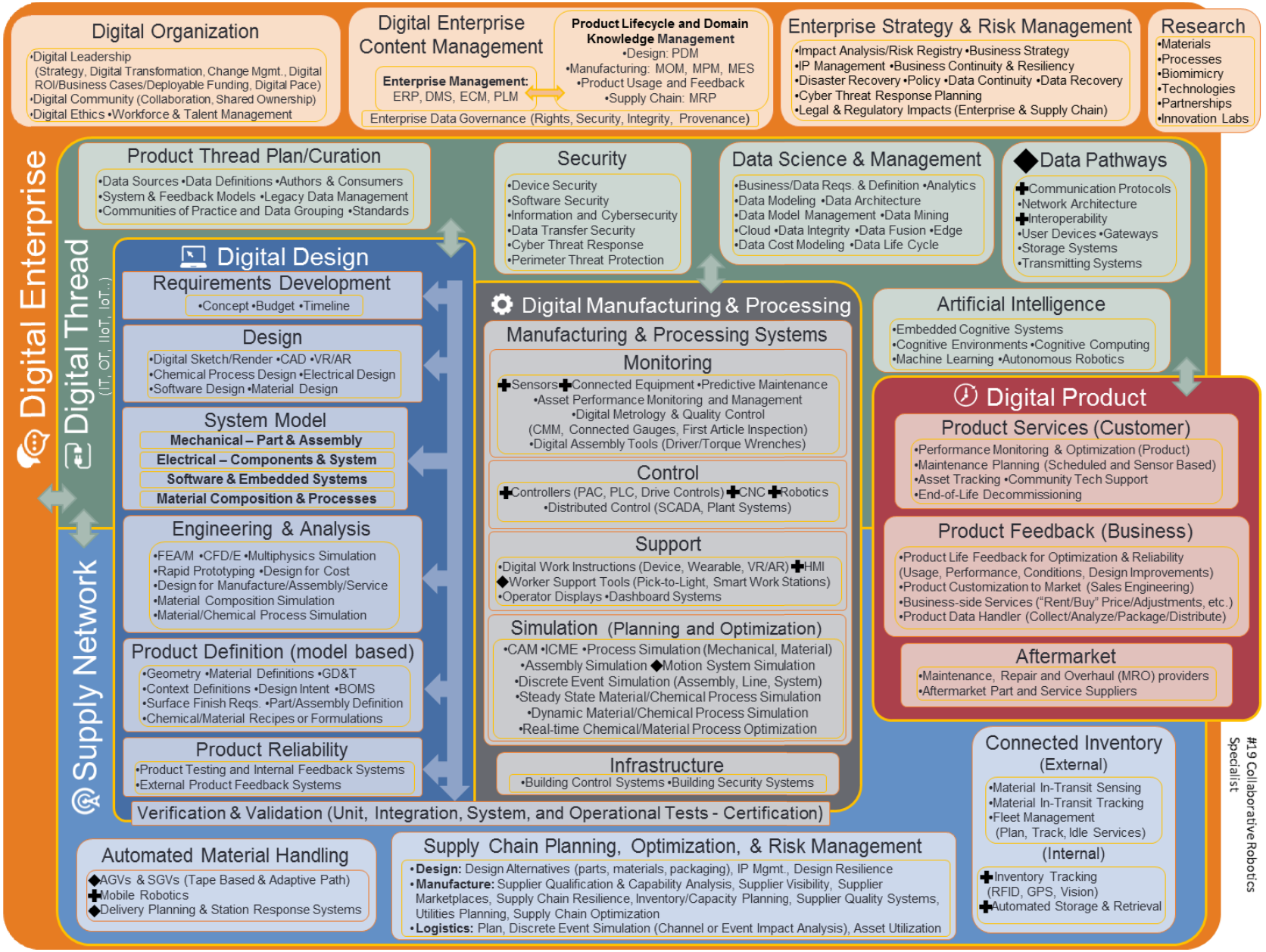
Essential Technical Competencies

The following DM&D Technical Domain Map shows the technology, tool, skill, or work areas desired for this role.

Key for Required Expertise Levels

Symbols shown at the domain level, sub-domain level, or individual level apply to that level and below:

- ◆ = **Deep comprehension** and/or comprehension of interactions (Level 1)
- ✚ = **Practiced engagement** and/or application (Level 2)
- ★ = **Direction setting** and/or expert application (Level 3)



Section 5: Experience and Education

Education

Degrees

- AAS in Automation and Control Technology (Technician Level)
- AAS in Robotics Technology
- B.S. in Engineering (Mechanical/Electrical/Industrial) with courses in Robotics/Industrial Automation
- B.S. in Mechatronics

Certifications

- RIA – Robotics Industries Association

Experience Profile

- 5-7 years in progressively increasingly responsible production, maintenance, or systems-support related positions as lead operator, line leader, installation and repair, or other key production or systems roles
- Strong understanding and experience working with mechanical, electrical, and computer systems
- Experience in electro mechanics, electrical theory, electrical circuits, and wiring
- Experience with pneumatic actuators, valves, controls, and systems
- Previous experience with CAD, schematics, and diagrams
- Previous experience with assessing and designing process and performances, using or considering robotic systems, kinematics, sensor technologies, and feedback systems
- Previous experience in a related engineering or engineering-support area
- Knowledge of applicable regulations and standards including ISO/TS 15066, ISO 10218-1, ISO 10218-2, and ANSI/RIA R15.06
- Ability to translate and work with financial and business information to communicate application opportunity and return on investment

Section 6: Potential Progression

Role Cluster

12 Manufacturing Space Automation

Associated DM&D Community Roles

- Automated Guided Vehicle (AGV) Systems Specialist
- Collaborative Robotics Specialist
- Collaborative Robotics Technician
- Digital Factory Automation Analyst
- Digital Factory Automation Architect
- Digital Factory Automation Manager
- Digital Manufacturing Engineer
- Digital Manufacturing Safety Systems Specialist
- Factory Automation Engineer
- Instrumentation Engineer
- Inventory Systems Automation Specialist
- Machine Learning Scientist
- Machine Learning Specialist
- Self-Guided Vehicle (SGV) Systems Engineer

Progression Roles

Collaborative Robotics Technician

The Collaborative Robotics Technician works to setup and maintain collaborative robotics systems throughout the manufacturing environment. They are able to safely setup a collaborative robot to automate repetitive tasks, perform machine loading, improve process precision, or assist a worker. In their role they can successfully redeploy a collaborative robotics system to meet needs across different areas of the factory, driving system utilization and reducing production bottlenecks. To fully support the collaborative robot and system platforms they are capable of performing regularly prescribed maintenance and troubleshooting of the robot, end effectors, support platform and any additional critical peripherals.

Considered as a Transitional Role