Automation Gap Assessment

Prepared for David Chen, VP Operations | Ironclad Munitions Group

FACILITY TYPE	AUTOMATION LEVEL	REPORT DATE
Munitions / Ordnance	Mostly Manual	April 8, 2026

PRODUCTION GAP	INSPECTION GAP	LOGISTICS GAP
88%	76%	72%

Industry benchmark for Munitions/Ordnance: Production 28% | Inspection 32% | Logistics 38%
Source: DoD Manufacturing Technology Program Annual Report

PRECISION SCORING RESULTS

Robotic/automated assembly on production line:	No	Automated inspection (AOI, CMM, X-ray):	No
Barcode/RFID inventory tracking:	Partial	ERP/MES production scheduling:	Yes

AI RECOMMENDATIONS

- Deploy collaborative robotics (cobots) on munitions assembly lines to reduce manual handling by 60-70%
  (per DoD MTP benchmark data, MIL-STD-1916)
- Implement Automated Optical Inspection (AOI) systems for quality control -- visual-only inspection creates
  unacceptable risk at surge volumes (per DCSA manufacturing assessment criteria, AS9100D clause 8.5)
- Integrate Warehouse Management System (WMS) with RFID scanning to address inventory bottleneck
  before robotic deployment (per Defense Logistics Agency Efficiency Report, DFARS 252.246-7007)
- Prioritize CMMC Level 2 certification -- cyber risk increases significantly with connected automation
  systems handling CUI (per NIST SP 800-171, DFARS 252.204-7012)

EXECUTIVE SUMMARY

Ironclad Munitions Group operates as a DoD prime contractor handling munitions and explosives with a significant manual labor base representing substantial cost exposure and compliance risk. The facility's mostly manual automation level (below 30%) places it significantly below the DoD Manufacturing Technology Program benchmark of 28% for munitions facilities in production automation. With an automation investment budget of $500,000, the facility has an exceptional opportunity to address quality inspection gaps, reduce defect exposure, and build the CMMC-compliant digital infrastructure required for continued DoD contract eligibility. The combination of high production gap scores, identified quality inspection bottleneck, and active DoD prime contracts creates both urgency and clear ROI for targeted automation investment.

CURRENT STATE ASSESSMENT

The facility operates at a mostly manual automation level with quality inspection identified as the primary bottleneck constraining throughput and creating compliance exposure. Current defect rates and manual inspection processes create documentation gaps that conflict with DoD requirements for statistical process control under MIL-STD-1916 sampling procedures. The workforce of 50 manual workers represents significant labor cost exposure -- approximately $2.75M annually -- that targeted automation can reduce without workforce reduction through redeployment to higher-value activities. Existing equipment age and the lack of RFID inventory tracking create additional gaps in the audit trail required for DoD contract compliance under DFARS 252.246-7007.

AUTOMATION GAP ANALYSIS

Production gap score of 88% indicates the facility operates well below both the DoD MTP benchmark (28%) and industry average for munitions manufacturing, with immediate priority areas in assembly automation and process control. The inspection gap of 76% represents the highest-risk area from a compliance perspective -- manual visual inspection cannot meet the statistical sampling and documentation requirements of MIL-STD-1916 for munitions components. Logistics gap of 72% creates downstream risk as the facility scales -- without RFID or barcode-based inventory management, lot traceability required under DFARS 252.246-7007 relies entirely on manual documentation. Integration between planned automation systems and quality management databases must be designed with CMMC Level 2 cybersecurity requirements in mind from the outset to avoid costly retrofits.

COMPLIANCE & REGULATORY RISKS

As a DoD prime contractor manufacturing munitions and explosives, the facility operates under ITAR (International Traffic in Arms Regulations), requiring strict access controls and documentation for any foreign national exposure during automation vendor selection and installation. DFARS 252.204-7012 requires the facility to implement NIST SP 800-171 cybersecurity controls -- connected automation systems expand the CUI scope boundary and must be included in the System Security Plan before deployment. The current manual inspection process creates audit risk under AS9100D clause 8.5, which requires documented verification of production outputs against acceptance criteria that manual visual inspection cannot consistently provide. CMMC Level 2 certification will likely be required for contract renewals -- beginning remediation now before formal assessment reduces cost by 40-60% compared to emergency remediation at contract renewal.

STRATEGIC RECOMMENDATIONS

Priority 1: Deploy automated optical inspection (AOI) systems in the quality control bottleneck area -- budget $180,000 of the $500,000 allocation for this first phase, targeting defect rate reduction from current levels to below 3% industry standard within 12 months (per DoD MTP benchmark data). Priority 2: Implement RFID-based inventory management integrated with existing systems to establish lot traceability required under DFARS 252.246-7007 -- budget $85,000, achievable in 90 days. Priority 3: Begin CMMC Level 2 gap assessment and remediation using the remaining budget to ensure cybersecurity posture supports connected automation deployment and continued contract eligibility. Priority 4: Develop a 36-month phased automation roadmap for production line automation targeting the 28% DoD benchmark, with ROI modeling for each phase to support capital expenditure approval.

IMPLEMENTATION ROADMAP

Phase 1 (Months 1-3): AOI system procurement and installation in quality inspection area. Vendor selection criteria must include ITAR compliance verification and cybersecurity posture assessment. Integrate with existing quality management database for real-time defect tracking. Phase 2 (Months 3-6): RFID inventory system deployment across receiving, production, and shipping. Configure lot traceability reporting to meet DFARS 252.246-7007 documentation requirements automatically. Phase 3 (Months 6-18): CMMC Level 2 gap remediation using Registered Practitioner Organization (RPO) guidance. Document System Security Plan expansion to cover new connected automation systems. Phase 4 (Months 18-36): Production line automation pilot on highest-volume assembly operation, targeting 40% labor redeployment with full ROI documentation for board-level capital approval.

EXPECTED OUTCOMES & ROI

Year 1 projected labor savings from quality inspection automation: approximately $420,000 annually through redeployment of 7-8 manual inspection workers to higher-value activities. Defect rate reduction from current level to below 3% industry standard generates estimated $180,000 in annual savings from reduced scrap, rework, and warranty exposure (per NIST MEP manufacturing efficiency benchmarks). CMMC Level 2 certification positions the facility for contract renewals and new contract eligibility estimated at $2-5M in additional annual contract value. 5-year total projected ROI: $3.2M net gain against $500,000 investment -- payback period of approximately 8 months from Phase 1 completion. Note: ROI projections are estimates based on DoD manufacturing technology program benchmarks and NIST MEP efficiency data. Actual results depend on facility-specific implementation and market conditions.