



MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: RED Number: # 1

Problem Statement Title: No tags allowed

Problem Statement: There are no RFID tags allowed. This is an issue for identifying what equipment is what and it's current state. Serial numbers and labels can be worn, damaged, dirty, etc.

Effective Outcome: Provide an automated computer vision identification capability that recognizes unique weapons, reads serial numbers where available, and records items identity time and location.

Unique Conditions: Little reference data is available today, serial numbers not readable. Some equipment is uniquely serialized while other equipment is managed by quantity, requiring both item-level and quantity-level workflows. In a secure environment that might restrict camera usage.

Standards/Desirements: Ability to identify unique weapons at 99% accuracy without a human in the loop. Be able to process 100's of items a day.

Technology Research Areas of Interest: Computer vision/AI, optical character recognition, and visual feature matching for serial numbers, engravings, markings, etc.



MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: RED Number: # 2

Problem Statement Title: Tracking theft

Problem Statement: Weapon and equipment accountability is currently dependent on manual entry, paper documents, physical counts, Excel files, etc. With only one or two people typically working in the armory, missing or stolen items may not be detected quickly, and it can be difficult to determine where an item was last observed, when it went missing, or who last had custody.

Effective Outcome: Ability to accurately trace 99% of items to reduce theft/tracking issues. Maintain an auditable event history containing item identity or quantity, status, location, time, transaction type, and responsible person or system process.

Unique Conditions: Limitations include the current manual entry of data, 1-2 people staffing an armory required to update this stuff

Standards/Desirements: Target at least 99% traceability for serialized items and reduce unresolved quantity discrepancies. Maintain an auditable event history containing item identity or quantity, status, location, time, transaction type, and responsible person or system process. Detect and flag missing, unexpected, duplicate, or mislocated items.

Technology Research Areas of Interest: On-premises inventory databases, data lakes, event-sourced audit logs, and analytics platforms sized for large armories.

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MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: RED Number: # 3

Problem Statement Title: CAC Enabled Personnel Assignment

Problem Statement: Personnel currently complete paper issue forms and receive physical "baseball cards" or similar documentation showing what gear has been assigned to them. There is no automated CAC-based identity step and no authoritative database connection that ties optically identified weapons or equipment to the individual receiving them

Effective Outcome: Enable a zero-signature issue and return workflow in which a Marine authenticates with a CAC and PIN, the system validates the identity against an authorized DoD authentication service, and the equipment observed during the transaction is automatically associated with that person.)

Unique Conditions: Issue and return transactions must be fast enough for high-throughput operations and practical for personnel receiving 15-20 items at a time. The system must support serialized weapons and quantity-tracked gear in the same personnel record.

Standards/Desirements: Eliminate routine handwritten signatures and duplicate manual data entry while preserving an authoritative audit record. Validate the CAC and PIN through an approved DoD identity and authentication integration.

Technology Research Areas of Interest: CAC readers, PKI-backed authentication, PIN validation, identity federation, and approved DoD authentication APIs.

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MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: ORANGE Number: #1

Problem Statement Title: Digitization of manual inventory processes

Problem Statement: Current inventory processes rely heavily on manual data entry and legacy forms, limiting throughput, consistency, and the ability to automate downstream inventory functions.

Effective Outcome: Establish a standardized digital inventory data model that converts existing inventory records into structured, validated, and reusable data.

Unique Conditions: The solution must use existing inventory records and forms as the baseline for the data schema with the ability to operate within a closed environment, with minimal to no reliance on external services or dependencies.

Standards/Desirements: A digitized inventory architecture that standardizes how inventory data is represented, ingested, validated, and maintained while remaining aligned with existing inventory processes and authoritative records.

Technology Research Areas of Interest: Data modeling and schema normalization; ingestion and parsing of multiple flat-file formats; automated data validation; data transformation; local analytics; support for diverse legacy data sources.

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MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: ORANGE Number: #2

Problem Statement Title: Policies and Procedures into Automated Business Logic

Problem Statement: Armory operations are governed by established MARSOC policies, SOPs, and TTPs that currently depend on personnel to interpret and apply procedural rules. These rules must be formally represented before portions of the workflow can be automated.

Effective Outcome: Convert validated policies, procedures, and operational rules into executable business logic that consistently applies required controls while preserving human decision points where policy requires them.

Unique Conditions: Existing MARSOC policies and armory procedures may require human review, approval, or intervention. Automation must therefore support human-in-the-loop decision making rather than assuming every process can be fully automated.

Standards/Desirements: A modular digital architecture that MARSOC SOPs and TTPs into traceable business rules, validation logic, workflow controls, and exception-handling processes.

Technology Research Areas of Interest: Rules engines; workflow orchestration; test-driven development; modeling and simulation for business-rule validation; deterministic decision logic; hardware and software architectures capable of operating with minimal external dependencies.



MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: ORANGE Number: #3

Problem Statement Title: Automate Inventory Nomenclature Matching and Reconciliation

Problem Statement: Manual inventory entry and inconsistent nomenclature can create duplicate, mismatched, or incorrectly associated inventory records, resulting in false matches, missed matches, and potential mis-issuance that can affect inventory accountability and operational readiness.

Effective Outcome: Automatically identify and reconcile inventory records against standardized nomenclature and authoritative inventory data, reducing manual discrepancies and providing a complete, auditable association between inventory and the assigned Marine.

Unique Conditions: The solution must account for a continuously changing inventory population, including previously unrecorded items, multiple supply sources, varying nomenclature, and different ownership or accountability statuses.

Standards/Desirements: Automated reconciliation should compare incoming inventory records against standardized inventory data, assign a confidence level to potential matches, automatically resolve high-confidence matches, and route ambiguous records to personnel for corrective action.

Technology Research Areas of Interest: Entity resolution; probabilistic record matching; fuzzy matching; data normalization; anomaly detection; confidence scoring; machine-learning-assisted matching; inventory data analytics.



MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: YELLOW Number: #1

Problem Statement Title: Armory Serial Item Capture

Problem Statement: MARSOC armory personnel must manually locate, read, and record serial numbers from serialized equipment during inventory, issue, turn-in, and accountability activities. Serial numbers may be missing, or difficult to locate, access, or read, making the process time-consuming and susceptible to human transcription errors. MARSOC requires a more efficient and reliable method for capturing serialized item information.

Effective Outcome: Armory personnel through automation can rapidly and accurately capture an asset's information and associate it with the correct asset record, reducing manual entry, errors, and the time required to conduct accountability activities including asset check in/out and audits and inventory.

Unique Conditions: The capability must operate within an armory environment containing a wide variety of equipment types, sizes, and materials. Identification of the assets has challenges. RFID cannot be used for warfighter safety. Tags/stickers easily come off. Engraving may not apply to some materials, degrade, or become unreadable. Armory facilities are very cramped and do not provide a visual line of sight for photography capture. Needs to be a way for humans to validate captured asset information and trigger remediation for incorrect information.

Standards/Desirements: The capability should:

- Accurately identify and capture asset specifics for a range of equipment
- Minimize time and fatigue of manual transcription and operator input
- Allow personnel to verify or correct captured information before submission
- Associate captured assets with other assets and its existing equipment record
- Support existing armory inventory, issue, turn-in, and accountability workflows
- Operate reliably under expected armory lighting, connectivity, and environmental conditions
- Maintain appropriate security and

protection of equipment and inventory data in both the armory, and warfighter (currently cards of issued equipment) · Reduce current multiple points of failure for data capture/validation · Provide real-time inventory data · Be intuitive for users (standard UX/UI compliance)

Technology Research Areas of Interest: Computer vision and optical character recognition (OCR); ATAK, mobile, and edge-based image processing; AI-assisted asset detection and validation; barcode, QR, ECC200.matrix, and other automatic identification technologies; image enhancement for worn or low-contrast markings; offline/edge processing; and integration with existing inventory and accountability systems. Cloud storage for unified asset management. On and offline capabilities. Independently and verifiable proof bundles for full audit trail. .



MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: YELLOW Number: #2

Problem Statement Title: Physical Validation of Receipt and Return

Problem Statement: MARSOC armory personnel require a reliable method to physically validate that the correct equipment is issued to and returned by the appropriate individual. Current processes depends on manual verification and multiple administrative excel records, handwritten records, printed out copies of pdf docs, creating the potential for discrepancies between what is recorded in the system and what may have physically changed custody from one individual to another (or armory inventory). There are concerns with asset theft and lost items that cannot be tracked.

Effective Outcome: Armory personnel can rapidly confirm that any physical item being issued or returned matches the expected item and transaction record, providing positive validation of equipment custody and improving confidence in armory accountability. Further, equipment can be matched to an identified warfighter for accountability which should reduce potential loss or theft. There would a clear path to reconciliation of assets.

Unique Conditions: The capability must support high-volume issue and return operations involving multiple personnel and equipment types in very crowded, small spaces with limited armory staff. Items may be visually similar, contain multiple identifying markings, or be processed alongside numerous other items. Validation may need to occur quickly without creating additional bottlenecks in the issue or return process.

Standards/Desirements: The capability should:

- Positively validate a specific asset at the point of issue and return.
- Match the item to the correct individual and transaction.
- Identify and alert personnel to mismatches or discrepancies before completing a transaction.
- Provide a record of a physical validation event.
- Minimize additional steps required of armory personnel and warfighters.
- Support both individual and bulk asset data transactions where applicable for new inventory

or inventory brought into the armory from another location · Function during limited or intermittent network connectivity. · Protect personnel, equipment, location, and accountability data in accordance with applicable security requirements.

Technology Research Areas of Interest: Computer vision and object recognition; serial-number and identifier recognition; barcode, ECC200.matrix, QR, and NFC technologies; mobile scanning and edge computing; automated transaction validation; digital chain-of-custody technologies; sensor-assisted verification; and integration with existing armory and accountability systems. Data security for combined asset / warfighter / location data. AI automation.



MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: YELLOW Number: #3

Problem Statement Title: Armory Process Efficiency

Problem Statement: MARSOC armory accountability processes require significant manual effort to identify equipment, capture information, validate transactions, and maintain accurate records. These tedious administrative activities increase the time and labor required for inventory, issue, and return operations and can create bottlenecks that take personnel (armory admin team and warfighter deployed teams) away from higher-value operational responsibilities and are prone to human error. There are also multiple points of failure.

Effective Outcome: Reduce the time and manual effort required to execute routine armory operations and in the theater asset inventory activities while improving equipment accountability and accuracy. Personnel should be able to complete inventory, issue, return, and reconciliation activities with fewer manual steps and less duplicate data entry.

Unique Conditions: Armory operations may involve large quantities and diverse types of equipment, periods of high transaction volume, multiple simultaneous users, and requirements for strict accountability. Processes must remain effective during rapid issue and return events and in environments with limited connectivity while accommodating existing operational and security procedures.

Standards/Desirements: The capability should:

- Reduce the time required to conduct inventory, issue, and return operations with automation
- Reduce repetitive manual data entry and administrative tasks.
- Eliminate unnecessary duplicate entry across systems and workflows.
- Minimize the number of steps required to complete routine transactions.
- Maintain or improve inventory and transaction accuracy.
- Allow personnel to quickly identify and resolve discrepancies.
- Support operations during high-volume periods without creating additional bottlenecks.
- Provide measurable improvements in transaction and

inventory processing times. · Integrate with existing accountability systems and workflows where appropriate. · Produce cryptographically verifiable independent proof bundles

Technology Research Areas of Interest: Workflow automation; AI-assisted and general automated data capture and validation; computer vision and OCR and ECC200.matrix; mobile and edge computing; automated identification technologies; system and data integration; robotic process automation; digital workflow management; offline-first applications; and analytics for identifying process bottlenecks and opportunities for automation.

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MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: GREEN Number: #1

Problem Statement Title: Manual Data Entry

Problem Statement: Time consuming and error-prone

Effective Outcome: Automated process leading to less time required and human error

Unique Conditions: Durability of labeling options given environmental conditions during use; no RFID, Bluetooth, radiating outside armory

Standards/Desirements: Simple UX/UI; fewer input categories; accuracy rating; audit trail; speed of entry.

Technology Research Areas of Interest: Exists in the commercial; other Services have deployed digital inventory; rugged 2d imagery and camera; ECC200dot data markings

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MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: GREEN Number: #2

Problem Statement Title: Inventory Management and Reconciliation

Problem Statement: Quick reconciliation between physical assets and digital inventory.

Effective Outcome: Reduced human error; ability to act quickly during discrepancies.

Unique Conditions: Real-time visibility; USMC vs USSOCOM specific regulations.

Standards/Desirements: Reduced human error; automated reconciliation workflow; CAC-authentication.

Technology Research Areas of Interest: Inventory management for controlled items .

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Problem Statement Template

TEAM: GREEN Number: #3

Problem Statement Title: Metrics & Dashboards

Problem Statement: Ability to quickly review to make decisions.

Effective Outcome: Integrated dashboards with real-time/accurate information; allowing Marines at all levels to make informed decisions

Unique Conditions: Cloud-based, silo'd systems; user-friendly UI; integration into other data sources; data export in various formats

Standards/Desirements: One source-of-integrated truth; intuitive/straight-forward dashboards tied to role of the user

Technology Research Areas of Interest: Integrated data mesh; UAT .



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Problem Statement Template

TEAM: BLUE Number: #1

Problem Statement Title: Lack of Accountability Tracking

Problem Statement: Current system consists of local paper logs and excel spreadsheets

Effective Outcome: Visible chain of custody records to include serial numbers, time stamps, location, personnel. All auditable and recallable

Unique Conditions: Technological constraints that have zero emission, RF signature. Reliance on technology accuracy.

Standards/Desirements: High standard of accuracy, decreasing amount of time allocated for human vs automated audit. Random sampling for verification of technology accuracy

Technology Research Areas of Interest: AI vision technology, Non-RFID tagging technology, edge compute, auditable secure database,



MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: BLUE Number: #2

Problem Statement Title: Time

Problem Statement: Too much to do a full audit and sight verification

Effective Outcome: Less time to complete full audit and sight verification

Unique Conditions: Personnel Qualified to complete audit, frequency of audit,

Standards/Desirements: Decreasing amount of time spent on audits to significant factor, accuracy,

Technology Research Areas of Interest: Automation



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Problem Statement Template

TEAM: BLUE Number: #3

Problem Statement Title: Readiness

Problem Statement: Current System causes lack of readiness, inability to accurately assess readiness

Effective Outcome: Rapid and efficient inventory, tracking, auditing, maintenance,

Unique Conditions: Time, manpower, human errors.

Standards/Desirements: The ability to rapidly assess current state of the armory and assess readiness

Technology Research Areas of Interest: Integrated database/software.
Automated auditing system, automated issue and return.



MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: PURPLE Number: # 1

Problem Statement Title: Inconsistent equipment identification

Problem Statement: Diverse equipment is marked with non-standard serial numbers due to differences in manufacturers, nomenclature, country of origin, camouflage paint, or wear/tear

Effective Outcome: The Armory is able to capture information about each piece automatically and with accuracy. The Armory is able to capture total asset visibility and property accountability at a high level of accuracy and at speed.

Unique Conditions: 1) size and scale of equipment in armory; 2) must account for foreign and other SOF-peculiar weapons; 3) size, durability, and format variance in serial numbers; 4) obstruction of reading serial numbers; 5) poor lighting conditions in armory; 6) low risk tolerance for solutions that might put data at risk to adversaries

Standards/Desirements: 1) Solution must be accurate at the 100% level, with reasonable fall back and recovery; 2) must have a built-in alert for unreadable serials numbers and allow for manual entry override; 3) must be able to read-in serial numbers automatically; 4) foreign and SOF-peculiar items would need to request standard serial numbers to adhere to FAR requirements; 5) new equipment must meet new form factors in the future; 6) must work in low-light conditions

Technology Research Areas of Interest: 1) computer vision/OCR. Used by Amazon, grocery store check-out; 2) image-based LLMs. This solution has been used for RICO (Thread AI); 3) policy changes to account for serial number standardization; 4) Image recognition model/SAM models, deep dive into specific weaponry recognition. This is used by the Professional Golf Association (PGA)



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Problem Statement Template

TEAM: PURPLE Number: # 2

Problem Statement Title: Time-consuming, manual processes

Problem Statement: A paper-based, manual process leads to long wait time for Marines checking out and returning equipment. Monthly serialized inventory takes up to 3 days; daily inventory takes 3-4 hours, twice a day. Reports and forms are completed manually using Excel or by hand increasing likelihood of human error.

Effective Outcome: Time to conduct monthly and daily inventory are significantly reduced. Validation of the weapon assignment is automated. Manual entry/human intervention is minimized to only an as-needed basis. Minimize typing or manual input and move to automation/drop-down selection. Template of issue for Marine based on their billet. Can account for and flag DNI status.

Unique Conditions: 1) connectivity issues can disrupt operations, requiring offline back-up capability; 2) this process is tradition, cultural resistance at leadership level to changing processes; 3) technology gap and learning curve; 4) must earn confidence in any new system, must be proven technology; 5) software and patching updates can take the system offline;

Standards/Desirements: 1) A centralized database of equipment in the armory located on GovCloud Azure; 2) offline transactions must flow to backlog; 3) Store and forward capability required; 4) must be environmentally resilient; 5) create different personas based on how the armorer is interacting with the equipment (i.e. inventory mode, distribution mode, etc.); 6) CAC-enabled recognition; 7) dashboard interface with drop downs; 8) automated reporting and form completion; 8) develop training for end-users and sustainment requirements

Technology Research Areas of Interest: 1) computer vision/OCR. Used by Amazon, grocery store check-out; 2) image-based LLMs. This solution has been used for RICO (Thread AI); 3) policy changes to allow camera/vision technology; 4) Image

recognition model/SAM models, deep dive into specific weaponry recognition. This is used by the Professional Golf Association (PGA). 5) Azure-friendly database; 6) store forward technology and development of offline back-up processes;



MARSOC: Automated Armory Collaboration Event (CE)

Problem Statement Template

TEAM: PURPLE Number: # 3

Problem Statement Title: Data security, lifecycle, and auditing

Problem Statement: Information on equipment is all stored physically and in a file cabinet. There is no way to perform analytics or audit transactional/inventory data. No anomaly detection for a piece of equipment.

Effective Outcome. Globally accessible data . Data is fully traceable. Data secured in GovCloud. Searchable capabilities, both look up and LLM search, for information. Automated flagging and report generation.

Unique Conditions: 1) Data may need to be connected into GCSS-MC, would require standard data management system across different locations; 2) tamper-proof data and end-user can't circumvent the system;

Standards/Desirements: 1) search through data records; 2) create reports; 3) reduce storage/retention risk; 4) access from anywhere; 5) role-based control (RBC) access capability; 6) deconfliction/compatibility flagging in the system; 7) create interoperability with GCSS-MC; 8) cloud storage requirement; 9) must be able to print records; 10) must be able to access on mobile device

Technology Research Areas of Interest: 1) computer vision/OCR. Used by Amazon, grocery store check-out; 2) image-based LLMs. This solution has been used for RICO (Thread AI); 3) policy changes to integrate into GCSS-MC, if needed; 4) Image recognition model/SAM models, deep dive into specific weaponry recognition. This is used by the Professional Golf Association (PGA). 5) Azure-friendly database; 6) store forward technology and development of offline back-up processes; 7) Zero-trust technology; 8) iCAM credential access management.

TEAM WHITE — Problem Statement #1

Problem Statement Title:

100% Asset Accountability with Minimal Human Dependency

Problem Statement:

MARSOC requires 100% accountability of controlled assets, but current processes depend heavily on personnel correctly identifying, recording, updating, issuing, returning, and reconciling equipment. Manual steps create failure points when actions are performed incorrectly, delayed, skipped, or not completed in accordance with policy.

Effective Outcome:

Maintain **100% asset accountability** while minimizing manual touchpoints and opportunities for human-induced error. Routine identification, issue, return, inventory, reconciliation, and record updates should occur automatically wherever practical, with personnel primarily managing exceptions and approvals.

Unique Conditions:

- Weapons and sensitive equipment require complete accountability.
- Personnel training, experience, workload, and adherence to process may vary.
- Required actions cannot depend solely on individuals remembering to perform them.
- Operations may occur in garrison, deployed, shipboard, or disconnected environments.
- Active RF technologies may be restricted.
- Serialized and non-serialized assets must be supported.
- Existing Marine Corps policy and arms-room requirements must still be followed.
- Equipment can move through issue, maintenance, staging, transfer, and return workflows.

Standards/Desirements:

- 100% accountability of controlled assets.
- Minimize manual entry and transcription.
- Automate routine inventory and reconciliation.
- Automated validation of issue and return transactions.
- Detect missing assets, duplicate issuance, incorrect returns, and other discrepancies.
- Maintain a complete and auditable transaction history.
- Support CAC-enabled authentication where required.
- Operate during network outages or disconnected conditions.
- Preserve required Marine Corps forms and policy workflows digitally where permitted.
- Allow personnel to focus on exceptions rather than routine data entry.

Technology Research Areas of Interest:

- Computer vision.
- OCR and serial-number recognition.
- AI-based inventory reconciliation.
- Automated issue and return workflows.
- RuBee magnetic wireless communications (automated inventory, rapid issuance with qualification check, exit detection). Reads through metal and liquid. No compromising emanations
- Passive identification technologies.
- Edge and offline processing.
- Automated discrepancy and anomaly detection.

- Digital chain of custody.
- Immutable/auditable transaction records.
- Automated workflow enforcement.

TEAM WHITE — Problem Statement #2

Problem Statement Title:

Positive Identification of Complex Weapons and Components

Problem Statement:

MARSOC must reliably identify weapons and their associated components across a large number of valid configurations. A company may have approximately 130 lowers, with roughly 80 supporting multiple uppers, often 3–5 each, before accounting for optics, lasers, suppressors, alternate calibers, and other SOF-peculiar equipment. Current processes do not consistently identify these components or maintain their relationships as configurations change.

Effective Outcome:

Positively identify every lower, upper, and associated component and continuously know:

What it is → Where it is → What it belongs to → What configuration it supports

Each component should retain its own identity while also maintaining its relationship to a parent weapon, kit, or configuration.

Unique Conditions:

- Approximately 130 lowers may exist within a company.
- Roughly 80 may support multiple uppers.
- Condition of weapons
- A single lower may have 3–5 different uppers.
- Each weapon may also have multiple optics, lasers, suppressors, or other accessories.
- Components can be attached, detached, exchanged, or issued independently.
- Components may support different calibers or mission configurations.
- Serial numbers may be worn, damaged, obscured, or difficult to read.
- Similar-looking items may require identification at the individual-item level.
- Dense storage and variable lighting complicate optical identification.
- Some assets may not support permanent applied labels.
- Active RF emissions may be restricted.
- Standard Marine Corps equipment and SOF-peculiar equipment must coexist.

Standards/Desirements:

- Identify assets at the individual-item level.
- Identify both parent assets and child components.
- Maintain parent/child relationships between lowers, uppers, optics, lasers, suppressors, and other equipment.
- Support multiple identification methods rather than one single technology.
- Recognize components when installed or detached.
- Preserve valid configuration relationships.
- Maintain historical configuration records.
- Flag uncertain identifications for human validation.
- Support damaged, worn, or incomplete markings.
- Allow components to move independently without losing their identity or history.

Technology Research Areas of Interest:

- Computer vision.
- OCR.
- Passive optical identification.
- Machine-learning object recognition.
- RuBee magnetic wireless communications (automated inventory, rapid issuance with qualification check, exit detection). Reads through metal and liquid. No compromising emanations
- Low-signature/non-radiating identification.
- Multi-modal identification.
- Parent/child asset graphs.
- Configuration management.
- Component recognition.
- Edge AI.
- Automated relationship inference.
- Image-based asset matching.

TEAM WHITE — Problem Statement #3

Problem Statement Title:

Persistent Component Custody and System-of-Record Continuity

Problem Statement:

MARSOC lacks a consistent mechanism to maintain custody, ownership, and parent/child relationships as components move between weapons, personnel, armories, units, maintenance locations, and property systems. With approximately 130 lowers per company and roughly 80 supporting 3–5 uppers each, hundreds of independently accountable component relationships may need to be maintained, particularly for SOF-peculiar equipment that does not map cleanly into existing property-management workflows.

Effective Outcome:

Maintain a persistent and authoritative record for each asset and component that continuously preserves:

Identity → Parent/Child Relationship → Custodian → Controlling Unit → Location → Status → History

The system should know who controls an item, where it is, what it belongs to, and how those relationships change throughout its lifecycle.

Unique Conditions:

- Upper receivers and other components may leave the armory independently of the lower.
- A component may move between compatible weapons.
- One lower may have several valid upper configurations.
- Components may move between personnel and units.
- SOF-peculiar equipment may not map cleanly into existing GCSS structures.
- Supply personnel may currently need to determine how and where an item should be entered.
- Parent/child relationships may change dynamically.
- Custody can transfer without the parent weapon moving.
- Equipment may move through maintenance, staging, deployment, temporary storage, or another armory.
- Units may receive components from other organizations.
- Connectivity to enterprise systems may be intermittent or unavailable.
- Asset relationships must persist even when systems are disconnected.
- Theft

Standards/Desirements:

- Every controlled component maintains its own persistent identity.
- Record current custodian.
- Record controlling organization or unit.
- Preserve lower/upper and other parent/child relationships.
- Track independent issuance of components.
- Record when a component changes parent weapon or configuration.

- Maintain complete custody and relationship history.
- Support both Marine Corps standard and SOF-peculiar equipment.
- Maintain continuity as assets move between units and armories.
- Synchronize with GCSS or other property systems where interfaces permit.
- Operate locally when disconnected and reconcile when connectivity returns.
- Prevent relationships from being lost because an item changes system, unit, or configuration.
- Provide an authoritative record of who controls items such as upper receivers after they leave the armory.
- This process should eliminate a majority of loss prevention and theft within the cage environment.

Technology Research Areas of Interest:

- Persistent asset identity.
- Parent/child relationship databases.
- Knowledge graphs.
- Digital chain of custody.
- RuBee magnetic wireless communications (automated inventory, rapid issuance with qualification check, exit detection). Reads through metal and liquid. No compromising emanations
- GCSS/property-system integration.
- Warehouse and logistics management.
- SOF-peculiar equipment classification.
- Automated parent/child association.
- Offline/edge synchronization.
- Lifecycle and configuration management.
- Cross-unit interoperability.
- API-based system integration.
- Custody and ownership event tracking.
- Computer vision.

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