OBJECTIVE: Develop a software application to allow Soldiers to easily identify, document, and manage vehicle maintenance issues that includes an augmented-reality based guidance system for operators and mechanics.

DESCRIPTION: The Army’s current approach to preventative vehicle maintenance is outdated and analog. Currently a soldier must locate the technical manual for the vehicle and follow the listed instructions. Any deficiencies, known as faults, are then written by hand on a paper form. Faults that cannot be immediately rectified must also have a fault code – found in the technical manual – listed next to the deficiency. Upon completion of the preventative maintenance the paper form is then passed to a mechanic to verify the faults, and passed again to a clerk who enters the faults into a software system that tracks the maintenance status of the fleet as well as locates or orders the required parts.

There are numerous pain points in this process. Technical manuals are sometimes missing and often damaged. The analog maintenance process also only captures faults as recorded and does not allow leaders to see when preventative maintenance was not performed at all, when steps were skipped, or faults were misidentified. The current process also does not make the vehicle maintenance history available to the operators and mechanics working on the vehicle line, leading to further misidentification of problems. The passing of the form to numerous people can lead to its loss and delayed entry into maintenance and supply chain management system. Human error in transferring fault codes from the manual, to a form also introduces error. Leaders have no way of managing this process without inserting themselves into the paperwork routing process, creating bottlenecks and increasing the time delay between fault identification and part sourcing. Lastly, this entire process is inefficient because it must occur sequentially and requires one busy Soldier to physically find another busy Soldier simply to pass a piece of paper. Automating this process will increase maintenance readiness of the Army’s fleet of vehicles by assisting soldiers in performing preventative maintenance through visual aids and by allowing leaders to track the fault identification and verification process in real-time.

Capabilities of this solution could include (but are not limited to):

- A computer vision enabled augmented reality application, implemented on a handheld or headset computing platforms, that allows operators and mechanics to receive visual aids for maintenance activities and provide recommended solutions
- Real-time geolocation of vehicles with faults within the motorpool, ability to prioritize verification based on vehicle type, geography, bumper number, fault-type or other criteria
- Picture-taking capability to allow for remote verification of faults
- Integration with training manual so that fault codes, and part identification (and alternate identification) numbers appear when fault is identified
- Ability to see past maintenance history of a vehicle when conducting services to confirm past faults have been corrected, and visualize part status for outstanding faults

PHASE I: Develop a solution that either assists with either/both maintenance supply chain operations or provides visualize aids during maintenance for a single vehicle type. Solutions are not required to be part of integrated whole. Proposals will be evaluated on a holistic basis based on the value they provide to the Army, allowing for solutions with a different constellation of features to be scored based on usefulness to maintainers and operators.

PHASE II: Develop an integrated solution, implemented on handheld or headset computing platforms, that integrates both augmented reality assistance with maintenance activities and supply chain activities into a single platform for a single vehicle type. As with phase I proposals will be evaluated on a holistic basis to assess the value they provide to the maintainers/operators of vehicles based on the included features.

PHASE III DUAL-USE APPLICATIONS: Develop application for numerous vehicle types that interfaces with existing maintenance status and supply chain systems to facilitate improved preventative maintenance and equipment procurement. Potential commercial applications of the technology exist within the transportation sector (automotive, airline, rail) and electronics repair industries.
REFERENCES:


KEYWORDS: Vehicle maintenance; Augmented reality; computer vision; supply chain; heads-up display