Call-Off Schedule 20 (Call-Off Specification)

This Schedule sets out the characteristics of the Deliverables that the Supplier will be required to make to the Buyers under this Call-Off Contract

Introduction

Purpose

Mixed reality, and in particular augmented reality (AR), offers increases to current capabilities if harnessed correctly. This project looks to build on the success and output of the Equipment Support Augmented Reality Triage (ES ART) work and Project CONVERGENCE 22 (PC22) from 2021/22 and aims to use ES as a vehicle for assessing the quantitative increases in capability it provides. This will complement the qualitive data that has been captured to date. It is also proposing an holistic view is taken on cohering all current innovation projects using AR and collate all AR experimentation that is taking place pan-Army to inform and generate a road map to delivery.

Background

Under the direction of D Futures CSS ES branch off the back of PC22, 5 FS Bn REME was tasked with exploring the potential for Mixed Reality application in an Engineering scenario: specifically utilising AR. With 4 HoloLens AR headsets and an off the shelf Laptop 5 FS Bn REME explored 2 pillars. Safe system training and Equipment Support (ES) at reach exploiting connectivity. Both pillars have been explored; through self-generated tests and demonstrations to CFA, Comd 104X and the TEG Capability Day it has been shown that there is real potential in developing mixed reality into normal practice to use as a safe system of training and to use as a tool to assist and record ES forward not only to technicians but the average soldier. It is appreciated that AR has utility across a number of other applications within the Army which this work package will expose to build a library of use cases.

Objectives

The objectives for this requirement are to be delivered across 7 Lines of Development (LODs):

LOD 1. Road Map and use cases. Production of a single Army roadmap for augmented reality which will form the basis of an ABC submission. The submission will articulate proven benefits of AR and its wider potential for exploitation Pan-Army. This will draw on LOD 2 to provide vignettes and detail a route forward for future work.

LOD 2. Coherence of AR work. Bring together all augmented reality work undertaken from unit to Army HQ in one place to ensure maximum exploitation of the

work already undertaken. Any work funding under the 'COs innovation budget' and AREIL can be quickly drawn together along with experimental aims and outcomes. Collection of the work is not limited to these two areas. The output will also detail a master question list on what was being asked and what the outcomes were to ensure duplication work does not occur. This will require summation of Level 1 use by 19RA, Level 2 use vehicle inspections at 1 Bn and in-depth repair at 5 Bn of various ES activities to highlight generic application ES Pan-Army. It will also consider parallel innovation conducted by individuals and organisations party to the community of interest led by D-Futures CSS ES branch.

LOD 3. Procurement activity. Procurement of several sets of headsets, standalone computers for development activity (guides building/remote assistance) and portable scanners is required to enable the rest of the work packages to be undertaken. Not only will this resource the current planned work but will provide a small pool for units/individuals to rapidly test hypotheses without the need to submit multiple BCs. This will also include the purchase of complete models of equipment and infrastructure required from manufacture or alternatively purchasing capability to model organically any equipment for AR exploitation.

LOD 4. Power Pack (PP) Repair guide build. Forming the core of the project, LOD 4 aims to build a series of maintenance guides for both the level 1 user and the level 2 maintainer. These will form a proof of concept on which a series of quantitative tests can be carried out and build on the experience gained from exploitation at 19RA, 5Bn and 1 Bn REME. The end state would be for an individual who is unfamiliar with the PP repair to deploy a Power Pack Repair Facility and a simple vehicle platform to undertake a level 1 and level 2 maintenance event. These will require the headsets to be lock down and for the guides software to be installed. Repair guides may require the employment of an Army Media team or purchase of premade models from potentially non-MOD sources.

LOD 5. AR software. To fully exploit the capability of AR technology, a robust user-friendly back-end software package is required that supports holographic overlays aligned to service equipment. These overlays will be created through AR technology equipment identification scanning with the capability of scanning the identified equipment to allow real time spatial anchoring of 3D models, videos, and documents. Thus, facilitating enhanced interaction during training and fault finding. Software that can use live data feeds from equipment in conjunction with predesigned holographic demonstrations of required actions will allow users to conduct maintenance on equipment they are not necessarily familiar with giving more SQEP at reach with less personal. This software would support LOD 4.

LOD 6. Modelling and Simulation. The ability to use portable scanners to create 3D images which can then be manipulated within the augmented reality systems lays at the heart of the project. This allows for bespoke guides to be created when required, noting LOD 7, for rapid development of new and old systems. All work and products should be tied into the Defence Simulation Centre, Shrivenham. (Exploitation of 3D modelling cameras)

LOD 7. Data Storage and Technical assurance. The principle *of 'produce once use many'* must apply to gain efficiency savings and therefore central data deposits built

on the Army Data Warehouse must be the end goal. LOD 7 is the work package which aims to breakdown how this will be achieved and to produce a proof of concept. This will aid in the rapid dissemination of data for experimental platforms and can be tested through the build package in LOD 4. The data produced/used in the project will be at OS, not above. All hardware will have to be assured if it is to communicate with local systems.

Scope

This requirement is instrumental in the development of an understanding how AR can support ES in the Army in both an instructional and operational environment. This is a continuation of the proof-of-concept work ongoing which showed AR utility in teaching ES activities in a safe environment and linking forward maintainers of varying KSE with a wider network of specialists and experts. The contractor shall provide all hardware, software, and technical expertise (including on-site technical support) to exploit the technology. The contractor shall provide technology demonstrations and content creation throughout the experiment. Contractors will not be provisioned for any military flights, accommodation, transport or relevant travel admin (health insurance, ESTAs etc); this is to be self-sourced.

Requirements

The mandated contract requirements are:

1. A single pan-Army roadmap to the adoption of AR developed to reflect current pan Army Capability Planning Groups. This will include exploitation of past, current, and future experimentation. The roadmap must provide recommended timelines, use cases, and limitations. (LOD1)
2. A pan-Army Master Question List (MQL) aimed at answering the gaps in knowledge and understanding based on the collated experimental data gathered to date. Gap analysis based on current experimental data. Production of a recommended experimental plan to close the knowledge gap. (LOD2)
3. Delivery of hardware and software detailed below (LOD3):

Item	Number	Comment
AR/MR user interface (goggles/glasses)	8	To enable all LODs concurrently and support emerging work
Interface integration to safety equipment	4	With integrated hard hat to enable safe working around equipment and at height.
Laptop/Tablet	4	Recommended for development and step builds. This will need to run the relevant software and be capable of communicating to a compatible network device.
Meta quest pro	2	Mixed reality to support multiple platform integration

Telecommunication device.	3	This allows cross platform collaboration and basic scan capability at reach. Not the optimal solution but enables rapid dissemination of information to support decision making and direction. Also provides a 5G router hotspot and an optical output. Suggested IPhone 14/15
5G mobile internet dongles	4	High speed upload and download connectivity options (include hardware and data usage)
Software	2	Modelling and AR software required.

4. Production of interactive guides to support the training and repair (at reach) of CV12[1] (OEM Perkins) Power Packs utilising the in-service Power Pack Repair Facility (OEM Marshall Land Systems). This is to include the creation and re-finement alongside 5 Bn REME (LOD4).
5. Support to testing of developed guides with 5Bn REME both in barracks and deployed on UK based exercises (LOD4).
6. Support in developing best-practice reach-back solutions (LOD4).
7. Training and support in the generation of a selection of 3D models in support of guide generation using the supporting hardware and software (LOD 5 & 6).

Optional requirements (non-mandated):

8. 3D modelling storage solution.

Outputs/deliverables/milestones

Core deliverables/outputs

1. An initial start-up meeting will take place where milestones and deliverables can be confirmed. This will include representatives from AHQ, 5Bn REME, 19 RA and Community of Interest individuals and organisations.
2. A single pan-Army roadmap to the adoption of AR and MQL presented in a report chaptered to inform current British Army Capability planning groups with supporting visual representations.
3. Receipt of hardware and software licenses as detailed in *Requirements.*
4. Proof of concept vignette using the Power Pack training and repair. Produce training guides and a reach-back user guide, including repair and inspection standards to be hosted within the AR system. The training package will pro-vide 3D modelling of the CV12 PP and the PPRF modules and will meet the current Training objectives of the in-house PP repair course conducted by 5 Bn REME and will be DSAT compliant.[2]

Optional deliverables/outputs

[1] The Cummins Power Pack in AS90 and the Cv8 in Warrior should also be considered.
[2] JSP 822 refers.

5. A model storage solution that allows storage and access from MoD authorised devices.
Intellectual Property (IP) Rights (Known as IPR) Any documents created as part of this contract will be owned by the authority under DEFCON 703. The IPR of the equipment however will remain with the OEM.
Government Furnished Supplies No GFA will be provided.
Payment Payment should be carried out via CP&F and Exostar within agreed milestone deliveries. These deliverables will be as per the pricing matrix. Goods and Services will only be paid on receipt and acceptance; all valid invoices will be paid within 30 days.
Contract management arrangements Contract management will be the responsibility of SO2a ES Cap Dev, MCP. Monthly update meetings will take place with contracted suppliers (regularity dependent on length of contract). Deliverables will be measured against agreed quality. Project management will be conducted internally by the supplier however coherence across all LODs will be conducted by ES Cap Dev. Please note the optional elements will not be evaluated as part of the competition however, they may be invoked as options during the life of the contract.
End of contract/Exit strategy End of contracts will be deliverable based and agreed at commencement. The exploitation route will be developed post contract award when deliverables are agreed. Hardware and software management at close of contract will be the responsibility of ES Cap Dev.