

Research to a universal diagnostic device, that simplifies the maintenance of ground-based weapon systems.

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Formerly the Royal Netherlands Army possessed the YPR. This was the main infantry combat vehicle of the Army. Due to its universal chassis, each YPR could be maintained with the same maintenance kit. In 2012 the YPR had to be replaced by new armoured vehicles, these are the weapon systems that are currently used. These weapon systems are supplied by different manufacturers. No prior mutual agreements were made regarding uniformity in maintenance. The result of this is an undesirable quantity and diversity of specialistic tools including the diagnostic equipment. The volume and weight of all equipment become a serious logistic problem, especially during missions. JIVC (Joint IV (Information Provision) Commando), the ICT department, does not support the devices. Simply because of the reason that they are not supplied by JIVC the devices in the first case. The devices are delivered together with supplied toolset of the weapon system. As result of this, they will not be considered for regular replacement and may not be connect to the internal networks. There is a need to reduce the number of devices, to receive support from JIVC and to update the devices via a secure route. In this early-stage Defence suggested that there might be a possibility to achieve this need if modern hardware and software should run all the applications on one device, and that only the dedicated device would be used for specific reasons. The combination of the devices will not only solve the practical issues but also deliver financial benefits. By analysing the current situation and future state, reviewing the user experiences and technical possibilities, and assessing concepts to the demands of the organization it should be found out to what extent a universal diagnostic device, that simplifies the maintenance of ground-based weapon systems, can possibly be created.

The computers used at the Ministry of Defence are government furnished equipment, they are supported by JIVC. This is not the case for the diagnostic devices. The diagnostic devices are delivered by the supplier of the system or self-bought, which makes them hard to manage. In the ideal situation the devices, are just like the other computers used by the Ministry of Defence.

The weapon systems of Defence are divided into classes from A to C. A-systems are face defining, mostly heavy and have a dominant role when deployed. The 43rd Mechanized Brigade has mostly A-systems at its disposal, at which the focus is laid during this project. The mechanics of 43 maintenance company should represent the practical side of the problem. The maintenance unit of the

43rd brigade is a primary user of diagnostic equipment, for them it is the tool to maintain the software and to read the CAN-bus of weapon systems. Because all mechanics are educated for one specific weapon system or even part of the weapon system, it does not matter if they use a universal device. The possibility to use the device for another system will make no difference for the mechanics. They need their equipment for their specific system. The current situation satisfies that demand completely. However, a universal device still has the potential to improve the situation. The current devices are not registered in the ERP system of the Ministry of Defence, therefore replacing a broken device is a time-consuming process. Also, in the current situation it is not possible to borrow a device from another maintenance unit because the devices are not interchangeable. To investigate if a universal device can be designed, the different ICT solutions that JIVC can offer are analysed. It is of great importance that the device is secure to use with the weapon systems and that it is usable and convenient for mechanics. Keeping computer systems up to date is a must for the Department of Defence. The older the systems get, the easier it is for hackers to intrude a digital system. Such cases must be ruled out.

The outcomes of this research result in requirements that can connect the demands to a technical solution. The requirements function as guideline to design a government furnished piece of equipment. A point of attention is that the connection and the use of MULAN, the internal network of the Ministry of Defence, is a frequent mentioned feature. This list of requirements eventually led to two different outcomes: A specific device built specifically conform the requirements but that cannot connect to MULAN. Or a MULAN-device that has limitations but can connect to MULAN. After a trade-off the MULAN-device can be considered as a better fitting solution than the specific device. But to really let the MULAN-device solve this problem, more research and changes in policies must be made to solve the limitations.

Lastly, it must be mentioned that despite the research is based on the A-systems, this result has a great potential to be expanded and applied to B-systems or even C-systems. With the current limitations a MULAN-device can still influence the performance of mechanics if he maintains multiple systems.