



# Documentation Evolution – Tablet/Smart Glasses Application



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Research and development of a Defence, secure and network ready, tablet and smart glasses to be the primary interface with future ADF technical publications.

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## Executive summary

Recently Capability Acquisition and Sustainment Group (CASG) released the latest version of the Defence Publications Standard that is written around S1000D. This is a large shift in the development of publications as the Defence industry will need to comply with this new standard and the new digital framework. To address this shift and move ahead of the curve, industry needs to look at the next generation of publications which will be Interactive Electronic Technical Manuals (IETM). This evolution will be away from paper-based manuals into electronically configured, managed and presented documents. Laptops will no longer be sufficient. Tablets are being developed to operate in harsh environments and with secure functionality that is vital to the connectivity of Defence personnel.



## Background

A combination of factors has recently occurred that will change the direction of technical publications within Defence. Primarily the release of an S1000D specific publication standard DEF(AUST) 5630 *Developing S1000D Interactive Electronic Technical Publications (IETP)*, that has coincided with 'Joint Head Land Capability / Head Land Systems Directive 16/20 - *Technical Data Reform*' was used to introduce the new standard and move Land Publications from the old User Handbook / EMEI based on DEF(AUST) 5629B.

The DEF(AUST) 5629C, also released in early in 2021, will play a secondary role to DEF(AUST) 5630, but only for smaller projects. The release of this Land Directive and its implications will have a significant impact on how Defence contractors and all the other associated contractors in the industry will have to interact and develop Defence Publications moving forward.

Industry still in some cases are developing Defence manuals based on DEF(AUST) 5629B which is two iterations old. Currently the development of these manuals is usually through Microsoft Word and Nuance PDF. While Nuance PDF and Microsoft Word will have a place in the future work for the DEF(AUST) 5629C small projects, for manuals beyond this standard Microsoft Word will become a backup option. Industry hasn't addressed this software gap to date, but with the Defence Directives enforced, software solutions will be needed sooner rather than later.

It will take time for the full acceptance of this transition to take place and in that time, there will be software companies competing to get early adoption of their solutions by providing industry the opportunity to convert publications from existing Microsoft Word documents and legacy documents into functional data modules that can be used in the shorter term. This will allow an understanding of what is required for companies to learn what is needed and the skill sets required before deciding whether to stay in the straightforward space of simple conversions from Word documents or move into a full S1000D data module development and common source database solution.



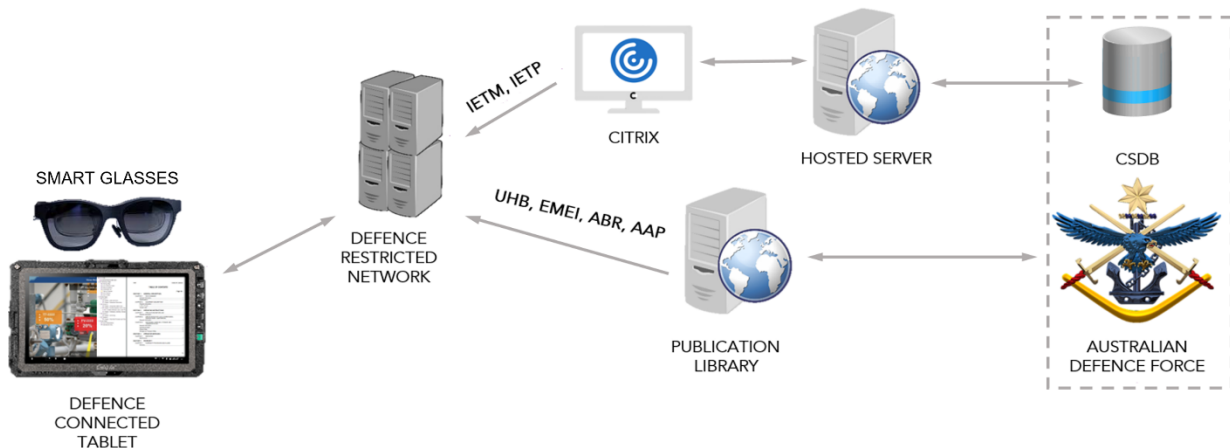
## Hypothesis

The implementation of a Tablet isn't going to have a big impact on the current processes used to develop Defence Publications as it is a medium not a process. There will be the need to make available software and applications to allow both the interface with the existing content and create environments through which the operator will be able to interact with the publications. Smart glasses will be adopted to allow the freedom of not being tethered to a workstation but be able to still interact with external environment and have the information available in what amounts to a 'Heads Up Display.'

In the short term understanding how this hardware works best and integrates into the publication usage will significantly benefit Defence as the work will be conducted alongside the IETM Project. This close association will provide transparency and ensure solutions achieved meet the mutual goals of both Industry and Defence.

The long term outcome is that in attaining the Commonwealths confidence Industry will be in a position to either help or create publication content for other Defence contractors that may not have the time, resources or budgets to produce the required information.

In line with this work expansion and the shift to electronic publications away from the traditional paper-based versions, the way in which Defence operators will be interacting with publications will also need to fundamentally change. Handheld devices such as Tablets will become the new medium through which publications will be read and as the acronym implies, IETM, interact with, refer **Figure 1**.



**Figure 1 Tablet Interface Network Configuration**

There is no real time delay in switching from a desktop/laptop configuration to a Tablet or similar device. For the purposes of efficiency most developmental work will be conducted on the desktop/laptop as it provides an easier interface for working with applications. The Tablet will be the test bed/sandbox upon which the interaction with the solution will occur and the required verification and validation (V&V) will be completed.

There should be minimal impact to the current IETM/IETP business workflow as the adoption of the Tablet is simply an extra interface that allows publications or applications to be viewed on a device that will be utilised in-service. This only possible impact is the addition of some additional tasks in the V&V process to accommodate testing.

The addition of the Smart Glasses removes the need for monitors or displays from the user's perspective. Smart Glasses use can be moderated while adjusting to them, but all a range of motions and interactions that are not possible when compared to a static workstation arrangement.

The introduction of Smart Glasses at this time will provide an introductory understanding to the way they can be used with the current requirements and mediums. Future Augmented Reality (AR) Glasses will be used to replace the Tablet and all functions including selections or interactions will be via voice or hand gestures.

### Ideal outcomes

The benefits of implementing this Tablet and Smart Glasses will be quickly realised with the successful commencement of new development work in the IETM/IETP development. The Tablet, once secured, can be used as a 'sandbox' environment to assess IETM/IETPs created for the DRN.

External applications like Quick Response (QR) codes, refer **Figure 2** can also be simulated and presented to Defence as practical options for accessing publications and other Original Equipment Manufacturer (OEM) manuals in support of System Program Offices.

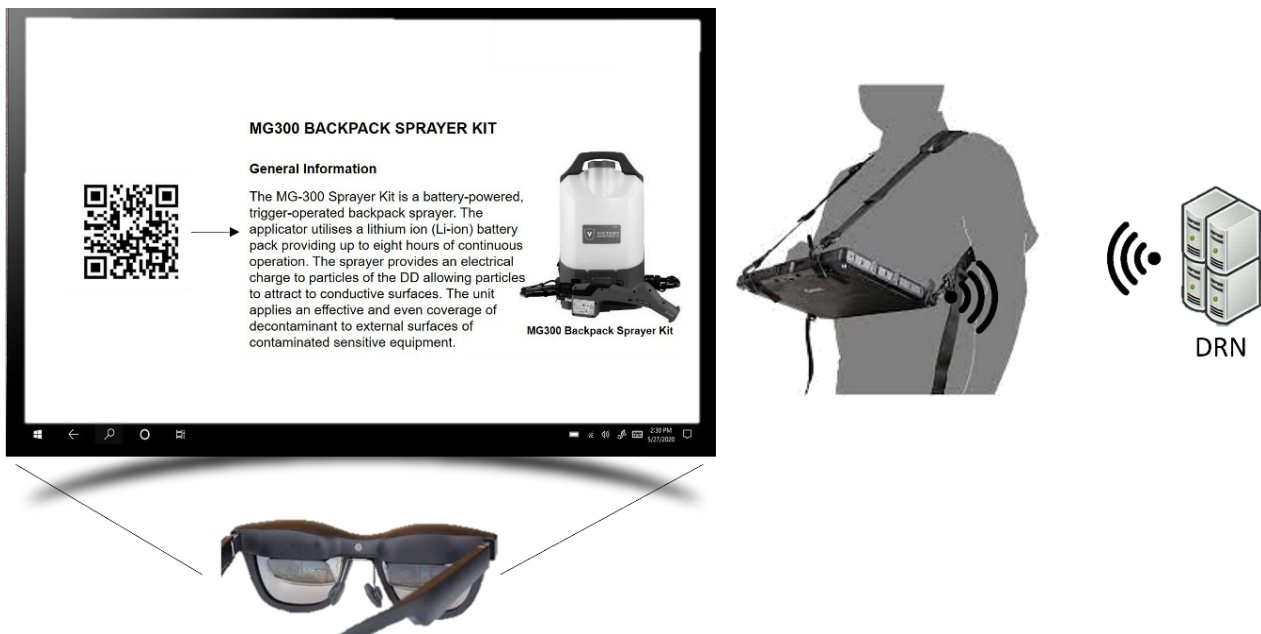
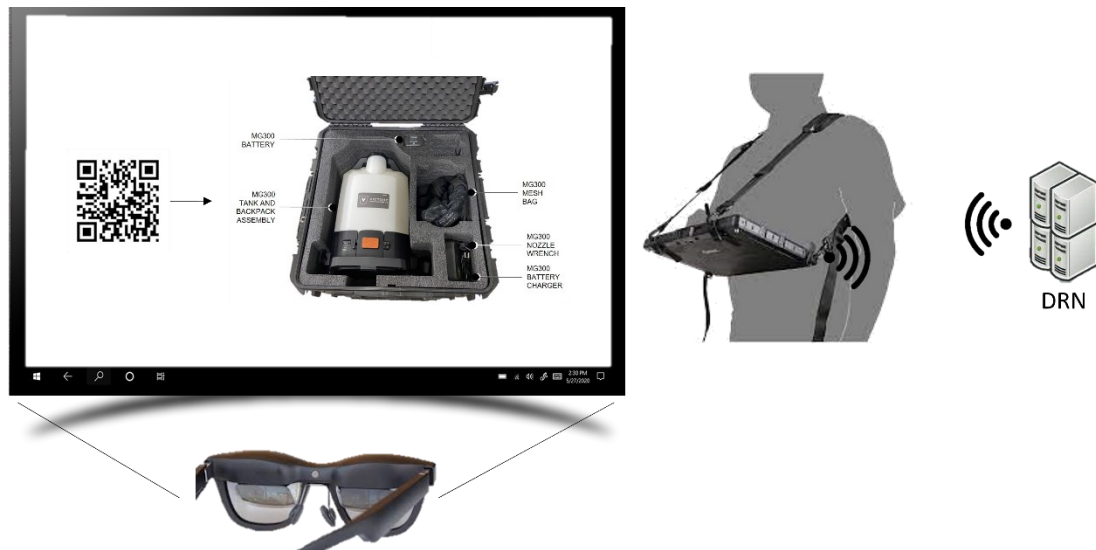


Figure 2 QR Code Example 1

## DOCUMENTATION EVOLUTION – TABLET/SMART GLASSES SOLUTION

The same QR codes could be used in a warehouse environment to check the components or equipment that should be present in a system/subsystem, refer **Figure 3**, prior to release to a customer, or as part of a spares inventory report



**Figure 3 QR Code Example 2**

Industry could support Defence legacy publications that won't be converted into IETMs or IETPs by creating interactive PDFs (flipbooks) from existing information. These could then be hosted on the same servers as the current IETMs and viewed on Tablets.



**Figure 4 Legacy Publications Interactive PDF**

Having the capacity and capability to test applications in real time or validate and verify presented content, prior to being released to users, reduces the risk of downtime due to faults or corrupt information.

## Potential risks

As with any device associated with the Internet of Things (IoT), there are many issues that may arise. However, as this Tablet in its current environment will only be used for testing and local work, there are no major risks.

If the Tablet was to become unserviceable then the backup plan is simply working on the desktop/laptop systems that are fully configured and already running.

Depending on the storage capacity of the Tablet, a backup of the IETMs could be carried out at a set frequency to ensure correct configuration, but this would only be required if work was to be conducted remotely in the absence of a secure network.

Smart Glasses will evolve in time to become AR Glasses. As microchip processors shrink the AR Glasses will become no bigger than a traditional pair of glasses, with all the functionality and reduced need for peripheral equipment. While this is a risk the learning curve from the experience of wearing the Smart Glass version will be of great benefit to understanding how best to utilise the technology.

## Alternatives

The only alternatives that can be considered are similar devices that meet the Defence requirements. While a ruggedised phone version may be an option, there isn't really a market at this stage. While the screen size is limiting currently, paired with future visual hardware that can display information a phone paired as a storage device may be a functional alternative.

Currently Tablets are the only go to in terms of scalable alternatives to carrying a laptop around or the printed version of the publication, which also has its limitations in that it is only for the system or subsystem in question. A Tablet would potentially be able to access either the entire projects documents or complementary systems that are being used in the situation.

There is a growing market for Smart Glasses and research will need to be conducted to find best fit for purpose.

To look wider a field, Extended Reality is a growing umbrella term that incorporates AR, Virtual Reality (VR), Mixed Reality. VR is a common alternative in this space as it can be used to create a virtual environment modelled on real world data to best provide the user with the ability to learn without leaving the 'classroom.' At the moment the cost of creating that environment as well as developing the interactions for a user is cost and resource intensive and requires a broad skillset, not to mention the cost of hardware. This makes the VR option not as doable as there needs to be a decision on initial investment that might be prohibitive to the average project. In time perhaps with the inclusion of Artificial Intelligence (AI) software in the development/creation, a drop in hardware costs with technology enhancements and a more demand by consumers, VR may become a more cost-effective option.



## Future expansion

The switch to a ruggedised Tablet also opens the possibility of applying AR either directly to the publication or indirectly through associated information about the system that compliments what is being read. This technology already exists but it is still in an emergent stage, so development is only going to accelerate. Where VR is an immersive whole body simulated experience, AR is an augmentation of publications utilising real world screen capturing to project additional information about a piece of equipment that gives real time interactivity at the operator's fingertips.

As indicated in the risks above, AR Glasses will replace Smart Glasses and the Tablet, but the Tablet may be kept to provide redundancy. AR Glasses will, in their own right, open opportunities around interaction with the surrounding environment and the ability of the user to be present and aware not isolated within an alternate reality.

The level of interaction is growing already with AR being used to step an operator through procedures and processes like running maintenance tasks or replacing a part, then completing an operational test in real time to confirm that the work was successful.

Other directions for expansions could also be:

- **Improved Display Technology:** Smart glasses could see advancements in display technology, moving towards higher resolution, better colour accuracy, and wider field-of-view displays. This would enhance the user experience and make Smart Glasses more practical for everyday use.
- **Integration with IoT Devices:** Smart glasses could serve as a central hub for interacting with other IoT devices, allowing users to control smart home appliances, receive notifications from connected devices, and access information from various sources seamlessly.



- **Privacy and Security:** With the increased use of Smart Glasses, there will likely be a greater focus on privacy and security concerns. Future developments may include features such as improved facial recognition technology for authentication and enhanced privacy settings to protect user data.
- **Accessibility Features:** Smart Glasses could incorporate advanced accessibility features to assist users with disabilities, such as visual impairment, by providing real time audio descriptions of their surroundings or reading text aloud.
- **Battery Life and Form Factor:** Future advancements in battery technology could lead to longer battery life for Smart Glasses, making them more practical for all-day use. Additionally, improvements in form factor could make Smart Glasses lighter, more comfortable, and less obtrusive.

## Conclusion

With this in mind and to remain ahead of the competition Industry needs to source a couple of these Tablets to start researching, developing and understanding what the best way is to deploy them into Defence while maintaining the security environment critical to the current military climate.

Portable devices will become the next generation of storage and access for Defence personnel. Not only will they be used in a communication or informational capacity, but they also have the potential to step an operator through the process of using a piece of equipment.

In the next 5 years, AR Glasses will reduce in physical size and project all the information directly into a lens through which the instructions are transmitted to the user without the need to physically turn a page. Interactive instructions guide the operator through the process.

