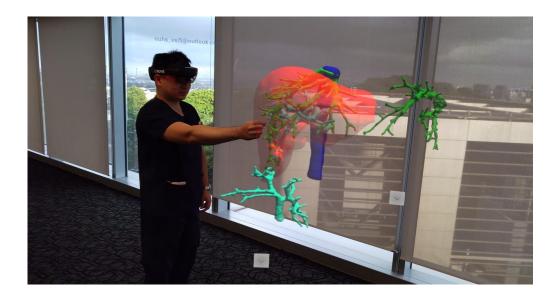Annex A: Details of New 5G use-cases

IMDA and NUHS 5G Use-case for Health Tech

Associate Professor Ngiam Kee Yuan, Group Chief Technology Officer, NUHS, said: "Public healthcare institutions are making fuller use of AI tools to enable medical practitioners to make faster, more accurate diagnoses and precise treatments. NUHS is at the forefront in terms of development and deployment of mixed reality technology in healthcare. This partnership with IMDA will further enhance NUHS' capabilities to develop MR modules and solutions to enhance clinical capabilities, clinicians' abilities, optimise patient trajectories and improve the quality of patient care and patient outcomes."

- **Pre-procedure planning:** For surgeries, a realistic 3D hologram would provide for better spatial reference to the operating field. Such holograms would allow surgeons to manipulate and shape the holograms with a real model and high level of feedback and perspectives compared as compared to a 2D computer screen. This enables the surgeon to perform pre-arrangement of fracture fragments into proper alignment and positions and identification of suitable surgical implants in relation to contours of a patient's bone structure.

- **Intra-Operative Surgical Navigation:** Holographic scanned images or guides converted from CT/MRI scans are then overlayed on the patient, providing real-time guidance for the surgeons during an operation to a single location in the operating theatre to support surgical use cases.

- **Point-of-Care Imaging and Reconstruction:** A point-of-care device which allows for real-time 3D reconstruction of an ultrasound scan enables clinicians to perform bedside screening of potential donors without going through a full work-up. Real-time 3D

reconstruction would also reduce the ambiguity of inter-operator interpretation of ultrasound images. Machine learning would be used for auto-segmentation of intra-hepatic structures, prediction of percentage fat, and image reconstruction. The machine learning algorithm would be trained for existing imaging and histology data and compared with MRI scans and histology from prospective patients.

- **Point-of-Care Superficial Vein Mapping:** AI software would be developed and used with Microsoft HoloLens 2 to detect a patient's veins. The software will identify and help the and locate the veins on a patient's arm. Through the headset's visor, a nurse will be to view the digital images of the veins superimposed on the patient's arm, guiding the nurse on where to insert the needle to draw blood or deliver fluids to the patient. Using the AR headset frees up both hands, making it easier for the nurse to draw blood.

- **Patient Education and Counselling:** With the aid of 3D holograms from patient's own scans, patients and clinicians would be able to interact within the same environment and share the same 3D holographic image. Clinician will be able to fully explain the procedure using these 3D images. A surgeon would also be able to perform a simulated run-through of the patient's surgery using the holograms.

IMDA and Infinite Studio 5G AR for Consumers

- Synopsis of Youri 2071: Unravel in an action-packed immersive experience adventure of Youri, a young girl from the future who travels back in time in search of her father. She is desperate to find her father before robots sent by greedy tech corporations get hold of her father and the secrets of time travel which he holds. Journey with her on her travels through significant moments of Singapore's history and discover how Singapore has grown from its humble beginnings to megacity in the future.

- A live AR performance at Marina Bay area that will simultaneously immerse visitors in a performance of larger-than-life AR renders with true cinematic quality featuring Singapore's skyline. This application will be an innovative platform for Digital Marketing

agencies and their customers, allowing them a more immersive way to reach out to consumers. Further possible extensions of the App ecosystem, already under evaluation, will include a dedicated Metaverse and a companion game. End-users of Apple 5G mobile devices will be able download the AR Application and unlock it with performance tickets bought through Marina Bay Sands web portal.

IMDA and Keppel FELS 5G use-case for Maritime Sector

- **5G AR-enabled Smart Glasses for Site Inspection:** The Smart Glasses are used to digitalise the process of inspection and asset maintenance. Inspection personnel wearing Smart Glasses can view work instructions, that can be controlled through voice-commands, via the display headset. This replaces labour-intensive manual check sheets and drawings. Remote expertise and coaching can also be provided via the platform. This application can reduce the manhours required for on-site quality inspection by as much as 50%.

- **Digital Twin Virtualisation Remote Monitoring:** This AR applications allow the monitoring of equipment performance and on-board system parameters via real-time sensor data. Using AR-enabled Smart Glasses, field engineers will be able to capture and stream live data to their main office to receive real-time remote guidance. Sensor data can also be overlayed on the site engineer's field of vision, displaying key information such as the equipment's real-time critical performance and condition during operations. This will also provide a common platform for field engineers and office-based support to troubleshoot and rectify issues. This application aims to improve field engineers' efficiency by 40%.

- **Remote Virtual Walkthrough:** Using Smart Glasses to conduct remote virtual walkthroughs of a vessel will allow Keppel engineers, clients, and Classification Societies to perform pre-construction feasibility assessments simultaneously and this will enable potential engineering design issues to be identified earlier, thus helping to mitigate pre-construction risks. In addition, during the construction phase, engineers can use Smart Glasses to validate that the project is being constructed to the correct specifications. The solution can also facilitate collaboration across different yards and locations where various vessel components are being constructed.

About Infocomm Media Development Authority

The Infocomm Media Development Authority (IMDA) leads Singapore's digital transformation by developing a vibrant digital economy and an inclusive digital society. As Architects of Singapore's Digital Future, we foster growth in Infocomm Technology and Media sectors in concert with progressive regulations, harnessing frontier technologies, and developing local talent and digital infrastructure ecosystems to establish Singapore as a digital metropolis.

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