



Overview of SmartGate trial (current at February 2004)

SmartGate has been trialed by Customs at Sydney International Airport since November 2002. The primary objective of the trial was to develop and introduce a system of self-processing utilising face recognition biometric technology to confirm identity and streamline the existing crew facilitation process while maintaining the integrity of the border.

Eligible Qantas aircrew are enrolled by Customs to enable them to use the voluntary system. At this time, five high-quality images are taken and stored for later comparisons against the live image of the crew person presenting at passport control. When processing aircrew, SmartGate also checks against the Qantas crew manifest to ensure they are a bona fide crew member and against Customs passenger processing security systems. If any problem is identified, the crew member is referred to the Customs officer for manual processing.

Average processing time for SmartGate is around 17 seconds. In the 15 months of its operation, SmartGate has carried out over 84,000 transactions and has over 4,400 enrolees.

The trial has been introduced in partnership with the Department of Immigration and Multicultural and Indigenous Affairs and Passports Australia. Customs continues to work with these agencies to advance the use of the system to automate border control.

Customs chose face recognition over other biometric systems as it is considered more user friendly than other biometric technology. It has been nominated by the International Civil Aviation Organisation (ICAO) as the primary biometric for border control.

Trial evaluation

During 2003 Customs undertook a formal evaluation of the SmartGate trial. The role of the evaluation was to assess the effectiveness with which the system has met its original objectives. The evaluation included a quantitative analysis of the SmartGate data by the Defence Science and Technology Organisation (DSTO), a survey of the Qantas aircrew by ACNielsen, an ergonomics assessment (ACTSAFE Australia), and an overall report by international experts. The results of each component follows.

Technical Evaluation- Defence Science and Technology Organisation (DSTO)

DSTO was asked to carry out a technical assessment of the SmartGate system. A number of tests were developed to evaluate the overall performance of the system.

Results showed that the percentage of users incorrectly rejected as being themselves by the system (i.e. X being falsely rejected as being X) was two per cent and the percentage of falsely identified users (i.e. Y being falsely accepted as X) was less than one per cent for each presentation of the passport. This is consistent with the overall system performance measured during the trial. Most referrals were for immigration issues and unrelated to the face recognition system. These included errors in the spelling of the crew member's name or flight details on the crew manifest or crew using expired passport.

The DSTO analysis identified a number of areas where there could be further refinement of the SmartGate design and its operating procedures such as reducing the time allowed to gather matching images.

Overall DSTO's rigorous evaluation found SmartGate to be a state-of-the-art system for one-to-one face recognition.

User evaluation- ACNielsen

The aims of the ACNielsen survey were to measure how effective SmartGate has been from a user's perspective and identify areas where the process could be improved. The survey found:

- ninety eight per cent of crew preferred SmartGate to manual methods
- over two thirds of eligible crew have now enrolled in SmartGate
- faster clearance through Customs was the motivation for crew to enrol
- ninety six per cent of crew did not express privacy concerns.

Overall it was found that SmartGate had proved to be very effective among Qantas crew. After using SmartGate for up to six months, the vast majority of Qantas crew expressed a preference for SmartGate over the standard manual clearance process.

Ergonomic evaluation- ACTSAFE Australia Pty Ltd

The aim of the ACTSAFE analysis was to identify user interaction patterns with the SmartGate kiosk and to provide recommendations for improving user transactions in relation to the existing kiosk design.

The recommendations contained within the evaluation included:

- the rearrangement of queuing barriers
- consideration of clearer user instructions.

The analysis concluded that the SmartGate kiosk offered a high percentage of successful automatic transactions for the experienced user and allows for the very rapid passage through the Customs control point.

Expert evaluation- Dr James Wayman and Dr Anthony Mansfield

World biometric experts, Dr James Wayman and Dr Anthony Mansfield, were engaged to review the evaluation reports and undertake a high-level analysis of the SmartGate system. The report included an assessment of the overall system performance against the objectives of the business plan and made recommendations about the future of the project.

They ascertained that the face recognition system is a documented success in this application and had supplied Australia with the world's most advanced border entry system based on facial recognition. It was the considered opinion of the experts that:

"...it is desirable to continue the SmartGate project, and extend participation to aircrew of other airlines, and to frequent flyers".

Profiles

Dr James Wayman is a Director of Biometric Identification Research at the Office of Research and Graduate Studies and College of Engineering, San Jose State University, USA. He also lectures at UCLA and is a Staff Consultant to RAND Corporation. His professional activities include involvement in the British Standards Institute IST/44 national delegation to ISO/IEC JTC1 SC37 Committee for Biometric Standards and U.K. editor, Special Group on "Vocabulary Harmonization". He is also the author of numerous publications.

Dr Wayman earned his PhD from the University of California in 1980.

Dr Tony Mansfield is a Principal Research Scientist at the National Physical Laboratory (NPL) where he works on performance evaluation for biometric systems. His work includes developing and improving test methodologies, conducting evaluations, and technical consultancy on biometric system performance for government and industry.

He is actively involved in the UK Government Biometrics Working Group, the biometrics standardisation committees ISO/JTC1/SC37 and BSI/IST44, and the Association for Biometrics.

Prior to joining NPL, Dr Mansfield received the DPhil degree in Mathematics from Oxford University in 1982.

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ACTSAFE Australia's main charter is assisting employers maximise performance in the workplace. This is achieved through the proactive integration of ergonomic considerations pertaining to work systems, the work environment and individual's requirements.

ACTSAFE Australia services include workplace analysis, equipment design, hazard identification, risk management, safety system development and OH&S training.

Ergonomic and industrial occupational therapist Lenore Gunning has conducted ergonomic assessments and developed strategies for the implementation of Rehabilitation and OH&S policy within administration, transport, printing, construction, cleaning, mining, retail and textile industries.

The **Defence Science and Technology Organisation** (DSTO) is part of Australia's Department of Defence. DSTO's role is to ensure the expert, impartial and innovative application of science and technology to the defence of Australia and its national interests.

DSTO research supports Australia's defence by:

- Investigating future technologies for defence applications
- Ensuring Australia is a smart buyer of defence equipment
- Developing new defence capabilities
- Enhancing existing capabilities by increasing performance and safety, and reducing the cost of ownership.

Defence customers - the Australian Defence Force (ADF) and other parts of the Department of Defence - initiate much of DSTO's research. DSTO complements this with its own forward-looking research to position Defence to exploit future developments in technology.

DSTO also collaborates with science and technology organisations around the world to strengthen its technology base and to support the Australian Government's broader objectives.