



Runway Safety – Technology and letting the end user own the solution

Philip Marques, HATC DXB

Current Technology at DXB



- GMR (Ground Movement Radar)
- RIMCAS (Runway Incursion Monitoring and Collision Avoidance System)
- Physical - stopbars, signage, lighting
- AFLCMS (Q4 2014) (Fully automatic routing and guidance, A-SMGCS Level 4)

Excellence Statements



- In 2012, DANS decided to change the way their business was done.
- They came up with 10 “Excellence Statements” that the business would achieve by 2016.
- Statement #2 - There will be **zero** DANS attributable level busts, losses of separation or **runway incursions by 2016**

Excellence Matrix



Excellence Statement	Excellence Statement Sponsor	Element	Sub-Element	Element Own	1 (Unacceptable)	2 (Poor)	3 (Satisfactory)	4 (Good)	5 (Excellent)
2. There will be zero DANS attributable level busts, losses of separation or runway incursions by 2016	Phil Marques	Equipment	Technology	Mark Green	No routing and guidance assistance to controllers. No ground surveillance, or if present, is subject to multiple unplanned outages and unreliable. Vehicles have no secondary identification systems. Any technology has been procured without user involvement.	Ground surveillance has multiple coverage issues, significant gap filling is required and there are multiple areas of deficient coverage. Controllers have basic, manual routing and guidance systems. Consultation with users to develop user based requirements has been minimal.	Advanced routing and guidance system has been implemented to assist controllers with routing of taxiing aircraft. There is some automation of the routing instructions but controllers continue to manually update the system. Ground surveillance is good but not gap filling required to ensure all targets identified and displayed at all times. Gathering of user requirements has taken place but not all requirements have been met and process to elicit and validate requirements is immature.	Implementation of advanced controller safety net tools to detect and prevent runway incursions. The tools enable the controller to have enhanced situational awareness of potential conflicts when considering instructions to manoeuvre. Ground vehicles are fully integrated into the system to give the controllers a full "picture" and the advanced automated routing and guidance system has full surveillance of all targets. Airlines have begun to implement tools to assist flight crews in preventing incursions, although this is not integrated with ground based systems. Requirements gathering is a mature process where the user needs drive the process and validation closely reflects the original need.	Fully integrated system of multiple advanced controller and flight crew tool. Surface communication, navigation and surveillance system for enhanced and shared situational awareness of the runways and taxiways. Capability to automatically detect and resolve potential conflicts at an early stage. Full surveillance of ground vehicles which is integrated into the alerting system. Drivers receive alerts to prevent incursions at early stage. Flight crew tools provide cockpit display that gives the pilot real-time guidance, showing and sounding an alert if another plane or vehicle is about to encroach onto the runway. Flight crew vision enhancement system provides pilots with a clear electronic picture of what's outside, no matter what the weather or time of day. Controllers have a system of augmented vision, which provides a visual aid when looking "out of the window", providing flight data when looking at an aircraft and assessing, detecting and resolving potential conflicts of all aircraft. User centred design and requirements gathering drives the procurement of the chosen tools and programme management ensures that the different support tools are integrated into a system of systems. ASMGCS Level 5 capability implemented.
2. There will be zero DANS attributable level busts, losses of separation or runway incursions by 2016	Phil Marques	Airfield Development	Signage, lighting, surface surveillance	Phil Marques	No signage and/ or poor lighting have increased the risk of getting lost. Surface surveillance is poor and there are multiple areas of no coverage.	Minimal signage. Not all lighting is fit for purpose; evidence of pilots/ drivers loss of situational awareness. Inadequate surveillance coverage on manoeuvring areas	Signage and lighting comply with ICAO Annex 14. Surface surveillance is adequate but areas requiring gap filling are identified and quantified. Single source of surveillance implemented. Limited redundancy.	There is a good level of surface surveillance coverage in all manoeuvring areas. Multiple sources of surveillance ensure that Controllers have confidence in their surface surveillance and its associated redundancy. Predetermined routes are in use. Clear & unambiguous signage & lighting across the airfield. Stop bars and runway guard lights at all runway/taxiway intersections under all weather conditions (24 hours a day) to help prevent runway incursions. .	Fully protected runway. Fully automated routing and guidance technology, all conflicts detected and resolved - controller monitoring role. No risk of loss of situational awareness. Surface surveillance capability comprises of multiple, high quality sources, areas of required gap filling identified and mitigated. 100% surface surveillance coverage of all manoeuvring areas. 100% resilience.

Has it worked?



- ATCOs involved in:
 - Dual Arrival Streams
 - AFLCMS implementation (Ghosting, Shadow mode trials, simulation)
 - All related safety and hazard identification sessions.
 - Attendance at conferences and meetings with suppliers.

Thank you for your time....

