Pilot Training for Operational Evaluation of Runway Status Lights (RWSL) at SAN

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Outline

• Runway Incursion Problem

• Runway Status Lights (RWSL) Solution
  – RWSL Operational Concept
  – RWSL Operational Requirements
  – RWSL Operational Evaluation at SAN

• Summary
Definition of Runway Incursion

“A runway incursion is any occurrence on an airport runway involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of separation with an aircraft taking off, intending to take off, landing, or intending to land.”

– Source: FAA Runway Safety Office

*Pilot deviations are the largest cause of runway incursions*
Overview of RWSL

• Runway Status Lights Purpose
  – Reduce frequency and severity of runway incursions
  – Prevent runway accidents

• How do lights do this? By increasing pilots’ and vehicle operators’ situational awareness
  – Direct indication via runway entrance lights (RELs) that a runway is unsafe to enter or cross
RWSL Operational Concept

Runway Entrance Lights (RELS)

Airport Surface Radar

Transponder Multilateration

ASR-9

Multilateration not at SAN
REL Operational Requirements

- RELs must not interfere with normal safe operations
- RELs must operate automatically for each landing and departure
- RELs must accurately depict runway is unsafe to enter/cross
  - Red if runway not safe
  - Otherwise off (no illumination)
Operational Evaluation at SAN

- RELs installed on RWY 09/27
  - North side: TXYs C1, D, C4
  - South side: TXYs B1, D, B4, B8
RELs Placement and Direction of Light

- Red RELs always aligned with taxiway centerlines
  - Including one REL placed on runway centerline
  - DFW taxiway centerlines are straight
  - SAN taxiway centerlines are both straight and curved

- RELs light always directed toward taxiway hold line

Example REL installation at SAN with complex taxiway intersection at D on runway 9/27
RWSL Development Phases

• **Phase 1: Engineering Development** (Completed Dec 05)
  – Recorded surveillance data
  – Laboratory (controlled) environment
  – Engineering assessment

• **Phase 2: Shadow Operations** (Completed May 06)
  – Live surveillance data
  – Simulated RWSL operation on display in tower
  – Controller evaluation

• **Phase 3: Operational Evaluation**
  – Live surveillance data
  – RWSL system operating in real time
  – User Group (controllers and pilots) evaluation
Shadow Operations Objectives

• Expose RWSL to live surveillance
  – Verify performance of RWSL hardware and software
  – Aircraft movement and surveillance

• Assess impact to ATC operations
  – Controller clearance and light timing
  – Light timing and runway operations
RWSL Anomaly Classification/Criteria

- Missed Detection (MD)  (1 per 360 Operations)
- False Activations (FA)  (1 per 1800 Operations)
- Interference (I)        (1 per 900 Operations)
Controller Feedback

• No negative feedback

• Positive responses from controllers
  – Effect on ATC/pilot workload (6,9)
  – Accurate and timely indication to controllers/pilots (1,2,7,8)
  – Runway safety (4,5,10)
Pilot information sources

• Media planned for training pilots
  – Website available on-line
    www.RWSL.net
  – Magazine articles in: AOPA Pilot, Flying, ALPA, and FAA Flight Safety, Aviation Week, ATCA
  – Poster to be placed in Pilots’ briefing rooms
  – CD-ROMs of Powerpoint presentations

• 7930.2G Notices to Airmen (NOTAM'S)

• ATIS
  – “Runway status lights operational evaluation in progress”

• Jeppesen Inserts
Proposed Phraseology

• Flight crew members and air traffic controllers should follow these procedures with installed RELs:
  – When cleared to either “cross the runway”, “position and hold”, or “immediate takeoff”, and RELs are illuminated; stop the aircraft and indicate to Air Traffic “Transair 123 stopped with red lights” and then wait for further clearance.
  – When RELs illuminate normally due to crossing, landing or departing traffic without any proximate hazard, the flight crew should remain clear of the runway or stopped short of the runway and wait for further clearance.
  – When controllers issue clearances that result in aircraft stopping due to red lights at runway/taxiway intersections, Air Traffic should reevaluate the traffic and issue further clearances accordingly.
  – When no clearance was given or the clearance was to “hold short of the runway” but the aircraft continued across the hold line and flight crews observed illuminated red lights, the flight crew should tell Air Traffic that “Transair 123 is stopped with red lights.”
Operational Evaluation completion

• Pending successful final results of RWSL operational evaluations at DFW and SAN, changes to require RWSL use will be published in:
  – AIM, Aeronautical Information Manual
  – ATC Handbook 7100.65, Controllers’ Handbook
  – FAA Supervisor’s Handbook
Summary

• RWSL Goal
  – reduce frequency and severity of runway incursions

• RWSL Concept
  – improve safety via increased pilots’ situational awareness

• RWSL Method
  – provide automatic depiction that a runway is unsafe to enter via status lights on airport for pilots

• RWSL Requirements
  – controller acceptance: no impact on normal safe operations
  – pilot acceptance: operational suitability of lights
Next Steps

• Proceed with ARCON system for Operational Evaluation

• Develop ATC training materials - 7/19

• RWSL system integration - 8/15

• Develop pilot and vehicle operator training materials - 9/20

• SAN ATC/Vehicle operator training - 10/16

• Pre-Operational Evaluation flight test - 11/1
  Or T (Two weeks after completion of SAN Airport Runway Project)

• Operational Evaluation - (T + 2 weeks)