Operational Benefit Evaluation by Testing an A-SMGCS

A European Commission DG-TREN project
Introduction and Background
Advanced Surface Movement Guidance and Control systems (A-SMGCS) are developed and deployed to cope with airport safety, capacity and efficiency demands. A-SMGCS need to be prototyped in real environments and require the enhancement of procedures for safe and efficient control of aircraft. BETA is a European Commission Fifth Framework project. The operational Benefit Evaluation by Testing an A-SMGCS (BETA) on real airports is the main objective.

The European Commission Directorate for Transport and Energy (DG-TREN) has contracted the BETA consortium to make use of earlier A-SMGCS results and to measure the operational benefits of an A-SMGCS installed at two major airports: Hamburg and Prague.

On the international level, ICAO and EUROCAE WG41 need validated performance specifications for future A-SMGCS. Earlier, results have been provided in October 2001 to AOPG/PT2 for completion of the European A-SMGCS Manual due by the end of December 2001.

* DAFUSA, ATHOS, AIRPORT-G, DEFAMM, MANTEA, SAMS, ATOPS, VISION, DAVINCI and NEAN.

Objectives
The objectives of BETA are:
- Showing operational benefits to users at significant airports
- Showing A-SMGCS related environmental benefits
- Providing A-SMGCS performance data for the ICAO-A-SMGCS Manual while
- Identifying airport constraints
- Developing an A-SMGCS Operational Concept for these constraints

Approach
From operational airport constraints an operational concept has been developed for the implementation of A-SMGCS adapted system and procedures. Controllers from Hamburg and Prague were trained a-prior on a Tower Research Simulator, and provided feedback on the Human Machine Interface (HMI). The first BETA project year (2000) was used for design and integration, the second year (2001) for trials and evaluation-Phase 1 at three airfields Hamburg, Prague and Braunschweig. The final project year (2002) was used for additional functionality (e.g. routing at Prague, additional SSR interface at Hamburg), improvements to Phase 1 (e.g. expansion of sensor set at Hamburg by a co-operative Multi-Lateration-System based on Mode-S) and test and evaluation trials Phase 2.
A- SMGCS Systems and functions

**Surveillance**
- Non co-operative objects (SMR, NRN, ARMI)
- Co-operative objects (SSR, Mode-S Multi Lateration, DGPS-Link)
- Data correlation and fusion
- Display and labelling

**Monitoring and Control**
- Runway occupancy and incursion alerting
- Restricted area intrusion alerting
- Stop bar crossing alert
- Route deviation alert (Phase 2)

**Routing and Planning**
- Flight plan handling and presentation
- Electronic flight strip data processing
- Handover and Clearance Management
- Departure Management
- Plan Monitoring
- Taxi Route Planning (Phase 2)

**Controller HMI**
- Traffic situation display
- Electronic flight strips
- Support to Runway, Ground, Start-up and Delivery Controller
- Zoom, pan, inset window
- Departure planning display
- Route advisory display (Phase 2)

**Guidance**
- Using stop bar control
- On board guidance for equipped aircraft
- Clearance delivery for equipped aircraft
- Indication of taxi route
The BETA consortium benefits from contributions of ATC and Airport Authorities, Research Institutes, Airlines and Industry:

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