Advanced Integrated Tower Control

Belgocontrol

Belgocontrol is an autonomous public company with the following mission:

- To guarantee the safety of air navigation in the civil airspace for which the Belgian State is responsible
- To control aircraft movements at and around the Belgian public airports

The Control Tower

Belgocontrol's Control Tower at Brussels Airport, operational since end 2004, integrates the most recent technologies for Air Traffic Control (ATC) by means of functionalities resulting from the processing of flight plan data, air and ground radar data. The realizations are based on European and international concepts:

- Gate-to-Gate
- Advanced Surface Movement Guidance & Control System (A-SMGCS)
- Collaborative Decision Making (CDM)
- Controller-Pilot Data Link Communication (CPDLC)

Integrated Tower Position

For a Tower Controller, the direct view on the aircraft traffic movements is as important as its representation on radar and flight data displays. Both requirements are taken into account in the organization of working positions at the Brussels Airport Tower:

- Integrated functions
- Essential info directly visible, extra info on request
- Easy readable characters, big font size
- Limited number of "low height" screens
- Common information and standardized HMI

The flight data processing working position is the most important means of interaction for the Tower Controllers, while the surveillance screens are mainly for monitoring.

Airport Movement System

AMS Basic Tools

- Real-time Display & Update of Flight Characteristics and Flight Status
- Advanced Electronic Strips
- Integrated Air & Ground Radar Data
- Stopbars & Taxiway Segment Management
- Integrated Departure Manager
- Integrated Air-Ground Data Link
- Integrated Tools for Collaborative Decision Making
- Planning and Real-Time Stand & Gate Management

Electronic Flight Strips – Flight Data Display (FDD)
AMS updates in real-time mode the status, characteristics and flight times at each movement phase of the aircraft and distributes the information to the Tower Positions and the CANAC (Computer Assisted National ATC Centre) En-Route and Approach Centre.

Ground & Air Radar Data Displays (RDD)
The AMS RDD, with integrated A-SMGCS functions, is fed by several air and ground radars (digital and video information). Since June 2006, multilateration information is added allowing automated labeling of departure flights.

A-SMGCS – Control
Automatic stopbar control integrated in AMS helps to prevent runway incursions and excessive head-down time.

A-SMGCS – Routing
The occupation of runways and taxiways is optimized by the allocation of standard taxiways and AMS functions correlating ground radar data and flight plan data. AMS also provides accurate timestamps for the used taxiway elements, runway entry and exit points.

A-SMGCS – Guidance
AMS plans to develop automatic commands of the airport taxiway lighting segments to provide guidance for pilots in bad weather conditions (follow-the-greens) and is ready for the provision of taxi-routes for graphical representation in airborne equipment.

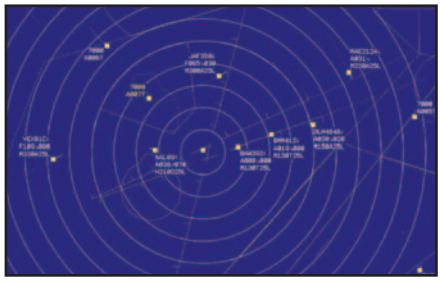
A-SMGCS – Planning
For each planned flight, the AMS Departure Manager (DMAN) calculates the taxi route and variable taxi time and assists the Tower Controller in optimizing the departure sequence by calculating the expected delays at take-off and at start-up.

CPDLC
To reduce misunderstandings in radio communication as well as frequency overload, AMS provides the Clearance Delivery Service via Air Ground Data Link as from its certification in 2003. Belgocontrol AMS Developments contributes to the Eurocontrol D-TAXI project for the feasibility study of the usage of Air Ground Data Link for Push-Back and Taxi Clearances.

CDM – Situational Awareness & TOBT
To improve airport efficiency, a subset of the information at the Tower Clearance Delivery position is made available to the different airport partners. The implemented TOBT (Target Off-Block Time) dialogue between Tower Controllers, Handlers and Airlines contributes to optimize the accuracy of the estimated start-up time. Recently, information exchange on de-icing has been added to the CDM Project.

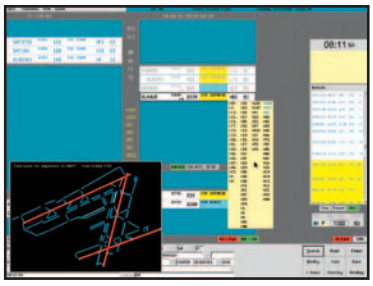
CDM – FUM/DPI
AMS participates in the Eurocontrol trials for the improvement of the slot allocations by exchanging FUM/DPI (Flight Update Message / Departure Planning Information) messages with CFMU (Central Flow Management Unit of Eurocontrol).

In-house Development Competences



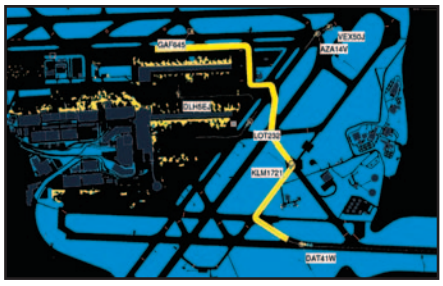
Air Radar Data Display (AIR RDD)

The AMS Air Radar Screen gives the position and labelling of the aircraft to support their control in the direct vicinity of the airport.



Flight Data Display (FDD)

AMS is the core system of the Brussels Airport Tower Control. This in-house developed flight data processing system is the result of a close cooperation between controllers and software development engineers.



Ground Radar Data Display (GND RDD)

The AMS Ground Radar Screen displays the identification and location of the aircraft on the airport movement area (aprons, taxiways, runways...), the planned and current taxiways and airport lighting status.

Belgocontrol

In the domain of tower control, Belgocontrol is today one of the leading ANSPs in Europe and the AMS developments are in line with the technological requirements of the Single European Sky project. Belgocontrol is willing to share its acquired expertise by offering its services to others.

For more information

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