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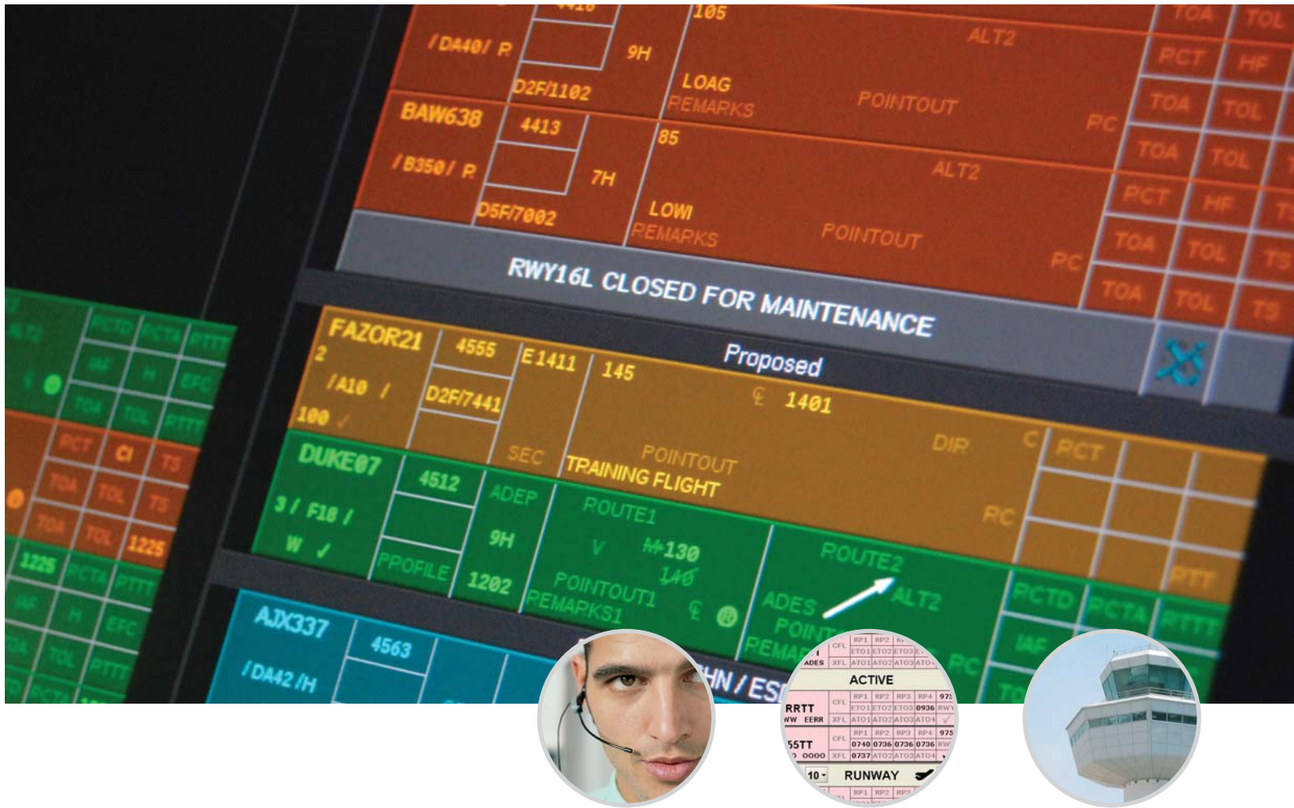
smartStrips©

NEXT GENERATION FLIGHT DATA MANAGEMENT



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SMARTSTRIPS® AT A GLANCE

MEMBER OF SESAR

smartStrips features a fully-redundant, failsafe and scalable architecture that is suited to small-scale deployments through to large centres requiring 100 CWPs or more.

- → Efficient and highly usable flight data management platform for towers (TWR), approach centres (APP) and en-route (ACC) control centres.
- → Improves safety & productivity through automation and silent coordination functions, such as efficient information sharing and workflow support.
- → Highly customisable and adaptable to customer and controller needs. Integrates various systems, such as weather or surveillance, to provide safety net functions.
- → Designed by ATCOs for ATCOs, with optimised human-machine interactions embracing innovative technologies such as automatic speech recognition.
- → Efficient evolution through various transition options: replacement of paper strip printer ...uni-/bidirectional flight data interfaces...SWIM integration using flight data objects.

The smartStrips Design fully supports the SESAR objectives and is in line with the ATM Masterplan. Frequentis stands for quality, innovation and a total commitment to ATM. The Single European Sky initiative is set to bring unprecedented change to the organisation of air traffic management. New technologies that both follow and integrate with the state-of-the-art architecture of the overall system will enable the operational improvements required to meet the 2020 targets. Frequentis supports the service-oriented system of systems approach described in the European ATM Master Plan and therefore favours an open SES ATM interface framework.

SMARTSTRIPS®– NEXT GENERATION FLIGHT DATA MANAGEMENT

Today, Air Navigation Service Providers (ANSPs) across the world are facing the challenge of varying traffic volumes and strong daily fluctuations in capacity demands. At the same time, there is a drive towards increased capacity, safety, and productivity in a cost conscious environment.

In order to cope with the demands placed on traffic capacity and operational efficiency, next generation air traffic management systems will focus on tower automation.

HOW NEXT GENERATION FLIGHT DATA MANAGEMENT CAN BALANCE EFFICIENCY, COST AND SAFETY

For decades, air traffic control (ATC) was dependent on paper-based presentation of flight data. Controllers used paper flight strips for planning and flight management, manually passing the strip from one position to the next. Safety-wise, this process is well-established and has been in use for decades.

Paper-based flight data management is, however, a very cost-intensive process: printing, distribution, archiving and post-processing for traffic counts, statistics and billing all need to be done manually. It also requires a high rate of verbal coordination within and between ATC facilities, and all this manual activity involves the serious risk of human error. To solve these problems, and to take advantage of the benefits of electronic integration, Frequentis has joined forces with leading ANSPs to provide the leading solution for next generation flight data management, using electronic flight strips (EFS) called smartStrips.

smartStrips is the Frequentis solution for next generation flight data management (FDM). The next generation of air traffic management systems will deploy enhanced automation techniques to improve efficiency and safety in all types of airspace.

smartStrips flight data management is a core technology specifically designed to provide tangible improvements in the controller's workflow and decision support activities. smartStrips FDM gives controllers the tools and information they need to work towards safety (separation), economic (efficient use of airspace, cost savings), and environmental (avoiding unnecessary emissions) objectives. The new FDM tools from Frequentis use open systems standards and open database models.

BY CONTROLLERS FOR CONTROLLERS

From the human factors point of view, smartStrips is engineered to mimic paper-based operation while exploiting the benefits of IT systems. It features a rich user interface that supports the mental presentation of the traffic picture. A combination of the latest touch technology and redundant, failsafe hardware secures the same failsafe operation you get from paper strips.

Frequentis combined its years of experience and technical know-how with input from active air traffic controllers to create a state-of-the-art product. It is the most innovative electronic flight strip system available on the market today. Frequentis smartStrips uses parts of the DigiStrips technology created by DSNA-DTI / Research & Development, formerly CENA (France).

smartStrips presents all data on a large 15" to 21" touch sensitive computer display. For easy operation, the controller uses an interactive stylus equivalent to the ballpoint pen used on paper strips. Keyboard and mouse operation is also supported.

BENEFITS

INCREASE EFFICIENCY

- Silent coordination of operations reduces the need for manual coordination.
- Positions and facilities benefit from seamless data and information sharing, thereby enhancing situational awareness at a lower cost.
- Integration with other systems allows seamless and fully-transparent data exchange, e.g. automatic traffic counts, billing, statistics, gate utilisation data.

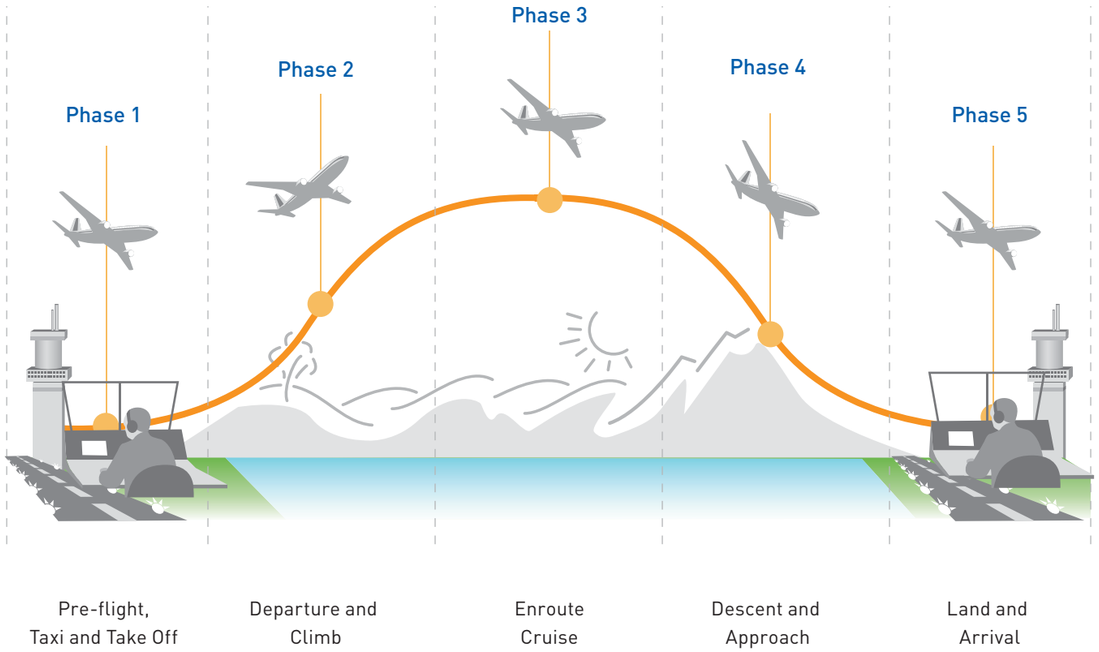
SAVE MONEY

- Automation features optimise personnel utilisation for strip distribution, sorting and archiving. They also support special programmes and procedures, such as Ground Stop, Slots, SWAP, Formation Split, and primary and secondary crash nets.
- A highly usable and intuitive user interface minimises training requirements and transition times.
- Removing the need for flight strip printers and distribution eliminates the associated printer, paper, ink and maintenance costs.

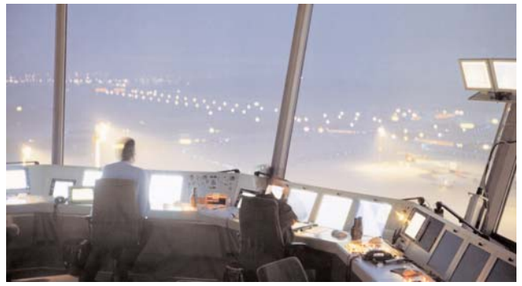
ENHANCE SAFETY

- Automated safety net functions correlate flight data and clearance status with surveillance information. These safety net functions help deal with the most common safety problems, such as runway incursions and level busts.
- Sophisticated animation and handwriting capabilities, single-click operation and advanced graphics design guarantee high user acceptance. This reduces human error.
- A highly-redundant, failsafe architecture ensures system availability at all times. Various built-in mechanisms and backup concepts make the system failsafe under the toughest conditions. By providing software assurance levels according to ED-109/DO-278B we are able to supply the evidence needed to fulfil ESARR 6 requirements.

SMARTSTRIPS® SUPPORTS ALL PHASES OF FLIGHT



ONE SYSTEM – MANY OPPORTUNITIES



Each controller working position (CWP) serves a similar purpose, but local operating environments can vary significantly. smartStrips is therefore designed to support a large range of air traffic control facilities. This includes tower operation (TWR, Terminal), approach control (APP, TRACON, RAPCON), and en-route control (ACC, ARTCC) facilities.

Local requirements and adaptations can be implemented very flexible through graphical editors. This underlines the company's leadership in human factors design, driven by the efficient design process used by Frequentis.

FACTS & FIGURES

- Fully-redundant server configuration with immediate switch-over to a backup server
- Fallback system for increased safety (patent-pending)
- 24/7 operation
- Platform-independent deployment on Linux and Windows
- 100% COTS hardware and displays
- Compatible with established data standards, including FAA, ICAO and EUROCONTROL mandated interfaces
- Correlation of flight data (FDP) with radar data (RDP) for enhanced safety support
- AFTN and strip printer support
- Connectivity to a variety of outside non-ATC networks, including AODB, CDM, statistics and billing
- Ready for Digital Departure Clearance (DCL) and CPDLC through SITA/ARINC datalinks
- Integrates with surveillance systems (A-SMGCS): flight data exchange, synchronised strip and surveillance target highlighting, safety checks and alerting

COMMITTED TO GREEN OPERATIONS

Airlines, airports, air navigation service providers and manufacturers are calling for a global approach to the reduction of aviation emissions. They are united in a commitment to improve fuel efficiency and see a long-term reduction in greenhouse gas emissions. With economic and competitive factors increasing the pressure on the air transport industry, optimised operations and sustainable development issues represent a real opportunity that needs to be seized.

Frequentis is taking part in key programmes dedicated to greener skies around the world. Both SESAR and NextGen have stated clear environmental goals for reducing environmental impact without compromising safety and capacity. These programmes address operational efficiency in terms of throughput and reduction of congestions/delays, but will also improve environmental efficiency during all phases of a flight.

Frequentis smartStrips flight data management is the focal point for all flight-related information. Its numerous interfaces and highly sophisticated flight logic make it the key to greener operations. Frequentis flight data management integrates information and algorithms from all kinds of systems (flight data, radar, departure managers, arrival managers, etc.) and provides a unified communication interface between the air traffic controller and the aircraft.

KEY FEATURES

EVOLUTION

The global demand for more efficient and effective air traffic management continues to grow at a rapid pace. Current air navigation systems must evolve into new modern architectures. smartStrips, the Frequentis solution for flight data management using electronic flight strips, improves the efficiency of (and simplifies) flight data management in towers, approach control facilities and en-route centres.

PLATFORM & ARCHITECTURE

smartStrips uses the TAPtools platform, which is a highly resilient, failsafe platform for ATC-grade IT solutions. The platform supports an extensive range of message sets and interface protocols, including common standards such as ICAO 4444, AFTN, EUROCONTROL ADEX-P and FAA NAS. It integrates a multitude of flight data processing (FDP) systems, automatic solutions, and other information sources to create a unified picture of the flight situation. Each flight is represented as a flight object in the platform, which allows information management in a SWIM-like environment.

smartStrips is the right solution for future oriented and safety-conscious flight data management in a highly sensitive area. smartStrips can significantly reduce manual operations through automation: it reduces controller workload and relieves the user of numerous additional work steps. This leads to more efficient and safer air traffic control.

Special Functions

SSR (Beacon) Code Handling
Wake Turbulence Timer
Strip Search Slot Indication

Workspace

Flexible Layouts with Bay Concept
Shared Bays/Transfer Bays
Role Combing/Splitting
Sector Management
Multiple Strip Types & Dynamic Strip Sizes
Pen-enabled Interaction
Context-Sensitive Strip Input Dialogs
Handwritten Annotations

Workflow

Flight Activation &
Strip Creation
Movements & Handover
Clearance Assignment
Silent Coordination

Strips

Multiple Strip Types & Dynamic
Strip Sizes
Pen-enabled Interaction
Context-sensitive Strip Input Dialogs
Handwritten Annotations

Information Integration

Datalink (CPDLC)
MET Information
AMAN Surveillance &
Safety Nets

Architecture & Safety

Highly Resilient & Safe Architecture
Fully-redundant & Failsafe
ED109 AL3 Compliant
Scalable from Tower Installations up
to Centre Installations with more
than 150 Positions

SELECTED REFERENCES

FROM A SINGLE POSITION TO MULTINATIONAL NETWORKING

Numerous civilian and military agencies rely on Frequentis leadership in flight data management via electronic flight strips. While the industry is still embracing the change from paper-based operation to electronic operation, Frequentis has already developed a next generation solution with advanced features. These include additional safety checks, silent coordination functions and an improved user interface (making heads-down time more efficient).

NATS Electronic Flight Data
smartStrips for En-route & Approach at Prestwick Centre and London Terminal Control (one of the busiest approach sectors in the world). Highest safety standards: ED-109/DO-278 AL3

Airways New Zealand
Countrywide deployment in towers and TMAs at Christchurch, Wellington and Auckland. Includes advanced VFR procedures. Integrated with Lockheed Martin FDP

Integrated Tower Solution for Airport Fiji
Solution, based on TAPtools® System includes air/ground communication, NavAids status, meteorological data display, automatic terminal information service and electronic flight strips

Ramp Control Hamburg, Germany
smartStrips used for ramp control. The system interfaces to FDP and local AODB

Integrated Tower Solutions for Nigeria
Rollout of integrated tower solutions based on TAPtools® for Lagos, Abuja, Kano and Port Harcourt. System includes air/ground communication, NavAids status, meteorological data display, automatic terminal information service and electronic flight strips

US Air Force
The operational evaluation for terminal flight data management includes all airfield facilities (TWR + RAPCON + BASEOPS). Includes speech recognition and crash net functions