ONE CONTROL

INTEGRATED CONTROLLER WORKING POSITION

One answer to your
Air Traffic Management needs

ADB SAFEGATE

Air traffic growth places extraordinary demands on the tower

Passenger volumes at the world's top airports grew by almost 5.5% in 2018. Worldwide, IATA expects a total of 7.2 billion passengers by 2035. Perhaps, the biggest challenge facing airports today is growth. As a result, airport capacity risks being overwhelmed.

With hundreds of aircraft movements every day, thousands of ground staff and hundreds of thousands of passengers, delays and cancellations threaten to mushroom. Airports are trying to meet this demand and overcome the ever-increasing complexity and unpredictability through systems that support air traffic controllers in their daily work.

OneControl: Give the tower the control it needs

Controllers at the apron or in the ATC tower depend on a variety of systems to help them manage traffic flows into, out of and around the airport. Traditionally, each system, such as the Advanced Surface Movement Guidance and Control System (A-SMGCS), electronic flight strip system and various information systems, has its own screen and interface that the Apron Controller or Air Traffic Control Officer (ATCO) must monitor. Each system will also typically have its own visual representation and input method, further adding to the complexity of the task facing controllers.

ADB SAFEGATE OneControl addresses this, providing a flexible solution that reduces complexity significantly. With OneControl, users can enable and disable services depending on their working preferences and operational responsibilities. These services, for example surveillance and advanced airport safety support, apron management, routing and guidance service, AGL or workflow support, are smartly integrated and provide a higher level of situational awareness.

OneControl's intelligence ensures controllers get the vital information they need, clearly and at the right time, without distraction. Only the required information is displayed, shown consistently on a single screen solution. With a consistent layout and user experience, the controllers can focus on their real task: managing air and ground traffic.

KEY FEATURES

- Harmonized user interface integrating various systems into a single screen solution
- Open and modular architecture
- Stable platform based on proven solutions
- Additional data e.g. surveillance, flight plan and progress, apron and AGL data can be enabled on demand
- Users can choose building blocks based on operational demands
- Camera

KEY BENEFITS

- Increased safety and efficiency
- Reduced workload through consistent user interface and single input device
- Easily expandable without major investments in infrastructure
- Additional functionality through aggregation and clever computation

Relevent information as and when Air Traffic Control needs it

The airport or airspace map is presented on a single screen and forms the central part of OneControl. The map displays only the most relevant information needed in the daily operations, depending on the current situation and the user's role. Additional widgets for all sorts of additional information can be enabled on demand. These might include flight strips for building a sequence of flights, information views containing weather data, NAVAIDs and other interface status, runway operation mode, CCTV cameras, flight sequence windows, and so on.
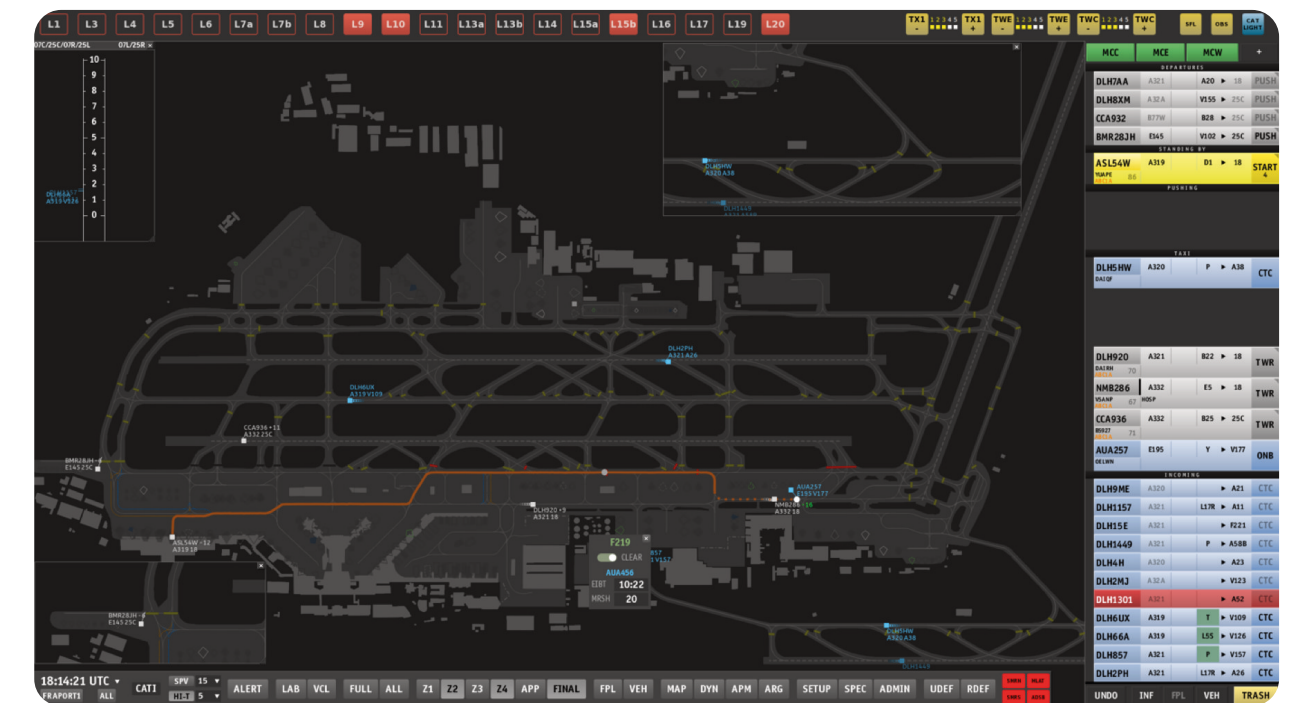
Improve situational awareness

Get an accurate view of the current traffic situation with the **Surveillance Service** which processes sensor data from multiple external surveillance systems. Multi-Sensor Data Fusion (MSDF) combines data from multiple radars and other surveillance sensors based on different ASTERIX categories.

- Track all moving targets (aircraft and vehicles) on the runways and taxiways using plots extracted from Surface Movement Radar (SMR) data. SMR video can also be displayed.

- Integrate multilateration and ADS-B data to obtain the position and identity of cooperative mobiles.

- Seamlessly extend the tracker coverage beyond the multilateration range with Secondary Surveillance Radar (SSR) data.

- Boost the tracker coverage and accuracy at the gate areas by integrating Advanced Visual Docking and Guidance systems (A-VDGS) for surveillance purposes.

OneControl displays the traffic picture on the map for ground (A-SMGCS) or air (ASD) traffic. Apart from identification information, it also shows approach countdown, zoom windows, and restricted or closed areas.

Add further movement data

Flight and Tow Plan data can be integrated for display and modification in the **movement data service**.

- Flight Plans are automatically correlated to tracks, providing additional data such as aircraft types, stands and CTOTs.

- Vehicles equipped with Mode-S transponders can be automatically identified and enriched with additional information such as the vehicle class.

- Towing Plans can be used to combine tug and aircraft tracks, presenting the most relevant information automatically.

Detect safety conflicts early

The **Airport Safety Support Service** continuously monitors airport traffic and raises an alert when a conflict is detected or if a safety violation is anticipated. Various safety net checks exist – Runway Monitoring and Conflict Alerts (RMCA) looking only at surveillance data, Conflicting ATC Clearances (CATC) and Conformance Monitoring Alerts for Controllers (CMAC) which also consider clearance input from controllers.

- **Runway Monitoring and Conflict Alerts (RMCA)** are based on surveillance only and monitor movements on or near the runway to detect conflicts between aircraft and another mobile. The service uses surveillance data and predefined rules/parameters and takes runway configuration, procedures, position and type of mobiles (arrivals, departures, vehicles), aircraft in vicinity and meteorological conditions into account. Additionally, checks for stop bar and restricted area violations are performed.

- **Conflicting ATC Clearances (CATC)** alerts are raised when the Airport Safety Support Service detects that the electronic clearance input of a controller does not comply with the local ATC rules or procedures. It gives an early prediction of a situation that would end up in a hazardous situation if not corrected.

- **Conformance Monitoring Alerts for Controllers (CMAC)** detect non-conformance to procedures or clearances for traffic on runways, taxiways and in the gate/stand/apron area. When pilots do not follow the instructions entered by the controller via ECI, then early detection and indication of ATCO/pilot/driver errors that might result in a hazardous situation is provided.

- **OneControl** contributes to air operations with the most prominent safety checks for Approach Path Monitoring, Area Proximity Warnings, Minimum Safe Altitude Warnings and Short-Term Conflict Alerts.
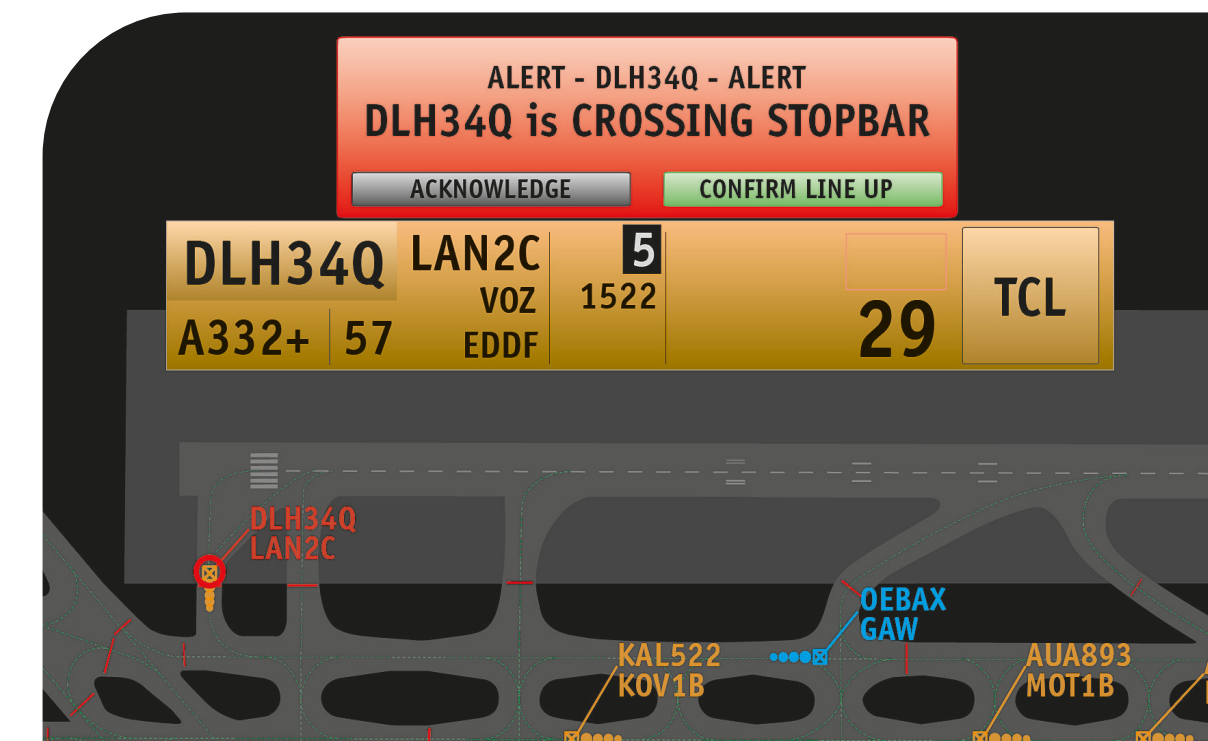
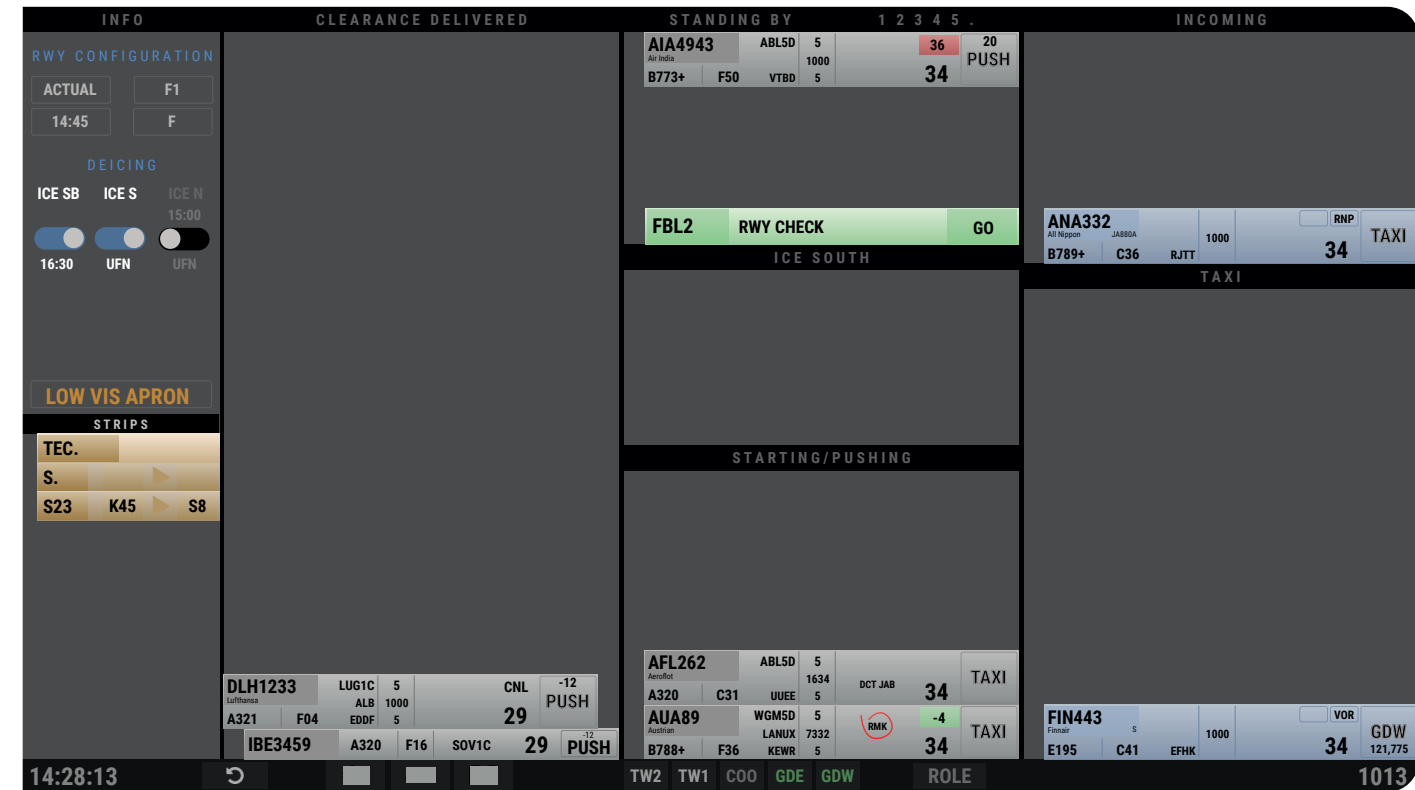# Allow Air Traffic Control to focus on what's key

OneControl's **Workflow Service** provides a role-based concept that defines the function and area of responsibility of the multiple ATCOs working at the tower. Depending on the role and responsibilities of these users, the Workflow Service monitors the progress of movements and proposes the next steps for a movement and/or action along a logical sequence of events. This reduces the time required to interact with the system to an absolute minimum, freeing the ATCOs capacity for their primary tasks – provision of a safe and orderly flow of traffic.

Basic Workflow Principle

TWR 1

TWR 2

GND E
APR E

GND W
APR W
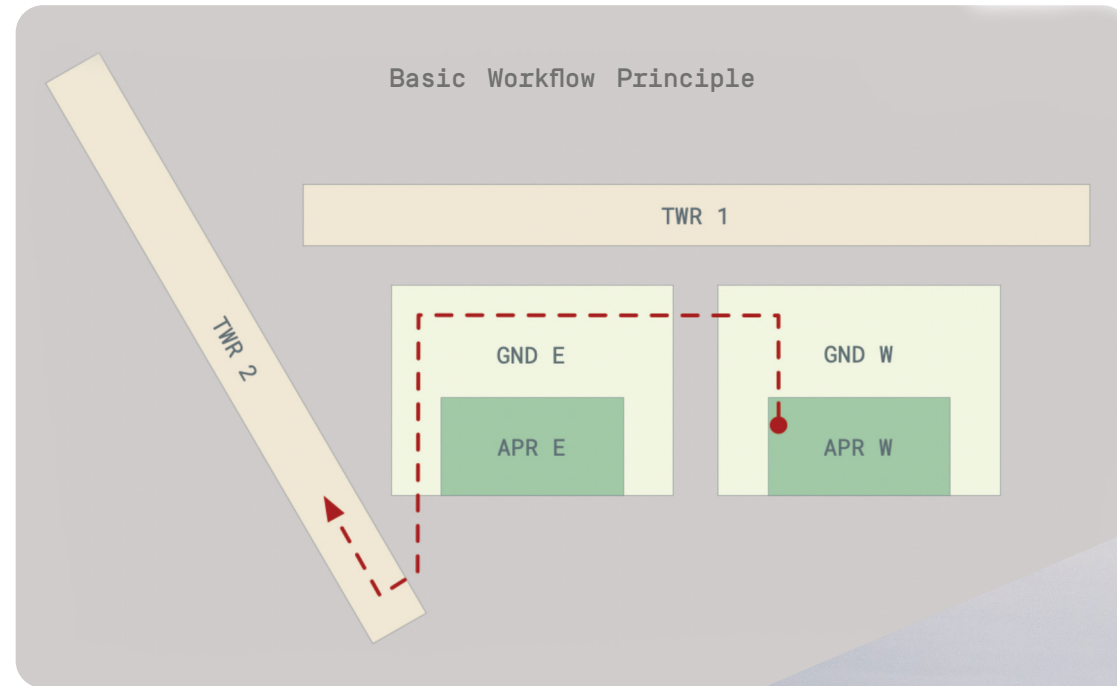
The Workflow Service can handle all kinds of procedures – civil or military flights, standard or non-standard – including Y and Z – flights, formation flights, training flights, re-landings, diversions, helicopters and tow movements and is ready for Tower, Approach, and Area Control Centre (ACC). The service can be integrated with other capabilities – surveillance, flight strip sequencing, and the routing and guidance services.

Plan flight sequences with ease

The **Flight Strip Service** combines the well-established benefits of a paper strip system with the advantages offered by electronic data handling. The appearance, content and layout are carefully designed keeping in mind the user's needs. ATCOs can automatically synchronize the content of these strips with external sources or update the strips manually. Flight strips can be arranged and rearranged in logical strip bays to show the flight progress and to plan a flight sequence for a clear view of a particular air traffic situation.
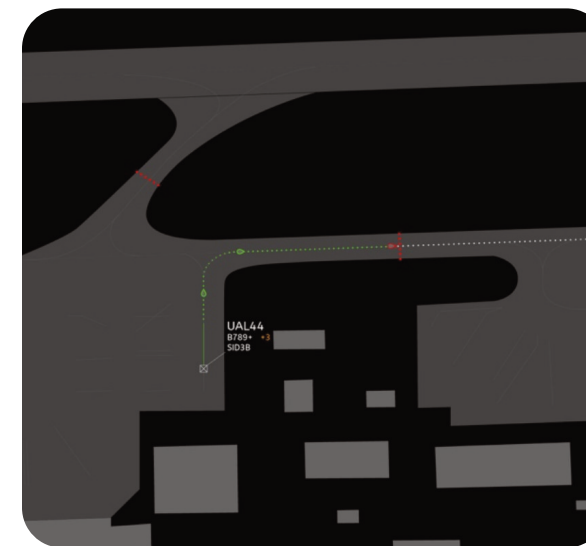
Find the most appropriate routes

A state-of-the-art routing algorithm recommends the most appropriate route for each movement by taking the different criteria like standard patterns, aircraft classification, restrictions or visibility conditions into consideration.

The **Routing Service** is integrated into the workflow of ATCOs in an intuitive, simple and non-intrusive manner and is visible directly in the airport map. The controller can change the route depending on traffic situation, and the workflow changes accordingly. Other features supported include entering of hold shorts, return to stand or remote holdings.

The route deviation monitoring capability continuously checks the conformance of movements with their respective assigned routes. When a deviation occurs, an alarm is raised, and the system may offer options such as rerouting from the current position.

Smoother gate operations

Integrated to the airport map, the **Gate Service** clearly indicates the status of the stand to the ATCO. They can see whether a parking position is available or in use, and which aircraft is coming and when. Each stand is represented by a colored stand status polygon, which provides detailed information in a status information window, and includes a safety logic to avoid stand conflicts. The ATCO may display alerts to raise awareness:

- Show state of positions (free, occupied, and so on)

- Show next flights/tows at gate

- Display A-CDM information

| A66	
⚪ CLEAR	
DLH123	
TSAT	-5
TOBT	11:45
DLH456	
EIBT	11:50
MRSH	22 ▶
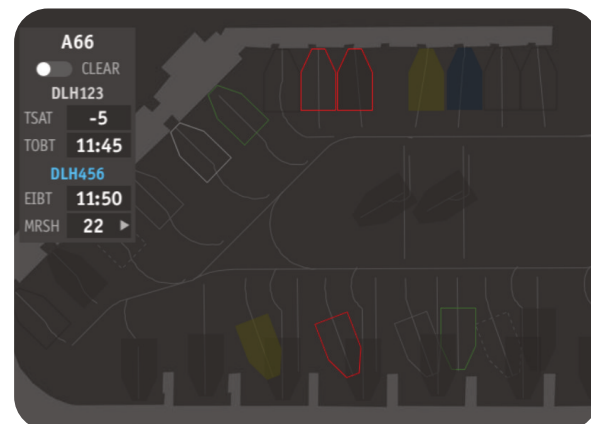
Improve guidance, enhance efficiency

The **Guidance Service** integrates with the airport's AGL infrastructure - the centerline lights for a specific distance are turned on when a ground movement approaches, and off, once it has passed. The service also controls stop bars so the pilot or driver of a mobile only needs to follow the green lights to reach the proper destination. It will be possible to provide the route via data link directly to an aircraft. Using the centerline lights for guidance of mobiles is most effective when the airfield ground lighting system supports single lamp control. Single-Lamp Control systems are available and can be provided by ADB SAFEGATE.

Optimize departure sequencing

Calculating numerous variables to predict or plan future traffic flows over the medium to long term is too complex for human beings; computers can do this much better. The **Sequencing Service** calculates efficient departure sequences according to A-CDM principles:

- Increasing capacity with more efficient use of infrastructure, including runways and taxiways

- Reducing congestion on ground, thus reducing fuel consumption and CO_2 emissions

- Reducing controller workload due to less traffic on ground, and automatic coordination

- Supporting data sharing between different stakeholders and increasing predictability
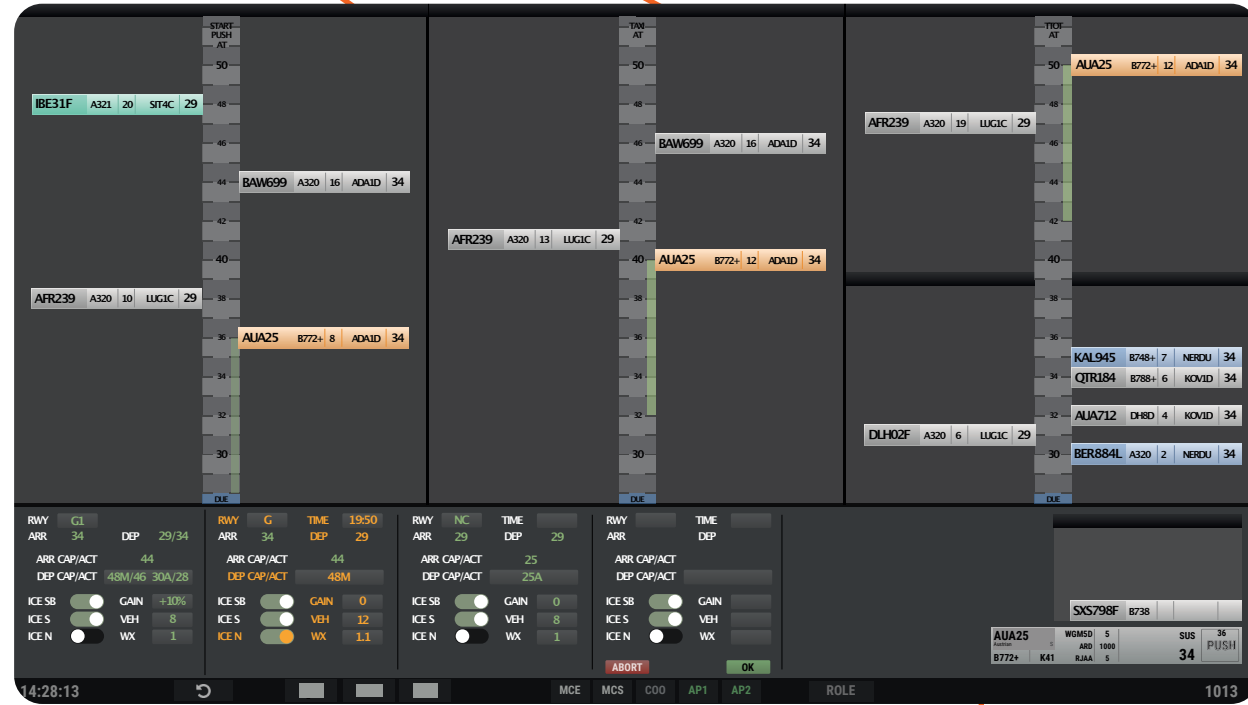

Runway changes, closures, including temporary closure of taxiways, can easily be taken into consideration in order to deliver precise Target Startup Approval Times (TSATs). OneControl can handle remote de-icing situations and remote parking, as well as flow management restrictions from regulating bodies.

Data that Air Traffic Control values immensely

The **MET Service** in OneControl displays all available meteorological data such as wind (including calculated cross-, head- and tailwind components), RVR, QNH, METEOSAT images, TAF, METAR/SPECI, weather radar images, to mention a few. In addition, configurable alarms for critical meteorological data can be provided.

With the **Info Service**, documents, such as charts, procedures and illustrations in different forms (PDF, JPG, PNG, Text etc.) can be displayed on the OneControl screen. Real-time video from standard video cameras can also be presented anywhere on the screen. The Navaid status is displayed color-coded either permanently or on a selected page according to user requirements. Detailed NAVAID status information can be aggregated for a simplified representation. OneControl can process and display various AFTN/AMHS messages, such as METAR/SPECI, NOTAM, TAF, SIGMET, ATIS, AIRMET, and so on.
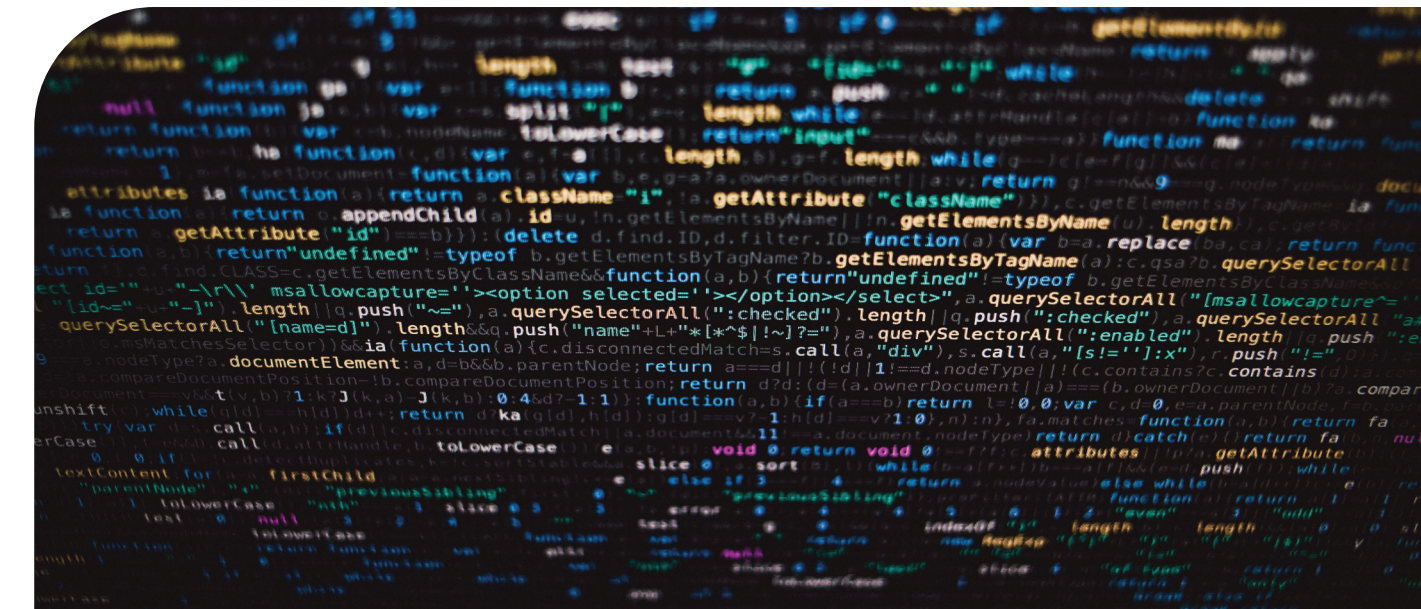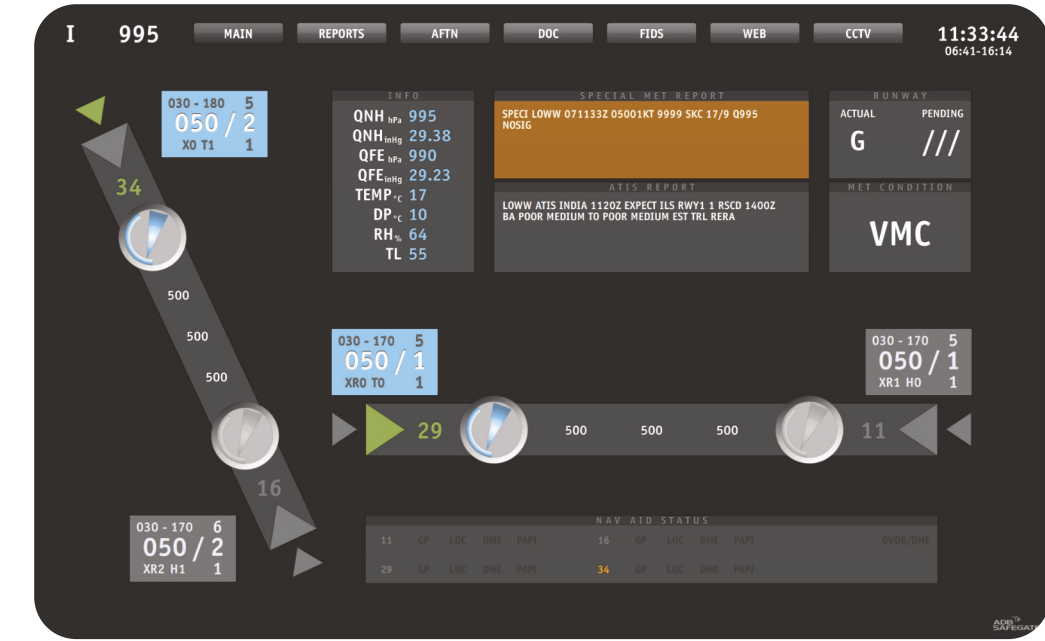
Unmatched flexibility

By integrating well-established modules, OneControl brings all systems required by air traffic controllers in their daily work into a single screen application to increase safety and efficiency. OneControl is easily expandable and allows users to add capabilities through new services without the need of major infrastructure adaptations. With a consistent layout and user experience, controllers can manage air and ground traffic smoothly.

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