PRODUCT DATA

Flight Tracking Software — Type 7804

Flight Tracking Software – Type 7804 enables the noise monitoring system to correlate aircraft movements with noise events recorded by Brüel & Kjær's range of Noise Motoring Terminals. It provides data on track violations and singles out offending aircraft and airlines. It also provides data for comparative studies, e.g., between two airlines operating with similar aircraft.

Real-time and historical displays of flight tracks provide quantitative evidence of compliance or violation of noise abatement procedures.

Type 7804 software is able to interface to existing radar systems and also via disk or magnetic tape.

7804

Brüel & Kjær

USES

- ❍ Correlate aircraft noise with aircraft movements
- ❍ Monitor noise abatement procedures
- ❍ Display Gates, Corridors and Cylinders
- ❍ Identify track violations
- ❍ Calculate aircraft/airline noise statistics
- ❍ Display flight tracks on detailed layer-based maps
- ❍ Present real-time flight tracks

FEATURES

- ❍ Runs under Windows NT®
- ❍ Multi-user access via network
- ❍ Fully integrated with ArcView® GIS from ESRI

Real-time Playback Display

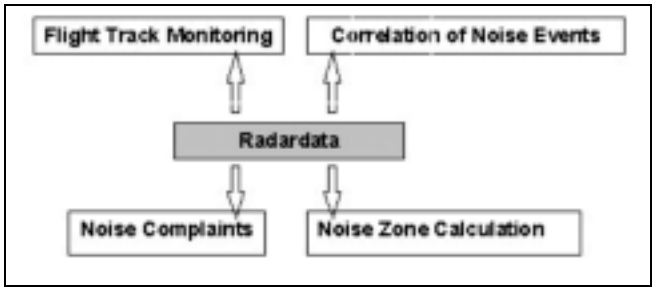


Fig. 1
Flight Tracking Software Type 7804 uses radar data as the foundation for many types of analyses

Provided there is a suitable real-time link with the airport's radar system, flight-track data can be displayed as lines tracing out the movements of all aircraft currently within the airport's area of air traffic control. At the head of each flight track, a flight label is displayed which identifies each aircraft. The flight label contains details that are unique to a given flight plan. These details are received automatically by the Type 7804 software from the airport's flight information data system (FIDS). The software will add the flight-label details to the flight-track data already stored in the database and provides positive identification of each aircraft. The flight label includes a customer-defined number of flight information data, e.g., transponder code, aircraft type, current speed and altitude.

Historical flight-track data, together with correlated monitored noise levels, may also be re-displayed (played back), and speeded up if required.

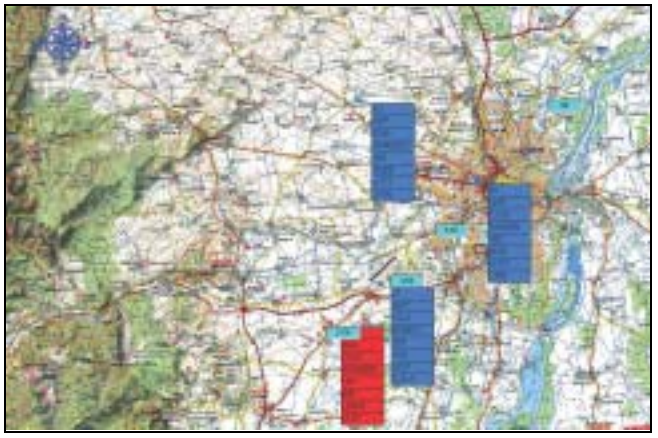


Fig. 2
Playback of historical flight tracks. In this example, the flight track of one specific aircraft is shown. The available data includes: date and time, flight ID, aircraft type, runway, transponder code, arrival or departure, speed and altitude

This is a useful feature, especially when demonstrating to culprits the consequences of their deviations from the established noise abatement procedures. Fig.2 shows an example of such a display.

Correlated noise events are shown in bar graphs. You can use this feature to see at which point the maximum noise level was recorded.

Geographical Information System (GIS)

The background of all displays is one or more layer-based maps of the airport and its environs. GIS data is stored in multiple layers and contains different spatial data. As an example, a comprehensive GIS of an airport's surroundings could consist of the following layers:

- Layer 1 – runways
- Layer 2 – property boundaries and land use types
- Layer 3 – road and railway networks
- Layer 4 – terrain characteristics

With GIS maps, the system enables you to:

- Retrieve street names with a single mouse click
- Type in an address – the position will be shown on the map
- Calculate the distance between a radar point inside a flight track and the location of a complainant's house

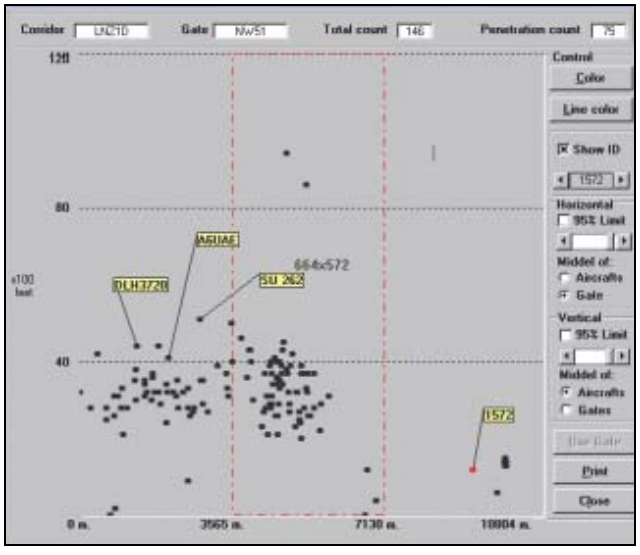
Analyse Flight Tracks

All flight tracks are stored in the central database and a built-in SQL search engine enables you to narrow down the search through the flight database. Therefore, you can selectively pick a group of flight tracks and display these on the map. An example is a filter which only selects departures from one particular runway.

Gates, Corridors and Cylinder Analysis

You can define sectors in the air to find violations or to optimise flight procedures. For example, select a gate and identify each aircraft in the group and where it penetrated the gate.

Fig. 3
Gate penetration

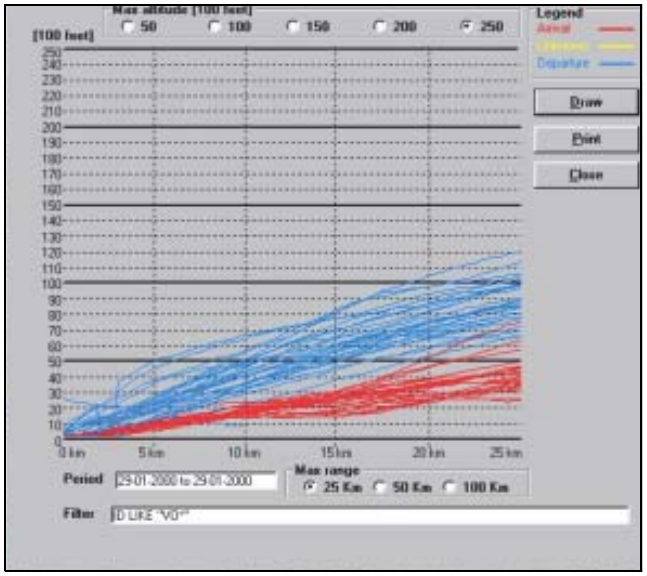


Gate Penetration

Each air corridor is defined as a series of gates through which all aircraft must fly. The size, altitude and deployment of these gates (rectangular in shape) can be individually defined from user to user inside the airport.

A built-in Track Violation routine automatically examines the track of each aircraft and reports any violation of the established air corridors. Violation data are also automatically entered into the records of each track record.

Fig. 4
Altitude profile

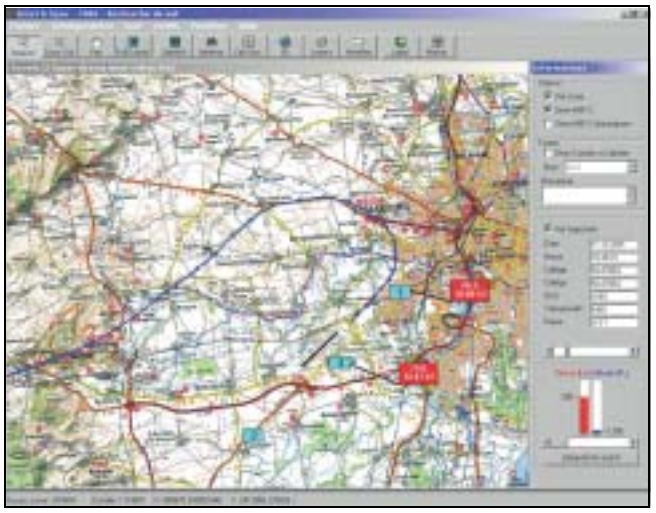


The altitude profile display (see Fig.4) shows how the selected aircraft's altitude varies with the position on the flight track. A similar type of display shows how the selected aircraft's velocity varies with the position on the flight track.

Correlation of Noise Events

The Noise Monitoring Terminals are shown on the map as small boxes. These change colour, e.g., from green to red, for each correlated noise event. The noise level is shown in dB at the NMT where the noise event is detected.

Fig. 5
A noise event is correlated to an MD11 departing from Copenhagen Airport



The correlation between noise and flight data is done each time a noise event occurs. The exact time of the noise event is registered and a correlation is made with the aircraft in the specific area at the time. This means you can positively identify the aircraft which caused the noise event.

The correlation is done automatically by Flight Tracking Software Type 7804.

Noise Statistics Using Aircraft and Airline Databases

The aircraft database performs several tasks. For example, it will enable you to analyse the recorded noise data based on different aircraft types flying on similar flight paths. The airline database is useful when making comparative noise studies between the various airlines using the airport.

Reports are divided into the following categories:

- Aircraft type
- Airline operator

- Runway usage
- Aircraft Chapter

Reporting Software Type 7832 offers enhanced noise statistics. See Product Data BP 1888.

Noise Zone Calculation

A very useful feature is the facility to calculate the number of people exposed to noise, e.g., above 60 dB. This can be done very easily provided that the relevant GIS layer containing population data is installed in the system. Note that the INM Link Software Type 7834 (see Product Data BP 1886) and the INM prediction model from F.A.A. must be installed.

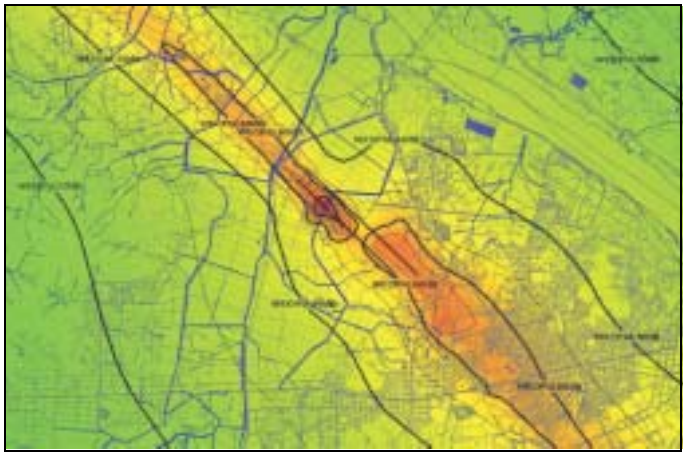


Fig. 6
A noise contour calculated for Kimpo Airport, Korea

A selected time period of flight traffic can be exported to the INM model via the INM Link software. Inside the model, the required contour map is created. This map can be transferred back to the airport noise monitoring system as a GIS layer.

Fig.6 shows an example of a contour map showing 20, 40 and 60 dB noise zones. This has been made using the INM prediction model.

The model has calculated the noise exposure based on 1 month of aircraft movements stored inside the 7804 Flight Tracking Software.

Noise Complaints

A “first level” complaint analysis can be manually made by calculating the distance between the complainant’s location and the aircraft operating at the time the complainant was disturbed. This is done using the replay function so that flight traffic can be viewed between specified times.

A second method is to go through the list of recorded noise events and, based on this information, evaluate if any loud noise has been recorded. Thirdly, a Gate/Cylinder penetration analysis can be made to check if any aircraft did not follow the normal flight-tracks, and which took it near to the complainant’s location.

Finally, the weather conditions need to be evaluated (the weather data are saved in the systems database if this option is installed as part of the airport noise monitoring system).

An effective method of handling complaints is to add the Complaints Module Type 7833. Using this software, all relevant information is stored in a database. This significantly speeds up the handling of incoming complaints.

Specifications – Flight Tracking Software Type 7804

Software

The software is supplied on a CD-ROM ready for loading into existing Type 7802 software. Note that Type 7802 software must already be installed

Flight Data and Radar Link (with RAFIC Software – Type 7675)

The software is primed to receive data according to an expected format via the following media:

- Indirectly via disk/magnetic tape
- Directly via an agreed radar link and special software for Radar and Flight Information Capture (RAFIC) on a separate computer. RAFIC will also dump data in the expected format onto a disk or magnetic tape

The specific details of setting up any direct link will depend on the individual airport. The link will usually start from a suitable output port made available by the airport authorities

Data Collection

Automatically, immediately after the Type 7802 Terminal Service Program (TSP) has finished downloading noise data, the flight track data and flight information data are collected. Collection may also be initiated manually. Similarly, arrangements can also be made for obtaining data from the airport's flight information computer for immediate aircraft identification

Data Storage

All flight-track data are stored in the system's database (dBase III format) extended by the Type 7804 software with data transfer facilities via an extended user menu

Correlation

Flight-track data are automatically correlated with Noise Events. The software will examine aircraft movements whose flight paths pass through imaginary user-defined radar hemispheres centred on each Noise Monitoring Terminal

Track Violations

Track violations are detected from flight-track data. This includes aircraft and airline information, and user-defined gates and air corridors. Reports based on user-selected criteria are also available.

Map Displays

The system fully supports GIS-maps (minimum .shp, .shx, .dbf files) but a flat map displaying flight tracks on a background map of the airport and its environs can also be used (.bmp or .tif format)

Data Presentation

An extended main menu with comprehensive facilities gives access to the contents of the database for retrieval of flight-track data for subsequent amendment, and display in tabular and. graphical form

Ordering Information

Type 7804 Flight Tracking Software

Required Accessories

Type 7802 Noise Monitoring Software
Type 7675 RAFIC software
Type 6553 Interface Box for RAFIC computer

Optional Accessories

Type 7832 Reporting Module
Type 7833 Complaints Module
Type 7834 INM Link

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