

FLIGHTKEYS: ADVANCING THE STATE-OF-THE-ART IN FLIGHT PLANNING

First View: Rapid analysis of breaking news, providing perspective

THE FACTS

In a briefing from Senior Management T2RL have learned that FLIGHTKEYS GmbH will soon launch its new Flight Planning solution, FLIGHTKEYS 5D, and announce launch customers. The initial release will include all the functionality expected of a current state-of-the-art solution as well as new capabilities useful to airlines of all sizes. In particular the “5D optimization” feature not only calculates an optimal flight track in terms of latitude, longitude, altitude, and time, but also supports re-filing of the flight plan while en route in order to mitigate post-departure factors such as slot limitations, airspace bottlenecks, or unexpected bad weather.

THE ANALYSIS

FLIGHTKEYS was founded in 2015, with a mission to create the world’s leading Flight Planning solution for commercial airlines and the business aviation community. Although a new company, it has a strong pedigree. Several of the principals were part of f:wz which was founded by a group of Austrian Airlines pilots in the late 1990s and subsequently became part of Dubai Aerospace Enterprises. In 2010, f:wz was acquired by Sabre Holdings, and its flight planning system became part of the Sabre AirCentre Enterprise Operations suite. Five years later the core team from f:wz created FLIGHTKEYS with the intention of moving to the next level of airline operations software.

Developing any Flight Planning System (FPS) that can produce valid plans for airline operations is a formidable challenge all by itself. A system that can produce valid plans for any flying done anywhere in the world, with any equipment type, increases the challenge by an order of magnitude. Optimization of flight plans to reduce flight time and fuel costs requires knowledge of the mathematical frameworks that can iterate over thousands to millions of possible flight plans to find time and fuel savings from a better ground track, cruise altitude or speed. If a flight planning system provider does not have all of these boxes checked, then it does not offer any added value over the current state-of-the-art, and no airline will be interested in its solution.

In particular, the requirement to produce a plan valid for anywhere in the world requires integrating a variety of databases, some of which are maintained by competing companies



or government agencies, each with its own, mostly proprietary format. Data required for a robust flight planning system includes:

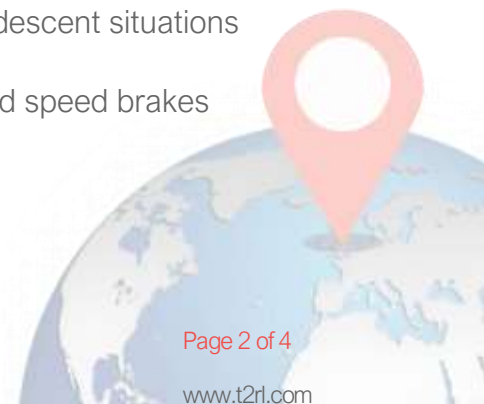
- Information on every airport, including runway characteristics, capacity, and standard departure and arrival routes
- All available navigational aids
- Operating and performance data for all aircraft types
- Data for every published airway, including endpoints, altitudes, and capacity
- Interface and ruleset for every air traffic control authority having jurisdiction over airspace through which that airline might fly
- Real-time wind, weather, and temperature, worldwide, updated as frequently as possible
- Airline records on available fleet, onboard equipment, and mission capabilities

These data sets are available from several providers around the world, including Jeppesen, NAVBLUE, and Lufthansa Systems. While all providers support the same basic data, they organise it differently enough that integrating it with remaining operational systems could be a problem. For example, if FLIGHTKEYS were to propose to install its FPS with an airline that uses Jeppesen to provide many of the databases above, but FLIGHTKEYS used Lufthansa Systems for this same function, then there will be a need to create some sort of index between the two in order to make equivalent data available for flight planning. The necessity to do this adds a cost, which may detract from the overall feasibility of the deal. If there are too many of these integration costs, the deal becomes non-viable and falls apart. This is something FLIGHTKEYS needs to think about, because it will probably not have the resources to build all necessary interfaces to all possible data providers as quickly as it would like.

FLIGHTKEYS also understands that airlines are looking for flight plans that can reduce cost through superior optimization algorithms. These, in turn, must operate within the constraints imposed by the governing air traffic control authority to follow airways or fly at a prescribed altitude. Accuracy of the flight plans is also critical to pilots. For example, if the FPS predicts fuel burn of 15,000 kg and the actual fuel burn is 16,000 kg, then next time the captain may decide that the flight plan is not accurate and ask for extra fuel to compensate for the error.

In addition to the optimization, FLIGHTKEYS claims many other innovations that will be of interest to large sophisticated airlines. In general, these help to improve accuracy in climb and descent calculations where the exact trajectory cannot be predicted in advance. Some of these include:

- Consideration of terrain in drift-down and other emergency descent situations
- Adjustment of fuel volume based on ambient temperature
- Reserve fuel calculations based on expected use of flaps and speed brakes
- Impact of anti-icing
- Inputs to the onboard FMS in support of descent profiles



In future releases, FLIGHTKEYS plans to exploit all available data to provide maximum flexibility and lowest cost of the flight plans it generates. The company expects to continue to add features that will make the system attractive to all airlines, regardless of where they are based and the nature of the flying that they do.

THE SPECULATION

Any major airline system migration will require some advance planning and staff overtime to learn the new system and its procedures. However, an airline switching its flight planning system should find these difficulties to be relatively low. The old and new systems both need to be available for some period of time, and each flight may be planned on either the old or new system. Training in the new system can be limited to a few people at a time and take as long as is needed. If anything goes wrong in the new system, the old is still available. To minimise the training and transition issues, the airline and FLIGHTKEYS will jointly have to ensure that its system can handle inputs and produce outputs in the same format as the system being replaced, at least until the cutover is complete and the old system has been switched off.

A bigger problem for FLIGHTKEYS is that there is no “burning platform” urgency to make the transition. Most likely the value of a switch is a long-term reduction of costs through more efficient flight plans. The business case might be favourable, but it may not be so compelling that the airline customer will need to rearrange its IT priorities to implement immediately. It’s like making a personal decision to start an exercise programme—you know it will improve your health, but the benefits are long-term and you can always put it off until tomorrow.

FLIGHTKEYS can mitigate the lack-of-urgency problem by making the transition as close as possible to “plug & play.” By taking charge of the problem to create standard interfaces to the various vendors of navigational databases and aircraft performance data, FLIGHTKEYS can substantially mitigate one of the major headaches of transitioning to a new system.

T2RL believe that the capability airlines will find most compelling is the ability to make changes in flight plans after departure, because that is what will help airlines to avoid crowded skies and reduce the impact of Irregular Operations (IROPS). The ability to adjust based on information that was not known at the time the flight plan was generated is the essence of the 5D capability. Like most other airline innovations, competing FPS vendors will likely notice and will be able to replicate it over time. FLIGHTKEYS will then have to come up with more new ideas to stay ahead of its competitors. Based on its website, it already has quite a good list of ideas for future enhancements.

Smaller airline customers and startups (say, 100 or fewer aircraft) will be less interested in these advanced features, simply because their networks are not dense enough to make use of them very often. They typically prefer to concentrate on innovations to attract paying customers, with operational efficiency further down the priority list. FLIGHTKEYS can still be attractive to those airlines if it can offer a service bureau flight planning concept, where the



customer airline pays for each filed flight plan at some negotiated rate. FLIGHTKEYS could do this itself, or it could partner with a firm that has expertise in operating a contract service, and negotiate a split in the revenue. In the past, this has been done multiple times within the airline industry for contract customers.

Based on the claims made on its website and in its briefing to T2RL, FLIGHTKEYS has built a compelling Flight Planning System, with many new features that have potential to generate significant savings for airline users. As it commences product introduction over the next several months, we will begin to see the impact on both FPS vendors and airline customers. Regardless of who wins or loses, this will be a net positive for the industry.



T2RL is an independent research and consulting company that specialises in the market place for airline IT systems. Based on data gathered and analysed since the year 2000 it has defined and tracked classifications of airlines and their IT providers. Its research is used by airlines to enable them to make informed choices of systems and vendors and by the vendors to help them develop products that best meet the current and future needs of the airline industry. For further information, visit our website at www.t2rl.com.

