Network Manager
nominated by
the European Commission

EUROCONTROL

EUROCONTROL Seven-Year Forecast February 2019

ANNEX 2 - FORECAST METHOD

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1. FORECAST METHOD

A set of documentation on the forecast methods (Ref. i) has been prepared in 2013. This documentation describes the methods at a number of levels of detail, from a two-page summary, to a function-by-function reference. For convenience of readers, the summary is reproduced in this section.

EUROCONTROL/STATFOR provides impartial air traffic forecasts, market analyses and statistics to the ATM community in the widest sense, to improve understanding of current and future trends, to enable better-informed decision making and thus to improve network performance. The STATFOR forecast has been serving European ATM since the 1970s. It is the only air traffic forecast covering Europe.

STATFOR publishes a forecast of IFR flights and both en-route and terminal service units for the next seven years in Europe. The main forecast update is published in February each year and refreshed in September. Our focus is on the traffic forecast for States or larger regions. This influences the modelling choices made in the forecasting process. Other EUROCONTROL units use this high level forecast to drill down to the level of airports, control centres, sectors etc.

The number of flights depends on the interaction of supply and demand: an airline operates a flight between an airport A and an airport B because it has customers who pay to travel or ship goods from A to B. Supply and demand are each influenced by a large number of factors like economy, regulation, demographics, business development, oil prices, high-speed rail. When forecasting, we use data that describe these factors, and data more directly about actual and future supply (past flights, and future schedules). Some data are more relevant to the short-term horizon (e.g., airline schedules) while others are used in the medium-term horizon (e.g., demographics). Probably the three most influential inputs to the forecast are:

- **Economic growth** forecasts obtained from external specialists, and which in recent years have been very variable; growth has slowed, but there is nothing in our data to show that flight growth has decoupled from economic growth;
- **Regulation**, e.g., rules on visas, open skies, airport funding, aviation taxes;
- **Overflight** patterns since, for the majority of States, most of their flights are overflights. A crisis such as that in Ukraine can easily change the number of flights by 10% or more in a number of States due to re-routing, even if the number of flights on the network as a whole is little changed.

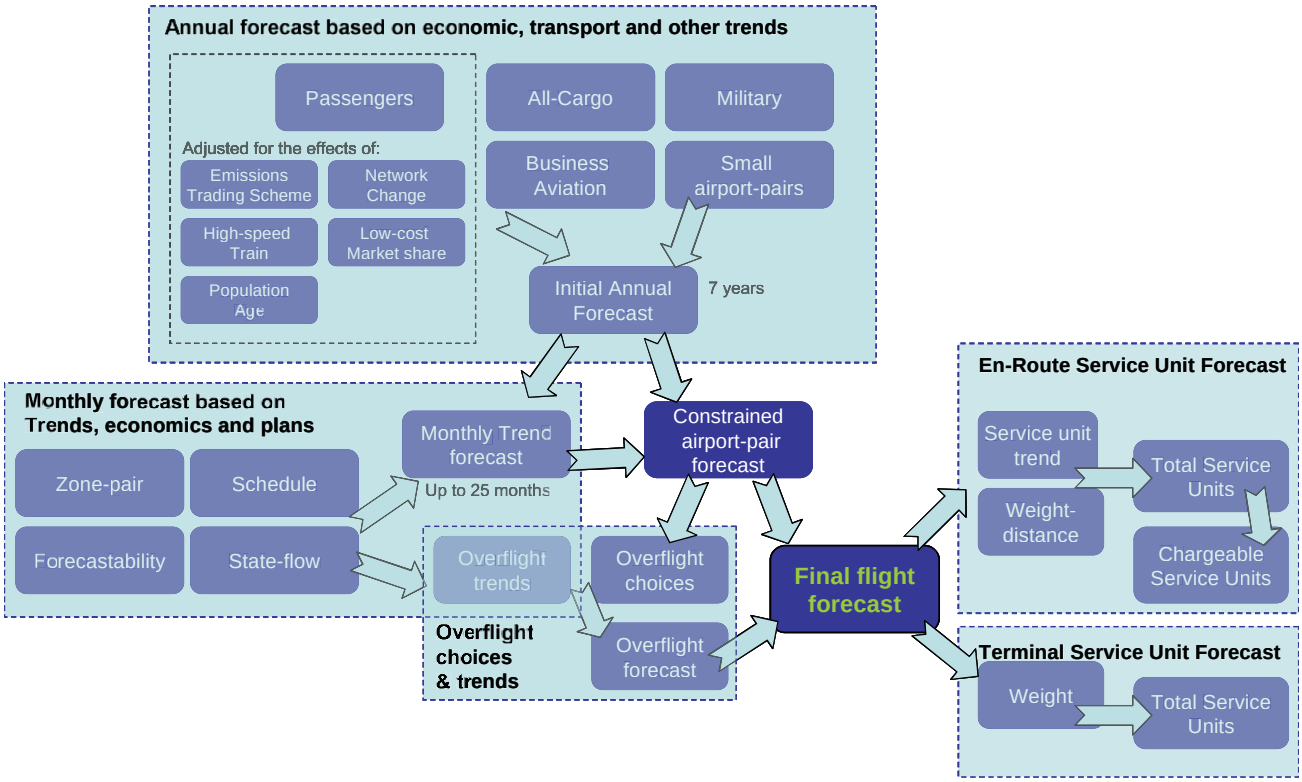
Overall, the components of the forecast can be grouped into five elements as in Figure 1.

- An initial annual forecast for the next seven years based on economic, transport and other trends;
- A monthly forecast based on trends, economics and airlines' plans;
- These are merged, and constrained by airport capacities to give the constrained forecast;
- The final step of the flight forecast is to calculate how many flights are generated in each State, using both routings through airspace observed in the historical data and recent trends.
- The number of service units in a charging zone depends on the number of flights, the weight of aircraft and, in the en-route case, the distance flown. The two service unit forecasts therefore take the flight forecast as an input and combine this with time series forecasts of weight and distance as needed. This gives total service units, from which future chargeable service units are estimated using the ratio of chargeable/total from the previous calendar year.

We use a highly-automated and structured process to produce traffic forecasts and because of the variety of factors and inputs, different forecasting techniques are used: traditional time series methods to extrapolate historical patterns, econometric analyses to take into account how economic, social and operational conditions have an effect on the development of traffic, scenario-based inputs to describe the future (what Europe will be in 10 years' time?) and specific data-driven models (e.g., high-speed rail development model). As for any forecast, the method relies on historical data either for taking a

snapshot of the most recent trends or longer history to calibrate the models.

Figure 1. The components of the STATFOR seven-year forecast.



The future is always uncertain. We capture this uncertainty in the forecast through three forecast scenarios: low- and high-growth scenarios, with the most-likely 'base' forecast in between. All three scenarios should be considered as part of the risk management of any decision based on the forecast.

As requested by Stakeholders, we have added the following items:

- Since the February 2014 forecast, the key relationships with economic growth, including introducing more specific country-pair flow relationships where these make statistical sense. This re-calibration process is described in Ref. ii.
- Since the February 2015 forecast, the key relationships with high-speed train growth. This re-calibration process is described in Ref. iii.
- Since the February 2016 forecast, we have switched to reporting based on the whole of the ECAC region in place of the smaller 'ESRA08'. So 'Europe' in this report refers to the total of all ECAC member States.
- Since the September 2016 forecast, we have re-calibrated our seats-to-flights models to take into account the trend to put thinner seats into aircraft.
- Since the February 2018 forecast, we have added a TSU forecast for Morocco.

2. REFERENCES

[i] Methods of the STATFOR 7-year Forecast, STATFOR Document 518, Draft v0.8, July 2016
[ii] GDP Elasticities for the STATFOR Forecast, STATFOR Document 499, Draft v0.4, November 2013
[iii] High-Speed Train Model Recalibration, STATFOR Document 551, Draft v0.1, November 2014

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