The Luxembourg high
How capacity values are developed nowadays

by Eileen Senger

In the good old days when flying was a means of transport for the rich and the famous aircraft would take off and land whenever it suited the company or the owner best. With so little air traffic there was no need to regulate the air traffic flow.

Eileen Senger

is an Air Traffic Controller at EUROCONTROL's Upper Area Control Centre in Maastricht. She works in the Hannover Sectors which cover north-western Germany and is an OJTI.

After the introduction of large capacity jet airliners making flying affordable for most and the growing phenomenon of mass air tourism it was clear that in the mid 70`s something had to change. Delays for flights to popular destinations at peak hours were growing fast and rudimentary flow control was born.

Over the years this system has been improved and developed from a very rough estimating tool where estimated times over points were calculated using flying time tables to derive a rather approximate departure slot. On paper, by mental arithmetic, for every single flight. Nowadays computers do the calculating. The estimates have become rather precise, and variables such as wind direction and speed are taken into consideration. The role of Flow Management Position (FMO) staff role is mainly to monitor and to intervene only if a problem occurs.

But where is the fine line between busy traffic and too much traffic?

How many aircraft can be safely handled on one frequency simultaneously? Who decides on the figures between safety and capacity, safety and cost, safety and revenue?
The managers who have to defend the figures to the member states or the controllers who have to work with these figures?

In the Maastricht UAC, sector capacity is defined by four values:

- the hourly rate (x/60 mins)
- the entries for a sliding 20 minutes window (x/20 mins) = the sustained value
- the actual occupancy at every given minute
- the peak value (max x)

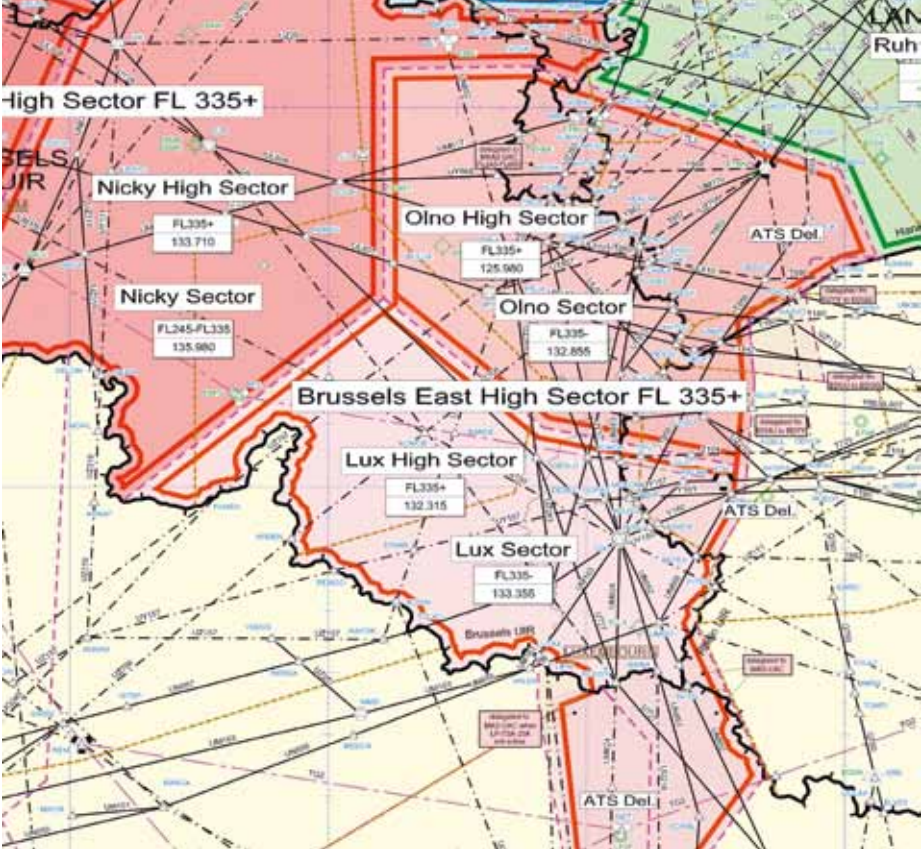
Traffic numbers are allowed to spike up over the sustained value for up to five minutes but should not exceed the peak value.

If a sector overload looks likely, the FMP officer and the Capacity Supervisor take a detailed look at the traffic predicted. On a flight list they try to estimate the complexity. How many aircraft are overflights? How many are inbound or outbound and will require vertical clearances? Is it a mixed traffic pattern or is everybody bunching up in one area of the sector? Is there military activity planned? Or maybe a test flight? If they decide that action is required they usually level-cap certain short haul flights. Hand picked flights are then not allowed to climb higher than a specified flight level or are instructed to stay clear of upper airspace. With this short-term tactical approach, broader protective restrictions that cause a lot of delay for hours can often be avoided.

The capacity figures which the computers and decision makers (FMP staff and sector supervisors) are working with are reliable data developed over many years. They are adjusted whenever a change in airspace or procedures takes place or when feedback is received that more traffic was workable or that the traffic capacity permitted was too great.

But how is a Traffic Monitoring Value (TMV) determined when a new sector is configured?

In Maastricht UAC, the Capacity Assessment Team (CAT) and the sector group experts will look at the existing sectors. Is there one that matches the new sector in terms of size or traffic flow? Then



they try to estimate the complexity. If a new sector is a result of a re-design in airspace structure, then simulations will have taken place beforehand to come up with realistic figures. In the end, the experts pick a figure and when the new sector first goes live, this figure is reduced by 25%. This is mainly done to allow controllers to get used to the new sector, the new structures and the new procedures with less traffic. Feedback forms are distributed and using this feedback the experts decide in their daily meetings whether to adjust the TMV.

That's the theory – but how is it done in practice?

On 4 April 2013, EUROCONTROL's Maastricht UAC opened a new sector in its Brussels sector group - the Luxembourg High sector. As the name implies it is a vertical split with the Luxembourg Low sector. Before, this sector could not be split vertically on its own, only when worked as a combined Olno/Luxembourg or 'East High' sector. The neighboring Olno sector could be split vertically on its own into a High and Low sector. Now the Luxemburg sector can be split vertically and the Olno sector can only be split vertically when there is a combined East High sector. The change was made to reflect the way the traffic flows have changed rather than to create extra capacity.

Of course, new procedures had to be developed for both the sectors changed and for neighboring sectors. This was done by a working group which consisted of airspace experts as well as current air traffic controllers licensed in the sectors concerned. Most of the procedures were taken over from the already existing combined Olno/Luxembourg 'East High' sector and it was anticipated that the change for the controllers would not be too big as they were already used to working this piece of airspace in a High/Low configuration.

After the implementation of the new sector, the CAT met twice a day to discuss the demand, traffic figures, regulations and the feedback received from the controllers. For the first few days the new sector was regulated to 75% capacity. This meant an hourly rate of 45 aircraft and a peak occupancy of 9 for the Luxembourg High sector. Although the controller feedback quickly indicated that they were happy to lift regulations and accept more traffic, it was decided to keep the regulations in place until at least 8 April in order to expose as many individuals controllers as possible to the new setup. On 9 April the CAT decided to lift the regulation for the Luxembourg High sector as it was felt by everyone involved that more traffic could be accepted and the restrictions had led to a bunching of traffic by the end of the restricted periods. Without the restrictions, it was anticipated that this traffic would be more spread out. However, the peak occupancy values for a split scenario were set to 9 for both High and Low sectors. On Thursday April 11 the CAT met for the last time. It was decided to lift all the interim restrictions and the TMV was established at 55/60 for the Luxembourg combined sector and the High sector with a peak occupancy of 14. For the Luxembourg Low sector the values were set at 50/60 and 12 aircraft as peak value.

The delays caused by the all the temporary restrictions had been well within acceptable limits with only a few flights being delayed by more than 40 minutes. Of all delayed flights, the average delay was 0.3 minutes. That is little delay compared to a day with active thunderstorms in Maastricht airspace.

Because the controllers were familiar with this airspace before the new scenario was introduced, little feedback was received.

After one week of restrictions and close monitoring, the Luxembourg High is now on-line at full capacity. It is delivering an optimised maximum capacity for this piece of sky with the same resources as the old sectorisation.

NOTE:

Unfortunately, after this article was written, controllers of the East High sectors became concerned with regards to the Paris TMA-inbounds whilst the Luxembourg High was open. After several meetings it was decided to keep the Luxembourg High configuration out of operation until these concerns were further investigated, simulated and addressed.