Local warming

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On a summer afternoon, many years ago and just a few weeks after I had received my ACC endorsement, I was working on a busy ACC Sector. It was an especially hot summer. Everything was melting, the tree leaves did not dare to move, not the tiniest wind around... We had also an unusually 'hot' traffic scene – a specific geopolitical situation had brought a growing number of aircraft to our airspace. Flow control was something unheard by our management at the time and we were accommodating everything that was coming our way. You came in hot from the outside burning hell to the air conditioned operations room and suddenly you felt like you were somewhere in the Arctic! You took over and sat in front of the screen and immediately forgot the freezing air blowing directly on your back. The heat of the traffic situation took over. When your colleague came to relieve you, he would take another – cold – chair rather than use yours. I am not joking!

The sectors we could open were limited by the number of available consoles with the old Airborne Instrument Laboratory (AIL) radar we were using at the time. The primary part of the radar could not "see" the high seas, and the high seas of my sector bothered me a lot with traffic coming from and, from time to time, omitting to set the transponder to the ICAO system and operating it on a friend/foe mode that was rendering the secondary part of the radar also useless.

And when trouble comes, it never comes alone.

First some magnificent convective activity was reported by flight crews in the west part of my airspace, with tops penetrating to the tropopause. The crews began avoiding this, leaving my sector for adjacent airspace on anything but the flight-planned route. This massively increased the time required for telephone coordination. My watch supervisor send a colleague, a third pair of eyes, just to sit behind and look out for missed conflicts.

Then, if that wasn't enough, the Air Force – we used to call them "sunny aviators" since they rarely wanted to fly on days with marked convective activity – was taking advantage of a heat wave in the east part of the airspace a large restricted area was activated for their exercises. This made the picture of the traffic flow a rather interesting pattern of winding lines. Finally, danger areas were activated up to FL 390 so that rockets could be launched to deliver some chemicals to the clouds which would, we were told, prevent the formation of hail and so save crops below. I was losing the picture and felt that everything was turning into chaos. I heard the voice of, my watch supervisor "restrict vertical movements to a minimum". I obliged – and although it made some inbound and outbound traffic from a major airport a little bit unhappy, confident control was gradually regained and the problems left one by one on their way to my nightmares.

This story made me realise that there is more to being a controller than just applying the Air Traffic Control tasks. I had been studying in the training school, at the simulator or in position with an Instructor.

Even if you perfected them, they were not enough – there were other tasks for you, your team and your supervisor – tasks to predict, monitor and manage the workload. We can automate Air Traffic Control tasks to a certain extent and this can help us to accept even more traffic, but our human brain remains the same, with the same capabilities and limitations. How can we predict and monitor the workload of the brain of controllers? Can we automate this monitoring?

A simple proxy might be to automate the prediction of the number of aircraft entering a sector in an hour – then you set a capacity figure and try not to exceed it. But the sectors are getting smaller and the traffic over a complete hour does not tell you much about the traffic distribution within the hour. So instead of traffic load, many ANSPs are now using 'sector occupancy' – the number of aircraft in the sector at a given time. You can set limit to this as well. But hey – remember my story – who has not experienced something similar? Traffic may be below the limit, yet the complexity of the situation may be 'overheating' you.

There are few ANSPs that are studying automated systems to predict complexity – traffic complexity and situation complexity. This is a scientific approach to factor-in as many of the indicators of complexity as possible e.g. the number of vertical movements, of heading changes, of conflicts, of weather deviations and of entries and exits not at designated points. All these together are supposed to help anticipate the 'heat'. It is never precise and it is complicated to do. But it is our responsibility to manage the workload and we need automation to monitor it and help us see problems coming before they occur..

But don't misunderstand me. Automation of a task should not necessarily come in the form of complex machinery. I know at least one ANSP that fitted a simple warning light system for the controllers to display their subjective feeling of workload. And the subjective feeling of workload is what really matters since it reflects all the factors involved – not just numbers of aircraft. You press a button and your colleagues and supervisor can see you are 'red' – you are 'overheating'. The team and supervisor can then help out. Managing your own workload – and that of your colleague(s) if you have a supervisory role is, like it or not, your responsibility and you'd better do something about it – a sophisticated system or a simple one or both.

But make sure you can feel the heat around the corner!

Enjoy reading HindSight!