Shall we cut off
the lizard's tail?

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"You cannot guess what long queue for border control I am in. There is no end to it! Unless I find a way to jump the queue I will probably miss my flight". The specific pattern of frequency spectrum in the voice of my wife has always the potential to wake me up but this time it sounded even more alarming. A nationwide strike in Belgium had brought the public sector to a standstill. Border control officers were 'working to rule' and following all their procedures to the letter. The result was a long queue of passengers at the airport waiting for their passports to be checked. How is it possible that following all the laid-down procedures prevent you from getting the job done in the normally-expected time?

Comparing strictly-followed procedures and normal ones can often illustrate the difference between a 'job as imagined' and a 'job as really done'. The procedures in place are often static and do not properly reflect the complexities of the real world. In reality, professionals like pilots, controllers, doctors and border control officers strategically prioritise their tasks. They treat some of them like elastic springs and reduce them to the bare minimum and completely omit others that they do not consider mission-critical. The nature of decisions about cutting their task load when under pressure is not dissimilar to a lizard under threat which 'elects' to lose its tail for safety reasons. Tails for lizards and non-critical tasks for professionals are not unnecessary, but one can sacrifice them as a self-defence mechanism to escape from critical situations. This allows the professionals to get the job done when the task load suddenly shoots up and allows lizards to save their lives when under attack by a predator. This flexibility is one of the features that make professionals what they are and they are proud of being able to accomplish tasks when under pressure.

But how much flexibility can be safely accommodated? With performance schemes in place, Air Navigation Service Providers are under pressure to do more with less, to accommodate more traffic demand whilst maintaining current levels of safety, to be more efficient and at the same time not allow the workload to reach unsafe levels. Let us examine two commonly-used strategies to manage more traffic demand that are often used together.

One strategy is to know the traffic well in advance and, when necessary, to pre-arrange it. This means giving up some flexibility in order to gain some predictability. If all flights arrive in a sector randomly without any pre-ordering, then a safety buffer will be needed for sector capacity in order to prevent sudden excessive bunching. Arranging the traffic non-randomly (by flight planning, flow control and working with more precise indicators like sector loads) increases the predictability of the task demand. The more predictable the demand the less uncertainty we will need to provide for in our estimations and the safety buffer on the capacity is often reduced. Instead of 12 aircraft in the sector and a buffer of 4 we can now have 15 and a buffer of 1. Increasing predictability not only allows us to work with more traffic, it also results in us working closer to our limits.

The other strategy is to accommodate more traffic demand by increasing the productivity of the controllers. Invariably this means a redistribution of tasks between the controllers in the team. For example re-allocating some non safety-critical coordination tasks so as to increase efficiency in the performance of primary controlling tasks and training controllers to be faster and leaner in their controlling. The gain in productivity "pays" for the acceptance of some additional traffic demand.

Both strategies allow us to work with higher traffic demand. However, when you work with higher traffic demand, each additional aircraft arriving in the sector typically leads to an increase in workload which is a little more than the increase which the previous aircraft brought. The reason that workload increases in this non-linear way is that every new aircraft will potentially have to be de-conflicted against a higher number of aircraft already present in the sector.
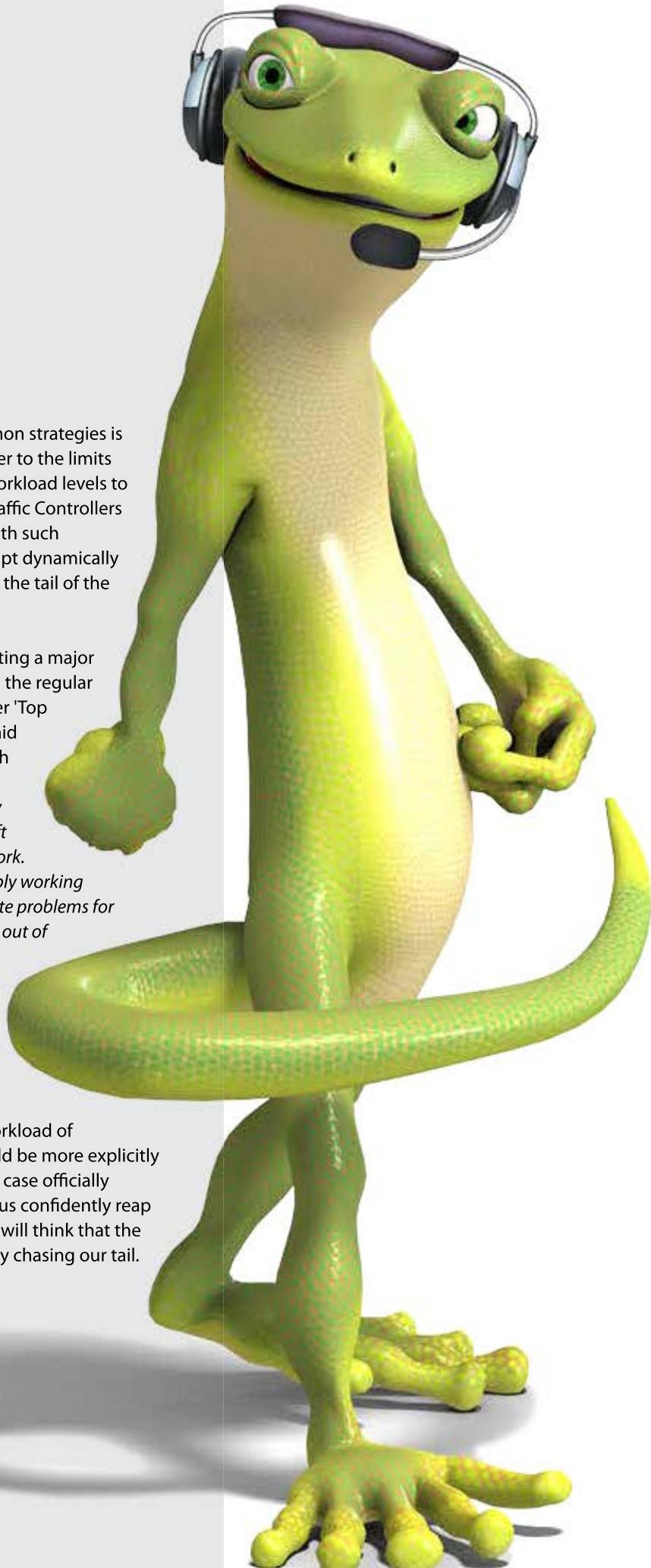
In summary, the result of applying the two common strategies is to make it possible to work with more traffic closer to the limits where small perturbations can suddenly bring workload levels to a critical high. Nowadays, professionals like Air Traffic Controllers are more often finding themselves confronted with such situations. And as they are professionals they adapt dynamically in order to get the job done and cope by "cutting the tail of the lizard".

Let me give you an example. Last week, I was visiting a major European Air Navigation Service Provider. During the regular workshop we had as part of the Network Manager 'Top 5' risk prioritisation process, the Safety Manger said "You know that we have increasing problems with 'intruders'. *These are flights that enter the sector not as originally planned by their flight plan. I know the word 'intruder' may be too strong for the aircraft operators but these flights intrude on our plan of work. And the plans these days are very tight. We are simply working at the edge of what is possible. These intruders create problems for us because we have squeezed all possible efficiency out of the way we work and one flight more in the sector becomes the straw to break the camel's back".*

As the pressure of society to get cheaper air travel increases, we will see ANSPs in a continual search for strategies to accommodate more traffic with the same number of controllers or less. I believe that in ATC, the effects on the workload of controllers of any new strategy or a change should be more explicitly assessed, protection measures identified and the case officially approved. This will protect us but will also allow us confidently reap the benefits of our improvements. Otherwise we will think that the workload is properly managed but we will be only chasing our tail.

Enjoy reading HindSight! ⑤