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THE REALITY OF GOAL CONFLICTS AND TRADE-OFFS

"Safety is our number 1 priority!" It's a phrase that's sometimes used by trade and staff associations alike, and occasionally by pilots when we are encouraged to listen to the safety briefing, or when a departure is delayed for technical reasons. But I've noticed something. Over the last couple of decades that I've worked in aviation, I am hearing the phrase less and less.

Perhaps this is something to do with the so-called 'rhetoric-reality gap'. There are two kinds of goals, which both relate to individuals and organisations. On the one hand, we have stated, declared goals. On the other, we have the goals that are evident from behaviour. In other words, 'the purpose of a system is what it does' (POSIWID) – a phrase coined by business professor Stafford Beer. The purpose of aviation is not to be safe *per se*, but to transport people and goods. In doing so, there are a number of goals. So how can we focus on what the system does and why it does what it does, in the way that it does? What a system does is subject to demand and pressure, resources, constraints, and expected consequences.

So let's look at the situation now. Demand is rising faster than at any time in history. According to Airbus, the number of commercial aircraft in operation will more than double in the next 20 years to 48,000 planes worldwide. And according to Boeing,

790,000 new pilots will be needed by 2037 to meet growing demand. But capacity is a critical concern. While average delays in Europe are down, capacity and staffing takes the lion's share of delays, according to EUROCONTROL data. Airports are another major part of the capacity problem. IATA chief Alexandre de Juniac said last year, *"We are in a capacity crisis. And we don't see the required airport infrastructure investment to solve it."*

Growing demand and increased capacity conflicts with environmental pressures. At a local level, this can be seen in the ongoing third runway saga at Heathrow, the busiest airport in Europe by passenger traffic. Despite receiving approval from Members of Parliament, expansion is opposed by local and climate groups. In Sweden, the word 'flygskam' or flight shame is becoming more than just a buzzword. Fewer passengers are flying to or from Swedavia's ten airports. At a global level, Greta Thunberg recently headlined the UN Climate summit. She was photographed arriving not by plane, but by yacht, fitted with solar panels and underwater turbines.

While aviation is particularly newsworthy with regard to climate change, the Intergovernmental Panel on Climate Change has estimated that aviation is responsible for around 3.5 percent of anthropogenic climate change, including both CO2- and

non-CO2- induced effects. However, the media and public interest in aviation creates significant pressure. In 2008, aviation sector leaders signed a declaration committing to carbon-neutral growth from 2020, and by 2050 a cut in net emissions to half 2005 levels.

As well as capacity and environmental demands and pressures, there are increasing concerns about cybersecurity (e.g., GNSS spoofing) and drones. Then there are more familiar financial pressures. At the time of writing, Thomas Cook, the world's oldest travel company, collapsed and Adria Airways suspended flights.

And now we come to safety. Accidents remain few in number, and flying continues to be the safest form of long distance travel. But 2018 was a bad year for aviation safety, with 523 on-board fatalities, compared to 19 in 2017, according to IATA. Accidents involving B737 MAX aircraft raised new questions about safety at all levels. Unlike most goals, safety is a 'background goal' that tends to come into the foreground only when things suddenly go very badly wrong, or 'miraculously' right.

This is only one way in which goals differ. Some goals have a short-term focus, while others are longer term. Some goals are externally imposed, while others are internally motivated. Some goals concern production, others concern protection. Some goals relate well to quantitative measures, while others don't. Some goals are more reactive, while others are more proactive. Sometimes, goals are compatible and can work together, while at other times they conflict and compete for resources and attention.

Goal conflicts create dilemmas at all levels, from front line to senior management, regulation and government. Dilemmas create a need for trade-offs and compromises. These decisions are influenced by how we perceive capability, opportunities, and motivation. There are many kinds of trade-off decisions. A familiar trade-off to everyone is between *thoroughness and efficiency*. Too much focus on either can be a problem. Day-to-day pressures tend to push us toward greater efficiency, but when things go wrong, we realise (and are told) that more thoroughness was required. Another familiar trade-off is between the *short and long-term* – the acute-chronic trade-off. Combined with pressure on efficiency, short-term goals tend to get the most attention. And we trade off *individual and collective needs and wants*, or a focus on *components and the whole system*. All of these trade-offs have implications for goals relating to safety, security, capacity, cost-efficiency, and the environment. To understand them, we need to understand five truths.

Five Truths about Trade-offs

1. Trade-offs occur at all levels of systems. Trade-offs occur in every layer of decision making, from international and national policy-making to front-line staff. They occur over years and seconds. They occur in the development of strategy, targets, measures, policies, procedures, technology, and in operation. They are often invisible from afar.

2. Trade-offs trickle down. Trade-offs at the top, especially concerning resources, constraints, incentives and disincentives, trickle down. If training is reduced for cost or staffing reasons, then staff will be less able to make effective trade-offs. If user needs are not met in a commercial-off-the-shelf system, staff will have to perform workarounds.

3. Trade-offs combine in unexpected ways. Trade-offs made strategically, tactically and opportunistically combine to create both wanted and unwanted outcomes that were not foreseen or intended. We often treat this simplistically.

4. Trade-offs are necessary for systems to work. Trade-offs are neither good nor bad. They are necessary for systems – transport, health, education, even families – to work. And most trade-off decisions can only be made and enacted by people.

5. Trade-offs require expertise. Trade-off decision-making often cannot be prescribed in procedures or programmed into computers. Decision-making therefore requires diverse expertise, which in turn needs time and support for development. In effect, expertise is about our ability to make effective trade-offs.

An interesting thing about trade-offs is that they are tacitly accepted, but rarely discussed. Might 'Safety first!' risk making us complacent about safety? Reality always beats rhetoric in the end. So we have to talk about goal conflicts and trade-offs. Let us bring reality into the open. ⑤

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