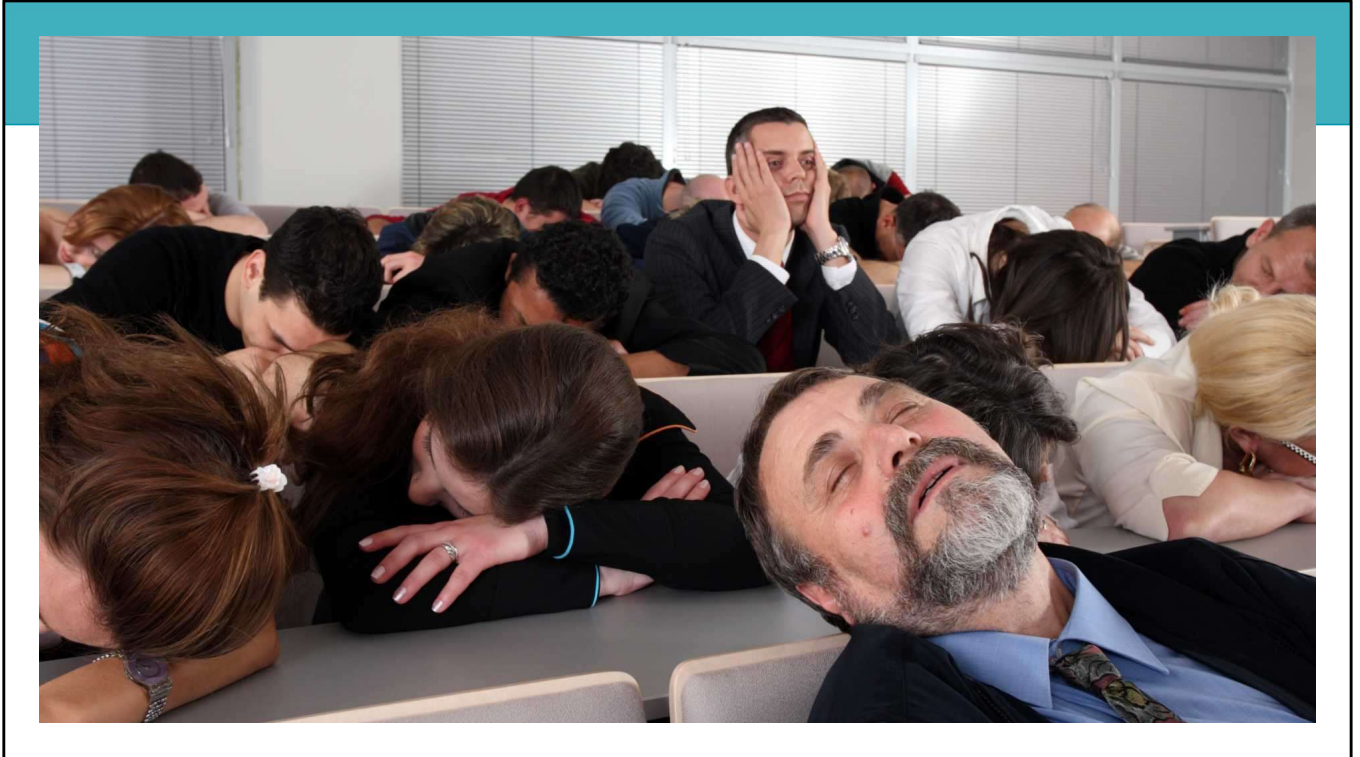




The title refers to re-defining what a hazard to a positive activity but still using the same definition. “something that has the potential to cause harm”



Success will be judged by how many people are awake at the end... not how many people are asleep.

Safety I v Safety II?



I believe in formal safety methods. I believe in clear definitions for safety risk management - hazard, safety risk, cause. I believe in the Swiss Cheese Model.

I believe in safety risk models – although I recognise their limitations.

- Causal relationships is nonsense.
- Root cause is nonsense.

There is a large community who say these techniques are not suitable. At the moment I will keep head firmly in the sand.

Safety I and Safety II are often seen as different or competing concepts. This may always be the case unless we can provide a common set of terms to help safety professionals work together. We need the operational and technical staff who have the broader view of how the business operates to deliver safety as well as the critical eye of the operational and technical safety experts to identify and understand failure.



How can we get our leaders to be interested in safety?



This is what interests the leadership. This is where the money comes from.

This is what they need to control to help them make money.

Yesterday we talked about the trade-off between business objectives and safety. A Safety I mindset always pushes safety down but a Safety II mindset is potentially at an equivalent level of priority compared to the efficient business operations.



Turn the concept of hazard on it's head. Hazards are the things that make you money.

This isn't a new idea – Oil and Gas (Shell) have been using this concept for years. Many parts of aviation already use it. Who in the room is familiar with this concept?

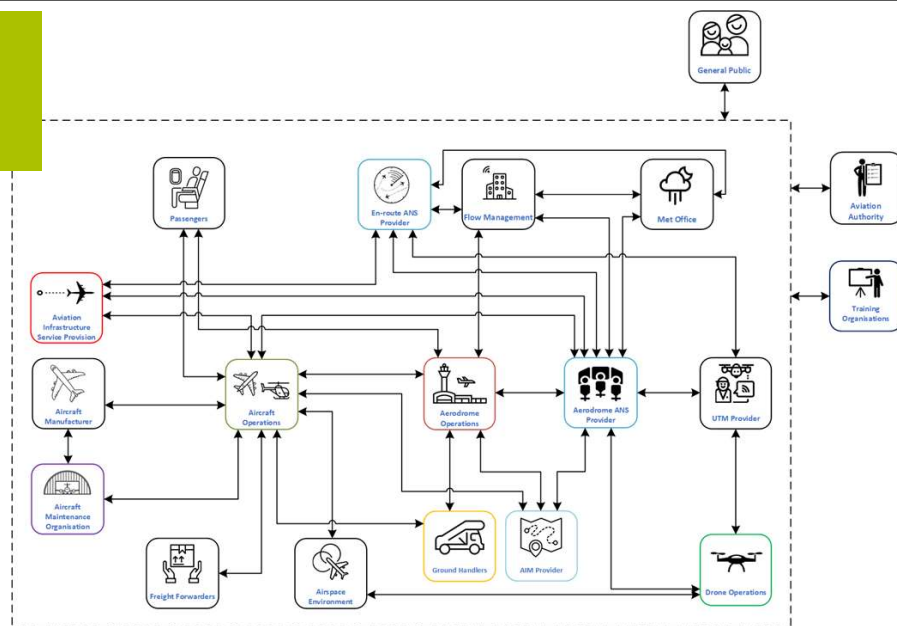
It's really simple. Instead of starting off by saying 'what could go wrong in my business' in the traditional approach you instead ask 'what does my business do to ensure it delivers the outcomes of the business'.

This switch in mindset is powerful on many levels. Safety and service delivery become intertwined rather than separate concepts. Does resilience engineering take over from safety at this point?





STARmap Level 1

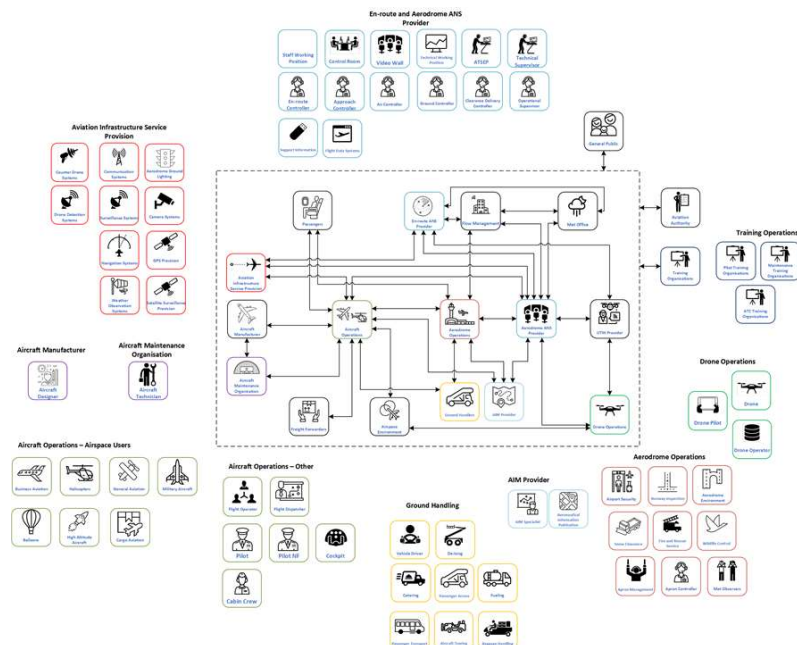


The first question I want to ask is what do we do in our industry to control the flight of an aircraft.

I always start with the Context Diagram. That has also been mentioned a few times this week. The start of any activity always relies on understanding the system. Aviation is definitely a complex system and I try and simplify that using what I call a STARmap.

STakeholder Action Relationship Map

STARmap Level 2



Level 2 shows the specific actors for each area.

The stakeholder relationships and the supply chain in aviation is complex. It is an international industry that requires significant connectivity. I am sure you could create a similar diagram.

Push-Back / Taxi / Take-Off			Domestic / Oceanic Cruise			Descent / Final Approach / Landing		
Unauthorised Movement	Jet Blast Conflict	Drone Infringement	A/C Deviates from Clearance	Wake Turbulence	Unsafe Clearance	A/C Deviates from Clearance	Unstable Approach	Wrong Surface Landing
Lithium Battery Fire in Cabin/Flight Deck								
3 rd Party Malicious takeover of control of aircraft from ground								

I want to break down the problem a bit more... Here are some example events that cause the hazard to become “uncontrolled”.

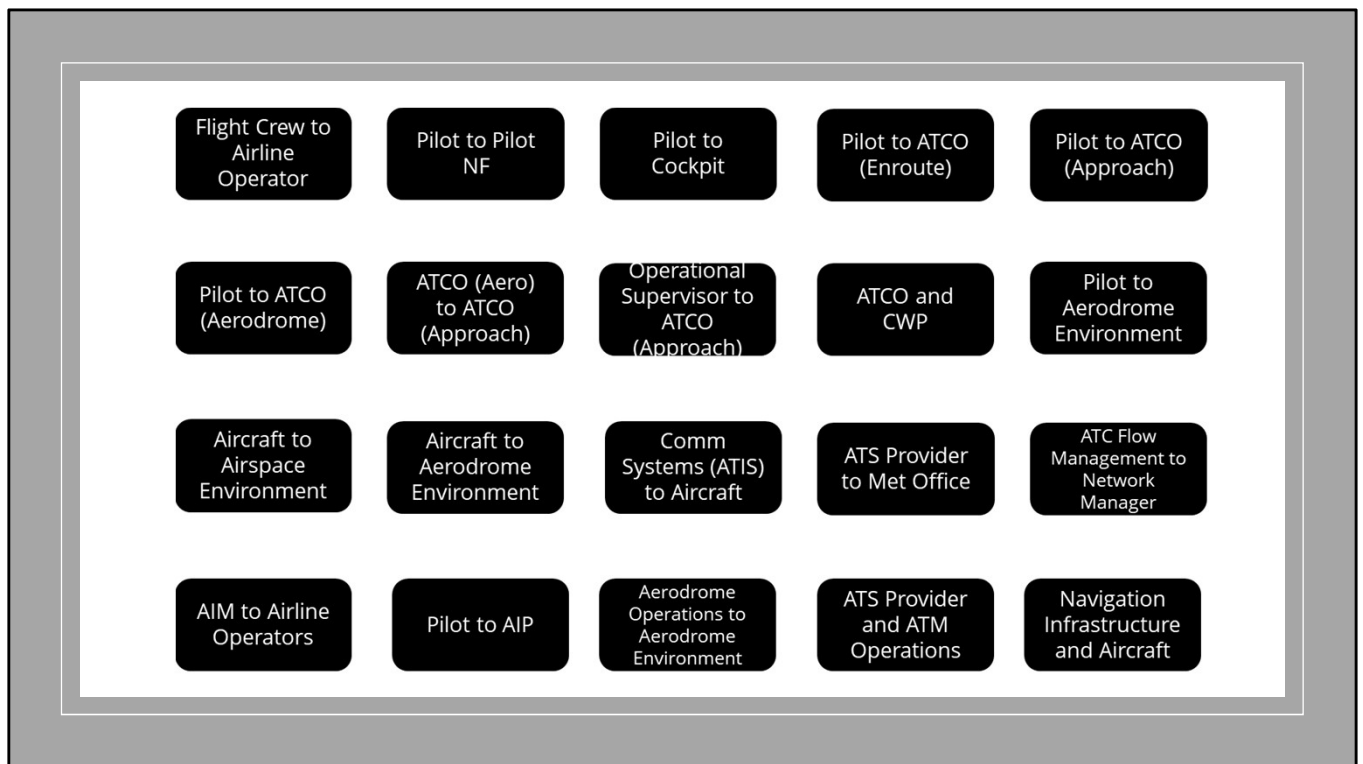


These uncontrolled events are bad events. But not the worst event.

The simple analogy is oil leaking out of a pipe.



Let's look at Unstable approaches.



Analysing the STARmap, and using various published literature, I identified 20 different stakeholder relationships that together contribute to controlling unstable approaches.

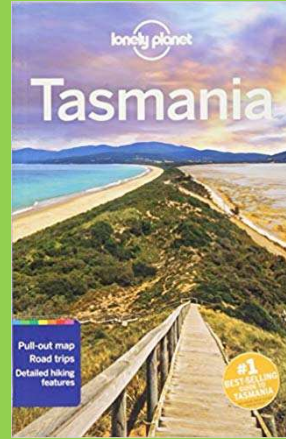
You cannot ever create a relationship (causal or otherwise) between each of the elements. Let's not waste our time. I suggest we manage them all on a case by case basis. That doesn't mean that there isn't some connectivity.

I should make a note at this point that there isn't a single organisation that is responsible for the actions of these stakeholder relationships. The role of the regulator is key here.

What do each of these stakeholders do to make that relationship a success?



Holiday as Imagined



Holiday as Prescribed

Read: Varieties of Work - Steve Shorrock

As the person responsible for planning the holiday I can imagine what it will be like for my family.

I can refer to travel books to understand all the great things I can do to make my holiday a success.

IDENTIFYING SUCCESS – SAFETY II PRINCIPLES

Pilot to ATCO
(Approach)

How do these Stakeholders interact to prevent Unstable Approaches?

*What makes
it's a success?*

Pilot requests
clearance from
ATCO

ATCO Provides
Runway Assignment

ATCO provides
speed control and
restrictions

As a safety professional (i.e. not the frontline experts) I can use the same approach to document the stakeholder relationship. I call these 'activities' in the proactive general sense (you could call them trivial-events in a reactive sense – but maybe trivial really isn't the right word as it doesn't reflect the importance). They are also SAFETY CONTROLS from a safety perspective.

Controllers and Pilots are not the source of error – they are the source of success! Let's recognise this in our safety assessments.

We discussed baking yesterday – the order of the events has some logic – but of course the reality of the environment means you never follow the same pattern! But that's ok – discuss more on next slide.

How does reality undermine the success of the relationship?



Holiday as Done



Holiday as Disclosed

Tasmania has lots of rain and the occasional bush-fire and for most its too cold to swim! Travelling long haul with 3 young kids and driving in the car for a few hours... That is the reality. (A big farewell to grumpy cat who died in May 2019). My wife though would be too embarrassed to mention this so tells everyone of the fantastic happiness we had.

IDENTIFYING WHAT COULD GO WRONG – SAFETY I PRINCIPLES

Pilot to ATCO
(Approach)

How can these controls be undermined? Or fail?

Pilot requests
clearance from
ATCO

ATCO Provides
Runway Assignment

ATCO provides
speed control and
restrictions

*What could go
wrong?*

Approach
procedure not
specified in request

Runway assignment
provided late

Speed restrictions
unrealistic for
aircraft type

The key message is that before you look at failure, and the realities of work, you must start with the context of success. Safety I makes so much more sense in the context of Safety II.

No matter the deficiencies in the control model – this is the opportunity to work with the front-line to make it right! The flexible order of baking a cake is recognised and key constraints can be identified.

IDENTIFYING MITIGATION TO MAXIMISE EFFECTIVENESS

Pilot to ATCO
(Approach)

How can we maximise the effectiveness of the controls?

Pilot requests
clearance from
ATCO

ATCO Provides
Runway Assignment

ATCO provides
speed control and
restrictions

*How can we
make our
controls EVEN
better?*

Airline SOPs define
criteria for precision /
non-precision / visual
guidance.

ATC Procedure for late
notice runway changes
(including 'no later
than' timing)

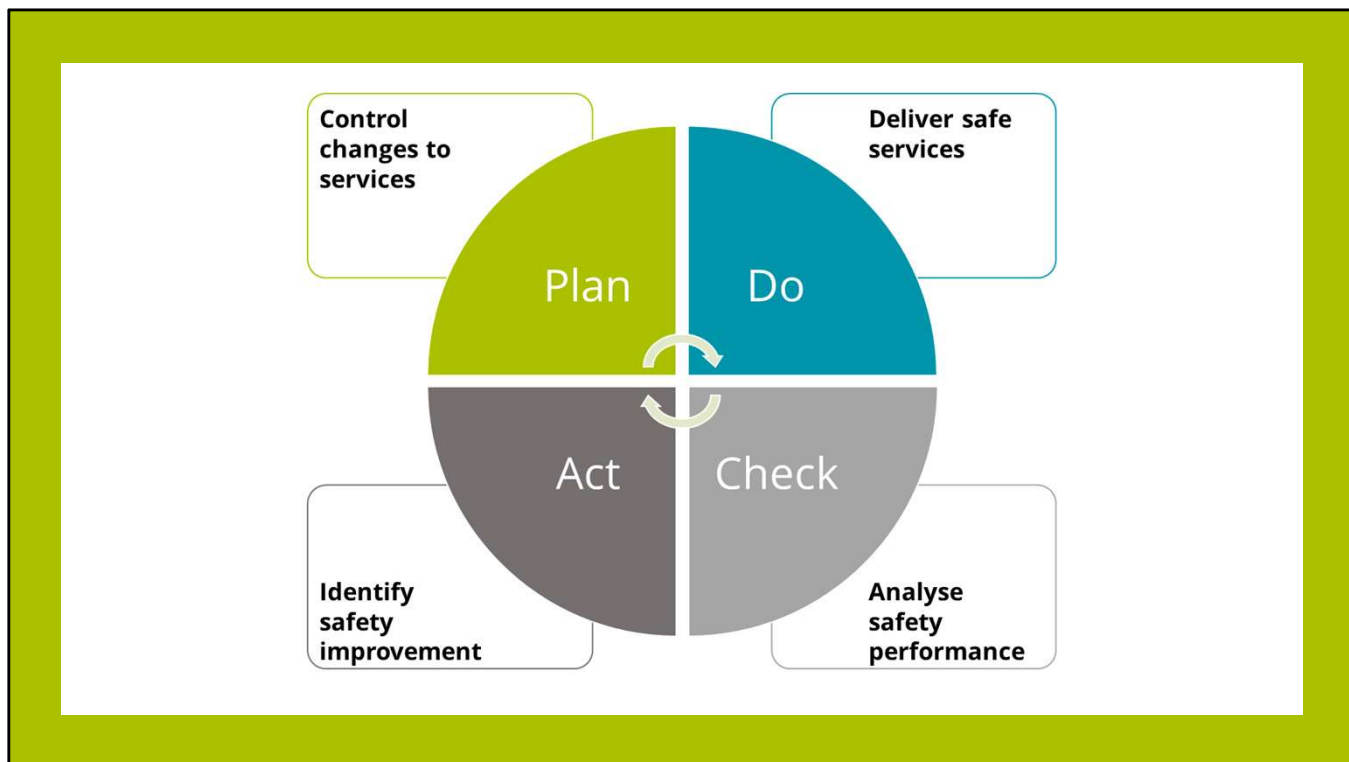
ATC Procedures and Airline
SOPs are aligned for
aircraft type, performance
and stable approach
criteria.

Approach
procedure not
specified in request.

Runway assignment
provided late

Speed restrictions
unrealistic for
aircraft type

Then we can understand how to minimise the impact of those failures by identifying mitigation. The aim of mitigation is to make the controls as effective as possible (unfortunately we can't make them 100% effective).



Finally.... We must have a safety management system that makes sense of this information.. Using service delivery based language helps make strong connection with the purpose of the business!

If we understand what it takes to deliver safe services (it is still closer to work as imagined to work as done) we can monitor and analyse the performance through identification of leading and lagging indicators. Monitoring what goes right and what goes wrong – using the many techniques discussed today. And big data will play a big part of that and the ASIAs programme in the US and the Data4Safety programme in Europe is pushing the industry forward. If you want to know about how to use data to understand human performance speak to Ryanair!

We then must use our intelligence of the situations to make changes. CFL/SFL check example.... And importantly when we make changes we are looking at the impact on our STARmap and stakeholder activities to maximise the effectiveness of any change.

What Do
YOU Think?

HUW ROSS — PRINCIPAL CONSULTANT

HUW.ROSS@ASKHELIOS.COM



29 Hercules Way
Aerospace Boulevard I
AeroPark
Farnborough I Hampshire
GU14 6UU I UK
Tel: +44 1252 451 651
www.askhelios.com

an  egis company

Huw is an Aviation Consultant with UK consultancy Helios.
Huw is also a Steering Committee member of the CANSO Global Safety Standing Committee.

Please get in touch if you would like access to the information presented.