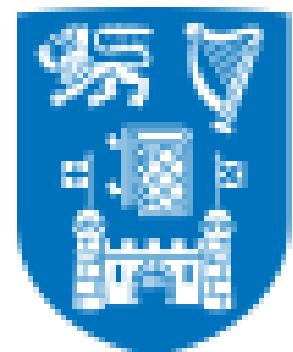


COVID RESPONSE/ACTION PLAN

& Ongoing Research...

Pilot Lived Experience & Tools to Support Pilot Coping at
Different Levels
(Modelling Problem, Behaviour Model & Link to Field
Research/Data Analysis)



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Centre for Innovative Human Systems

Introduction

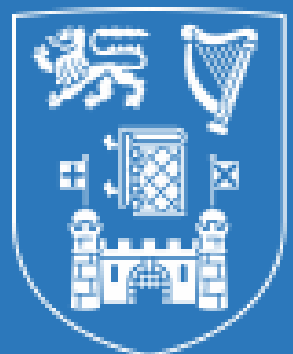
Issues to Address

Part 1

- **COVID response & action plan**

Part 2

- **Modelling and framing problem**
- **Behaviour model & empirical evidence for tool concepts**
- Personae (Pilots)
- Tool Framework
- Tools Framework & Situating in Process (Current & Future)
- Customer Journey (Current & Future)
- Auto-harvesting Data
- Early Stage Prototypes (Tool 1)



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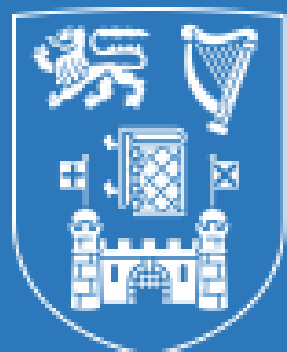
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Issues to Address

1. What issues pre-Covid – normal business operations were challenging (our research/survey)
2. Now
 - Changes in situation now
 - Pilots not flying – how prevent the issues getting worse
 - Current situation – different environment – flying cargo to new destinations, organisations on the brink (layoffs, cuts)
3. What issues bring to cockpit when flying after Covid
 - Post Covid 19 world look like
 - Operational pressure and impact on individuals
 - GA community come back – not yet flown in 2020
 - Mid July - potential for carnage in system



**WELL BEING HIT SQUAD | DEAL WITH THIS
| COLLABORATION**

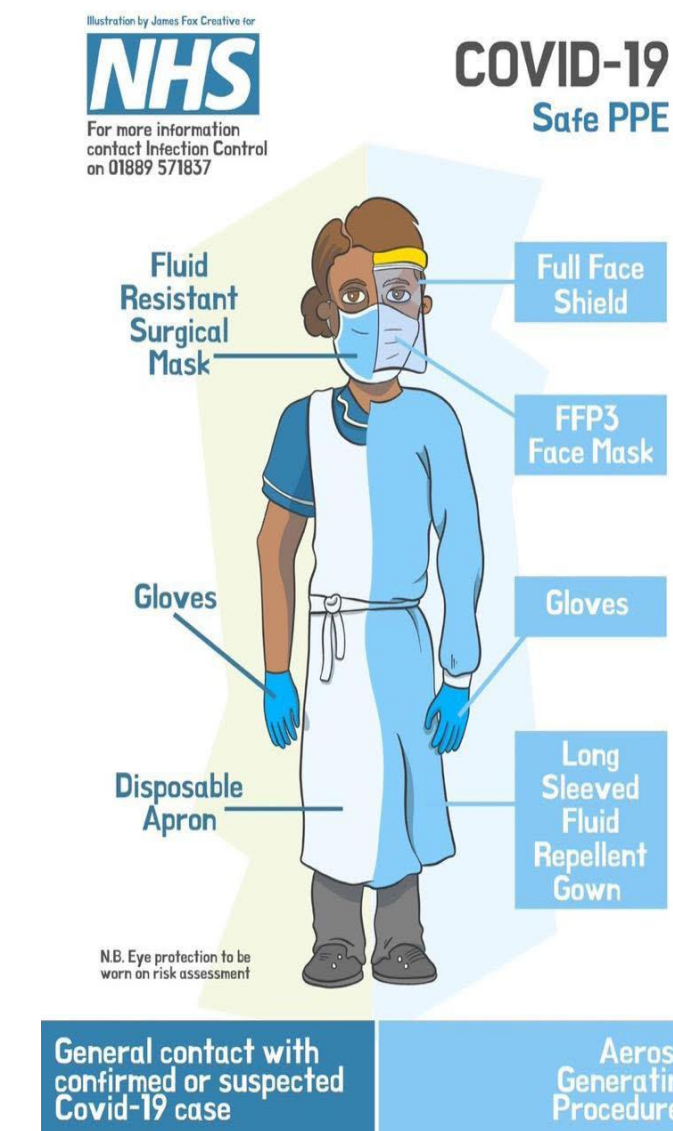
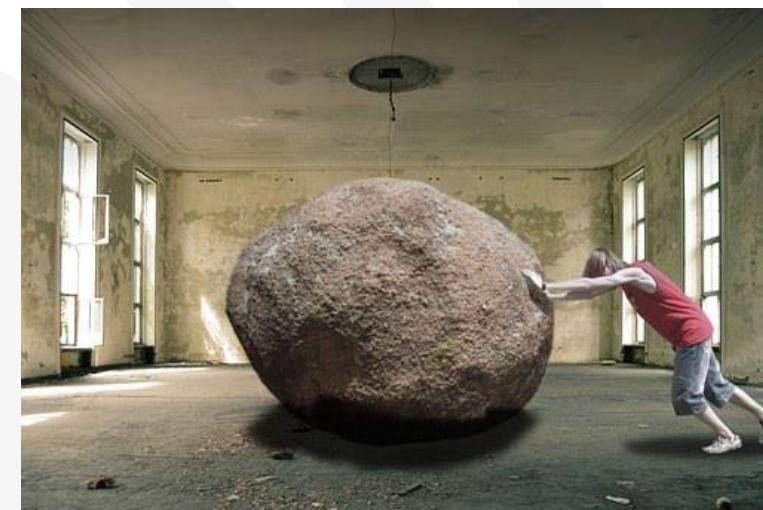


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PART 1: COVID ACTION PLAN



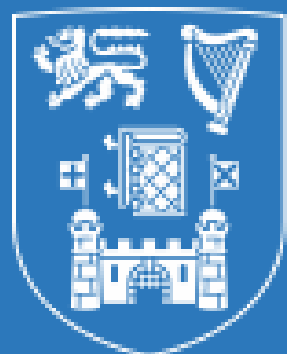
How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

⌚ Duration of the entire procedure: 40-60 seconds



MIND YOUR HEAD | ATTITUDE | SPIRITUAL & EMOTIONAL | HEALTH & WELLBEING



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Next Steps/Action Plan: Covid Response

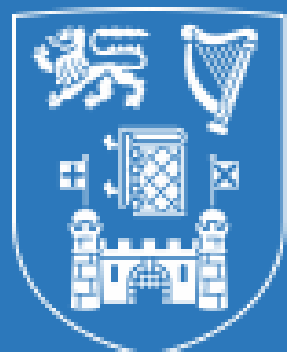
- **We need action NOW!**
- **Ideas**
 1. **Stress Coping Booklet** (Paul has circulated a version 1)
 2. Summary information on coping strategies and data analysis – to share with stakeholders (format TBD/animation, narrative)
 3. **Serious game** (education on wellbeing/MH awareness, risk assessment & coping) – linking to stress coping concepts/ideas but gamification
 4. **Extend/Modify Checklists** – include biopsychosocial rational and questions linking to coping mechanisms (Pave, I'm Safe, Pre-flight briefing)
 5. **Dutch Reach & Gestural cueing (Wellbeing & MH)**
 6. **Mindfulness**
 7. **John Franklin** – ideas on narrative – love them!
- **Interventions needs to be empirically supported/validated so that we can stand over for longer term (opportunity to address wellbeing/MH properly)**
- **Data analysis is ongoing**
- **We are also working on academic papers...has to be done & keen to ensure good evidence base!**

Already existing problems & **now COVID context and impact in short, mid and long term content**
COLLABORATE... with/for stakeholders..

Data is king (survey)
Key to progress...



Safety promotion, culture, training, wellbeing MH awareness, tools ...



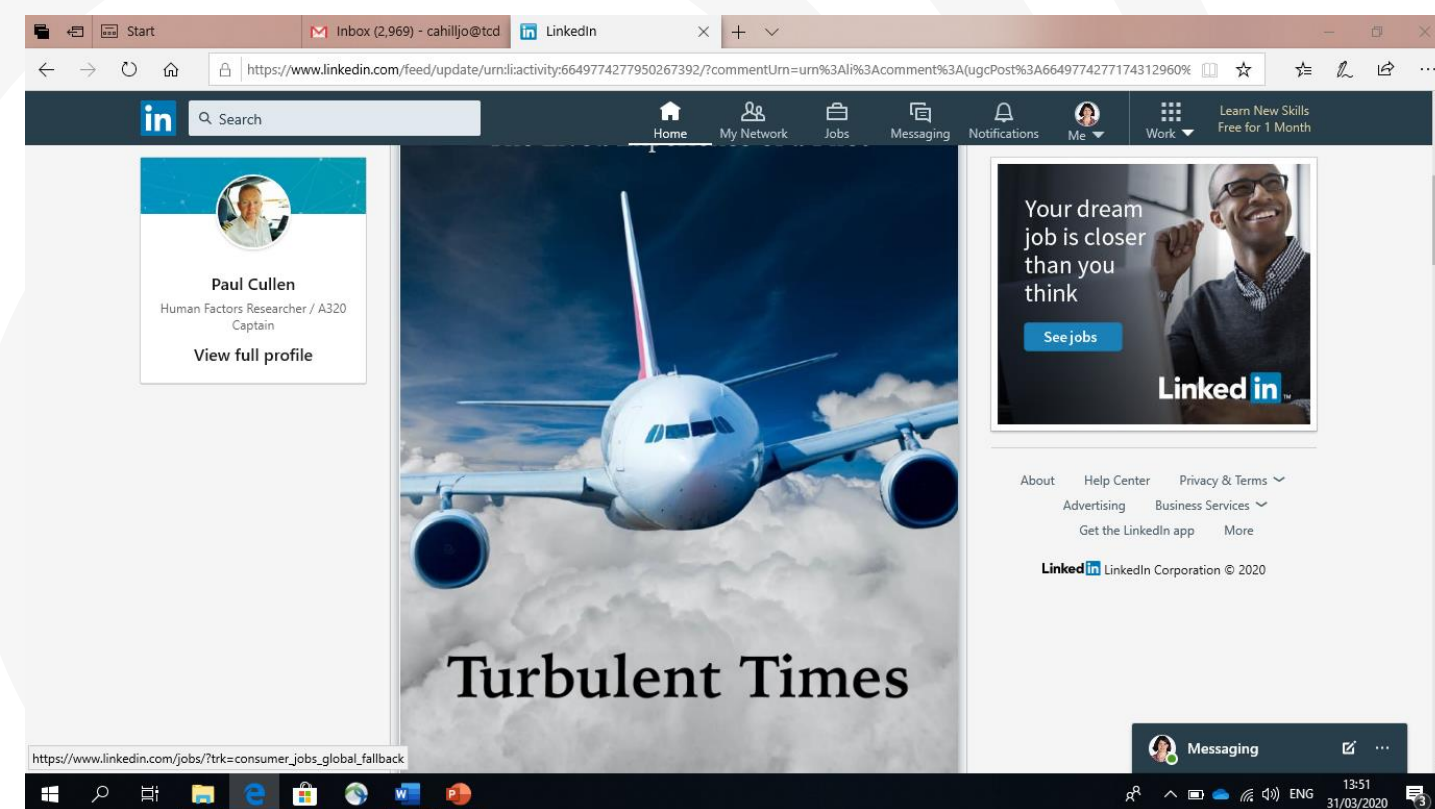
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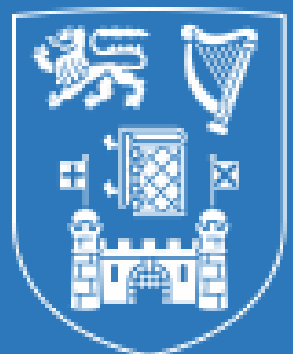
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Stress Coping Booklet & Other Materials (1 & 2)

Stress Coping Booklet (Paul has circulated a version 1)



- Summary information on **coping strategies and data analysis** – to share with stakeholders
- **Message easy to communicate/user friendly and not complex**
- Careful with what we say
 - Currently, strategies associated with lower depression levels/not about effectiveness of strategies
 - Also not yet looking at interactions – this in progress
 - **Need to do more on emotional exhaustion, dis/engagement and burnout – focus on this (more data analysis)**
- **Format TBD/animation, narrative**
- Potential to link in with **John Franklin's ideas on narrative and story telling (EASA Safety Promotion)**



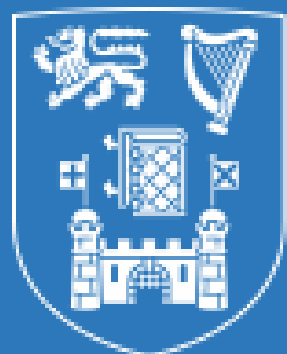
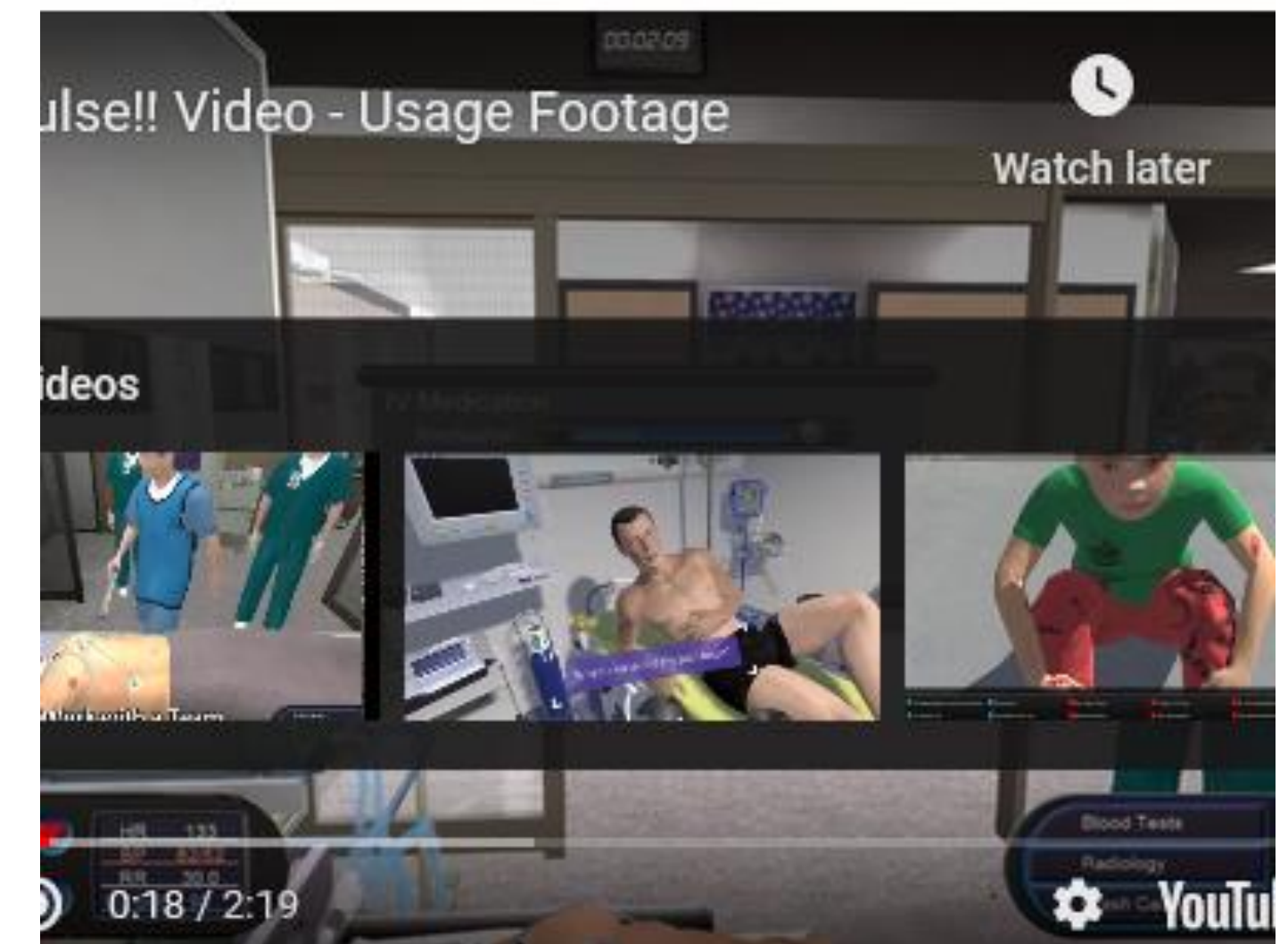
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Serious Game/Game Based Learning (3)

- **Serious game/game based learning**
- Objective is learning/practicing a skill – often content is put across in video games or other ‘hand’s on’ game based format (not necessarily involving video/augmented reality)
- Link training and practice
- 5 parts – (1) story/plot, (2) gamification, (3) immediate and individualized feedback, (4) simulation and (5) about learning (goal is to learn)
- Used in healthcare – linking to simulation approaches
- **Huge links to CRM approach & simulation, existing games in wellbeing (Jonny Bloomfield)**
- **Develop for (1) pilots and (2) other actors in aviation system (Human Factors Systems Approach)**
- **Suite of games - education on (1) wellbeing/MH awareness, (2) risk assessment/proactive (How am I doing now), and (3) stress coping/advice – link to NICE stepped care approach**
- Linking to booklets and other materials but gamification (rewards, points systems, badges)
- Interactive format, Have app or something on web?



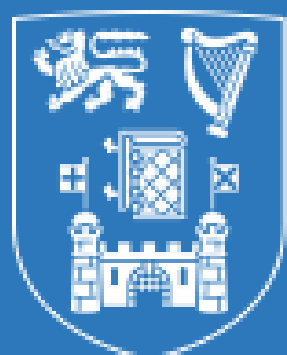
Extending/Modifying Checklists (4) – Quick Wins

- I'm Safe Checklist
- PAVE (Personal Minimums Checklist for Risk Management) – pilot, aircraft, environment and external pressures
- Pre-flight checklist
- CRM & Intelligent Flight Plan (Joan PHD)

- Move beyond regulatory approach
- Link to **data analysis findings** (importance of sleep, physical exercise, diet and hydration & talking with people)
- **Include physical exercise in checklist**
- **Assessment in relation to current emotional state (including mood and attitude) – not just physical health**
- **Assessment in relation to stress coping**
- **Consider the co-pilot 'the other guy'/team**

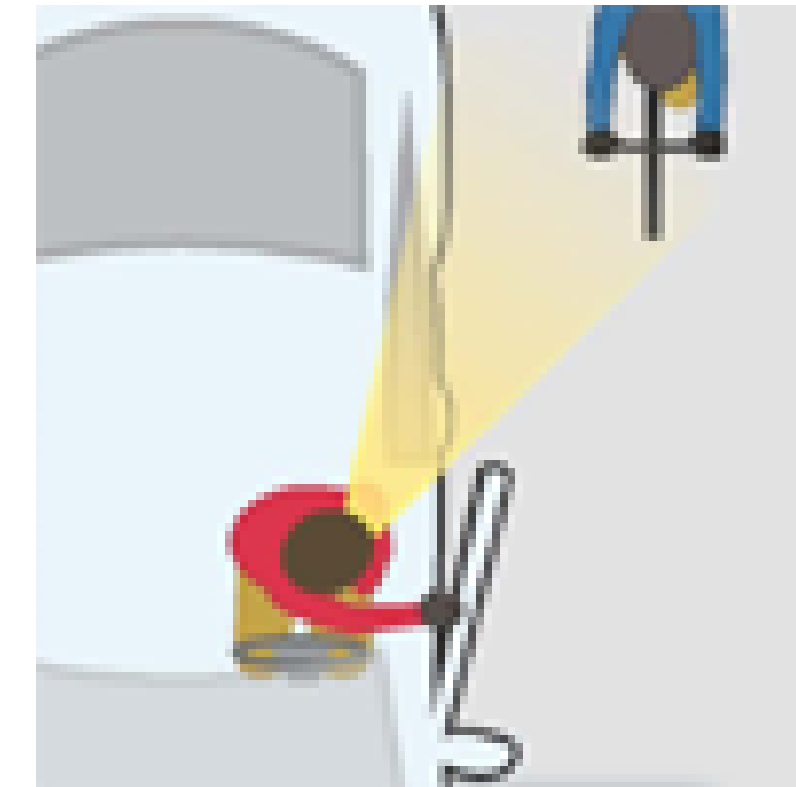
I	Illness	Do I have an illness or any symptoms of an illness?
M	Medication	Have I been taking prescription or over-the-counter drugs?
S	Stress	Am I under psychological pressure from the job? Worried about financial matters, health problems or family discord?
A	Alcohol	Have I been drinking within eight hours? Within 24 hours?
F	Fatigue	Am I tired and not adequately rested?
E	Eating	Am I adequately nourished?

I	Illness & Wellbeing	Do I have an illness or any symptoms of an illness? Am I feeling good/well? How is my overall health and wellbeing? Physical health? Emotional/Psychological Health? What's my mood and attitude like? Social Health? Have I seen family/friends? Getting help/support if needed?
M	Medication	Have I been taking prescription or over-the-counter drugs?
S	Stress & Stress Coping	Am I under psychological pressure from the job? Worried about financial matters, health problems or family discord? Am I actively managing my stress? Exercise? Social? Do I need help?
A	Alcohol	Have I been drinking within eight hours? Within 24 hours?
F	Fatigue	Am I tired and not adequately rested? Have I been managing my sleep?
E	Eating & Exercise	Am I adequately nourished and hydrated? Am I taking physical exercise?

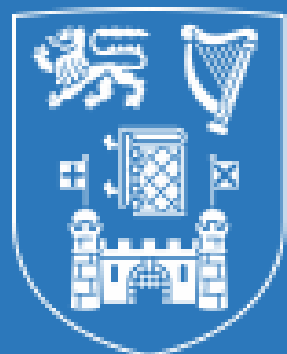


Dutch Reach (4)

- Which hand do you use to open your car door?
Puzzlement. “Why, this one, my left...of course.” “But the Dutch do it differently.” “Oh???” “They use their right, their far hand. It’s much safer.” “What?! ...Ooohh! I get it! It makes you turn, it’s easier to look! So simple! It’s obvious! I just never thought about it!”
- **Adapt for our context**
- **Help from pilots and MH experts**
- Quick wellness/MH risk signalling in the cockpit – adapt gesture for this context?
- Walk to the aircraft (Paul to elaborate)
- Touch the head? Hand on heart? Pause and breath together – link to mindfulness? **Fit to machoism culture, different cultures (parts of Europe, Asia, Africa)?**
- **Empowering for pilots/self-efficacy and be comfortable**



<https://www.dutchreach.org/>

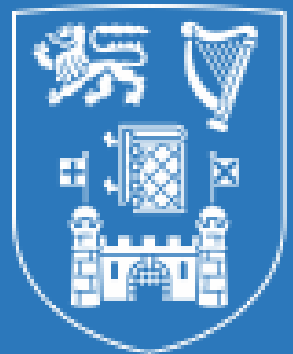


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PART 2: Framing Problem, Behaviour Change & Tools



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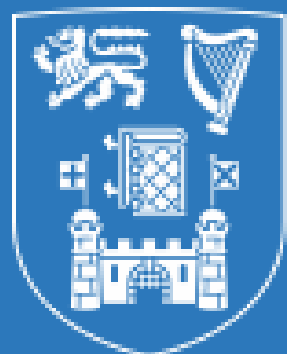


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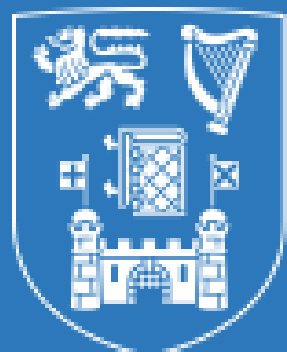
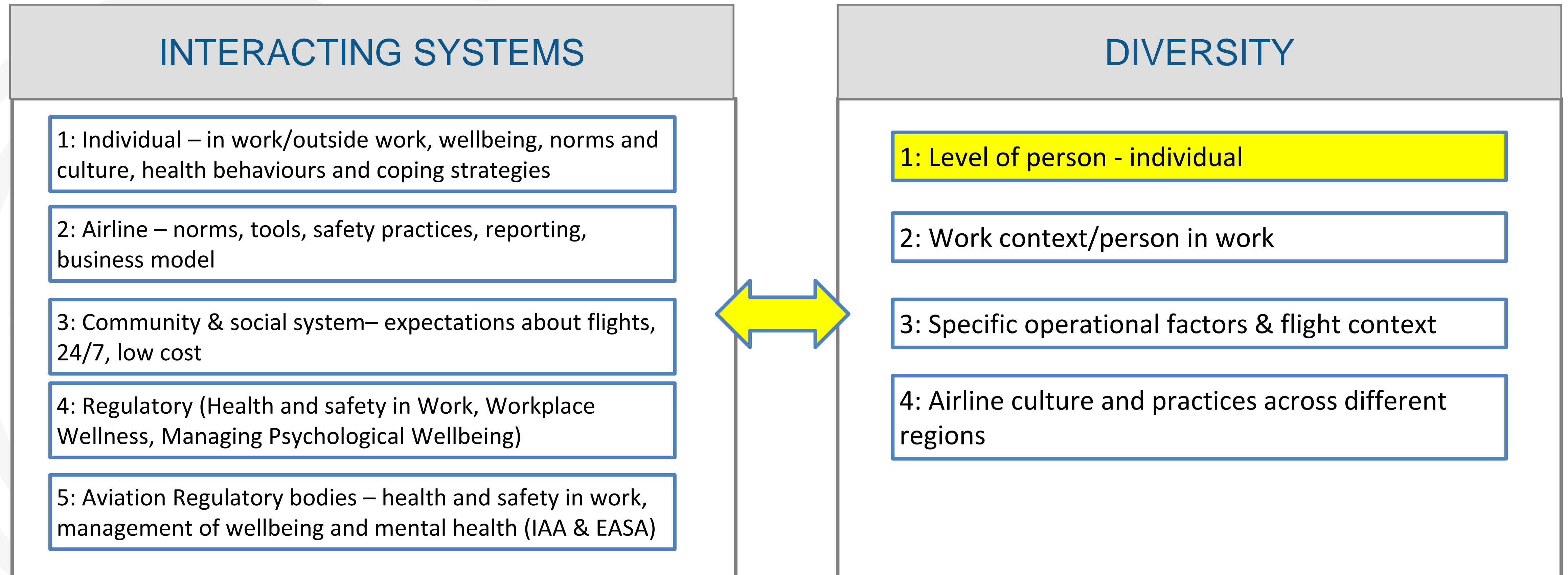
Understanding & Framing Problem

- **Wicked problem**
- **Problem exists at different levels – different intersecting systems – see 1 to 5**
- Frame solution in relation to these different levels
- Consider Fogg (behaviour change and technology)
- Consider **diversity** (see aspects of model)
- Also, **Human Factors & Ethics (See canvas)**

1. **Pilot level (practices and behaviour) – lived experience model**
 - o In work
 - o Outside work
 - o Home/work interface
2. Airline processes and culture, business model
3. Community and social system model – public expectations, pricing, 24/7
4. Health and safety governance (health & wellness in work) - national level
5. Aviation Regulator (national and European/EASA)



Understanding Behaviour: Interacting Systems & Diversity



Behaviour Model/Behaviour Science Approach

1. Main factors that contribute to problem – sources of WRS, lived experience model, influencing factors, diversity
2. Impact scenarios
3. Predictors of good mental health – lived experience model, data analysis (factors and outcomes)
4. Coping Strategies – impact on depression severity
5. Risk Assessment Model & Algorithm (in progress)

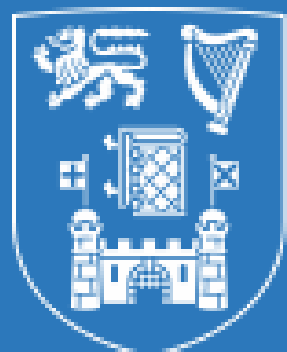
B=MAP

(Behaviour = Motivation, Ability & Prompt/Trigger)

INTERACTING SYSTEMS

DIVERSITY

HUMAN FACTORS & ETHICS



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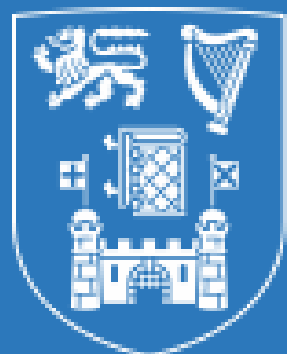
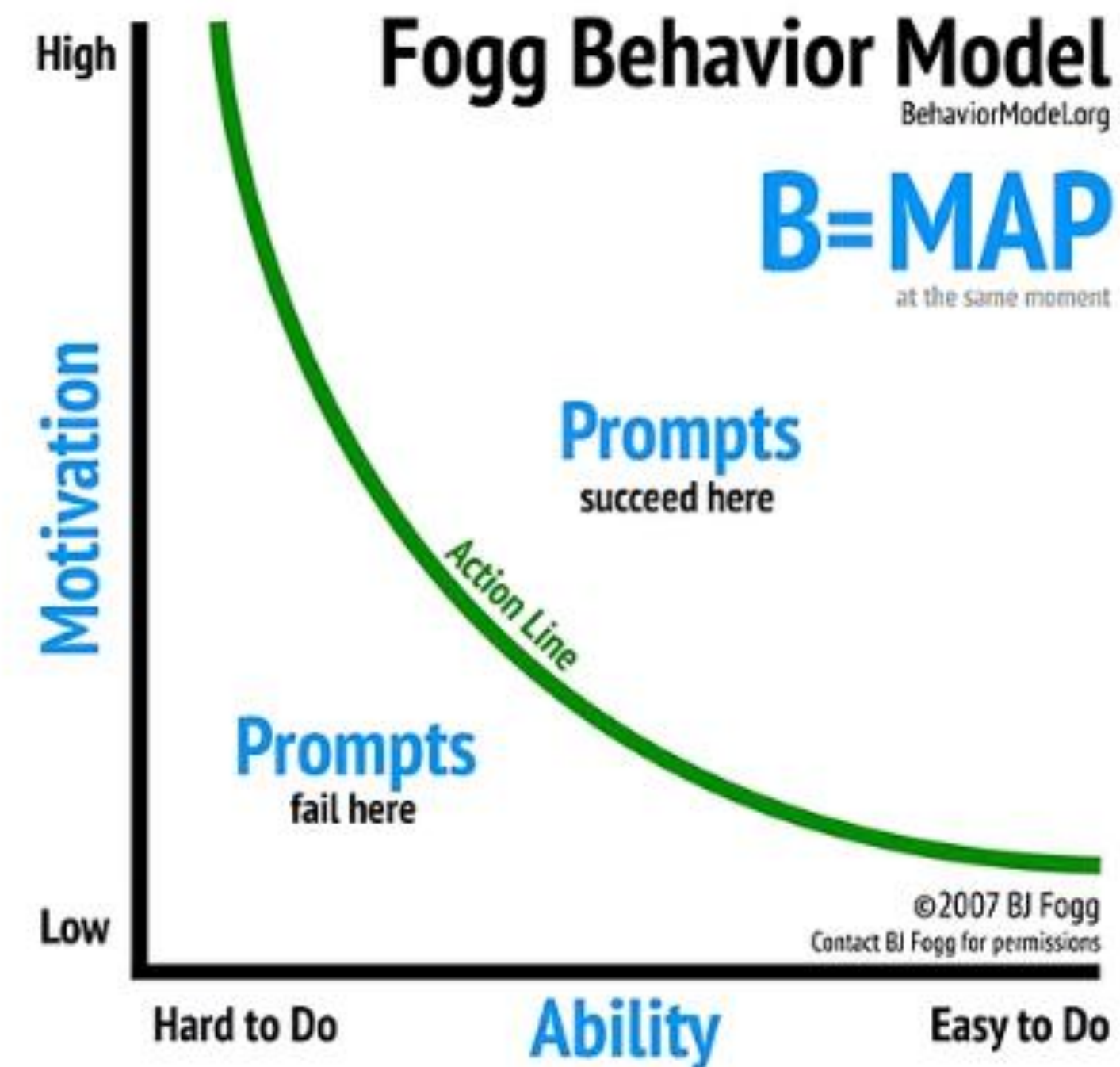
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Fogg Behaviour Model

Behaviour is the result of three specific elements coming together at one moment

B=MAP

(Behaviour = Motivation, Ability & Prompt/Trigger)



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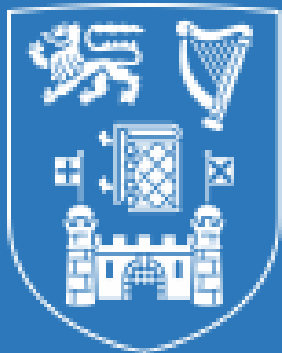


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Project Goals & Fogg Behaviour Model

B=MAP

Target Behaviour	WRS & wellbeing awareness and education	Increased awareness of WRS & wellbeing (including MH)
	Acceptability of MH/self-management of wellbeing and MH	Increased acceptability of MH Normalisation of MH Acceptability of self-care
	Self-management behaviour	Promote coping Shift to self-management
	Safety behaviour	Interface between life in and outside work
Motivation	Safety, health and wellbeing, work policy, health attitudes, social acceptability, work incentives and rewards etc	
Ability	Health, time availability, work flexibility, family support	
Prompt	(1) Mobile App + (2) profiles info & model of behaviour/trends (AI +ML) – available to airlines to direct rostering/planning + (3) changes in airline policy and practices + (4) health and safety regulatory body - changes re health and safety in work (national policy) +(5) aviation regulatory body – changes in practices – IAA/EASA	



Influencing Factors

- Concern for own health (self or family)
- Attitudes to health and wellbeing (including MH)**
- Attitudes to seeking help/support**
- Perception of own MH (normalisation of problem)**
- Shift pattern/shift time
- Work contract
- Type of operation
- Male/Female
- Pre-existing MH issue
- Existing health and wellbeing (if fatigue, burnout/exhaustion)
- Use of Coping Mechanisms – sleep, exercise, supports, diet**
- Interest in physical exercise
- Social capital and network
- Existing habits and behaviours (sleep, diet, exercise)**
- Convenience and access (24/7)
- Pilot education and awareness schemes**
- Social acceptability & demonstration of ‘socially desirable’ values and practices (self-care)

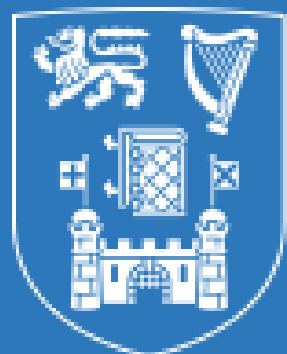
B=MAP

(Behaviour = Motivation, Ability & Prompt/Trigger)

INTERACTING SYSTEMS

DIVERSITY

HUMAN FACTORS & ETHICS

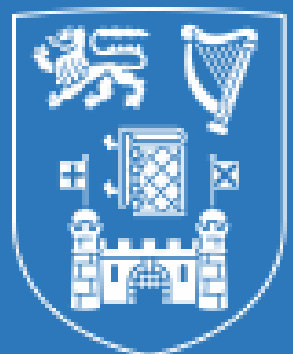
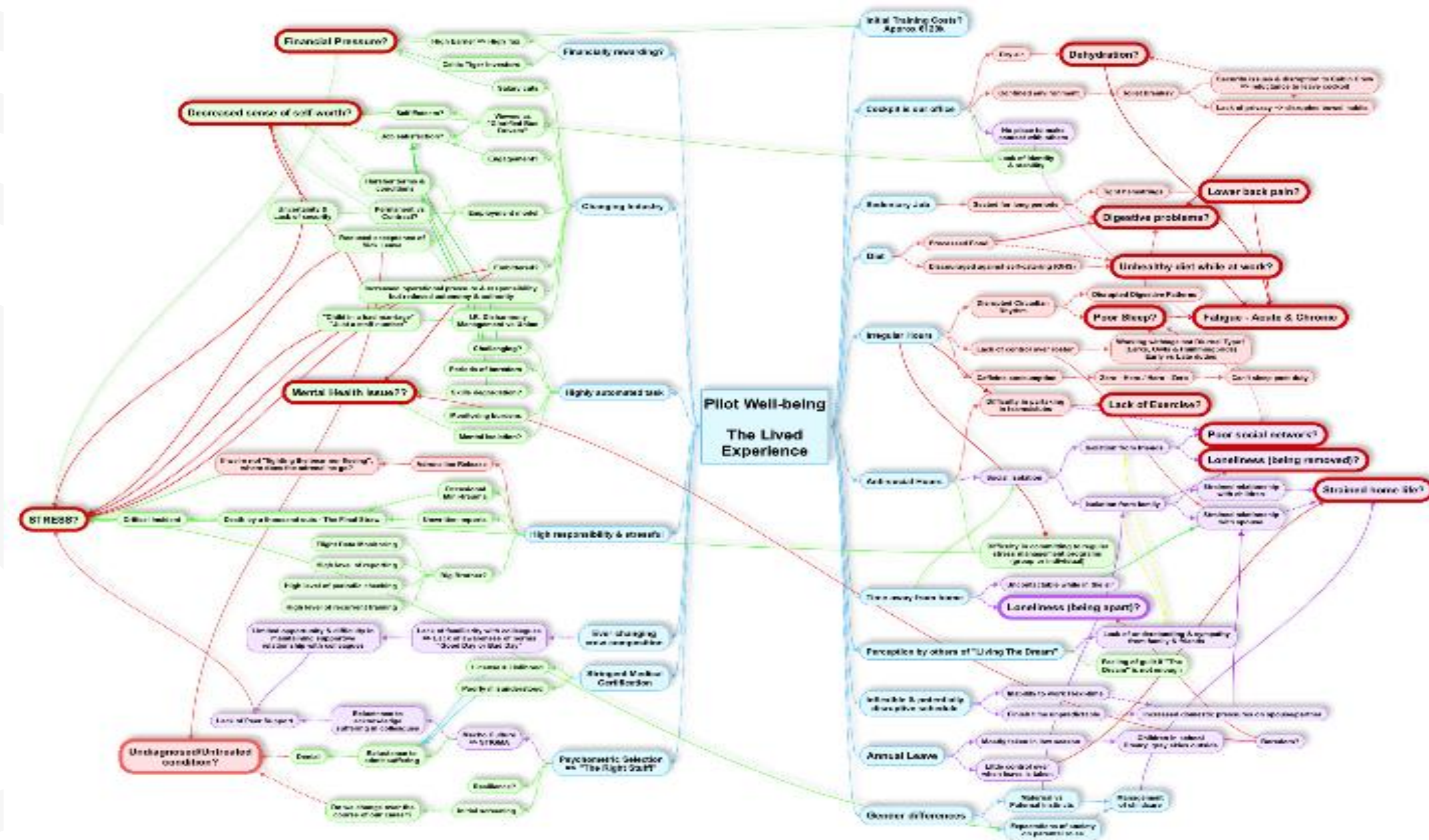


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Lived Experience Model (Factors & Outcomes)



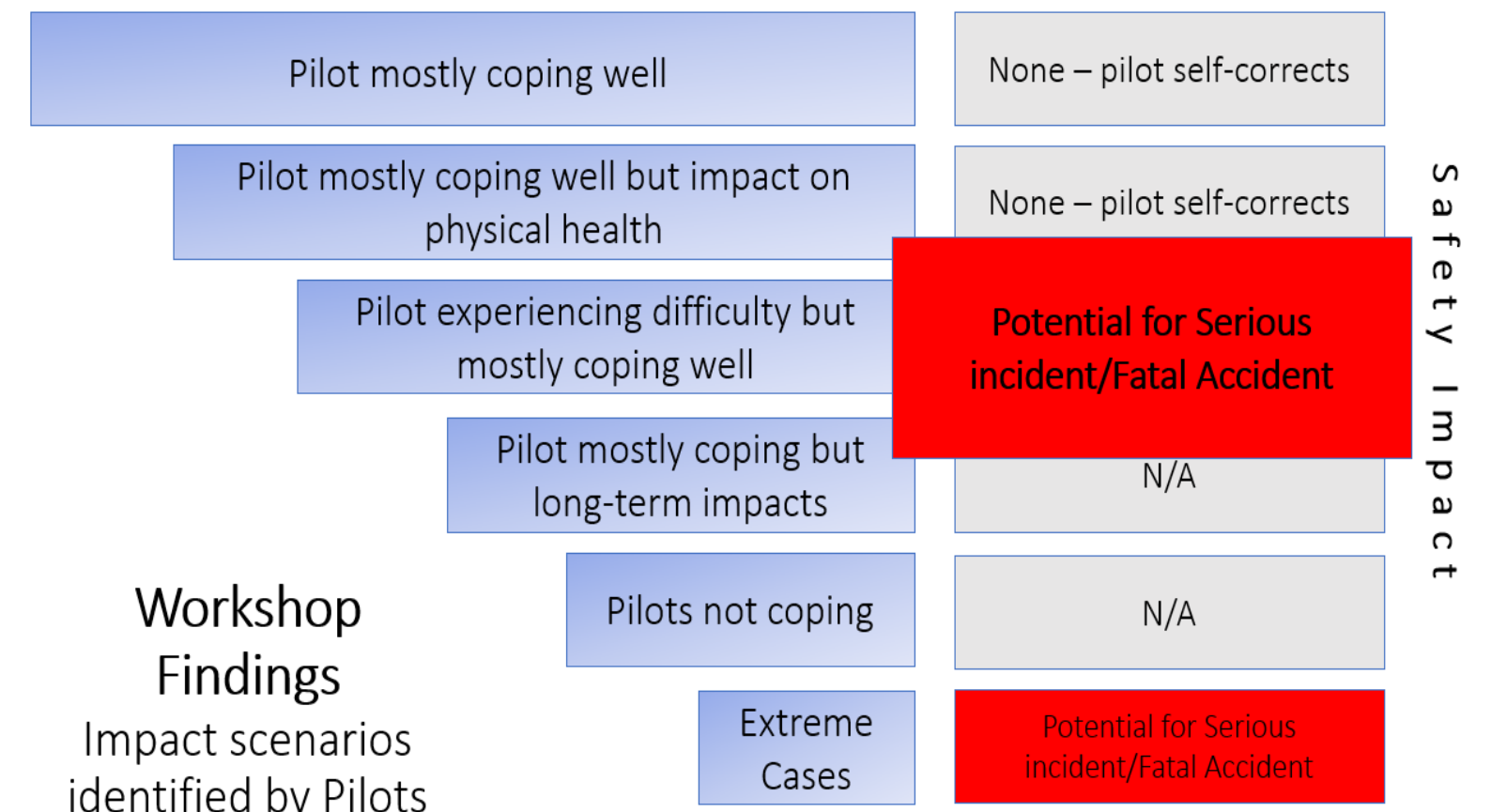
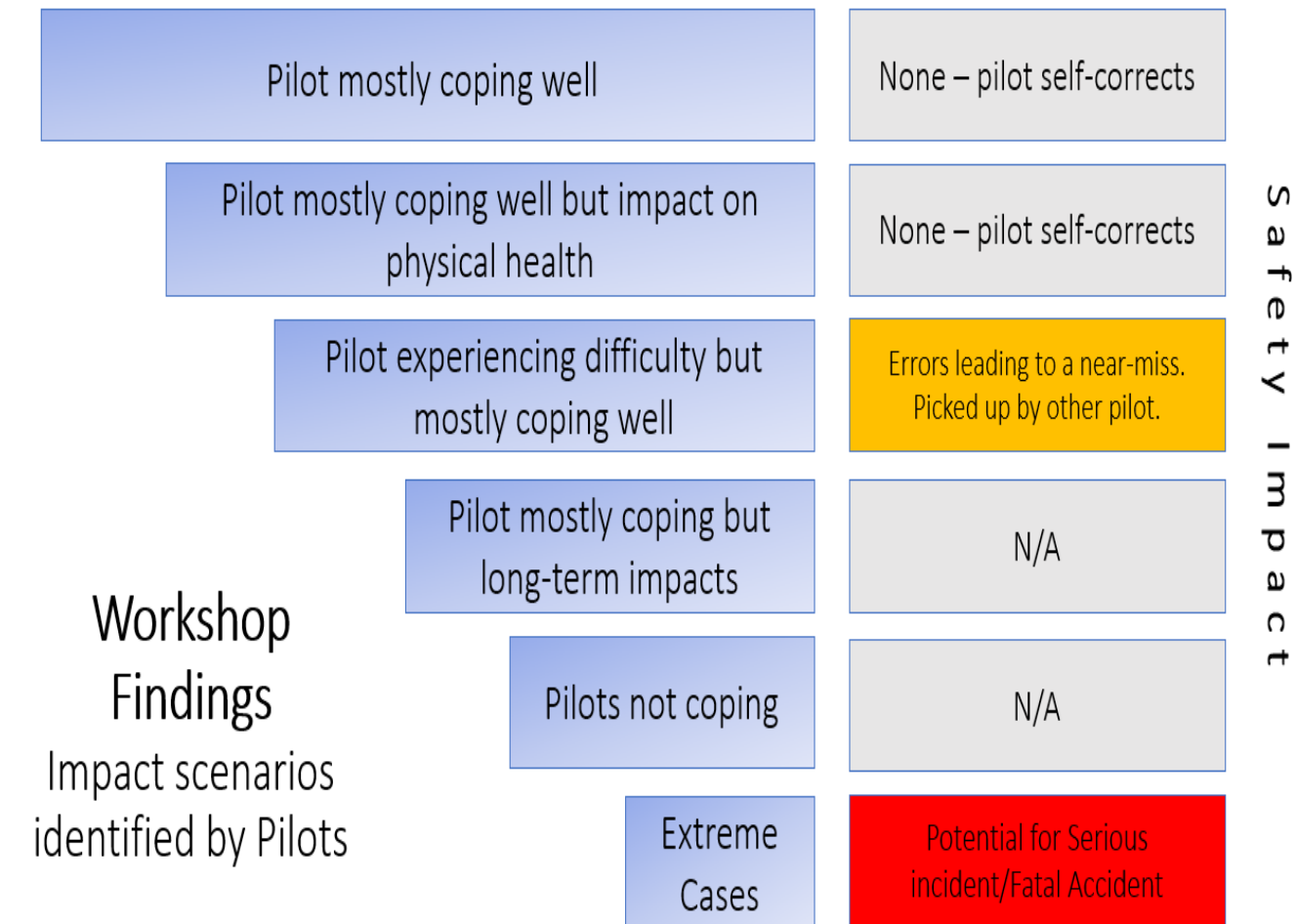
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Sources of WRS, Impact Scenarios

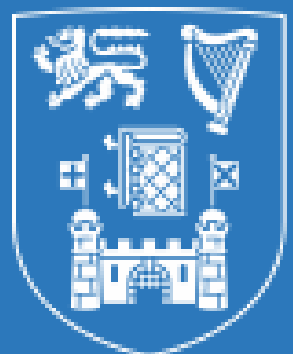
Sources of Work Related Stress (WRS)		
Factors impinging simultaneously on more than one pillar are highlighted with an *		
Biological	Psychological	Social
Working irregular hours*		
Working anti-social hours*		
Working within the close confines of the cockpit*		
Divergence of values between management and pilots*		
Unnatural location of work environment (5 miles up in the sky – no supports/can't step out)*		
Working long duties	Increased responsibility with reducing authority/support*	
Difficulties accessing fresh, healthy food	Lack of engagement (management and pilots)*	
Sedentary nature of working as a pilot	Perception of pilots possessing "The Right Stuff"*	
Cockpit environment – air quality, oxygen levels, noise	Perception that pilots are "living the dream"*	
	Time away from home*	
	Not having a sense of home/never at home*	
	Lack of certainty in relation to roster (changes)*	
	Being contacted by work when off duty if staffing/roster issues*	
	Managing and understanding cultural differences (international workforce)*	
	Commuting lifestyle*	
	Long working day in close contact with one other person (may or may not get on with)*	
	Captain responsibility – never switch off	Working inflexible / disruptive schedules
	Changing nature of the industry	Inflexible annual leave allocations
	Automation and prolonged periods of low stimulation	Ever-changing crew composition
	High training costs	
	Stringent medical certification	



Coping Strategies Associated with Lower Depression Severity Levels

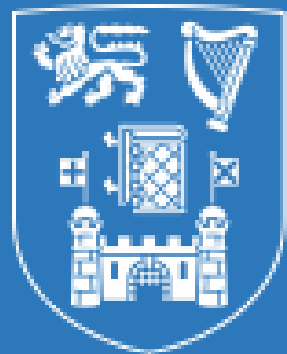
Parameter	Value	Std Error	t-value	p-value	Odds Ratio
Sleep - daily	-0.89	0.26	-3.36	0.0007	0.41
Exercise – few times a week	-0.77	0.22	-3.50	0.0004	0.46
Exercise - daily	-0.69	0.29	-2.37	0.01	0.50
Exercise – few times a month	-0.66	0.32	-2.04	0.04	0.52

- **Interpreting the odds ratio (OR)**
- General rule of thumb: if the Odds Ratio is less than 1, then it's associated with a probability of having a lower depression severity level
- p-value tells us whether a relationship was statistically significant, whereas the Odds Ratio tells us only the nature of said relationship (the **p < 0.05** coping strategies to be statistically significant)
- Co-relation not causality (coping strategy causing the PHQ score to be below 10 or vice versa)
- The model doesn't tell us whether the strategy made a difference - to claim that, we'd have to observe pilots over a period of time (while controlling all other variables), and asking them to use certain coping mechanisms and see whether they make a difference over a period of time. We're only claiming association.
- Note that this does not consider interaction between different coping methods



Algorithm & Risk Rating

Classification	Factor	Factor	Risk Rating		
			H	M	L
Biological	1	Sleep & fatigue			
	2	Physical Exercise			
	3	Diet			
Psychological	4	How feeling (stress)			
	5	Emotional stability and mood			
Social	6	Talking to others/seeing people			



Personae (Pilots)

Simon

- 48 years
- Captain, short range, F/T
- 24 years flying
- Uses social media apps
- Working in home country
- Young family, lives near airport (short commute)
- Social isolation and health problems (musculoskeletal issues - back and knees)
- Manage sleep, diet & physical activity



Brian

- 56 years
- Captain, long range, F/T
- 34 years flying
- Limited experience with social media and phone apps
- Does not talk about MH/macho culture/stigma
- Working in home country
- Divorced, family grown up, lives outside Dublin (long commute to airport))
- Unhealthy behaviours (occasional binge drinking, binge eating)
- Fatigue and health problems (gastrointestinal and musculoskeletal issues)
- Manage sleep, diet and physical activity and MH risk



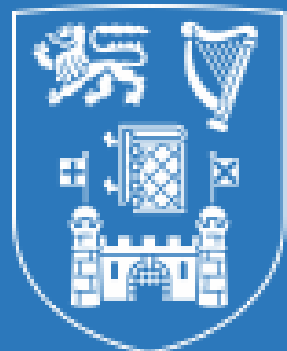
Karl

- 28 years
- First Officer, short range, F/T
- 3 years flying
- Uses Fitbit and social media apps
- Not working in home country, single, long commute to airport
- Healthy habits (exercise, diet)
- Fatigue, social isolation and loneliness
- Manage sleep, physical activity and MH risk



Francis

- 45 years
- First Officer, Short range, P/T
- 18 years flying
- Uses social media apps
- Working in home country, young family, lives near airport (short commute)
- Fatigue and burnout
- Manage sleep and roster (work life balance)
- Roster bidding important

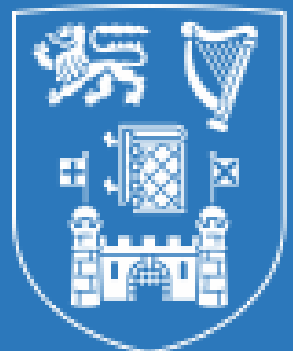
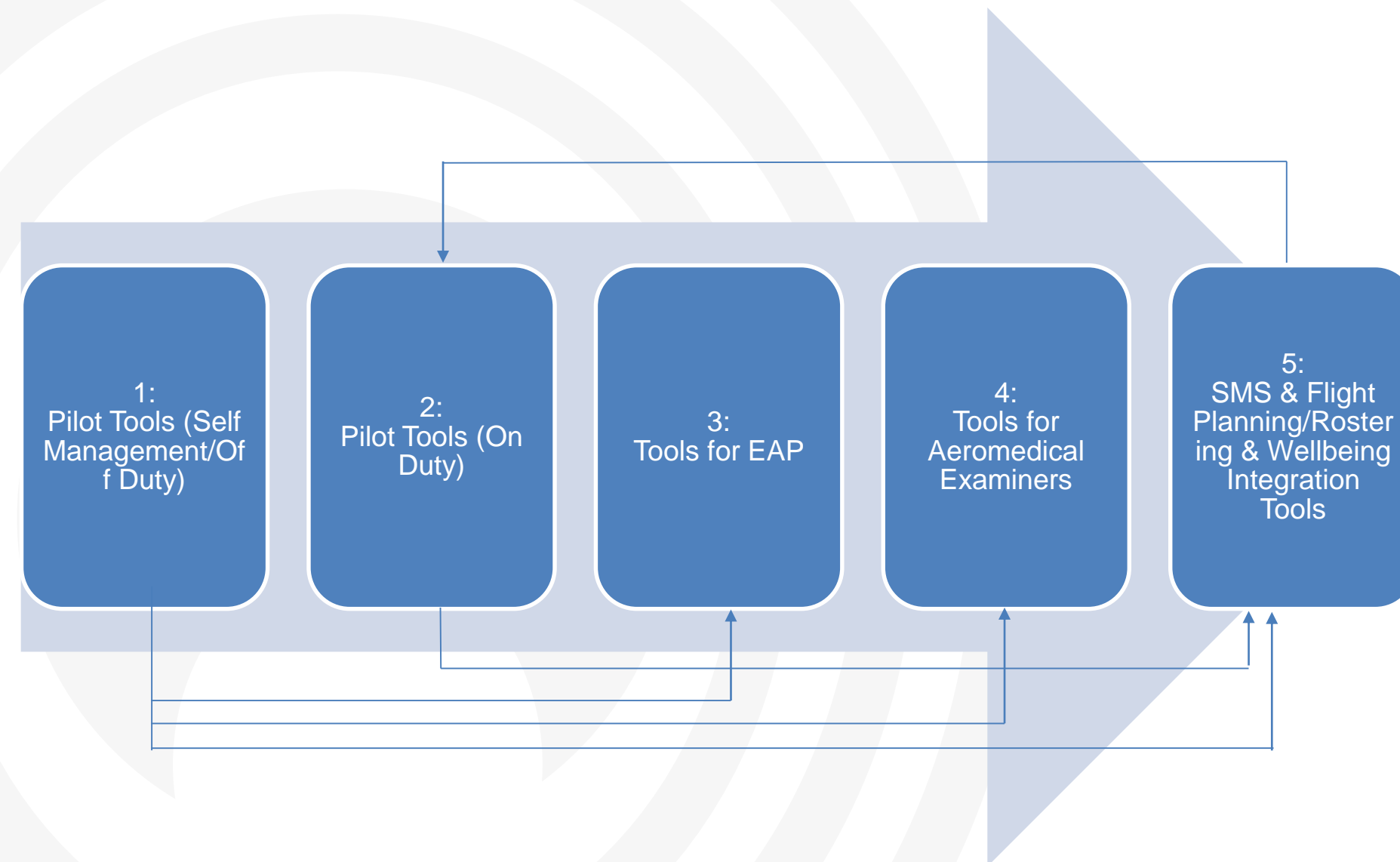


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Tool Framework

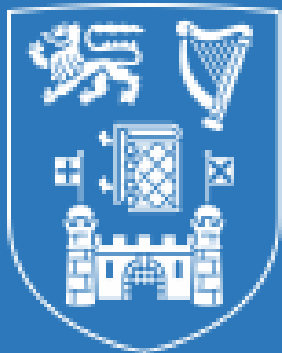
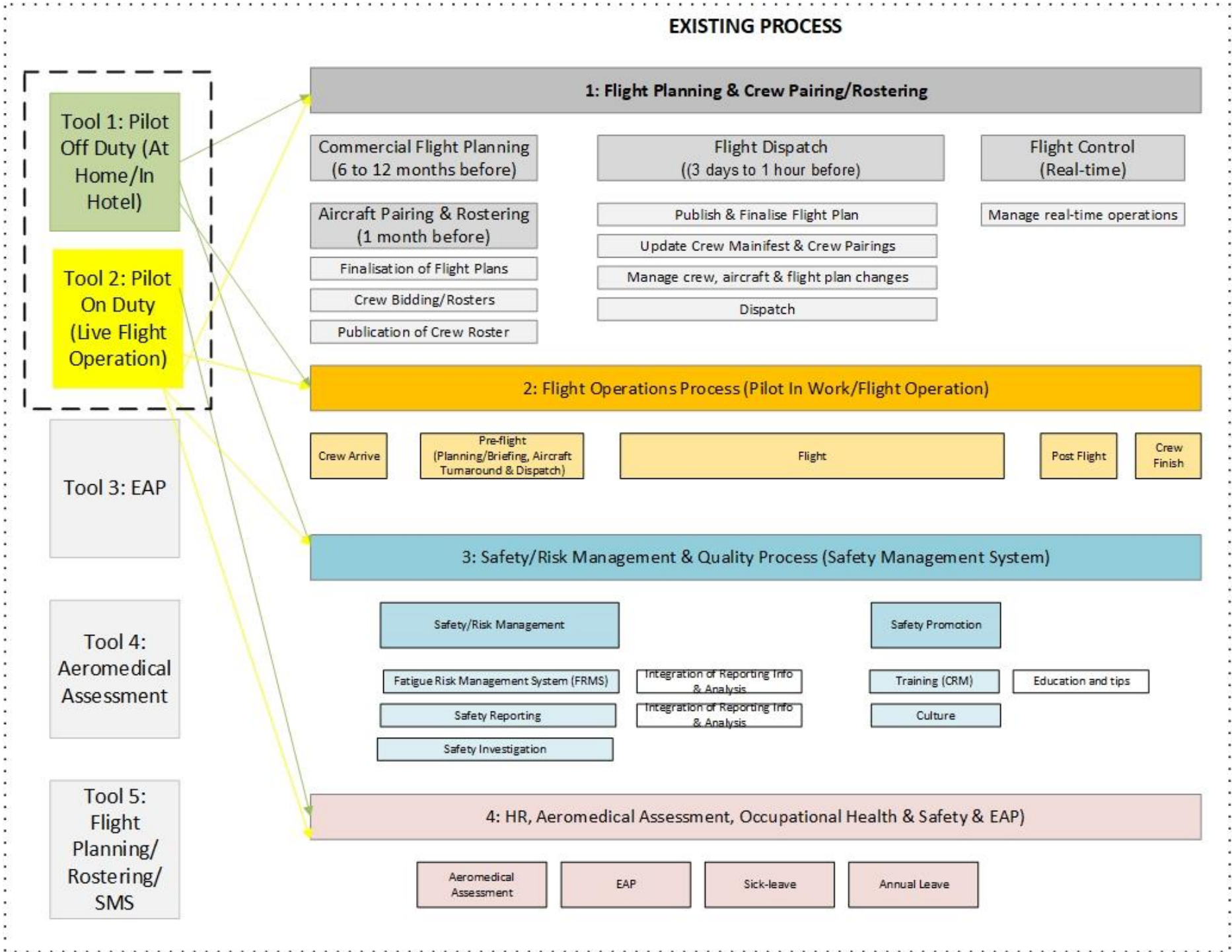
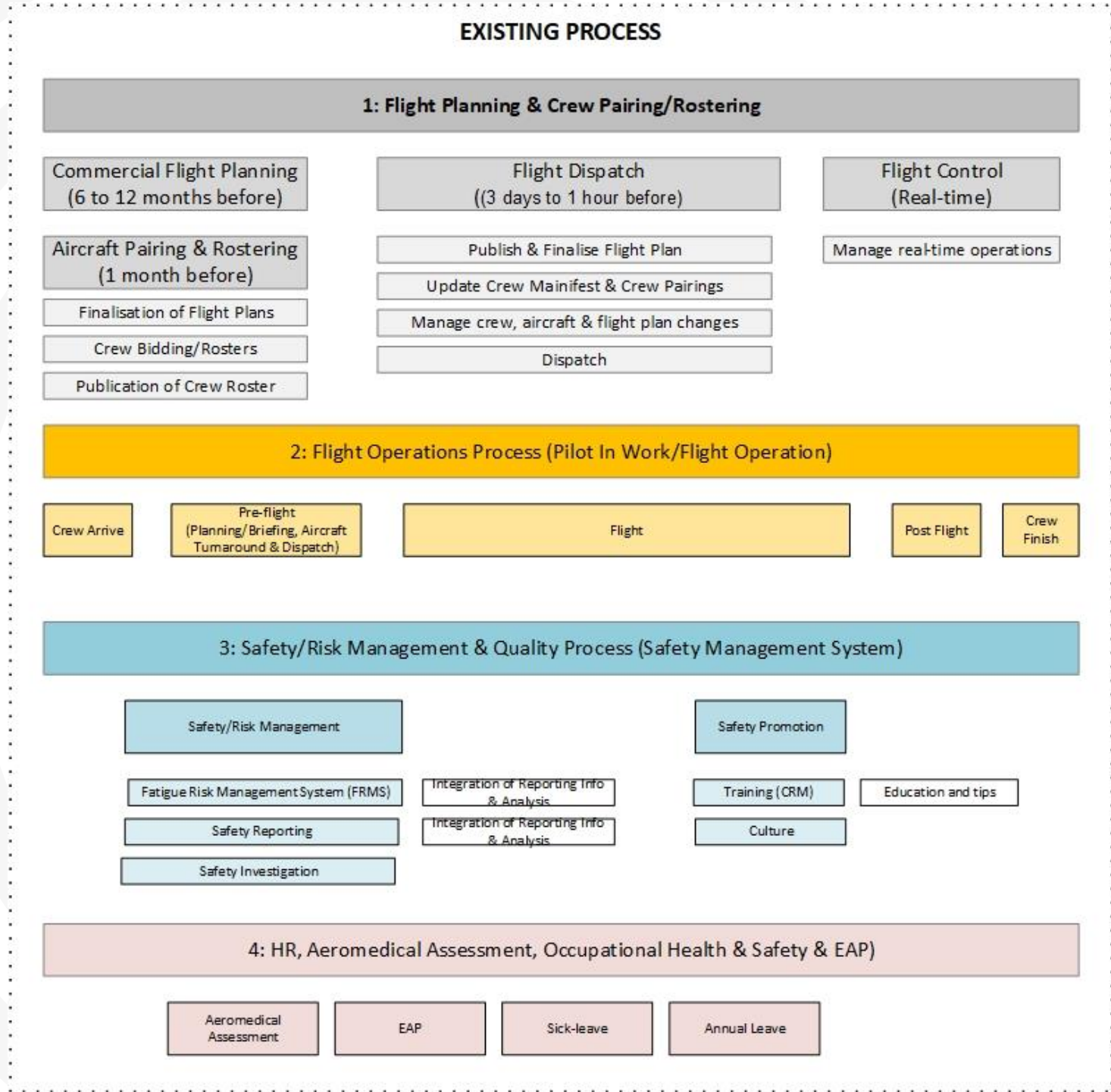


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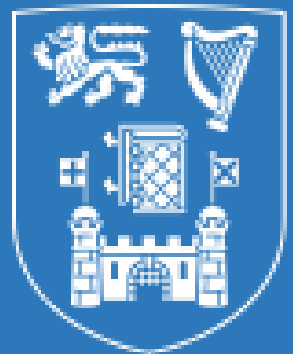
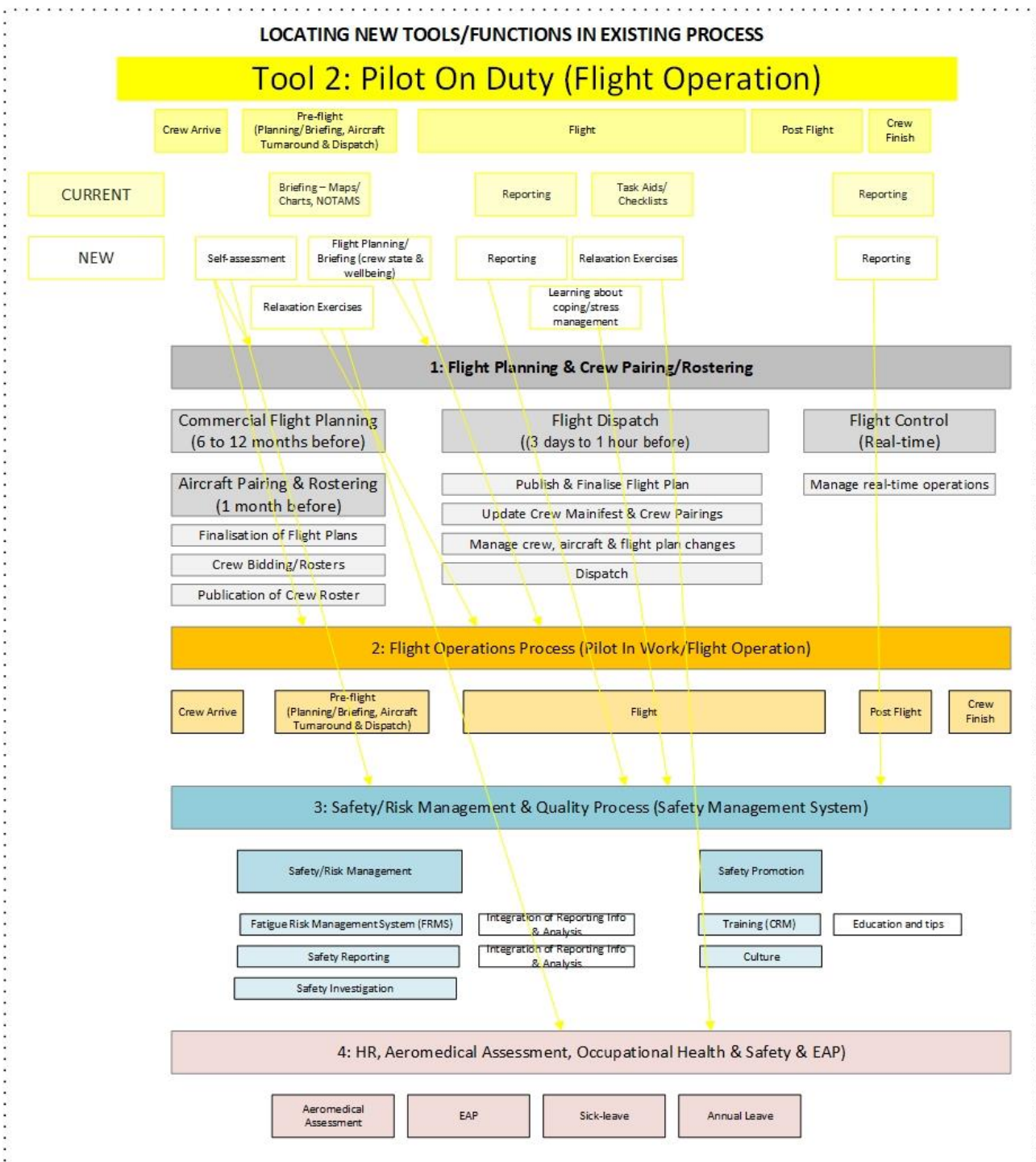
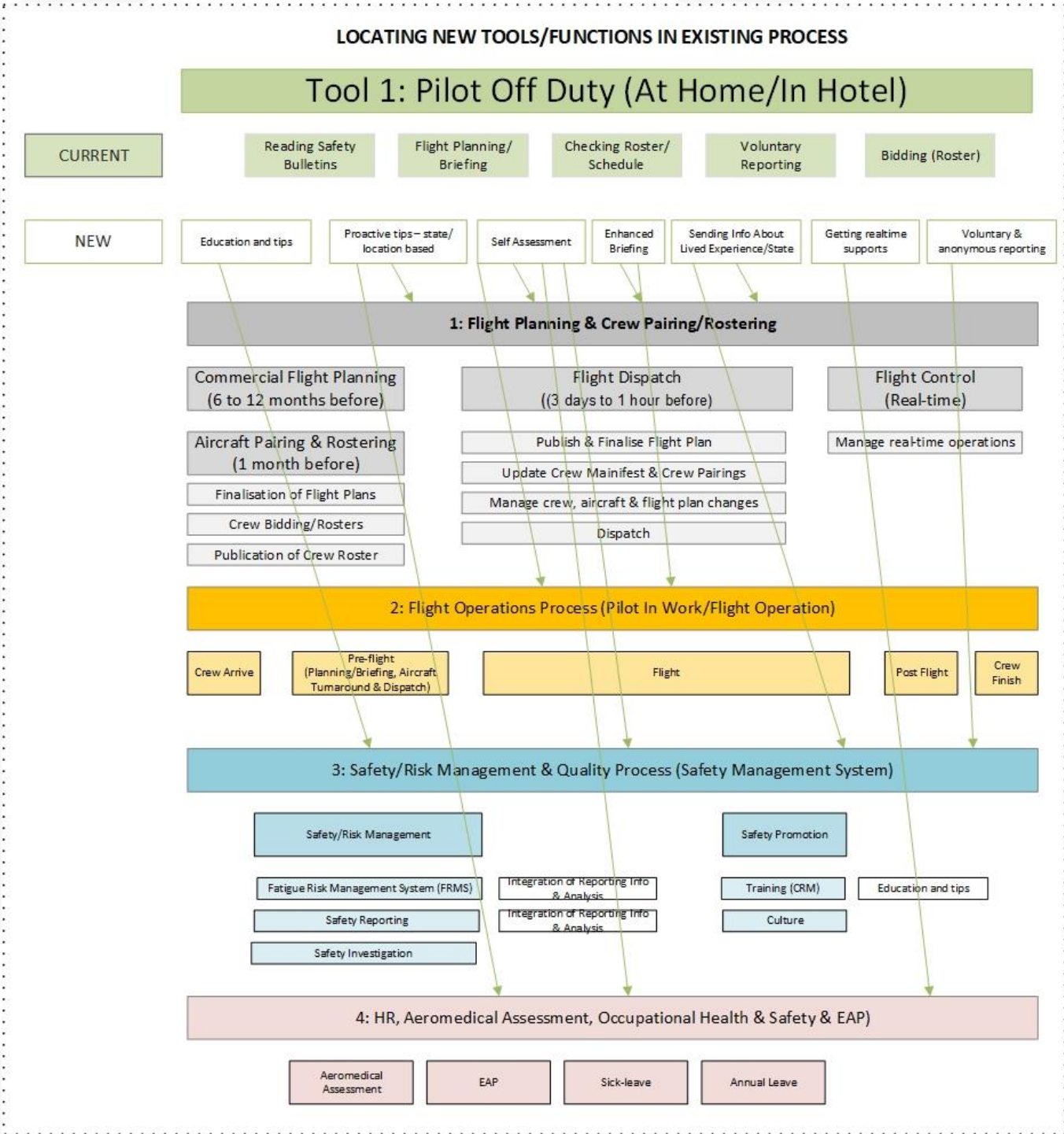


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Situating In Process (Existing Process)



Situating In Process (New Process)

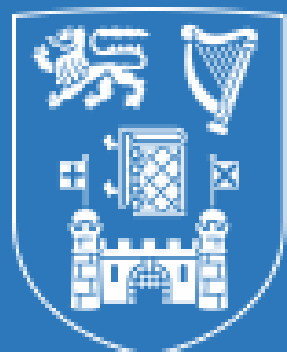
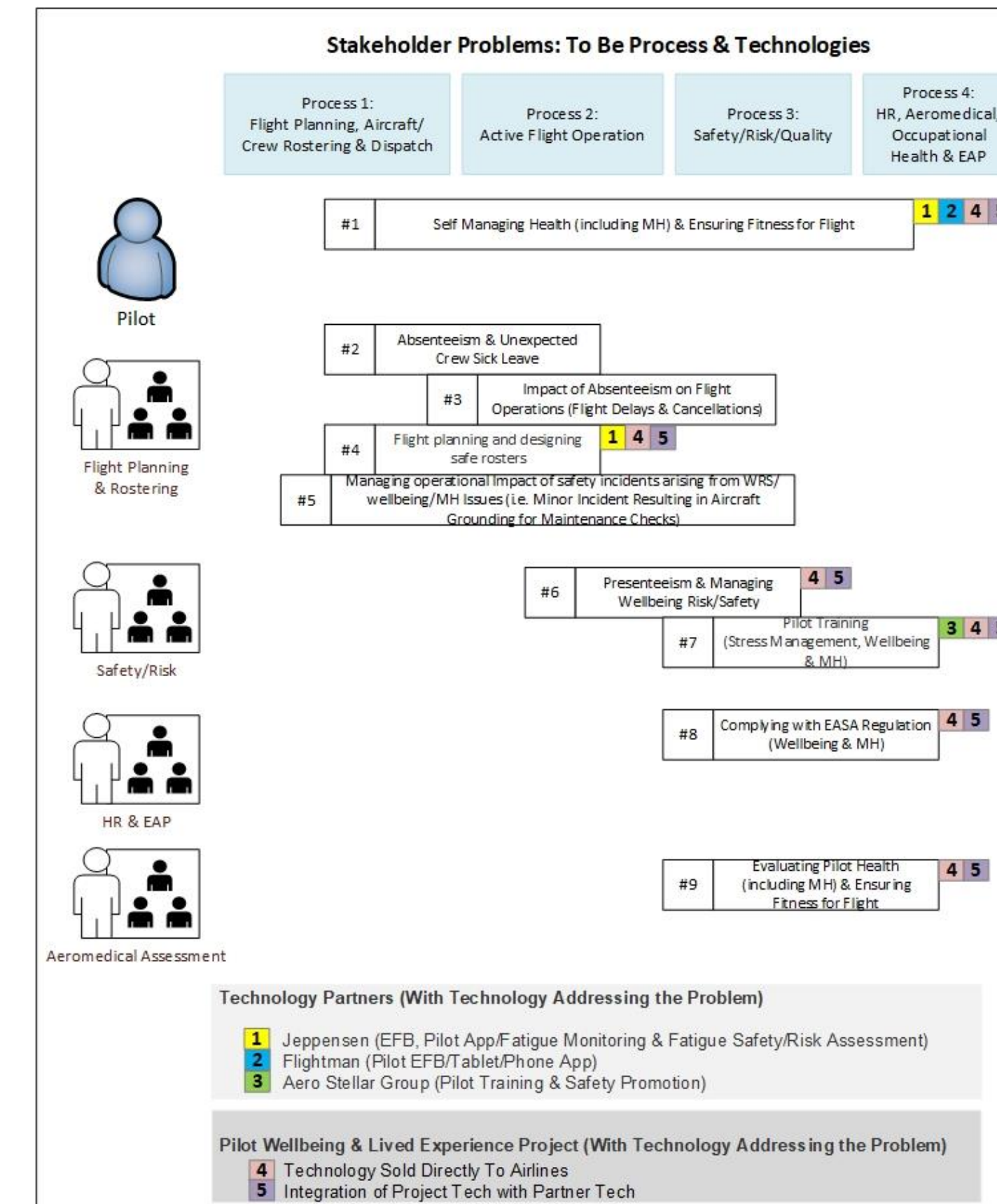
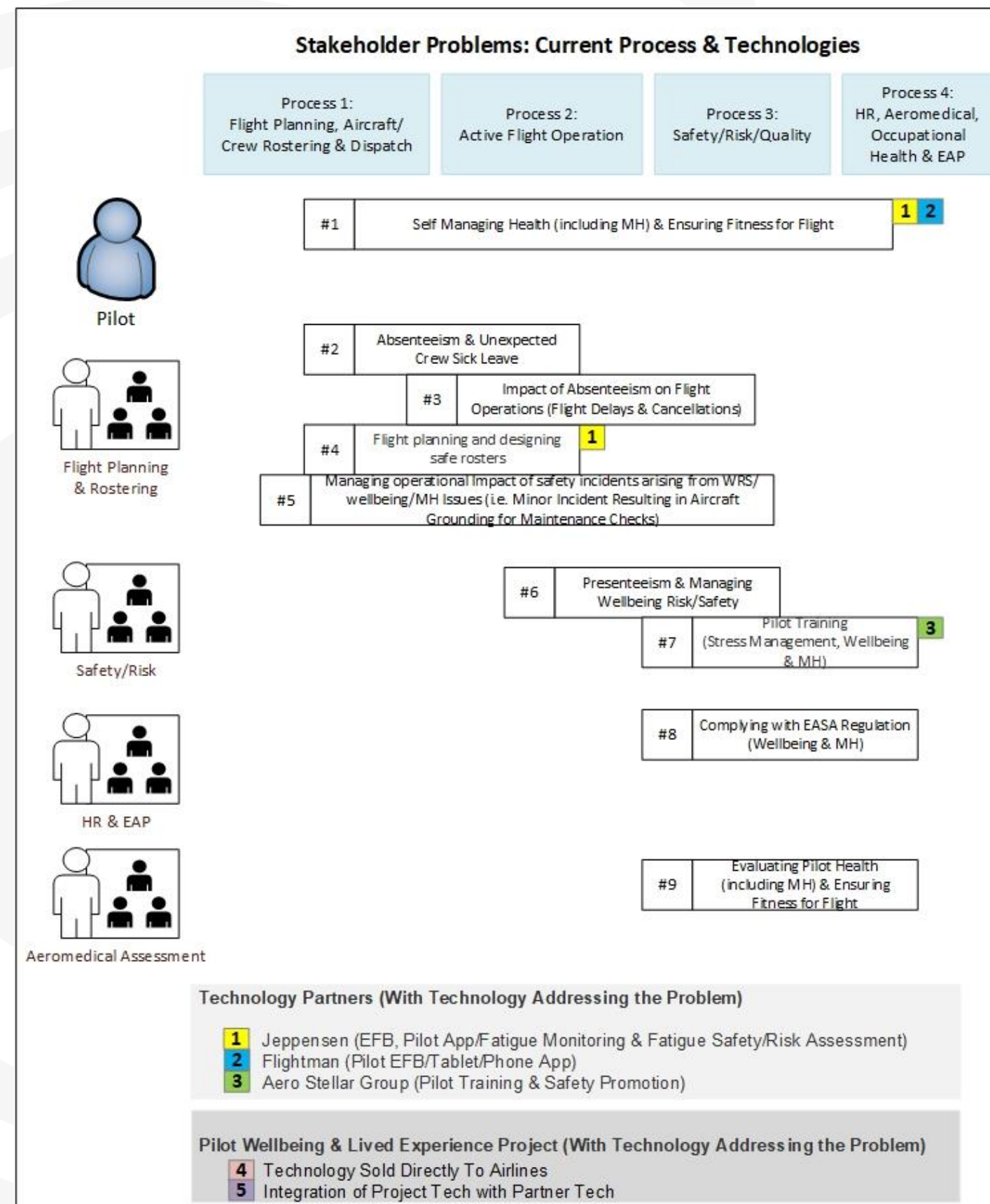


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Customer Journey (Current & Future Technologies)

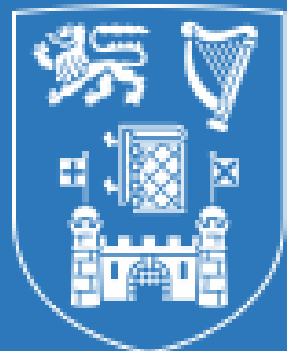


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Tool 1: Pilot Self Management (Outside Work)

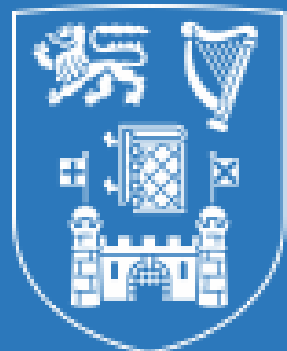


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Tool 2: Operational Tools (Pilot In Work/On Duty)



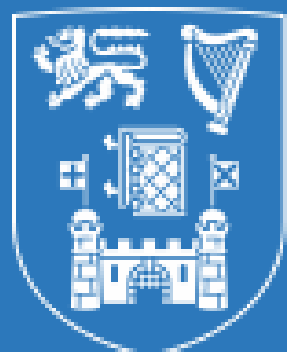
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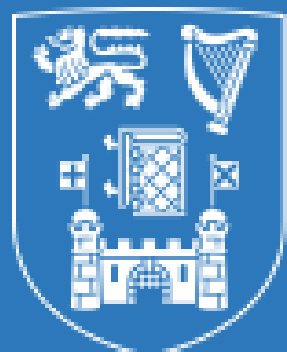
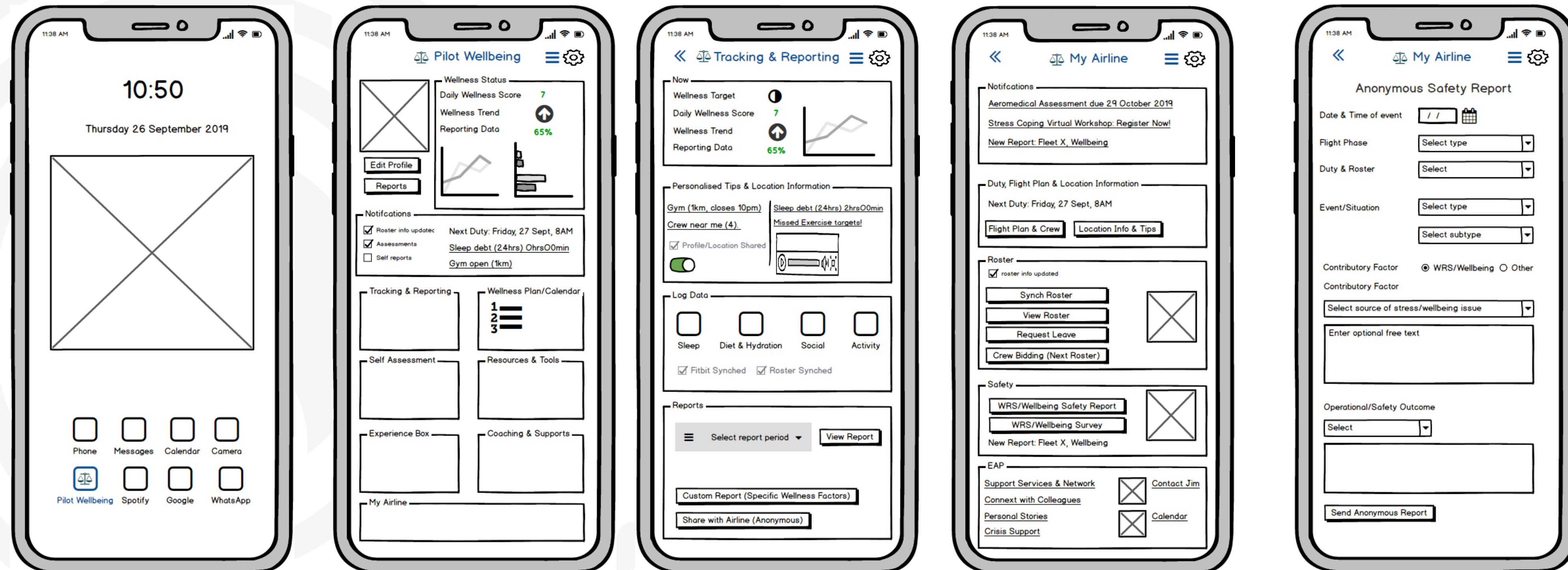
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Auto-Harvesting Data

Classification	Factor	Factor	Specific info	Our App or Other App (Auto-harvesting)	Example Other Apps/Auto-harvesting
Bio	1	Sleep & fatigue	No of hours sleep Sleep deficit Sleep disruption Sleep displacement	If using other, get from that Otherwise, 1 or 2 questions	From Crew Alert (if using) Or Garmin or Fitbit
	2	Physical Exercise	No of steps		Garmin or Fitbit
	3	Eating	1 question?		
	4	Hydration	1 question?		
Psycho	5	How feeling (stress)	Heartrate Perceived stress (self-report)	If not other App, 1 question each day?	Garmin has heartrate If using MH app, take self-report from that
	6	Emotional stability and mood		If not other App, 1 question each day?	If using MH app, take from that
Social	7	Taking to/contact with family			
		Talking to others/seeing people		1 question each day? If using mobile phone calendar – quick question about what pencilled in – did you do X	



Examples, Tool 1



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