

SUPPORTING PEOPLE AT THE HEART OF THE AVIATION SYSTEM

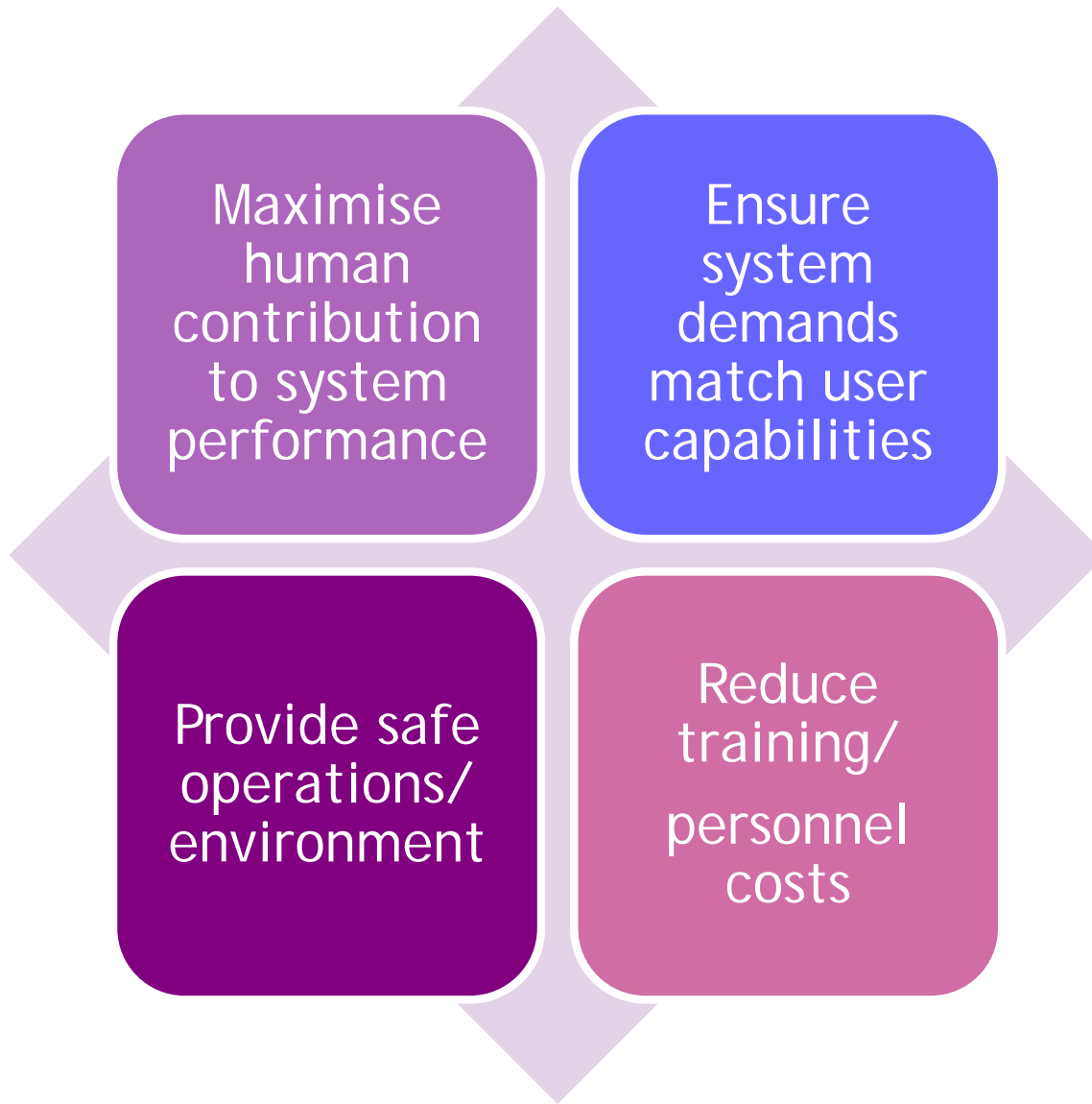


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WHY DO PEOPLE MATTER?

- People add flexibility and resilience
- Over the past 10 years, 2/3rds of commercial airline accidents have been attributed to human error
- About 60% of the whole life costs of major systems are attributable to factors such as recruitment, training, and salaries of operational and maintenance personnel

WHAT IS HUMAN FACTORS?

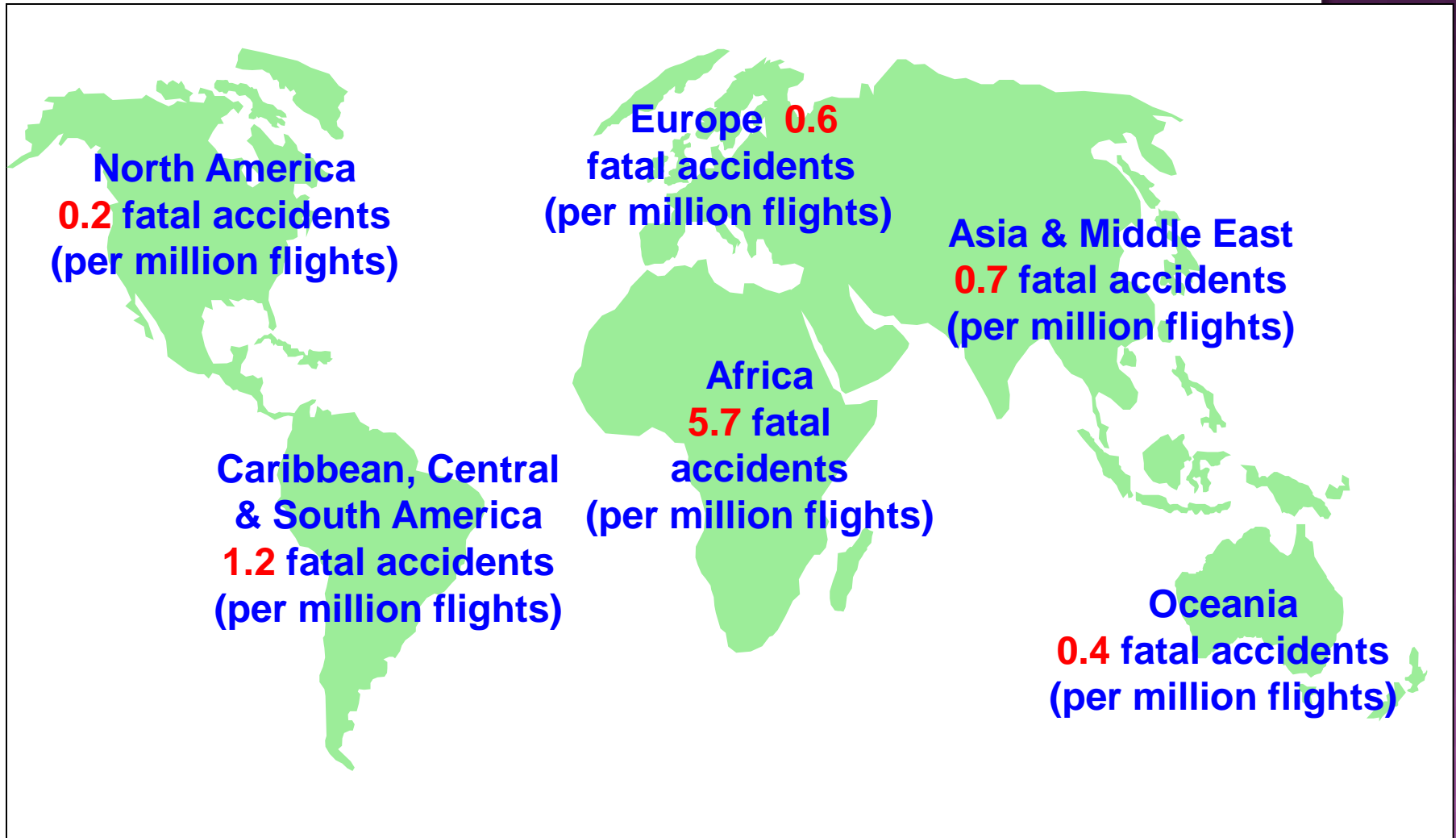


ROLE OF HUMAN PERFORMANCE



- Humans exist within a system
- We depend upon the human to fulfil certain functions
- If they can't deliver reliably, we can adjust the system to compensate

WORLDWIDE AVIATION SAFETY



RELATIVE SAFETY RATES (UK)

Transport Mode	Fatality Rate per Billion Kilometres (1995-2009)
Air	.003
Rail	.27
Car	2.57
Offshore Helicopter	15.2
Pedal Cycle	34.6
Pedestrian	43.27
Two-wheeled motor vehicle	106.67

UK SAFETY

fatal accident – commercial passenger aeroplane	Every 10+years
fatal accident – public transport helicopter	Every 4 years
fatal accident – recreational aviation aircraft	Every 1 month
high severity mandatory occurrence report (MOR)	Every 2 weeks
airspace infringement	Every 9 hours
mandatory occurrence report (MOR)	Every 35 minutes
UK commercial flight arrival / departure	Every 30 seconds

SAFETY MANAGEMENT SYSTEMS

- Legal requirement not just to comply with rules but to proactively manage risks
 - **Right Risks**
 - **Right Actions**
 - **Right Outcomes**
- Accountable Managers are key
- Provide evidence of operational outcomes



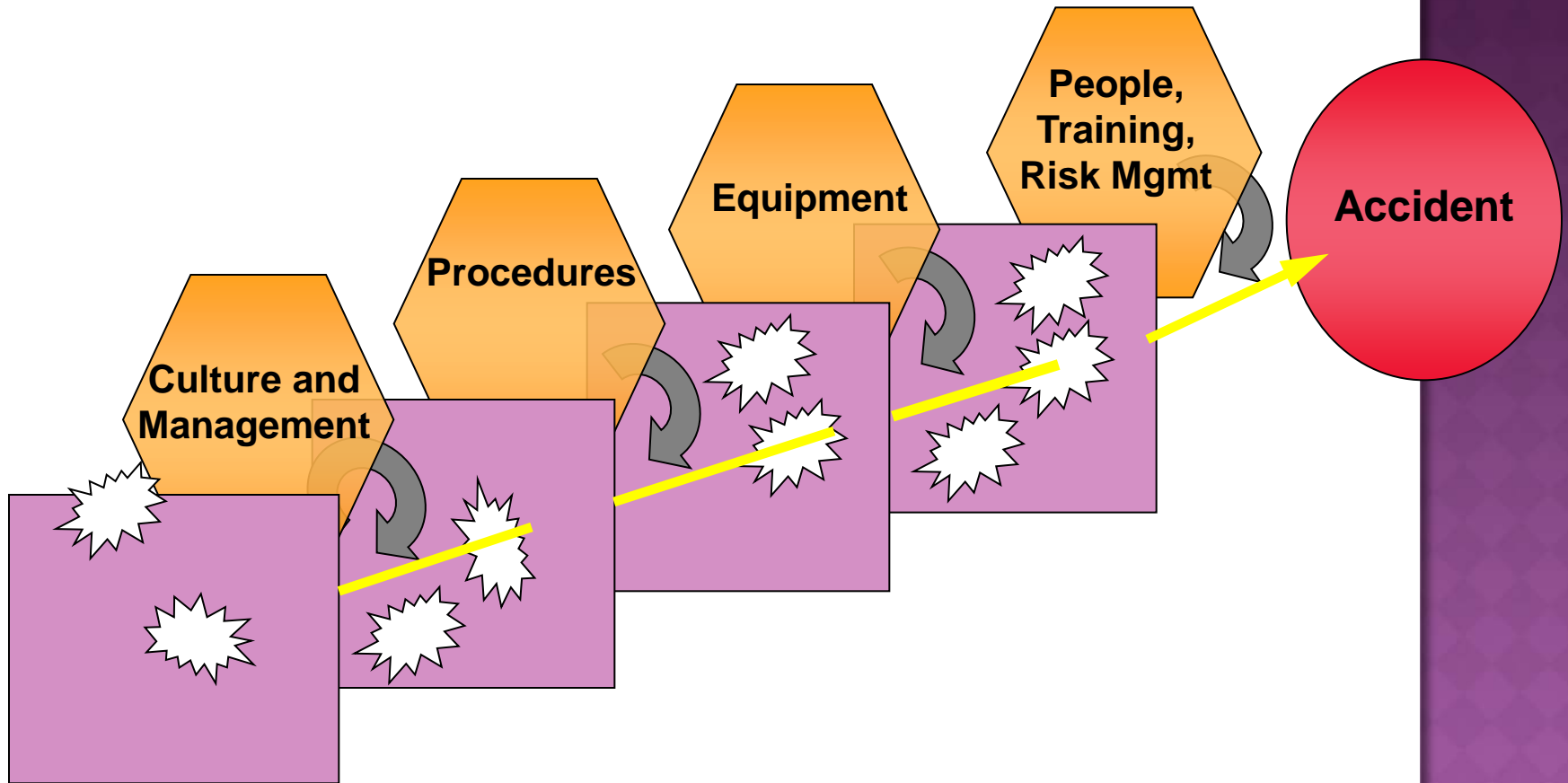
VISIBLE SAFETY PLANS

- Loss of Control
- Runway Excursions
- Runway Incursions
- Controlled Flight into Terrain
- Airborne Conflict
- Ground Handling
- Fire



Working in partnership across the total aviation system is key to success

STRENGTHENING RISK CONTROLS



With leading indicators of performance

GOALS AND TASKS

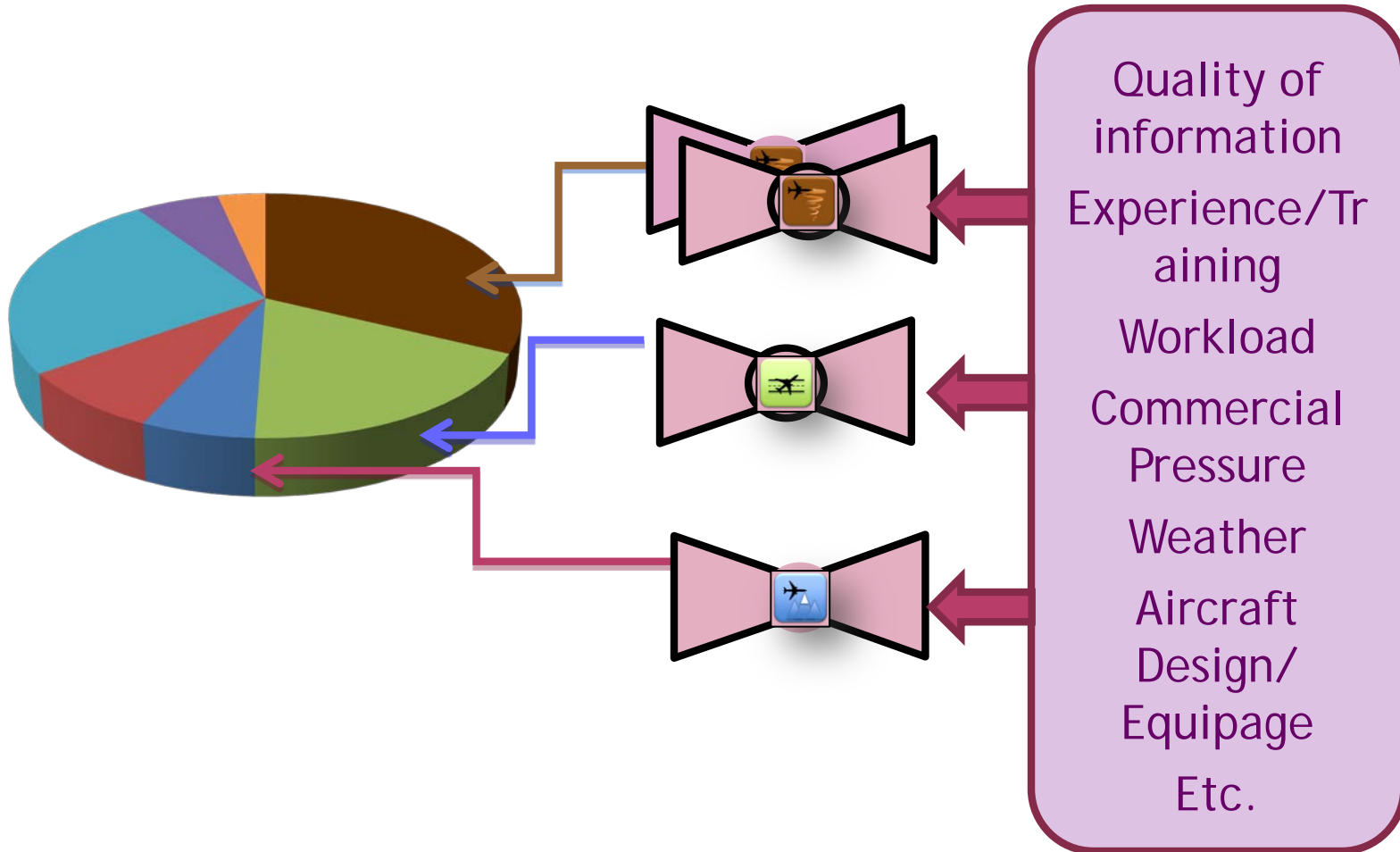


LINKING CAUSE AND EFFECT

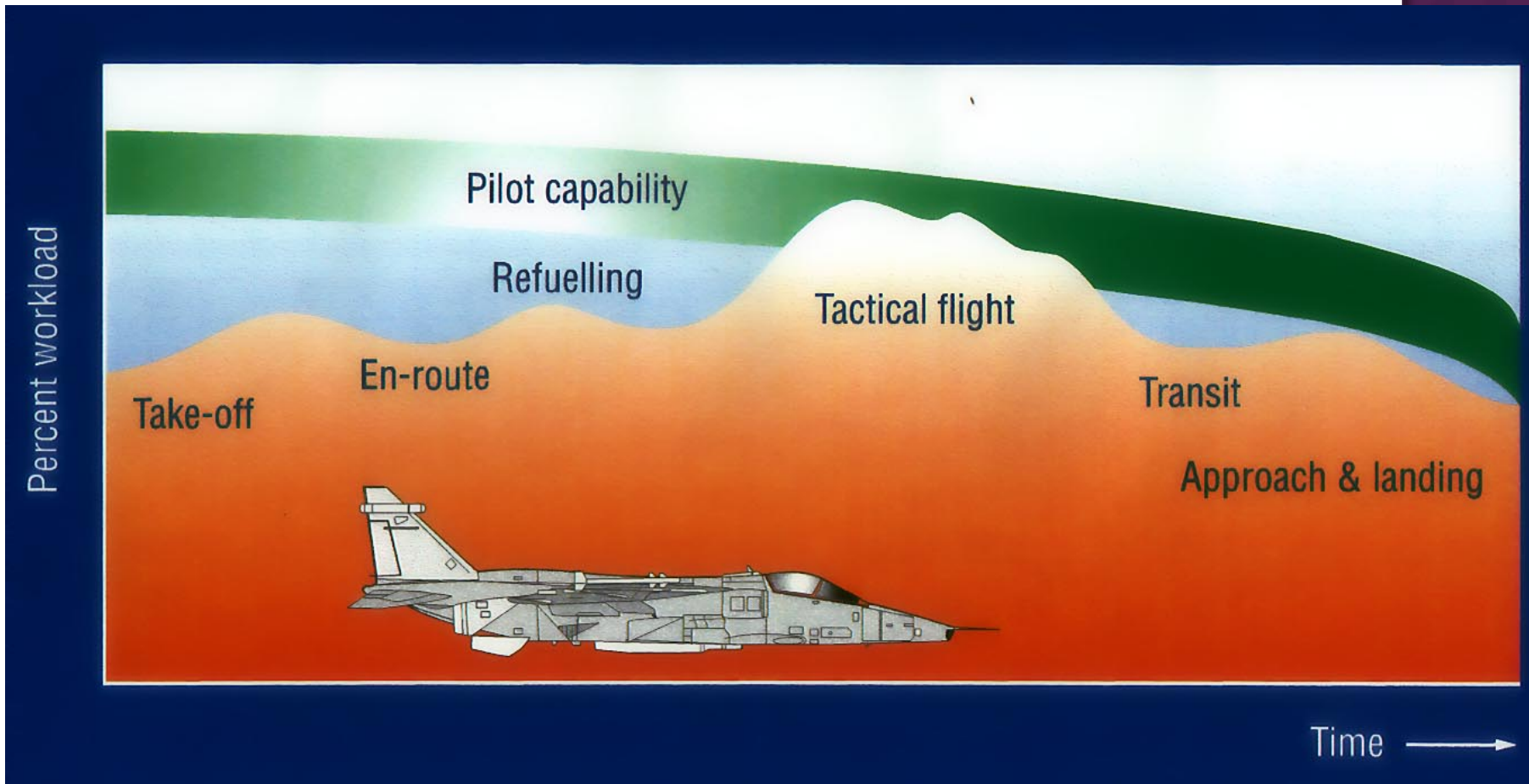
ACCIDENT/INCIDENTS

SCENARIOS/TASKS

SYSTEM ROOT CAUSES



MATCHING CAPABILITY AND NEED



HUMAN TASKS

Processing

Overload
Stress
Wrong framework

Interpretation

Heuristics (recency,
saliency)
Mis-calibrated
Bias



Diagnosis

Poor information / system
Multiple possibilities
Experience: seen it before

Perception

Distraction
Expectation
Inattention

Action

Inadequate Skills
Inadequate monitoring
Poor co-ordination

Decision

Risky Shift
Poor CRM
Poor risk management

CHARACTERISTICS OF HUMANS

- The Good News
 - Integrate information
 - Trainable
 - Adaptable
 - Problem Solvers
 - “Can Do”
- The Other News
 - Slips & Lapses - normal - (1×10^{-3})
 - Mistakes - training/ judgement
 - Violations - culture/ pressure
 - Skills - vary, can fade, don't vanish
 - May have own motivations



SHOULD WE FIX THE PEOPLE OR THE SYSTEM?

Human Error Type	Action
Slips & Lapses	SYSTEM: Design or procedure
Mistakes	PEOPLE: Training/ experience Better information Peer review
Poor Skills	PEOPLE: More or more frequent practice Select for aptitude Training
Violations	BOTH: System doesn't provoke it Checks and enforcement Education

WAYS TO IMPROVE HUMAN PERFORMANCE

People

- Competence
- Motivation
- Team working
- Risk perception
- Fatigue
- Supervision

Workplace

- Equipment Design
- Physical Environment

Organisation

- Performance targets/feed back
- Procedures
- Planning
- Maintenance
- Pay/conditions
- Process Design

Strategic

- Company Standards
- Contracting Strategy
- Profitability
- Worker Engagement /Comms

External

- Markets
- Regulation
- Social and Political
- Industry Standards

A POSSIBLE MODEL?

- Identify **human actions** that are key to preventing accidents/incidents
- Identify whether assumed performance is
 - **explicit** and clear in safety assessment
 - **realistic** according to known science (e.g. slips & lapses happen approx 1×10^{-3})
- **Measure** actual performance to compare with assumed and feed back the reality into the safety assessment

KEY QUESTIONS

What level of human performance is expected?

Is this realistic given the likely conditions?

Is there evidence of training, supervision, procedure and culture being adequate?

How will the person/system get feedback on how well they are performing?

Does the task match norms/conventions?

What are the consequences of an error?

- Single errors?
- Error chains?

What are Error effects?

How will they be detected?

How will they be recovered?

IN SUMMARY: PEOPLE ARE AT THE HEART OF THE AVIATION SYSTEM

- ◉ The single greatest factor both in accidents, and in the prevention of accidents is human performance
- ◉ Human factors aims to design the workplace to support performance and minimise the impact of predictable errors

