Enhancing Runway Safety: A predictive approach through LOSA

IATA SIRM (2024)

Nikhil Mathen
Fleet Captain Human Factors
Operations Safety
IndiGo

Runway Incursions – A growing concern

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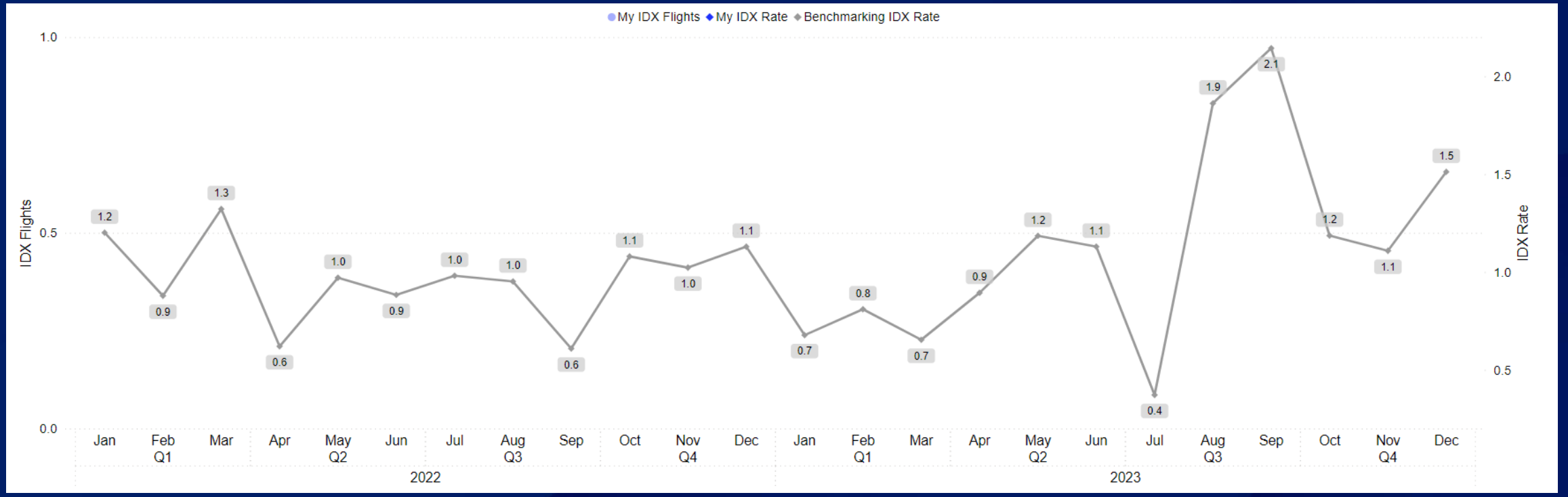


Runway Incursions – A growing concern

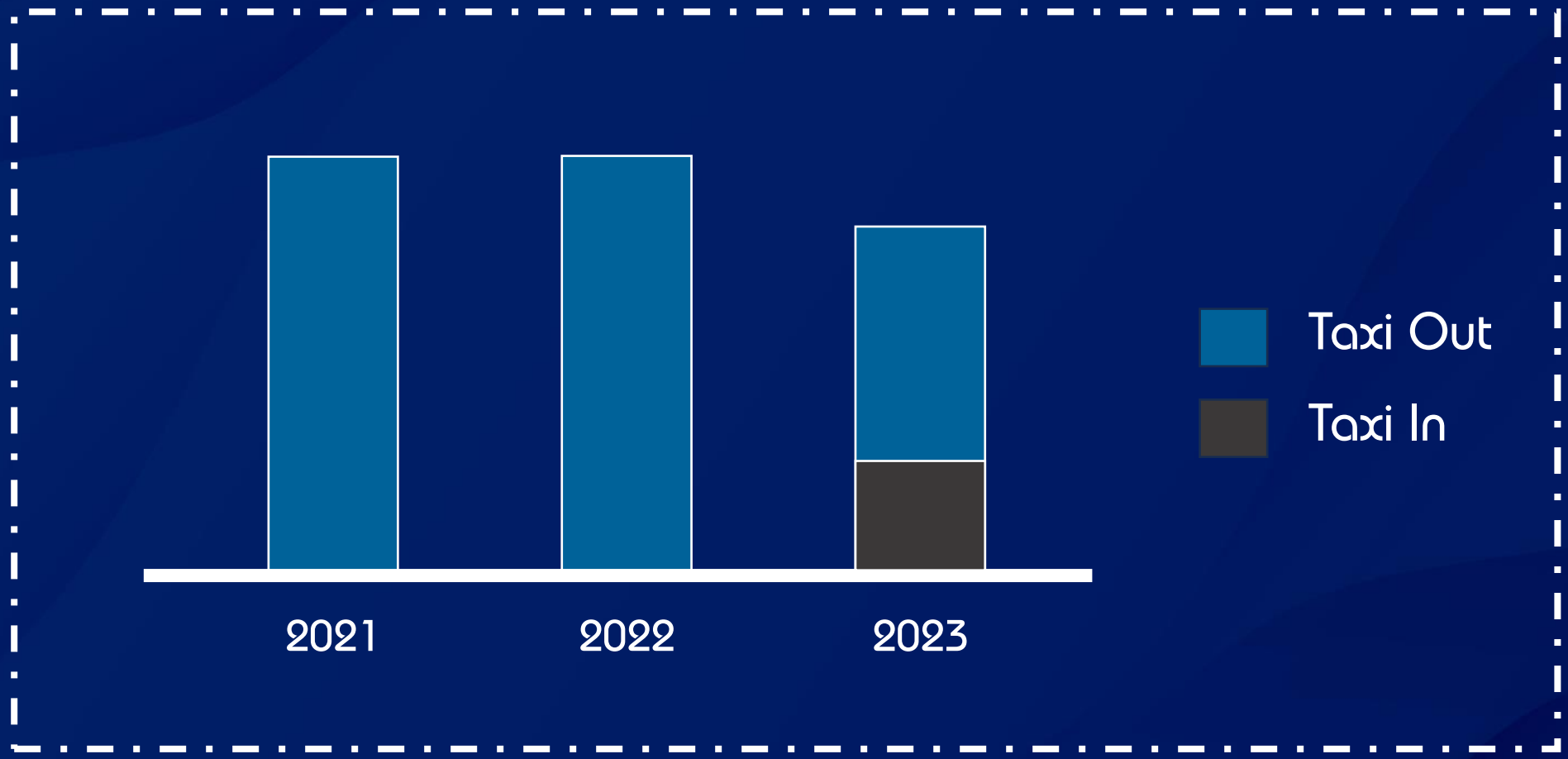
- Runway Incursion at Tokyo Haneda Airport (Jan 2' 2024).
- Global increase in runway incursions.
- Large number of close call events in the U.S.

Airline Close Calls Happen Far More Often Than Previously Known

Airline Incidents Show a System Under Growing Stress

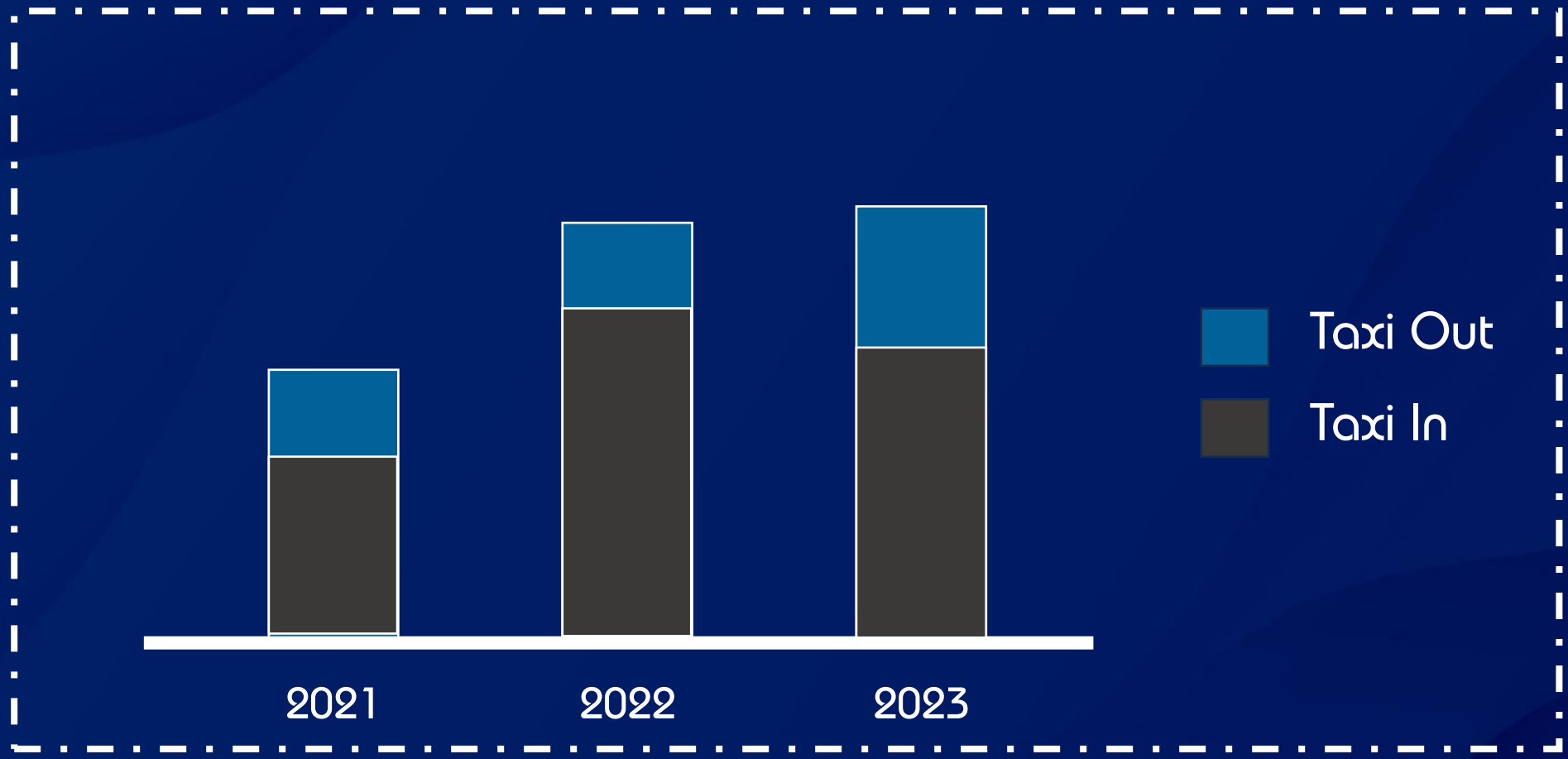
FAA Identifies 19 Serious Near Miss Incidents In 2023: The Most In 7 Years

Runway Incursions



Too infrequent to get a true picture of risk.

Taxiway Incursions



Alignment of Safety Data Training Data Taxonomies

Reactive

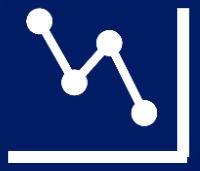
E.g., Analysis
Accident -
Incidents

Incident Analysis
+
Reports

Reactive/Proactive

E.g., Analysis
Of event
including UASs

Flight Data Analysis
(FDA)



Mandatory Occurrence
reporting

Proactive/Predictive

E.g., Analysis
Of Normal Work

Line Oriented Safety
Audits (LOSA)

Voluntary Safety
reporting

Threat and Error Management Chain

Anticipate/Recognize and Mitigate

Threat

Pilot Competencies

Detect/Correct

Error

Pilot Competencies

Recognize/Recover

Undesired Aircraft State

Pilot Competencies

END STATE

C O M P E T E N C I E S

Application of Knowledge

Application of Procedures and Compliances with Regulation

Flight Path Management -Manual

Flight Path Management Automation

Pilot Competencies

Leadership & Teamwork

Problem Solving and Decision Making

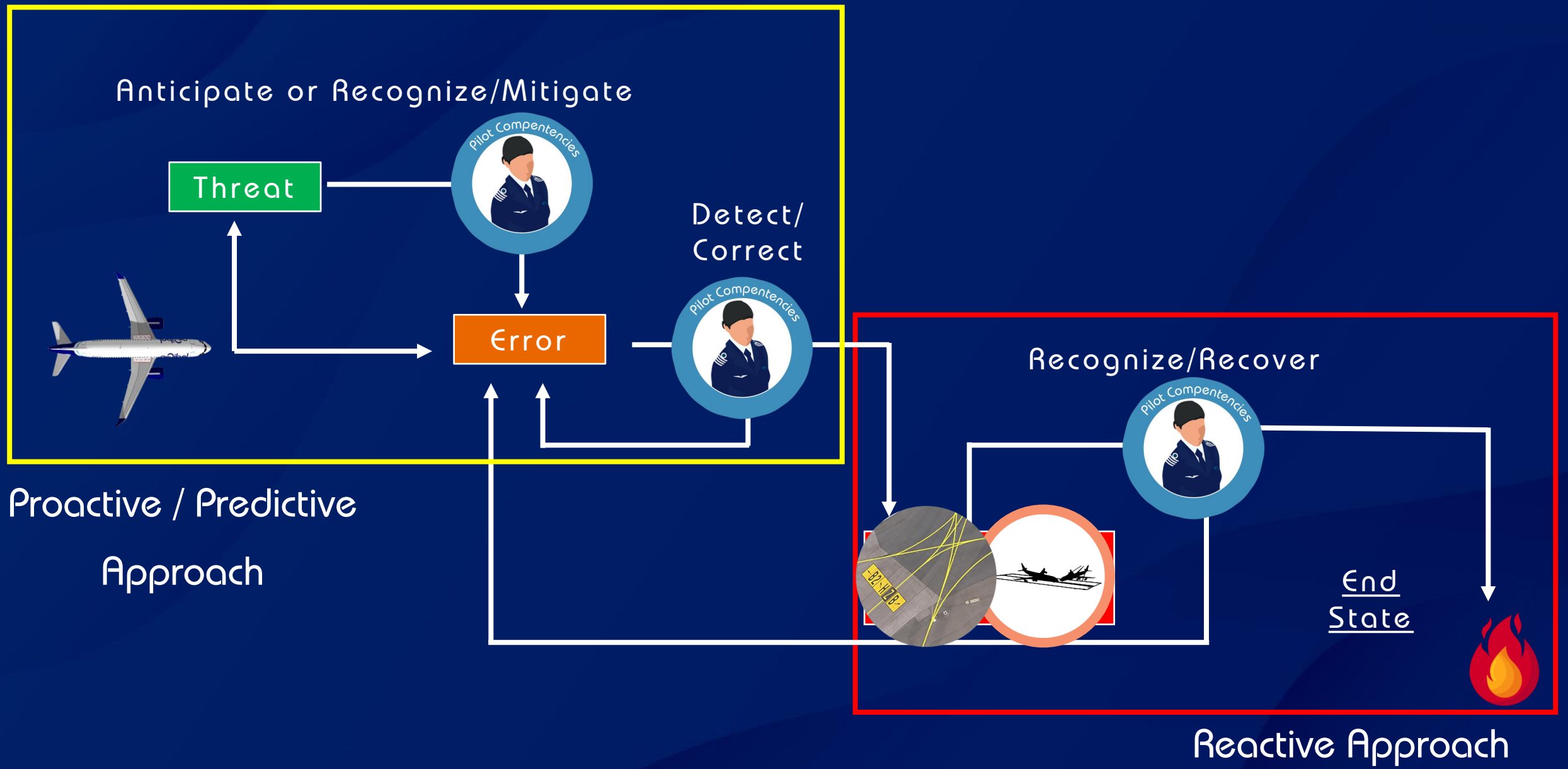
Situation Awarness and Management of Information

Workload Management

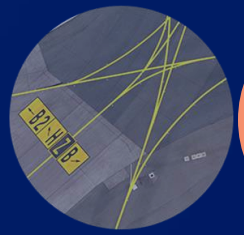
Communication

The Competencies are the individual and Team Counter Measures

Why do we need a LOSA Program



TEM Analysis of Runway and Taxiway Incursions

Threat → Pilot Competencies → Error → 

Airport
- Multiple/Parallel Runways
- Faded Markings/Signage
- Confusing Markings/Taxi ways

ATC
- Challenging Clearances
- Controller Error

Internal Threat
- Expectation BIAS
- Fatigue

Mismanaged Threats (Competencies)

Situational Awareness
- Checks for gross Errors
- Monitors the Environment

Workload Management
- Plans and prioritize task
- Manages Distractions

Communi-cation
- Active listening
- Intervention

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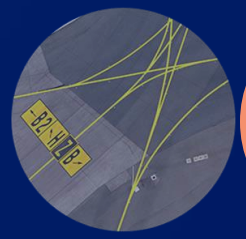
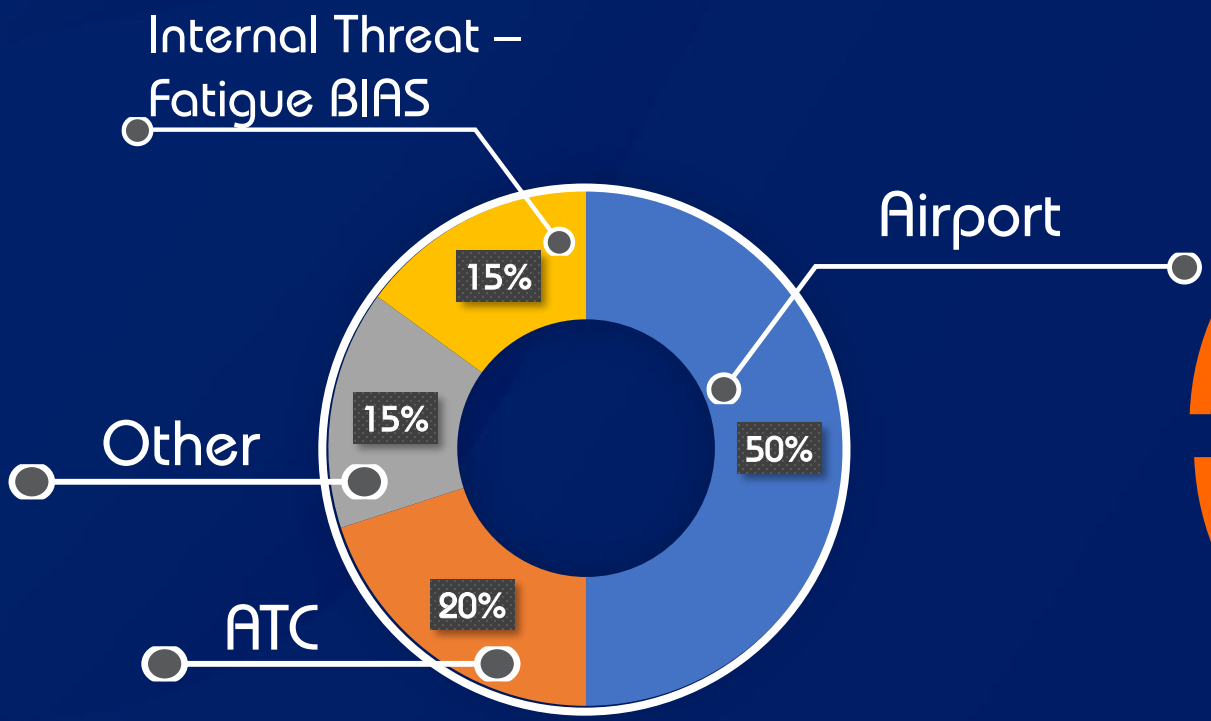
Threat → Error → 



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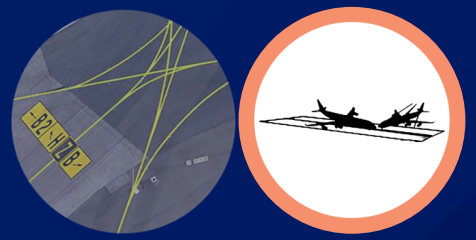
TEM Analysis of Runway and Taxiway Incursions

Threat → Error → Pilot Compentencies → 

Airport

Taxi Errors

Root Cause of Errors (Competency)

- **Communi-cation**
  - Active listening
- **Situational Awareness**
  - Checks for gross errors
  - Monitors the environment
- **Workload Management**
  - Plans and prioritize task
  - Manages Distractions

Summary of Runway and Taxiway Incursion TEM analysis

Threat & Errors

Airport

ATC

Fatigue/BIAS

Errors, Undesired Aircraft State & End State

Runway Incursion

Taxiway Incursion

Pilot Competencies

Situational Awareness

Workload Management

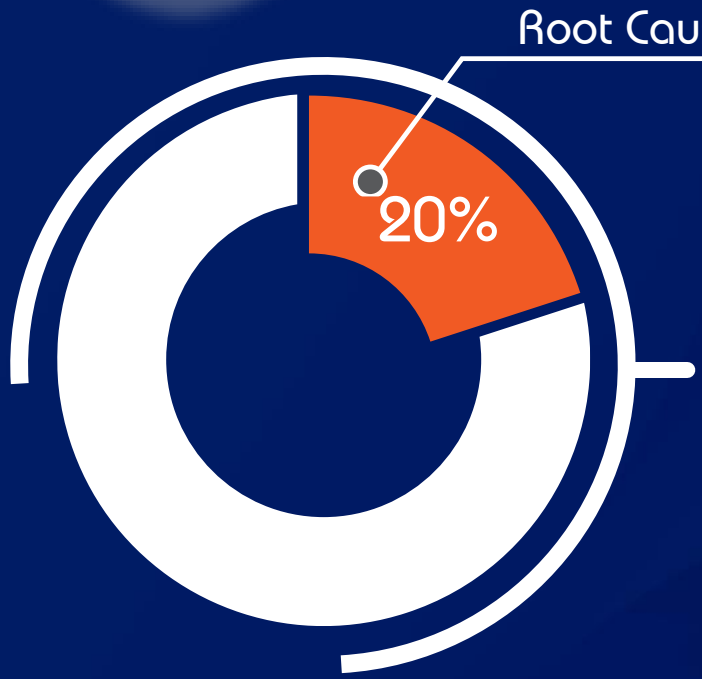
Communication

Determining Predictive Precursors to Runway Safety – LOSA data (Taxiway Errors)

Threat → Pilot Competencies → Error → Pilot Competencies → Undesired Aircraft State

Error Prevalence during taxi – 66% of flights had 3 or more Errors during Taxi

- Omitted 'clear left /right' call
- Fast taxi speed
- Nonessential duties performed
- Checklist Errors
- Wrong system settings

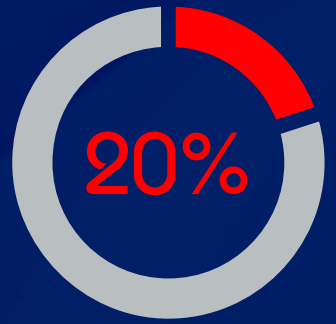


Predictive data driver: Error Prevalence during Taxi

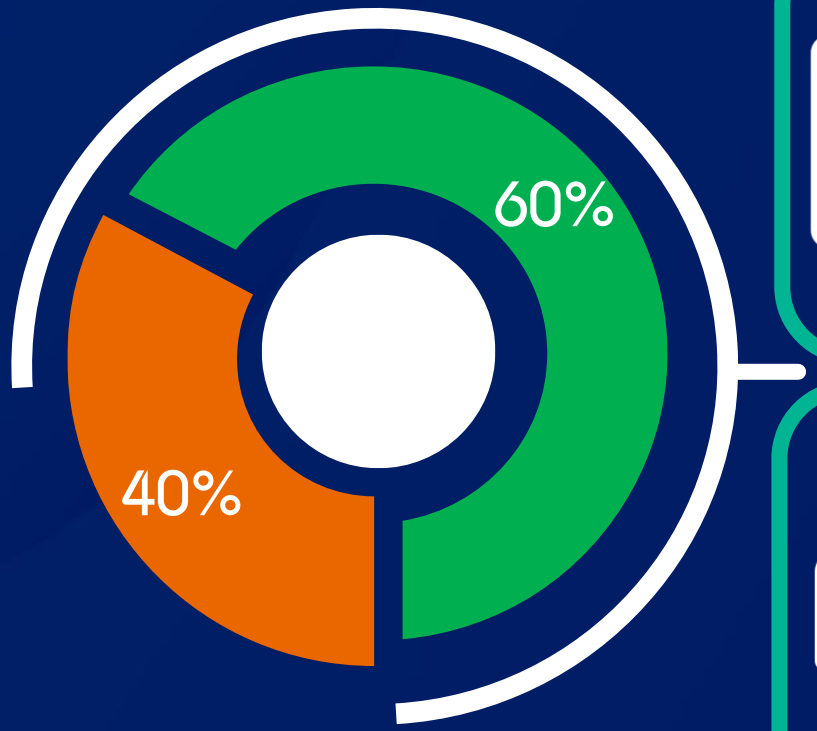
Workload Management

- Distraction Management
- Rushing
- Prioritizing tasks

Determining Predictive Precursors to Runway Safety – LOSA data (Understanding ATC Threat Management)



Of all Threats during Taxi were ATC related threats.



Workload Management

Communication

Predictive Data driver: The Management of ATC threats

Determining Predictive Precursors to Runway Safety – LOSA data (Understanding Crew Workload Management on Ground)

Top Threats On Ground (Prevalence)

- ATC – 53%
- Airport – 47%
- Airline Ops Pressure – 52%

Management

Positive Management

66%

Workload Management used the most

In Pre-Departure

Airline Ops Pressure

Management

Positive Management

76%

Workload Management used the most

Flight crew reliance on Workload management

Determining Predictive Precursors to Runway Safety – LOSA data (Understanding Crew Workload Management on Ground)

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Management → Positive Management **66%**

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In Pre-Departure

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Workload Management used the most

Are we putting the flights crew's operational resilience to the test?

Determining Predictive Precursors to Runway Safety – LOSA data (Understanding Crew Workload Management on Ground)

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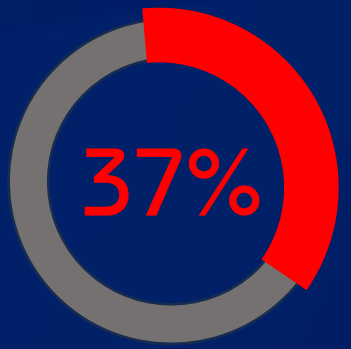
Predictive Data driver: A measure of Airline OPS Pressure on Ground

Determining Predictive Precursors to Runway Safety – LOSA data (How are crew dealing with Airport threats?)



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Management

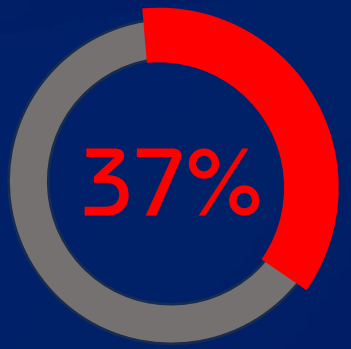
Positive Management

66%

When Anticipated

Predictive Data driver: A measure of the 'Anticipation' of Airport threats.

Determining Predictive Precursors to Runway Safety – LOSA data (How are crew dealing with Airport threats?)



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81%

When Anticipated

▲15%

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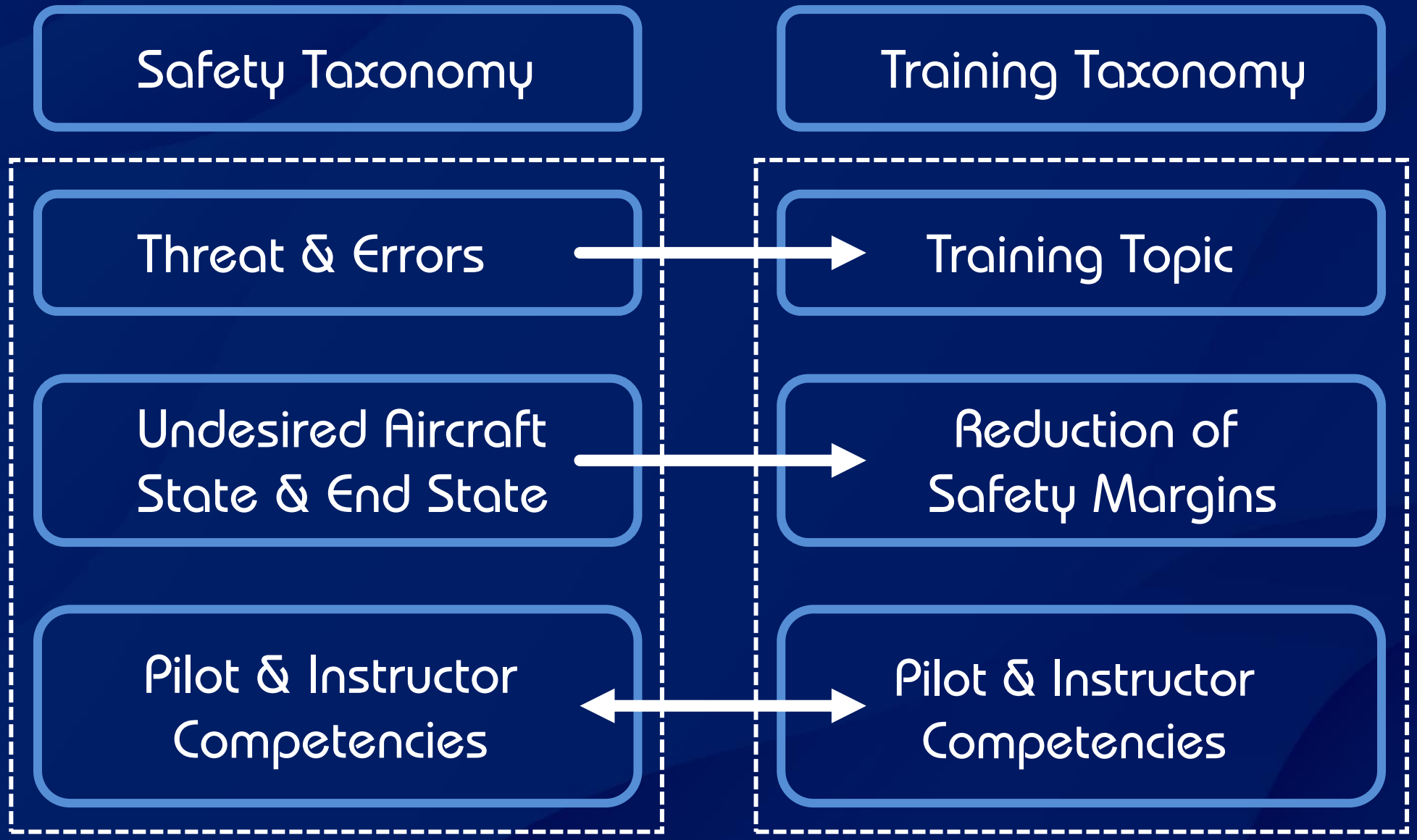
Alignment of Safety and Training Data Taxonomies



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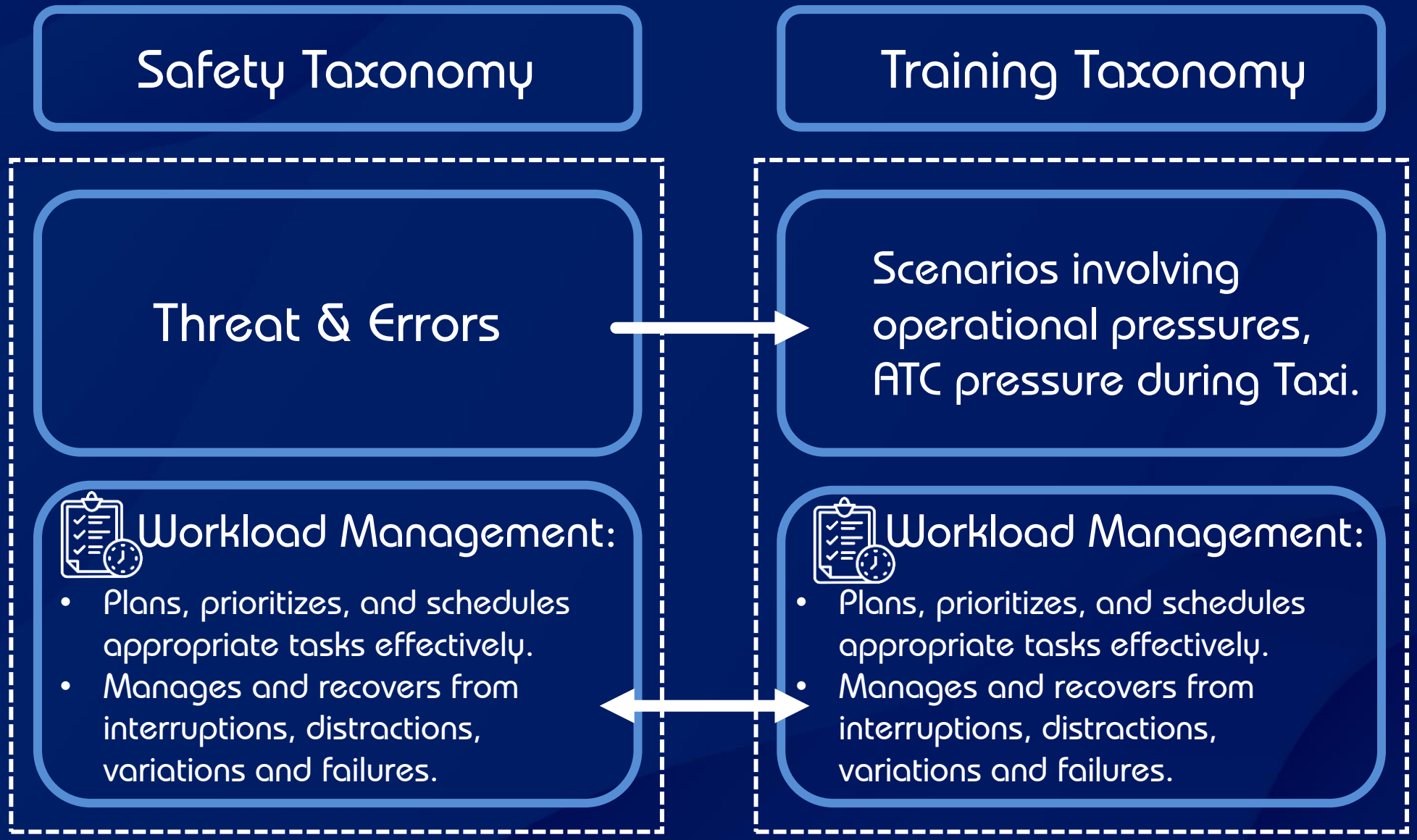

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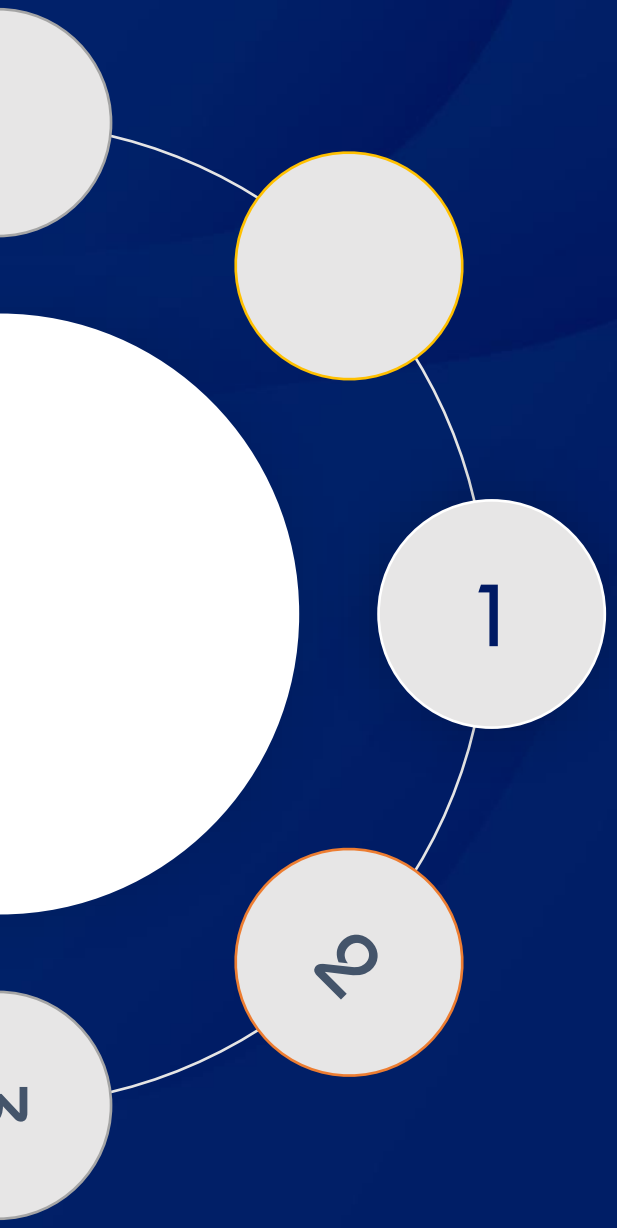

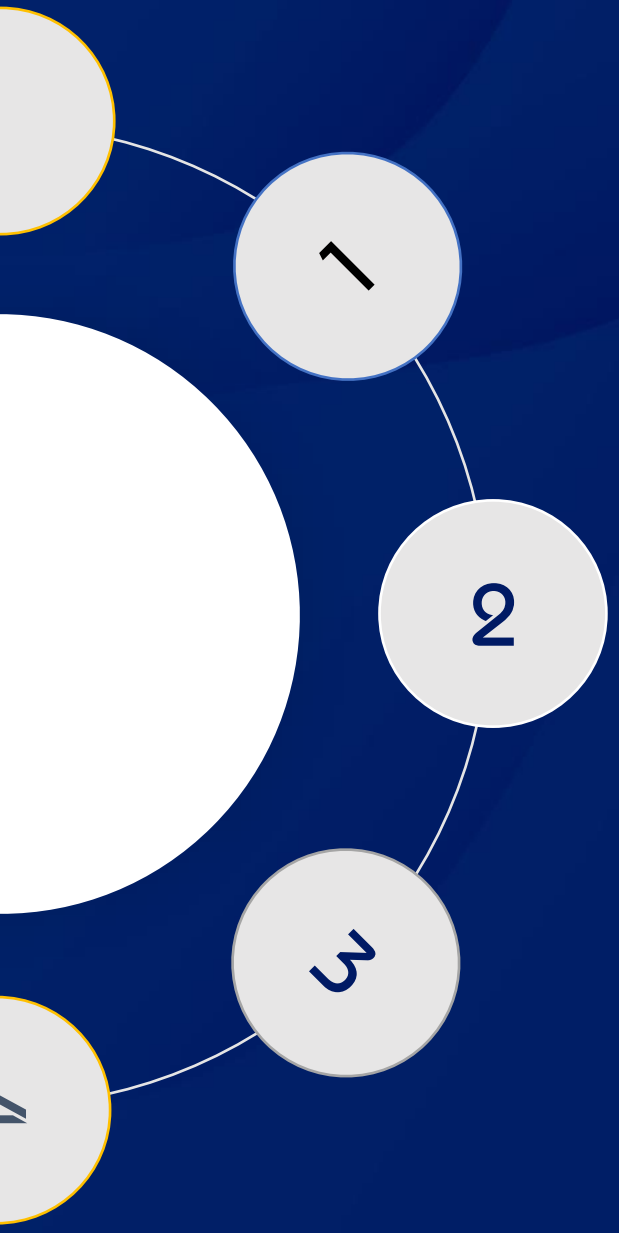

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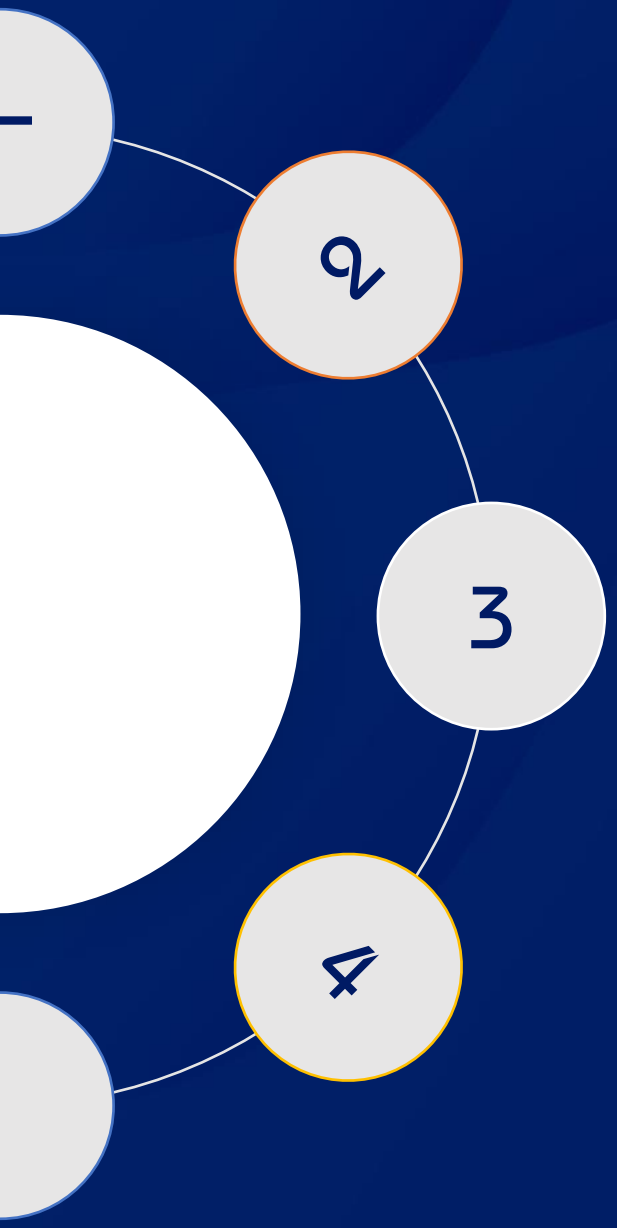

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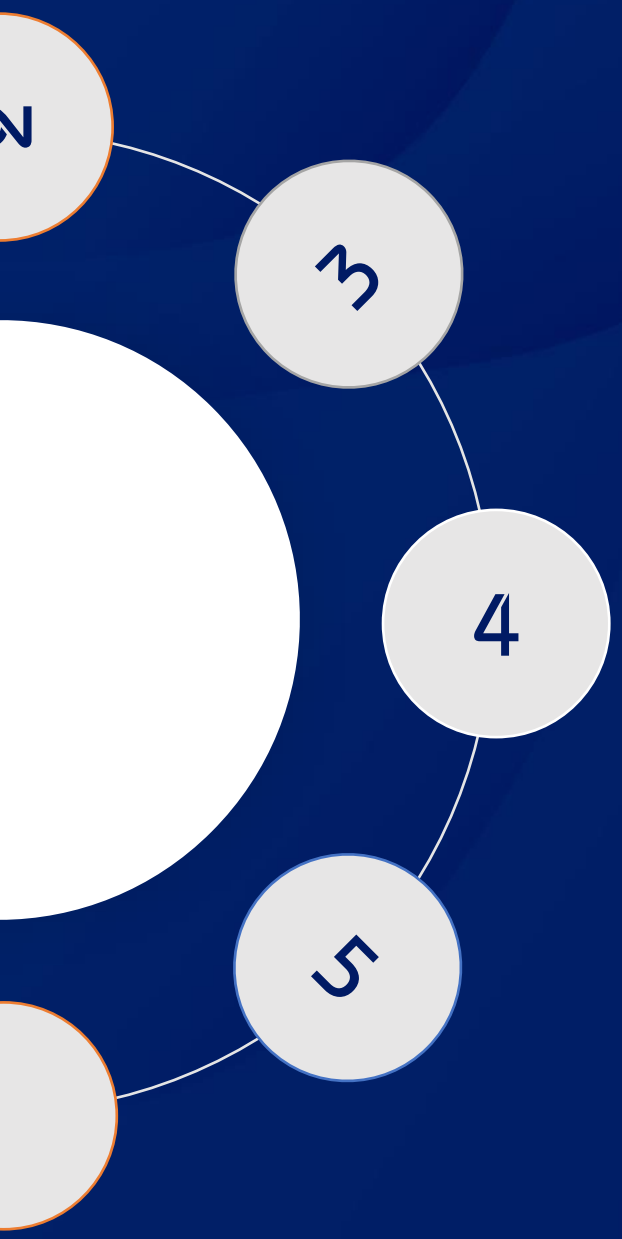

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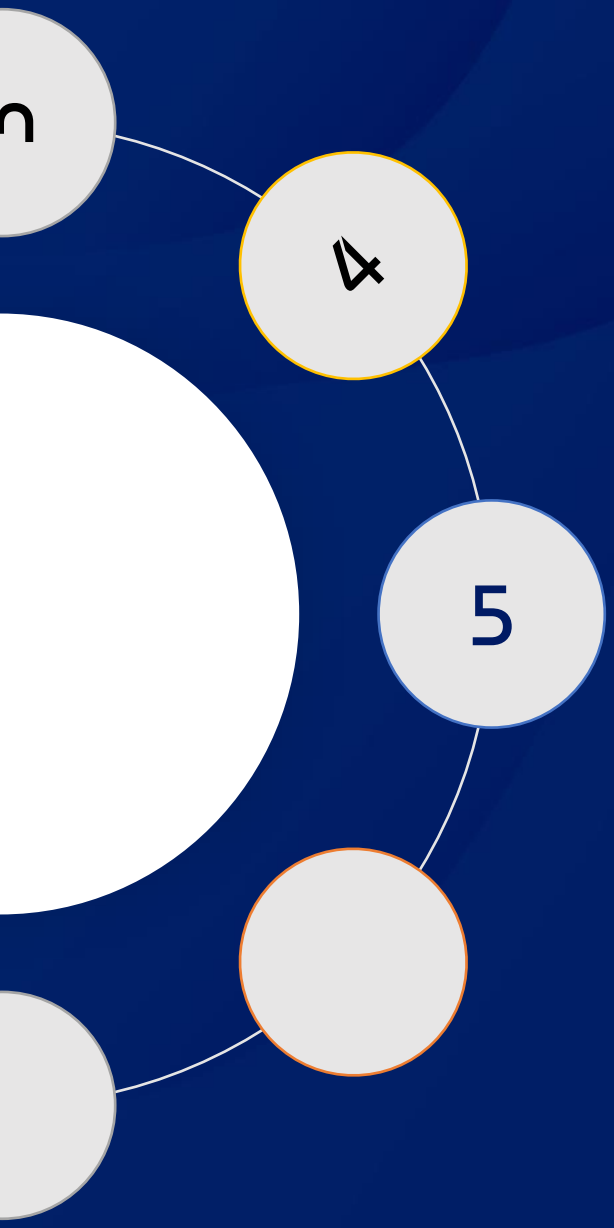

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- Enhance industry collaboration

Thank You