Building Aviation Mental Health into a Safety Management System

William R. Hoffman, M.D.

Medical Director, Joint Integrated Clinical Medicine, 59th Medical Wing
Affiliated Assistant Professor of Aviation, University of North Dakota
Co-Chair, Aerospace Medical Association Mental Health Working Group

(1) Review Healthcare Avoidance

(2) Mental Health in Safety Management

(3) Mental Health in Regulatory Design

The views expressed in this presentation reflect those of the speaker and do not necessarily reflect the official policy or position of the Defense Health Agency, Department of Defense, nor the US government.

Knowledge Check 1:

Which one of the following is false related to aviation mental health research?

A. There is clear empirical evidence of the clinical effectiveness of peer support in aviation personnel

B. Current data suggest peer support is the top factor in lowering the barriers to addressing mental health concerns in US pilots

C. As many as 56% of US and Canadian pilots report a history of healthcare avoidance due to fear for certificate loss

D. Junior flight attendants may report healthcare avoidance at a higher rate than more senior flight attendants

E. All of the above


Russia
Libya
DRC
Angola
Namibia
South Pacific Ocean
South Atlantic Ocean
Indian Ocean

Guide for Aviation Medical Examiners

- AMCS Login
- Application Process
- Decision Considerations
- Pharmaceuticals (Meds)
- Search Guide
- Special Issuances
- Substances Dependence/Abuse
- **Synopsis of Medical Standards**

Guide for Aviation Medical Examiners

Synopsis of Medical Standards

Download the Synopsis of Medical Standards (PDF) document.

Summary of Medical Standards

Medical Certificate Pilot Type	First-Class Airline Transport Pilot	Second-Class Commercial Pilot	Third-Class Private Pilot
Distant Vision	20/20 or better in each eye separately, with or without correction.		20/40 or better in each eye separately, with or without correction.
Near Vision	20/40 or better in each eye separately (Snellen equivalent), with or without correction, as measured at 16 inches.		

PART 67 - MEDICAL STANDARDS AND CERTIFICATION

Authority: 49 U.S.C. 106(g), 40113, 44701-44703, 44707, 44709-44711, 45102-45103, 45301-45303.

Source: Docket No. 27940, 61 FR 11256, Mar. 19, 1996, unless otherwise noted.

Subpart A - General

§ 67.1 Applicability.

This part prescribes the medical standards and certification procedures for issuing medical certificates for airmen and for remaining eligible for a medical certificate.

§ 67.3 Issue.

A person who meets the medical standards prescribed in this part, based on medical examination and evaluation of the person's history and condition, is entitled to an appropriate medical certificate.

[Doc. No. FAA-2007-27812, 73 FR 43065, July 24, 2008]

§ 67.4 Application.

An applicant for first-, second- and third-class medical certification must:

(a) Apply on a form and in a manner prescribed by the Administrator;

Breaking the Pilot Healthcare Barrier

William Hoffman; Elizabeth Bjerke; Anthony Tvaryanas

Pilot healthcare barriers **are factors that impede healthcare seeking behavior** by individuals who hold a pilot certificate. These barriers include **perceptions about potentially negative consequences of new health information on future ability to perform piloting duties.**

Hoffman W, Bjerke E, Tvaryanas A. *Breaking the pilot healthcare barrier*. Aerosp Med Hum Perform. 2022; 93(8):649–650.

Occupational Medicine

PubMed®

Occup Med (Lond). 2023 Sep 2;kqad091. doi: 10.1093/occmed/kqad091. Online ahead of print.

Multinational comparison study of aircraft pilot healthcare avoidance behaviour

W R Hoffman [1 2], P K Patel [3], J Aden [4], A Willis [1], J P Acker [5 6], E Bjerke [2], E Miranda [1], J Luster [1], A Tvaryanas [7]

Affiliations + expand

PMID: 37658781 DOI: 10.1093/occmed/kqad091

Healthcare Avoidance Behavior

- Non-disclosure during screening
- New symptom but flew
- Informal care seeking
- Prescription medication use

Occupational Medicine

PubMed®

Occup Med (Lond). 2023 Sep 2;kqad091. doi: 10.1093/occmed/kqad091. Online ahead of print.

Multinational comparison study of aircraft pilot healthcare avoidance behaviour

W R Hoffman [1 2], P K Patel [3], J Aden [4], A Willis [1], J P Acker [5 6], E Bjerke [2], E Miranda [1], J Luster [1], A Tvaryanas [7]

Affiliations + expand

PMID: 37658781 DOI: 10.1093/occmed/kqad091

56%

n = 5,170

J Occup Environ Med. 2022 Apr 1;64(4):e245-e248. doi: 10.1097/JOM.0000000000002519. Epub 2022 Feb 15.

Healthcare Avoidance in Aircraft Pilots Due to Concern for Aeromedical Certificate Loss: A Survey of 3765 Pilots

William R Hoffman [1], James Aden, R Daniel Barbera, Ryan Mayes, Adam Willis, Parth Patel, Anthony Tvaryanas

Mil Med. 2023 Mar 20;188(3-4):e446-e450. doi: 10.1093/milmed/usac311.

Self-Reported Health Care Avoidance Behavior in U.S. Military Pilots Related to Fear for Loss of Flying Status

William R Hoffman [1], James K Aden [2], Daniel Barbera [3], Anthony Tvaryanas [4]

Affiliations + expand

PMID: 36242520 DOI: 10.1093/milmed/usac311

Aerosp Med Hum Perform. 2022 Aug 1;93(8):649-650. doi: 10.3357/AMHP.6063.2022.

Breaking the Pilot Healthcare Barrier

William Hoffman, Elizabeth Bjerke, Anthony Tvaryanas

PMID: 36050857 DOI: 10.3357/AMHP.6063.2022

J Occup Environ Med. 2023 Jun 1;65(6):e413-e417. doi: 10.1097/JOM.0000000000002838. Epub 2023 Mar 14.

Health Care Avoidance Among Canadian Pilots Due to Fear of Medical Certificate Loss: A National Cross-Sectional Survey Study

Parth K Patel [1], William R Hoffman, James Aden, Jason P Acker

Affiliations + expand

PMID: 36914380 DOI: 10.1097/JOM.0000000000002838

J Occup Environ Med. 2019 Sep;61(9):e401-e405. doi: 10.1097/JOM.0000000000001662.

Pilots' Healthcare Seeking Anxiety When Experiencing Chest Pain

William Hoffman [1], Nikhil Chervu, Xue Geng, Aykut Üren

Affiliations + expand

PMID: 31306268 DOI: 10.1097/JOM.0000000000001662

Arch Environ Occup Health. 2022;77(3):234-242. doi: 10.1080/19338244.2021.1873093. Epub 2021 Feb 3.

Healthcare related aversion and care seeking patterns of female aviators in the United States

William R Hoffman [1], R Daniel Barbera [2], James Aden [3], Matthew Bezzant [1], Aykut Uren [4]

Affiliations + expand

PMID: 33533702 DOI: 10.1080/19338244.2021.1873093

NIH National Library of Medicine
National Center for Biotechnology Information

> J Occup Environ Med. 2022 Apr 1;64(4):e245-e248. doi: 10.1097/JOM.0000000000002519. Epub 2022 Feb 15.

Healthcare Avoidance in Aircraft Pilots Due to Concern for Aeromedical Certificate Loss: A Survey of 3765 Pilots

William R Hoffman [1], James Aden, R Daniel Barbera, Ryan Mayes, Adam Willis, Parth Patel, Anthony Tvaryanas

> Mil Med. 2023 Mar 20;188(3-4):e446-e450. doi: 10.1093/milmed/usac311.

Self-Reported Health Care Avoidance Behavior in U.S. Military Pilots Related to Fear for Loss of Flying Status

William R Hoffman [1], James K Aden [2], Daniel Barbera [3], Anthony Tvaryana

Affiliations + expand

PMID: 36242520 DOI: 10.1093/milmed/usac311

> Aerosp Med Hum Perfor doi: 10.3357/AMHP.6063.2022.

Breaki ithcare Barrier

bjerke, Anthony Tvaryanas

DOI: 10.3357/AMHP.6063.2022

> J Occup Environ Med. 2023 Jun 1;65(6):e413-e417. doi: 10.1097/JOM.0000000000002838. Epub 2023 Mar 14.

Health Care Avoidance Among Canadian Pilots Du to Fear of Medical Certificate Loss: A Nation Sectional Survey Study

Parth K Patel [1], William R Hoffman, James Aden, Jason P A

Affiliations + expand

PMID: 36914380 DOI: 10.1097/JOM.00

> J Occup Envi e405. doi: 10.1097/JOM.0000000000001662.

Pi e Seeking Anxiety When ng Chest Pain

n Hoffman [1], Nikhil Chervu, Xue Geng, Aykut Üren

Affiliations + expand

PMID: 31306268 DOI: 10.1097/JOM.0000000000001662

> Arch Environ Occup Health. 2022;77(3):234-242. doi: 10.1080/19338244.2021.1873093. Epub 2021 Feb 3.

Healthcare related aversion and care seeking patterns of female aviators in the United States

William R Hoffman [1], R Daniel Barbera [2], James Aden [3], Matthew Bezzant [1], Aykut Uren [4]

Affiliations + expand

PMID: 33533702 DOI: 10.1080/19338244.2021.1873093

What are the factors the influence health behavior of pilots?

AFRL

WHAT FACTORS INFLUENCE HEALTHCARE SEEKING BEHAVIORS AMONG CIVILIAN AIRLINE PILOTS?

WILLIAM R. HOFFMAN, MD, CAPT, USAF, MC
DEPARTMENT OF NEUROLOGY, BROOKE ARMY MEDICAL CENTER, TX

TANYA GOODMAN, M.S.; NICOLE DEVLIN, M.S
NEUROSTAT ANALYTICAL SOLUTIONS, LLC

RACHAEL N. MARTINEZ, PH.D.
AEROMEDICAL OPERATIONAL AND CLINICAL PSYCHOLOGY
711TH HUMAN PERFORMANCE WING, USAF SCHOOL OF AEROSPACE MEDICINE
WRIGHT-PATTERSON AFB, OHIO

Cleared, SAF/PA, Case # AFRL-2024-1806, 4 April 2023

	n (%)	M (*SD*)
Gender		
Male	24 (67%)	
Female	12 (33%)	
Age		40.6 years (11.3)
Career Stage		
Early	13 (36%)	
Mid	12 (33%)	
Late/Senior	11 (31%)	
Total pilot years		15.08 years (12.39)
Total flying hours		7147.7 hours (5462.4)

268 Pages of Transcript **80 hours of Recorded Interviews** **Codebook Saturated at 18 Interviews**

Results – Encouraging Factors

Encouraging Factors	n	Definition	Quote
Peer support services	12	Extent to which pilot's may be more likely to share their personal problems with pilots through utilizing a peer support service	*"I think there are services, for example, unions have peer support quick response programs, where you are able to talk through what is going on with them, without it being reported, i.e., completely confidential. It excludes the ability to go to an actual licensed medical professional. It excludes being able to get medication for mental health, but it does allow for people to at least talk through those issues with peers, people in the same industry and at least provide some sort of support as opposed to therapy or a diagnosis.*
Company Support	12	Extent to which pilot's company financially and administratively supports use of healthcare providers, insurance (e.g., healthy HSA insurance program), and preventative health resources (e.g., gym memberships)	*"For example, there is a health insurance plan that I am on that called healthy HSA insurance program where I save money each year on my health insurance by getting a physical from an actual civilian doctor. So, by proving that I'm a healthy individual, I save money on my health insurance plan. So, that gives me incentive to actually get a real physical."*
Aeromedical Consultation Services	11	Extent to which pilot's value having access to a sponsored aeromedical consultation service associated with the airline (either company or union) to assist with aeromedical certification questions and inform pilots about processes (e.g., experience with that information may be needed) and maintains confidentiality	*"They can help them to document everything appropriately from the start the special issuance process and make sure that they have all the proper documentation to send to the FAA the first time to get that special issuance. I have heard that they will ask we need this document and that document and all that stuff. So they kind of help guide you through the Aeromedical process."*

J Occup Environ Med. 2022 Apr 1;64(4):e245-e248. doi: 10.1097/JOM.0000000000002519. Epub 2022 Feb 15.

Healthcare Avoidance in Aircraft Pilots Due to Concern for Aeromedical Certificate Loss: A Survey of 3765 Pilots

William R Hoffman [1], James Aden, R Daniel Barbera, Ryan Mayes, Adam Willis, Parth Patel, Anthony Tvaryanas

Mil Med. 2023 Mar 20;188(3-4):e446-e450. doi: 10.1093/milmed/usac311.

Self-Reported Health Care Avoidance Behavior in U.S. Military Pilots Related to Fear for Loss of Flying Status

William R Hoffman [1], James K Aden [2], Daniel Barbera [3], Anthony Tvaryanas [4]

Affiliations + expand

PMID: 36242520 DOI: 10.1093/milmed/usac311

Aerosp Med Hum Perform. 2022 Aug 1;93(8):649-650. doi: 10.3357/AMHP.6063.2022.

Breaking the Pilot Healthcare Barrier

William Hoffman, Elizabeth Bjerke, Anthony Tvaryanas

PMID: 36050857 DOI: 10.3357/AMHP.6063.2022

J Occup Environ Med. 2023 Jun 1;65(6):e413-e417. doi: 10.1097/JOM.0000000000002838. Epub 2023 Mar 14.

Health Care Avoidance Among Canadian Pilots Due to Fear of Medical Certificate Loss: A National Cross-Sectional Survey Study

Parth K Patel [1], William R Hoffman, James Aden, Jason P Acker

Affiliations + expand

PMID: 36914380 DOI: 10.1097/JOM.0000000000002838

J Occup Environ Med. 2019 Sep;61(9):e401-e405. doi: 10.1097/JOM.0000000000001662.

Pilots' Healthcare Seeking Anxiety When Experiencing Chest Pain

William Hoffman [1], Nikhil Chervu, Xue Geng, Aykut Üren

Affiliations + expand

PMID: 31306268 DOI: 10.1097/JOM.0000000000001662

Arch Environ Occup Health. 2022;77(3):234-242. doi: 10.1080/19338244.2021.1873093. Epub 2021 Feb 3.

Healthcare related aversion and care seeking patterns of female aviators in the United States

William R Hoffman [1], R Daniel Barbera [2], James Aden [3], Matthew Bezzant [1], Aykut Uren [4]

Affiliations + expand

PMID: 33533702 DOI: 10.1080/19338244.2021.1873093

US Based Flight Attendants

Healthcare Avoidance Due to Fear for Loss of Flying Status

66.8%

n = 2,542

Hoffman W, Parekh P, et al. Pending Peer Review.

Who is participating in these healthcare avoidance behaviors?

Factor	Yes to Healthcare avoidance Behaviors
All	1686 (66.27%)
Age	
<29	202 (79.84%)
30-39	354 (78.15%)
40-49	291 (65.84%)
50-59	473 (62.57%)
>60	353 (57.12%)
Gender	
Males	528 (70.21%)
Females	1122 (64.48%)
Other	11 (84.62%)
Experience	
Early	315 (68.78%)
Mid	667 (72.34%)
Late	701 (60.69%)

Hoffman W, Parekh P, et al. Pending Peer Review.

Who is participating in these healthcare avoidance behaviors?

Factor	Yes to Healthcare avoidance Behaviors
All	1686 (66.27%)
Age	
<29	202 (79.84%)
30-39	354 (78.15%)
40-49	291 (65.84%)
50-59	473 (62.57%)
>60	353 (57.12%)
Gender	
Males	528 (70.21%)
Females	1122 (64.48%)
Other	11 (84.62%)
Experience	
Early	315 (68.78%)
Mid	667 (72.34%)
Late	701 (60.69%)

By experience

Hoffman W, Parekh P, et al. Pending Peer Review.

The International Journal of Aerospace Psychology >
Volume 34, 2024 - Issue 3

Review

Are Peer Support Programs Effective in the Detection and Prevention of Mental Health Issues in Commercial Aviation?

Marika Melin & Vilmer Lång

Pages 162-175 | Published online: 13 Nov 2023

Cite this article https://doi.org/10.1080/24721840.2023.2278670 Check for updates

The International Journal of Aerospace Psychology ›
Volume 34, 2024 - Issue 3

Review

Are Peer Support Programs Effective in the Detection and Prevention of Mental Health Issues in Commercial Aviation?

Marika Melin & Vilmer Lång

Pages 162-175 | Published online: 13 Nov 2023

Cite this article https://doi.org/10.1080/24721840.2023.2278670 Check for updates

Conclusion

Although there is limited or no evidence in any direction, the peer support programs seem to be without evident harm and were generally appreciated. The insufficient empirical evidence is nonetheless concerning, with these programs being implemented throughout Europe in such a high-risk context as the aviation industry. The results highlight the importance of more research on peer support in aviation.

The International Journal of Aerospace Psychology >
Volume 34, 2024 - Issue 3

Review

Are Peer Support Programs Effective in the Detection and Prevention of Mental Health Issues in Commercial Aviation?

Marika Melin & Vilmer Lång

Pages 162-175 | Published online: 13 Nov 2023

Cite this article https://doi.org/10.1080/24721840.2023.2278670 Check for updates

Conclusion

Although there is limited or no evidence in any direction, the peer support programs seem to be without evident harm and were generally appreciated. The insufficient empirical evidence is nonetheless concerning, with these programs being implemented throughout Europe in such a high-risk context as the aviation industry. The results highlight the importance of more research on peer support in aviation.

Knowledge Check 1:

Which one of the following is false related to aviation mental health research?

A. **There is clear empirical evidence of the clinical effectiveness of peer support in aviation personnel**

B. Current data suggest peer support is the top factor in lowering the barriers to addressing mental health concerns in US pilots

C. As many as 56% of US and Canadian pilots report a history of healthcare avoidance due to fear for certificate loss

D. Junior flight attendants may report healthcare avoidance at a higher rate than more senior flight attendants

E. All of the above

Knowledge Check 2:

Which one of the following is true?

A. Safety Risk Management (SRM) portion of a Safety Management System (SMS) determines need for and adequacy of risk controls in a system

B. Bow Tie Analysis includes all portions of the SMS process

C. Multiple regulatory approaches cannot be used to control the risks related to mental health in aviation

D. SMS aims to eliminate all risk in a regulated system

E. All of the above

Mental Health Regulation in Civil Aviation

Today

Prescriptive Approach

Identifies Hazards
Screens for Hazards
Requires Compliance

Diagnosis or Services
AME Examination
Medical Certificate

REC10 – Aeromedical Screening - Safety Management Systems (SMS)

Mental health screening functions should be performance based upon and managed within an SMS framework.

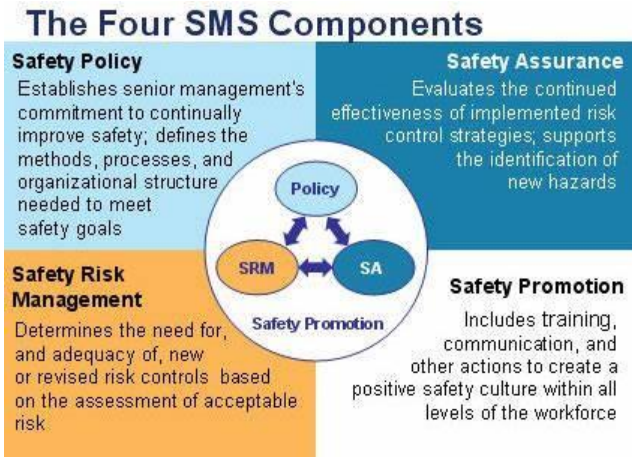
INTENT: To employ SMS principles when making medical certification decisions about a mental health condition or treatment and the potential threat of degraded performance. The focus should be on mitigating threats to performance capability relative to occupational standards rather than on the diagnosis *per se*.

Safety Management Manual (SMM)

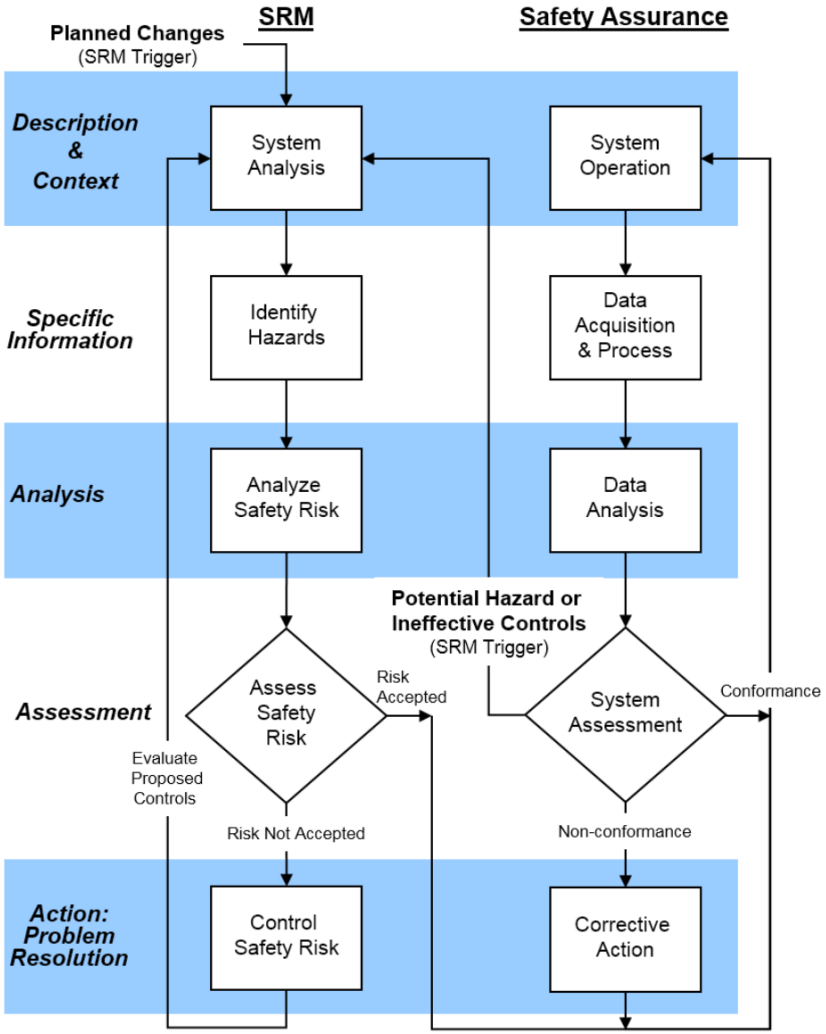
2.3 Service Providers' Safety Management Requirements

ICAO SARPs also include requirements for the implementation of an SMS by service providers and general aviation operators as an element of each State's SSP. The SMS provides the means to identify safety hazards, implementation actions to reduce safety risks, monitor safety performance, and achieve continuous improvement in safety performance.

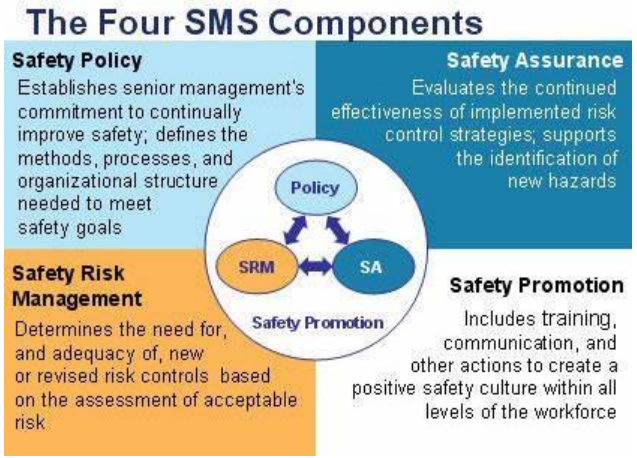
Federal Aviation Administration



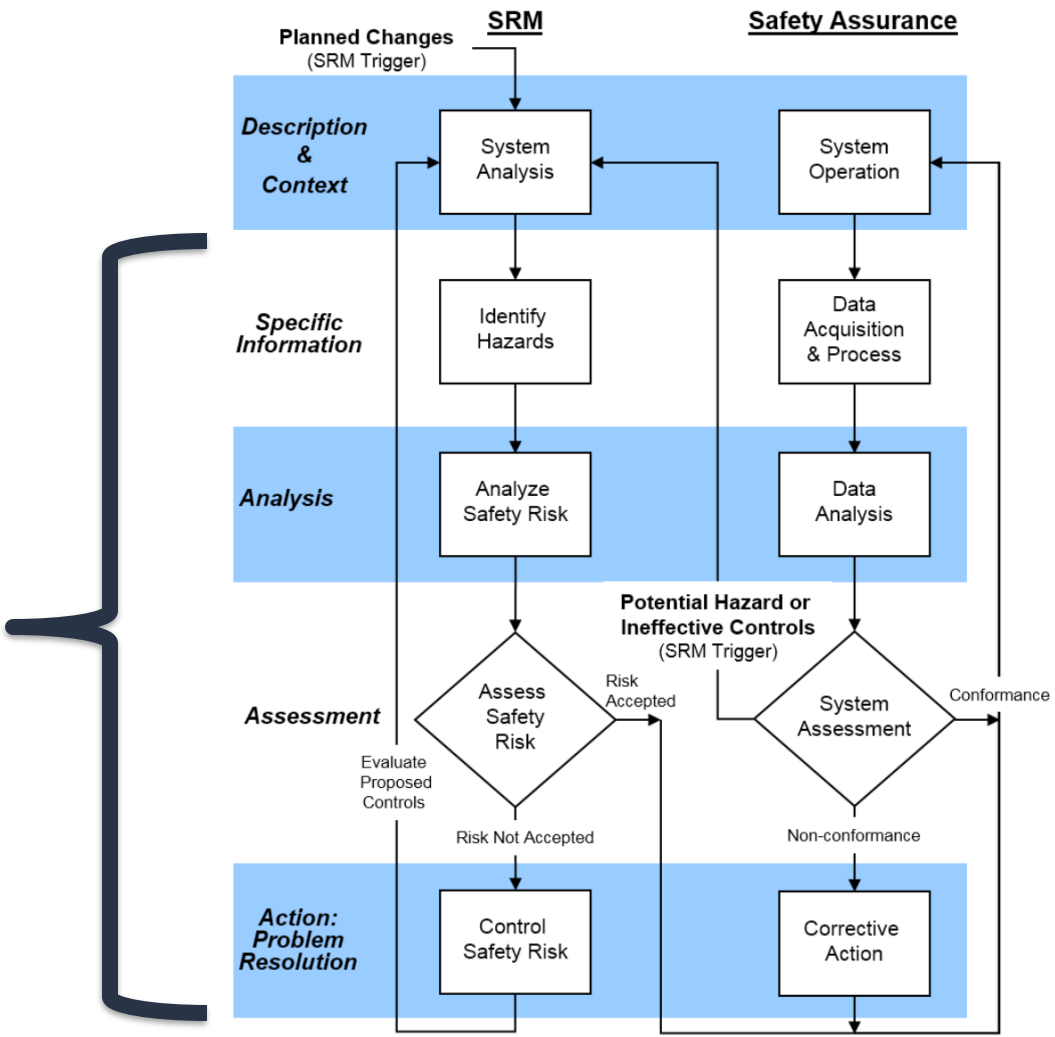
Images from FAA.gov



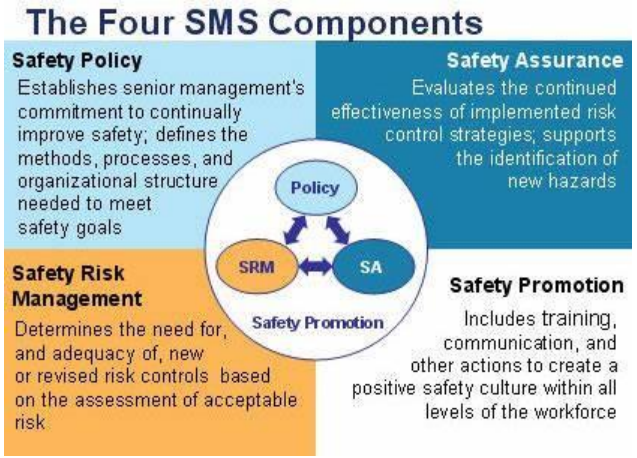
Federal Aviation Administration



Images from FAA.gov

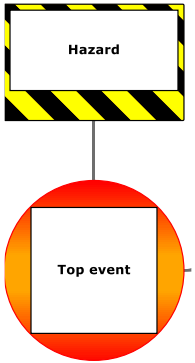


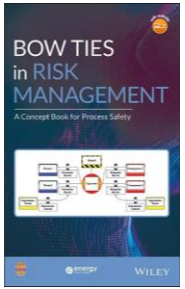
Federal Aviation Administration



Images from FAA.gov

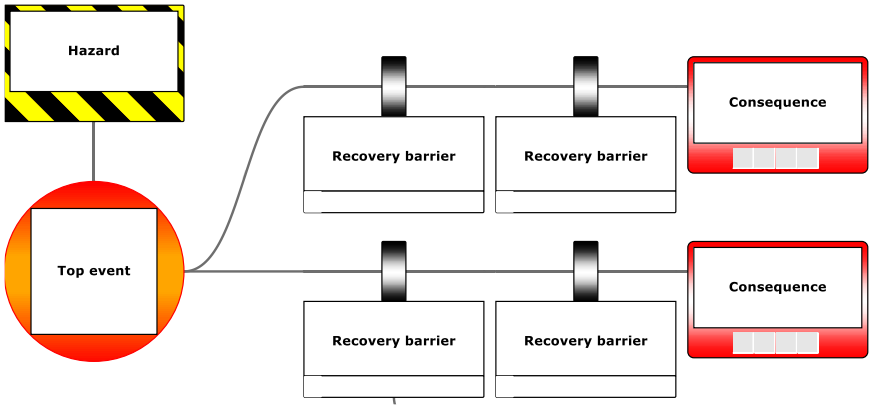
Bowtie models = barrier management frameworks

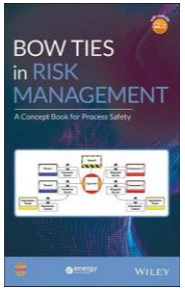




Courtesy of Dr. Anthony Tvaryanas, FAA

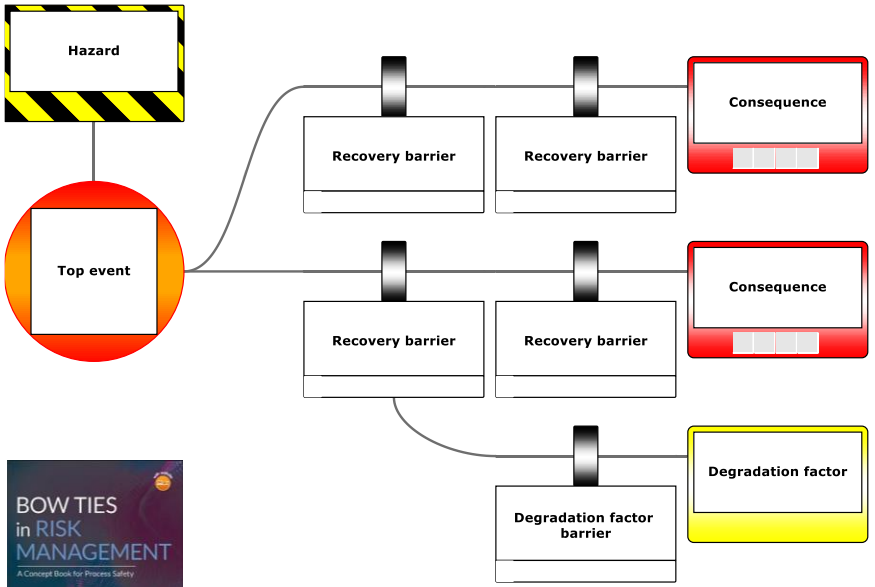
Bowtie models = barrier management frameworks

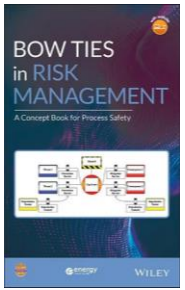




Courtesy of Dr. Anthony Tvaryanas, FAA

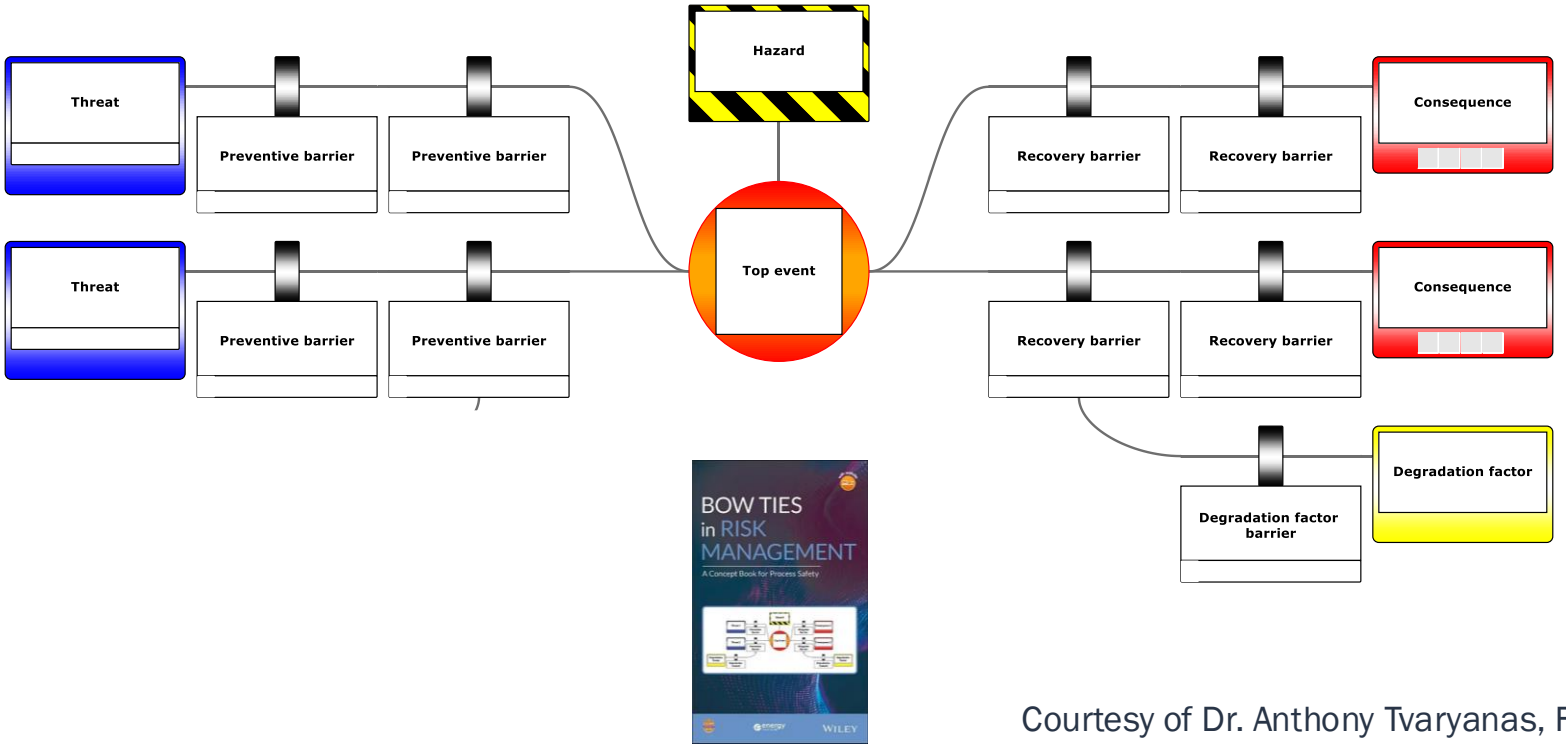
Bowtie models = barrier management frameworks





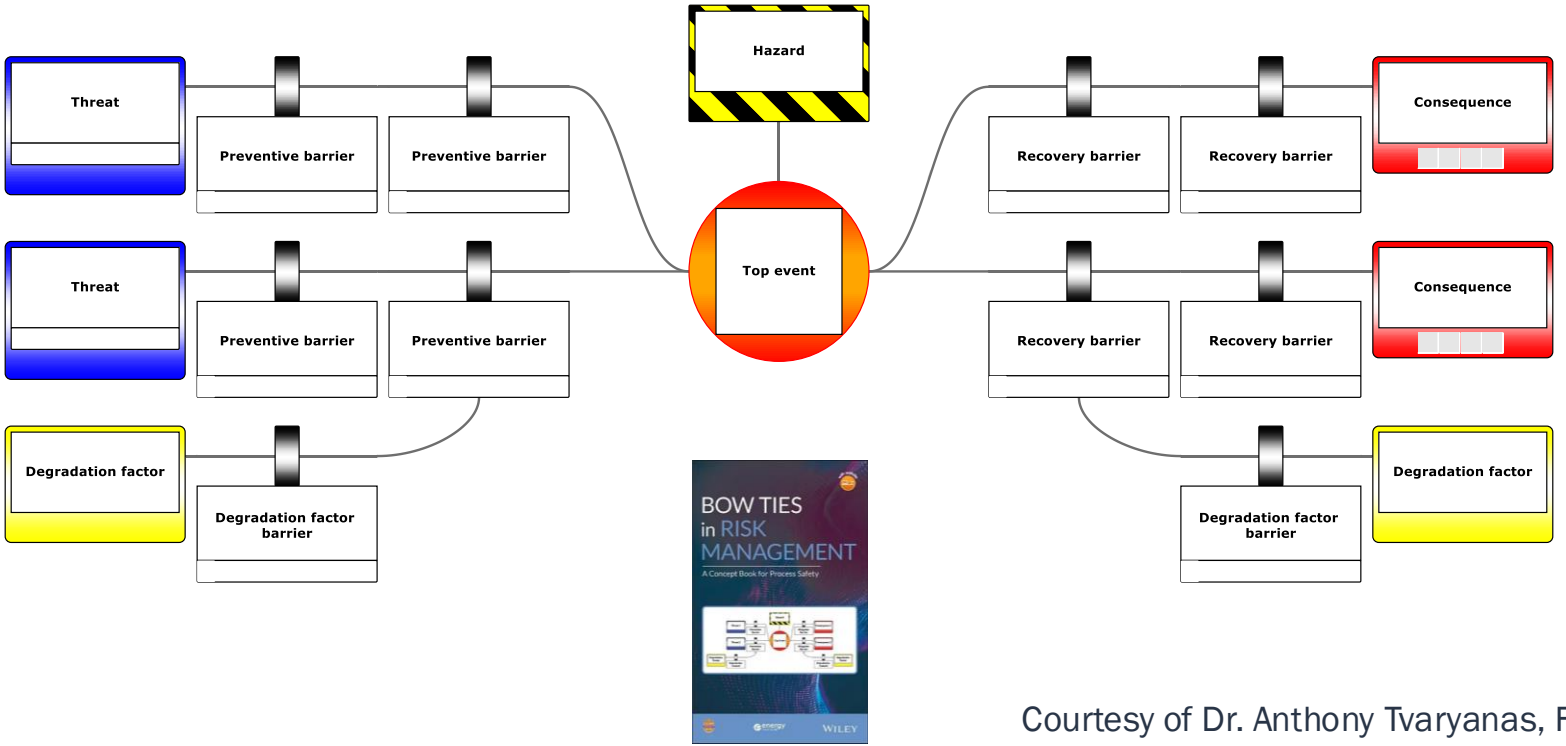
Courtesy of Dr. Anthony Tvaryanas, FAA

Bowtie models = barrier management frameworks



Courtesy of Dr. Anthony Tvaryanas, FAA

Bowtie models = barrier management frameworks



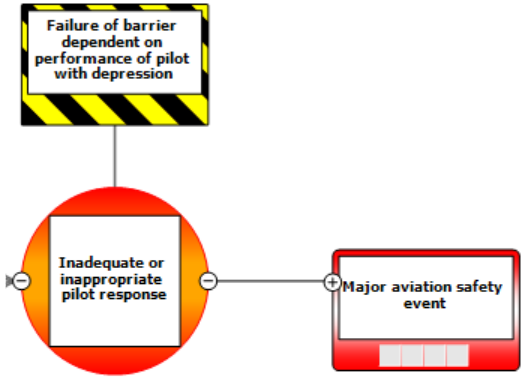
Courtesy of Dr. Anthony Tvaryanas, FAA

Bowtie model development

Courtesy of Dr. Anthony Tvaryanas, FAA

Bowtie model development

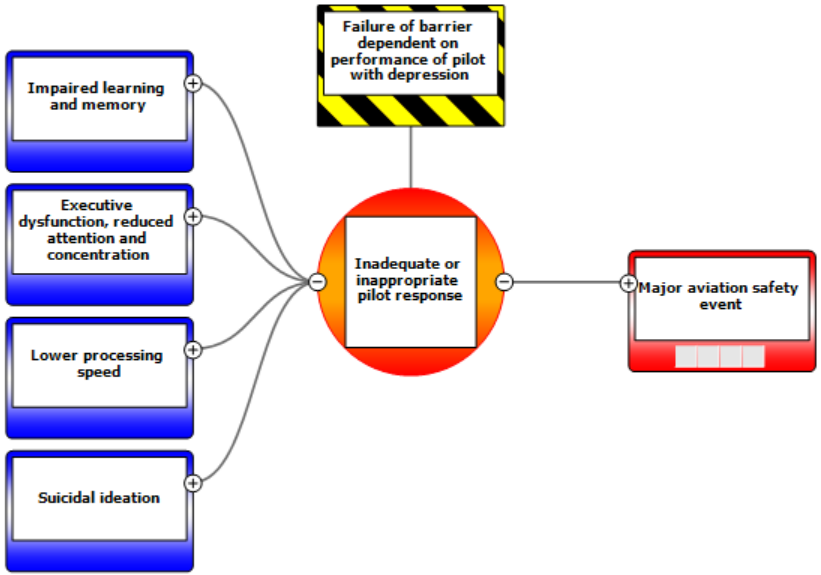
1. Identify hazard and top event ✔
2. Identify consequences ✔
3. Identify threats ✔
4. Identify preventive barriers (threat side of the bowtie) — *Next slide*
5. Identify mitigation barriers (consequence side of the bowtie)
6. Identify degradation factors and degradation controls (both sides of bowtie) — *Next slide*
7. Add metadata for barriers and controls — *Next slide*
8. Review bowtie for completeness and quality



Courtesy of Dr. Anthony Tvaryanas, FAA

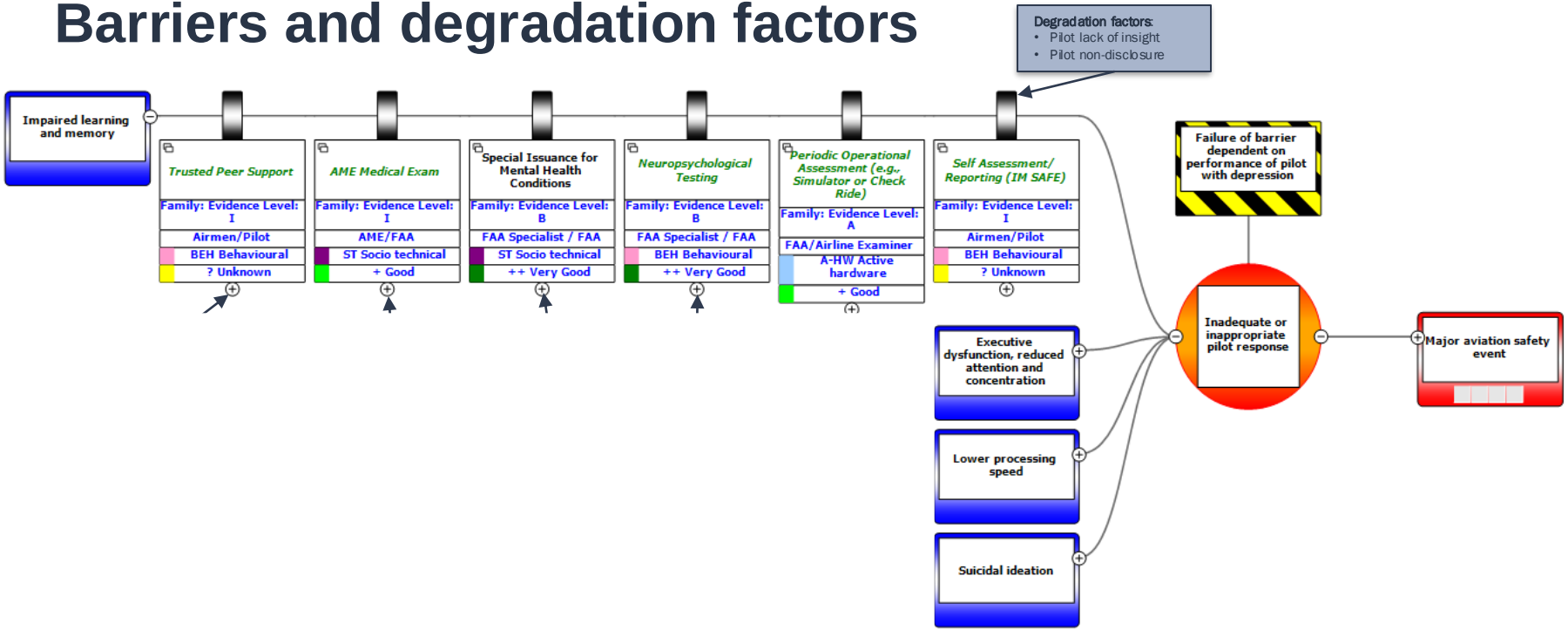
Bowtie model development

1. Identify hazard and top event ✔
2. Identify consequences ✔
3. Identify threats ✔
4. Identify preventive barriers (threat side of the bowtie) — *Next slide*
5. Identify mitigation barriers (consequence side of the bowtie)
6. Identify degradation factors and degradation controls (both sides of bowtie) — *Next slide*
7. Add metadata for barriers and controls — *Next slide*
8. Review bowtie for completeness and quality



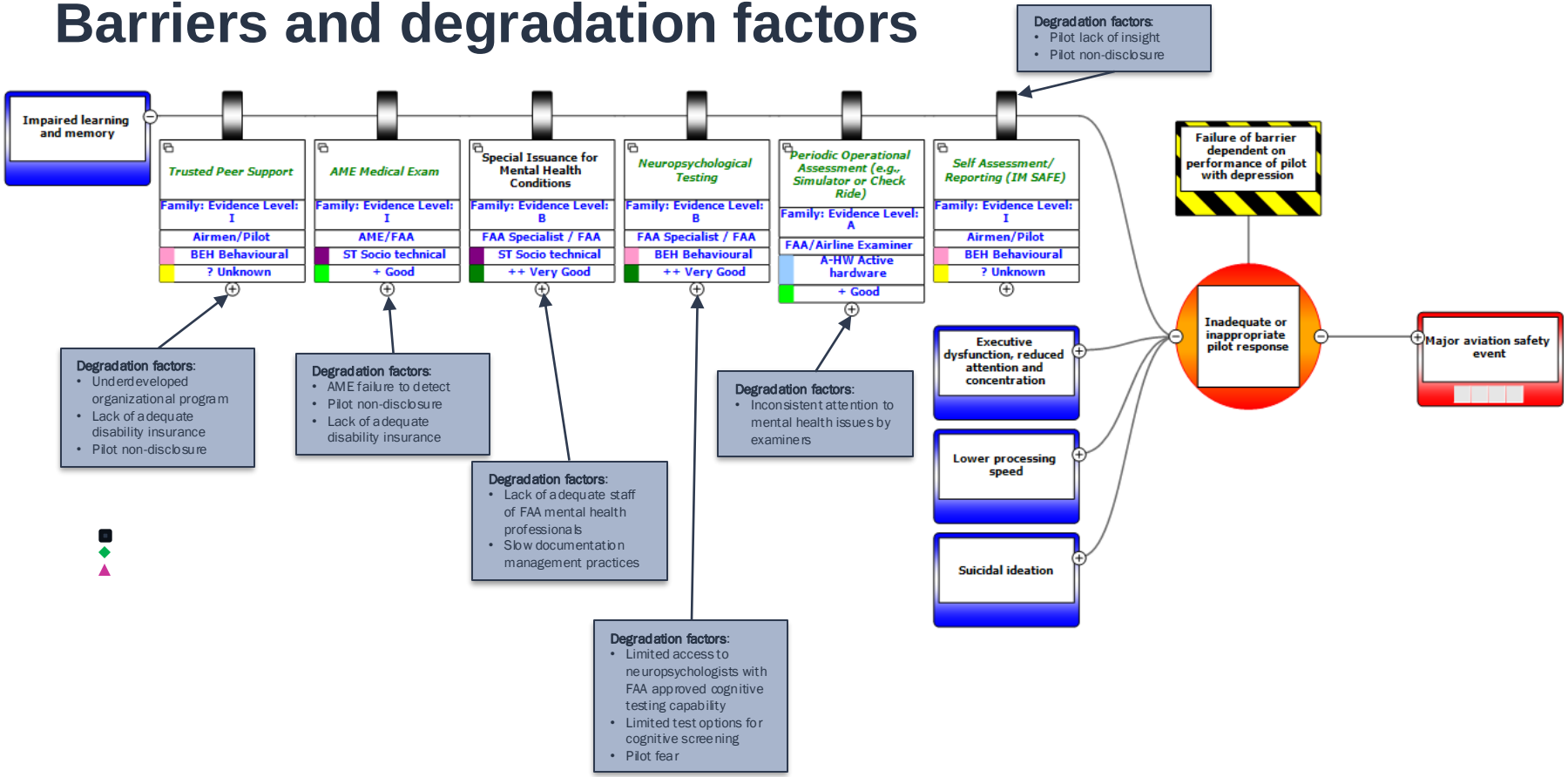
Courtesy of Dr. Anthony Tvaryanas, FAA

Barriers and degradation factors

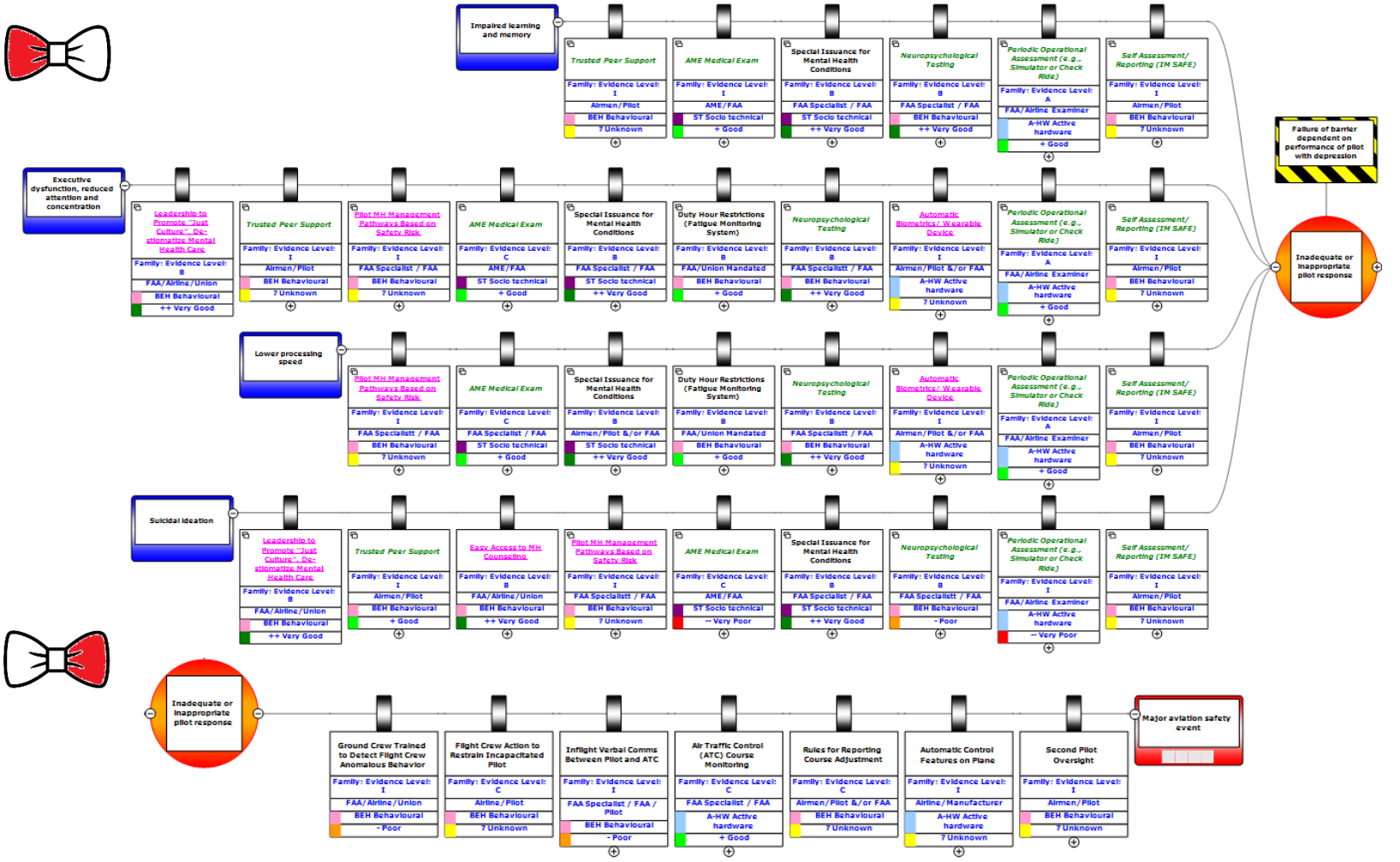


Courtesy of Dr. Anthony Tvaryanas, FAA

Barriers and degradation factors



Courtesy of Dr. Anthony Tvaryanas, FAA



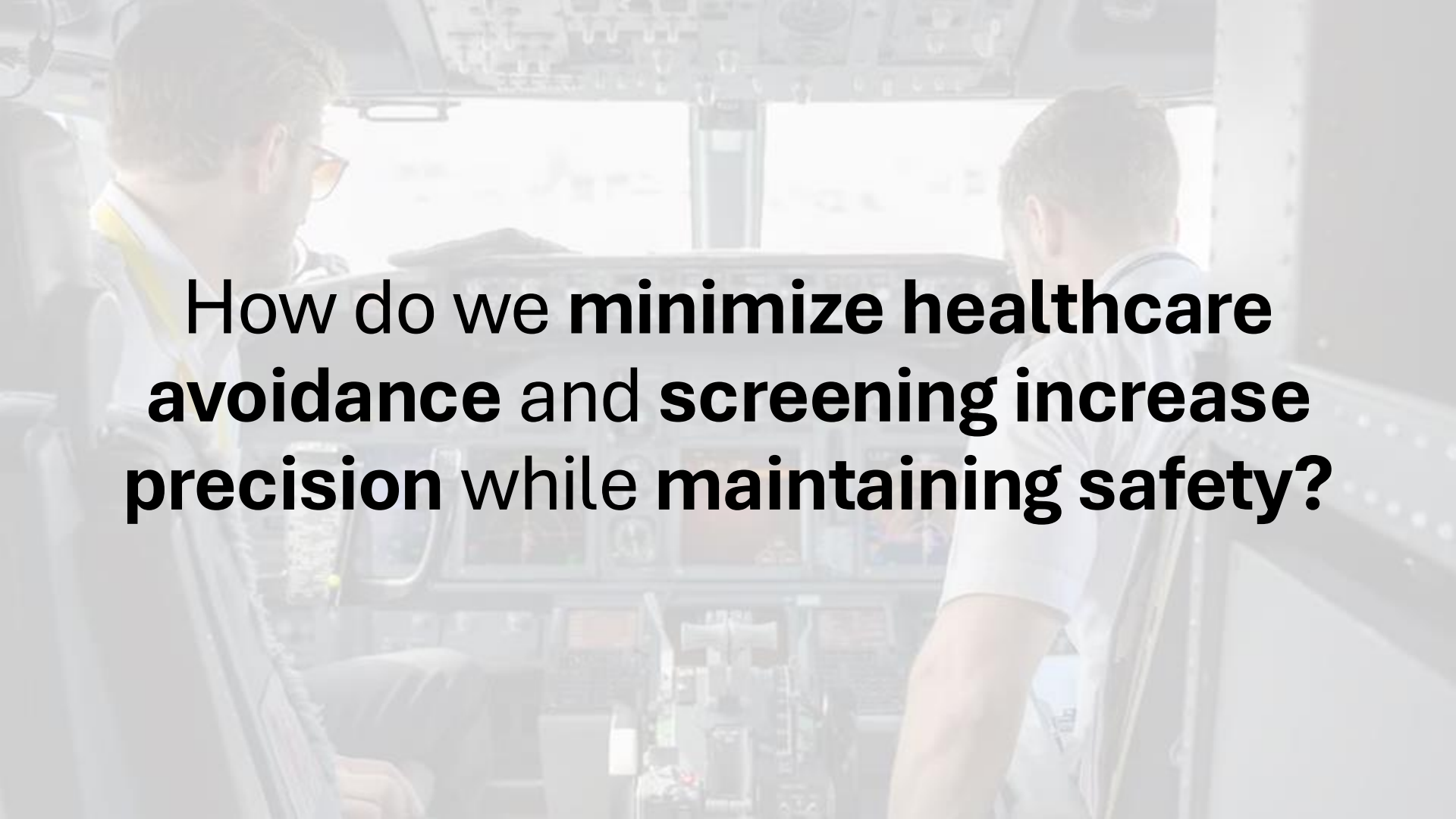
Courtesy of Dr. Anthony Tvaryanas, FAA

Bowtie Analysis of Pilot Depression and Barrier-Based Risk Management

dot_73096_DS1 (5).pdf

Sponsor: Federal Aviation Administration
Dept. No.: P234
Contract No.: 693KA8-22-C-00001
Project No.: 100976.10.102.1016.MH4
Outcome No: 4-5.B.2-3
PBWP Reference: Alternative Recertification Pathways for Pilots With Mental Health Conditions

McLean, VA

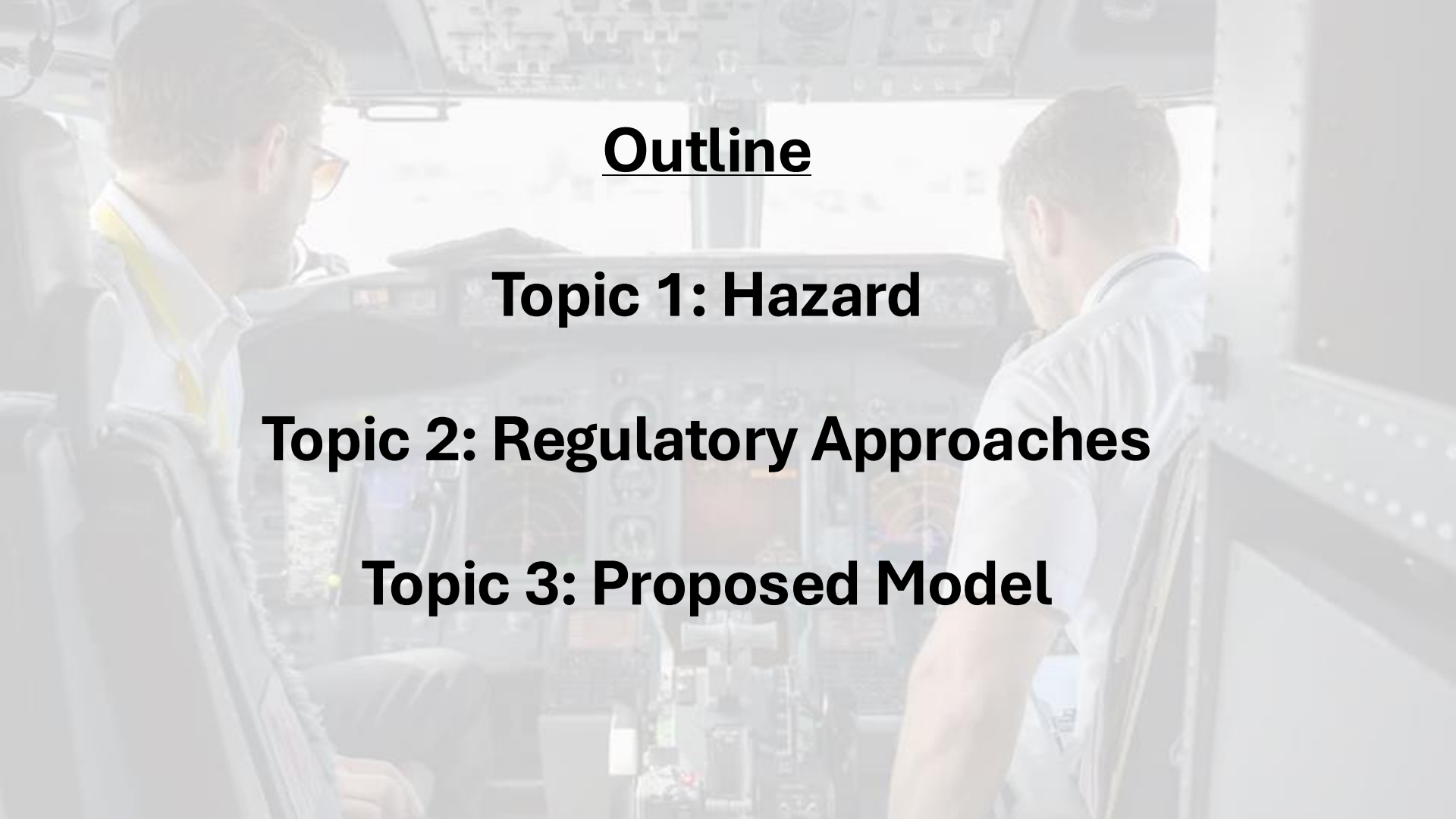


How do we **minimize healthcare avoidance** and **screening increase precision** while **maintaining safety?**

HARVARD UNIVERSITY

Malcolm K. Sparrow

Fundamentals of Regulatory Design



Outline

Topic 1: Hazard

Topic 2: Regulatory Approaches

Topic 3: Proposed Model

Topic 1: Hazards

Considerations for Regulatory Design in Airline Pilots Mental Health

(1) Hazards

(2) Predictability of Change

Topic 1: Hazards

(1) Hazards Related to Mental Health

Focusing on the safety-impacting manifestations of a condition rather than the diagnosis itself, we propose two broad hazard categories:

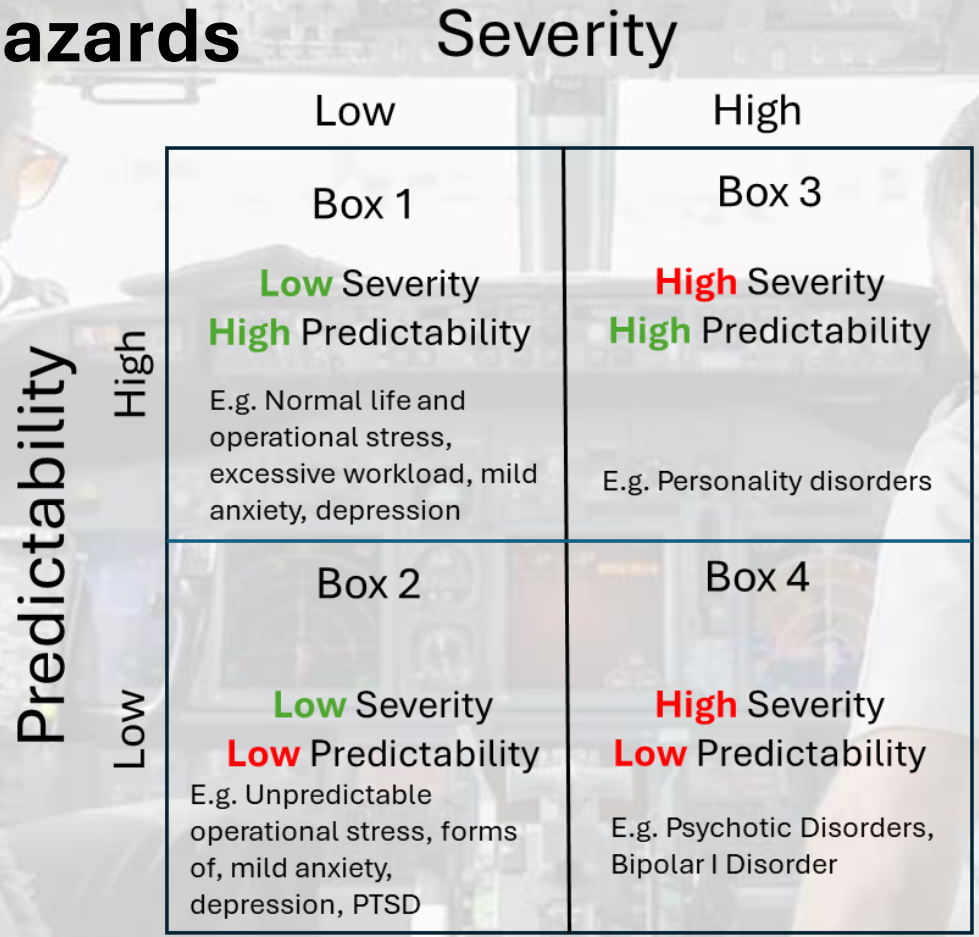
Hazard Category 1: **Cognitive Dysfunction**	**Hazard Category 2:** **Harmful Behaviors**
Executive Dysfunction	Suicidality
Impaired Learning	Homicidality
Impaired Attention and Concentration	
Impaired Working Memory	
Impaired Decision Making	
Impaired Self and Situational Awareness	

Topic 1: Hazards

(2) **Hazard Prevalence**

We pose an assumption that the proportion of pilots with symptoms varies inversely with the degree of symptom severity such that a minority of pilots have a safety-relevant impairment.

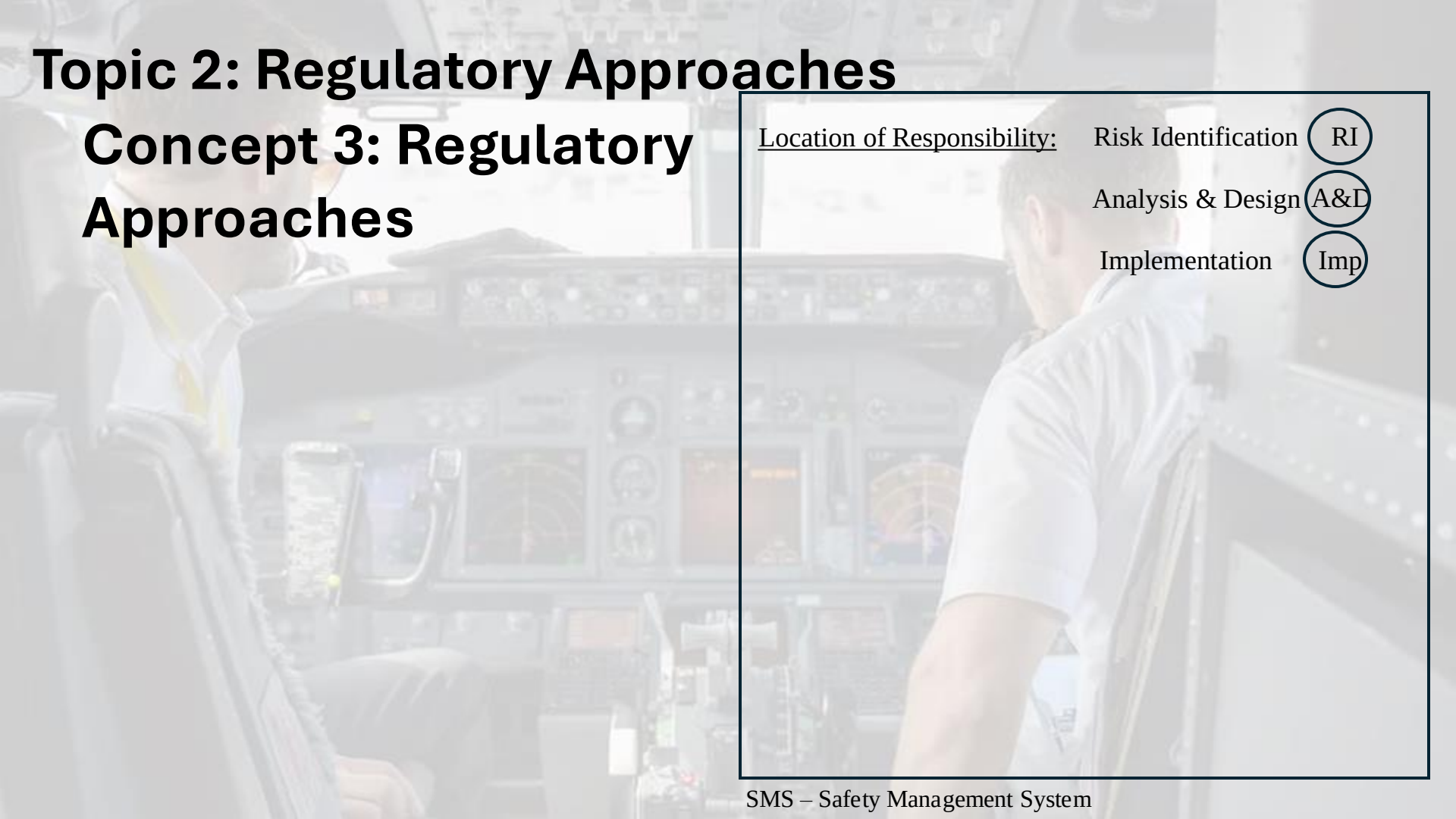
Topic 1: Hazards



*Theoretical Model

Topic 2: Regulatory Approaches

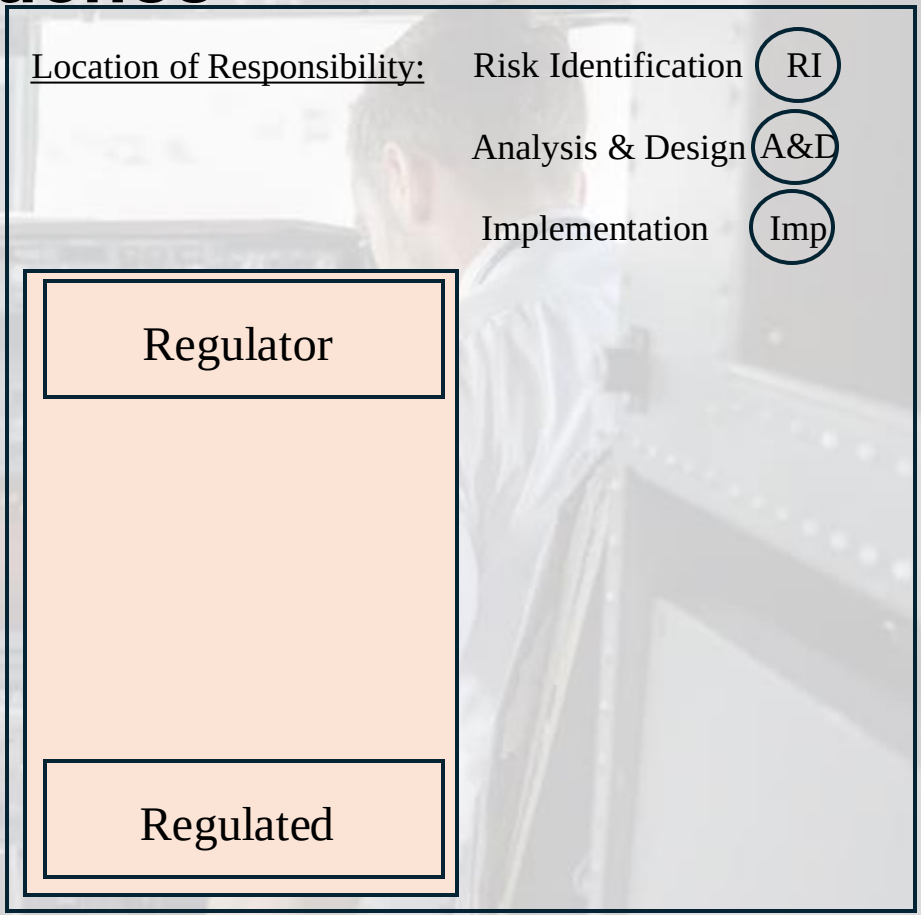
Concept 3: Regulatory Approaches



SMS – Safety Management System

Topic 2: Regulatory Approaches

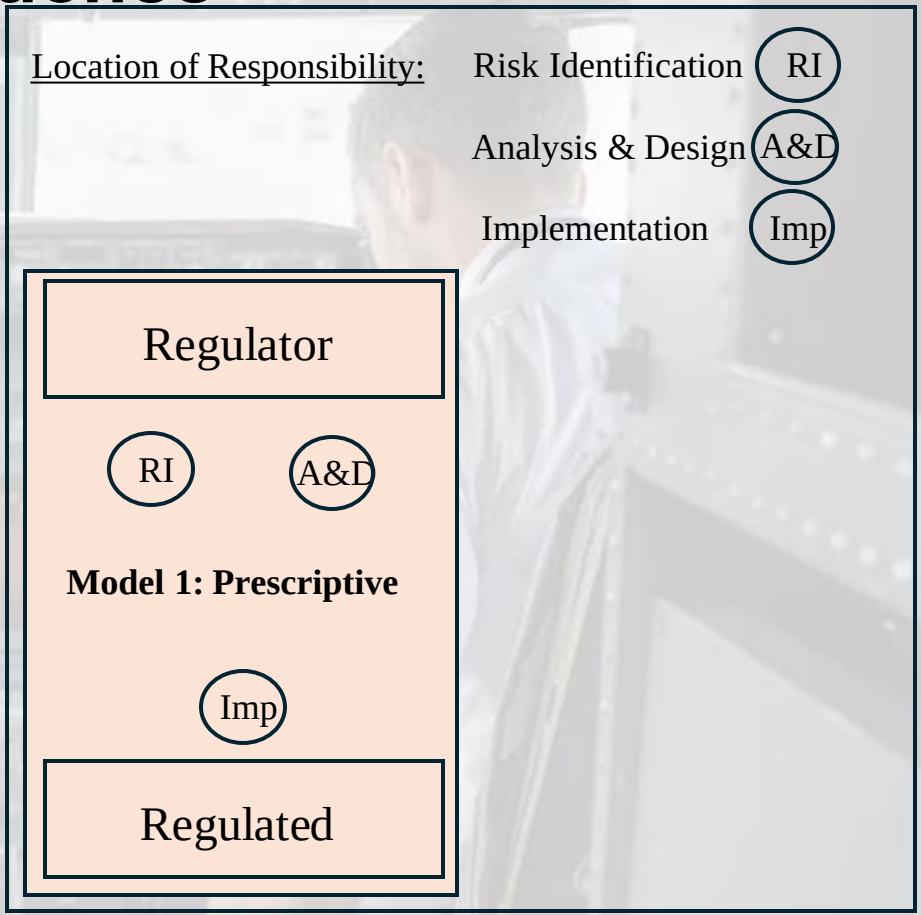
Concept 3: Regulatory Approaches



SMS – Safety Management System

Topic 2: Regulatory Approaches

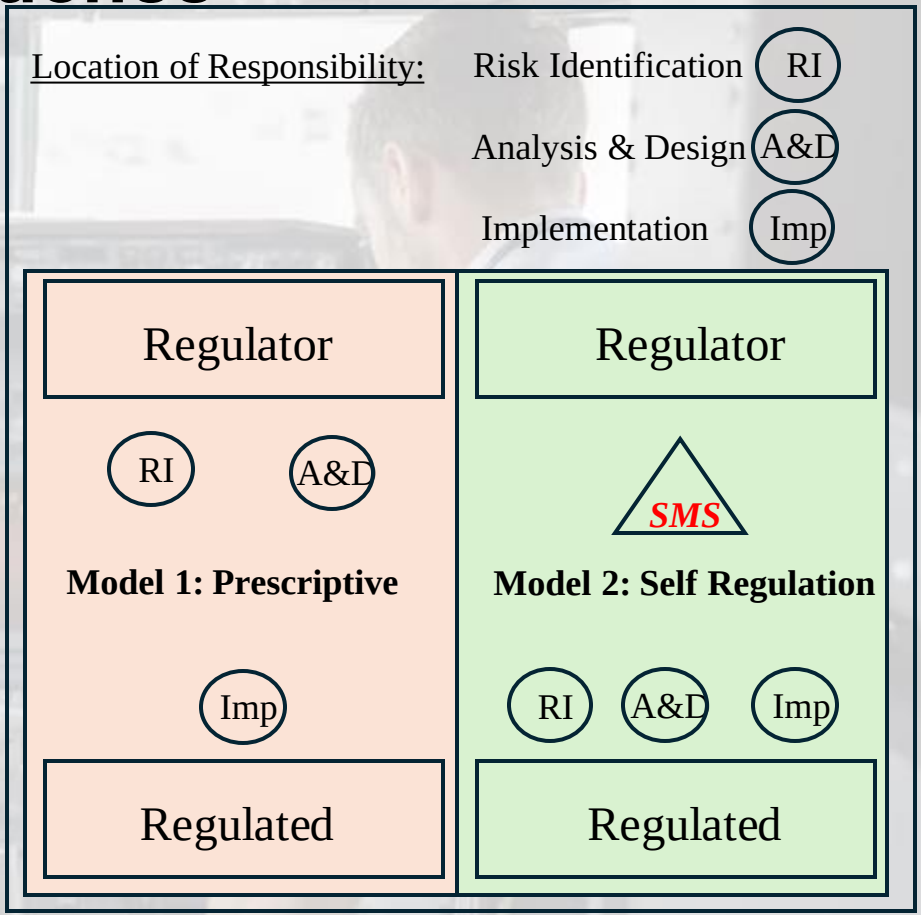
Concept 3: Regulatory Approaches



SMS – Safety Management System

Topic 2: Regulatory Approaches

Concept 3: Regulatory Approaches



SMS – Safety Management System

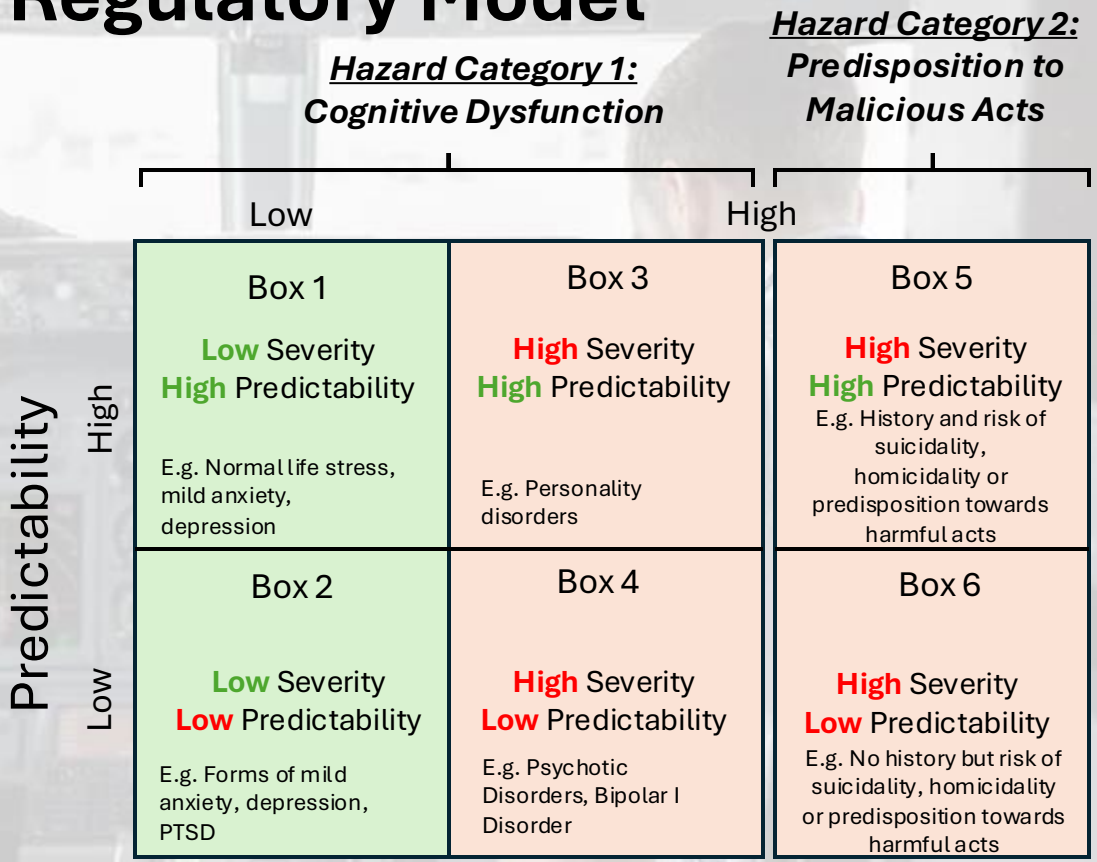
Topic 3: Proposed Regulatory Model

1. The broad hazard categories of cognitive dysfunction and risk of harmful acts require different risk controls

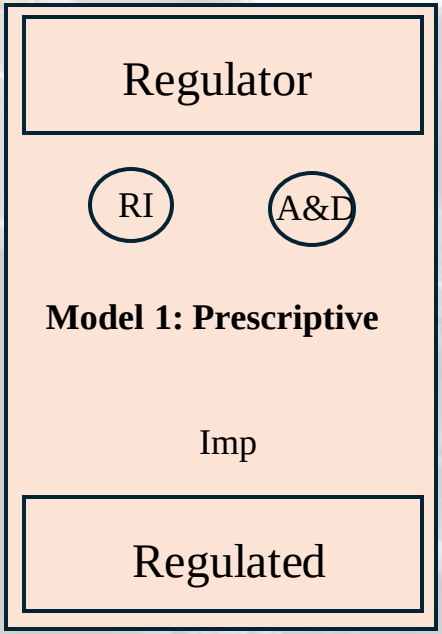
2. The preferred regulatory model differs based on the predictability and severity of the manifestations of a mental health condition

3. Multiple regulatory models can be used simultaneously

Topic 3: Proposed Regulatory Model



Topic 3: Proposed Regulatory Model



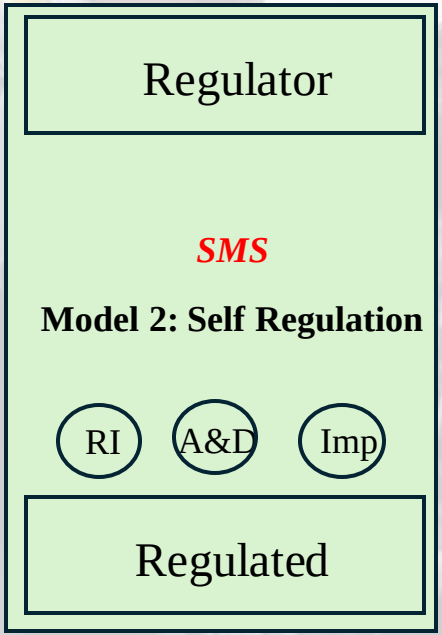
Hazard Category 1:
Cognitive Dysfunction

Hazard Category 2:
Predisposition to Malicious Acts

Predictability	Low	High
High	**Box 1** **Low** Severity **High** Predictability E.g. Normal life stress, mild anxiety, depression	**Box 3** **High** Severity **High** Predictability E.g. Personality disorders	**Box 5** **High** Severity **High** Predictability E.g. History and risk of suicidality, homicidality or predisposition towards harmful acts
Low	**Box 2** **Low** Severity **Low** Predictability E.g. Forms of mild anxiety, depression, PTSD	**Box 4** **High** Severity **Low** Predictability E.g. Psychotic Disorders, Bipolar I Disorder	**Box 6** **High** Severity **Low** Predictability E.g. No history but risk of suicidality, homicidality or predisposition towards harmful acts

Model 1: Prescriptive

Topic 3: Proposed Regulatory Model

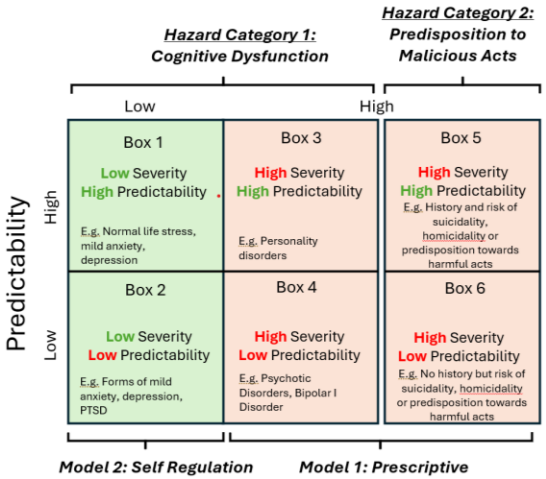


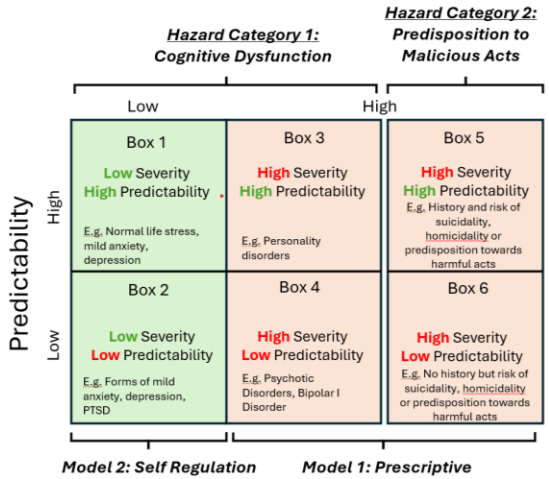
Hazard Category 1:
Cognitive Dysfunction

Hazard Category 2:
Predisposition to Malicious Acts

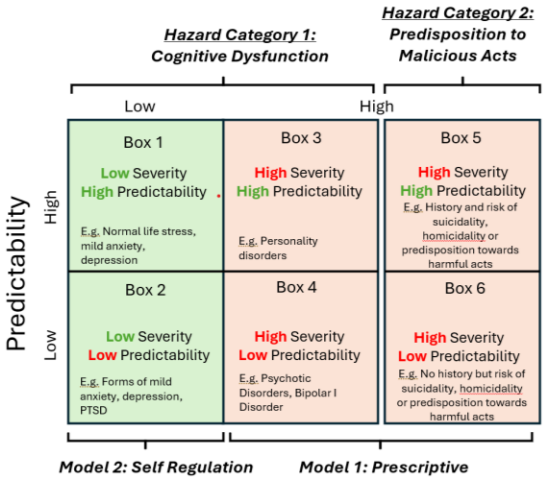
Predictability	Low	High
High	**Box 1** **Low** Severity **High** Predictability E.g. Normal life stress, mild anxiety, depression	**Box 3** **High** Severity **High** Predictability E.g. Personality disorders	**Box 5** **High** Severity **High** Predictability E.g. History and risk of suicidality, homicidality or predisposition towards harmful acts
Low	**Box 2** **Low** Severity **Low** Predictability E.g. Forms of mild anxiety, depression, PTSD	**Box 4** **High** Severity **Low** Predictability E.g. Psychotic Disorders, Bipolar I Disorder	**Box 6** **High** Severity **Low** Predictability E.g. No history but risk of suicidality, homicidality or predisposition towards harmful acts

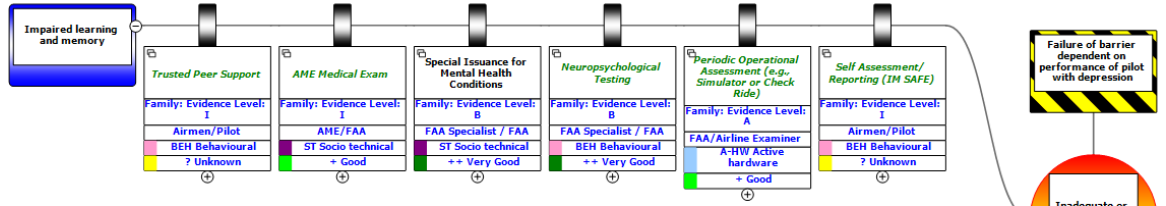
Model 2: Self Regulation ***Model 1: Prescriptive***


Hazard Category 1:
Cognitive Dysfunction
Hazard Category 2:
Predisposition to
Malicious Acts
Low
High
Predictability
High
Low
Box 1
Low Severity
High Predictability
E.g. Normal life stress, mild anxiety, depression
Box 3
High Severity
High Predictability
E.g. Personality disorders
Box 5
High Severity
High Predictability
E.g. History and risk of suicidality, homicidality or predisposition towards harmful acts
Box 2
Low Severity
Low Predictability
E.g. Forms of mild anxiety, depression, PTSD
Box 4
High Severity
Low Predictability
E.g. Psychotic Disorders, Bipolar I Disorder
Box 6
High Severity
Low Predictability
E.g. No history but risk of suicidality, homicidality or predisposition towards harmful acts
Model 2: Self Regulation
Model 1: Prescriptive

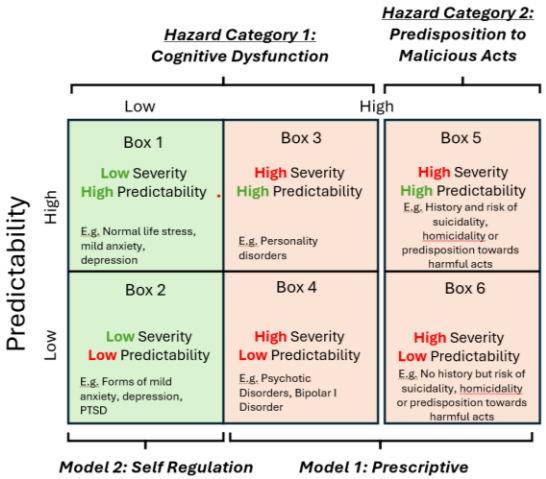

Hazard Category 1:
Cognitive Dysfunction
Hazard Category 2:
Predisposition to
Malicious Acts
Low
High
Predictability
High
Low
Box 1
Low Severity
High Predictability
E.g. Normal life stress, mild anxiety, depression
Box 3
High Severity
High Predictability
E.g. Personality disorders
Box 5
High Severity
High Predictability
E.g. History and risk of suicidality, homicidality or predisposition towards harmful acts
Box 2
Low Severity
Low Predictability
E.g. Forms of mild anxiety, depression, PTSD
Box 4
High Severity
Low Predictability
E.g. Psychotic Disorders, Bipolar I Disorder
Box 6
High Severity
Low Predictability
E.g. No history but risk of suicidality, homicidality or predisposition towards harmful acts
Model 2: Self Regulation
Model 1: Prescriptive

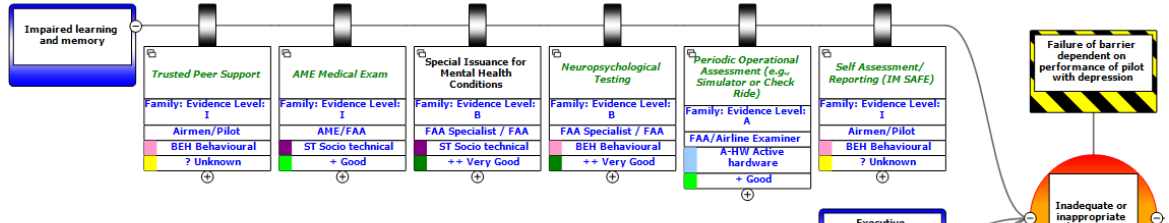

Planned Changes
(SRM Trigger)
SRM
Description & Context
System Analysis
Specific Information
Identify Hazards
Analysis
Analyze Safety Risk
Assessment
Assess Safety Risk
Evaluate Proposed Controls
Risk Not Accepted
Action: Problem Resolution
Control Safety Risk

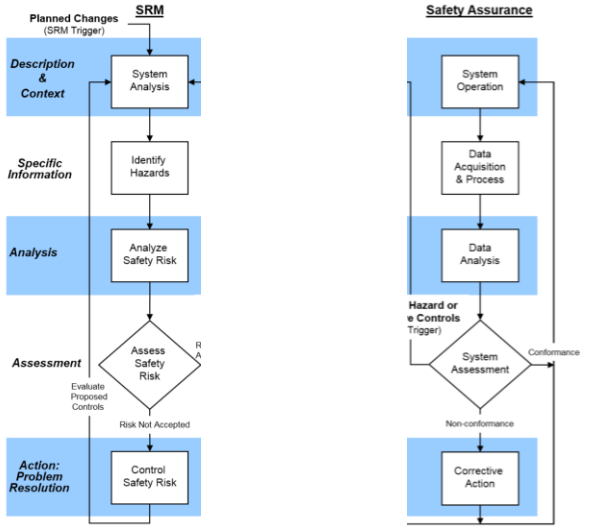

Hazard Category 1:
Cognitive Dysfunction
Hazard Category 2:
Predisposition to
Malicious Acts
Low
High
Predictability
High
Low
Box 1
Low Severity
High Predictability
E.g. Normal life stress, mild anxiety, depression
Box 3
High Severity
High Predictability
E.g. Personality disorders
Box 5
High Severity
High Predictability
E.g. History and risk of suicidality, homicidality or predisposition towards harmful acts
Box 2
Low Severity
Low Predictability
E.g. Forms of mild anxiety, depression, PTSD
Box 4
High Severity
Low Predictability
E.g. Psychotic Disorders, Bipolar I Disorder
Box 6
High Severity
Low Predictability
E.g. No history but risk of suicidality, homicidality or predisposition towards harmful acts
Model 2: Self Regulation
Model 1: Prescriptive

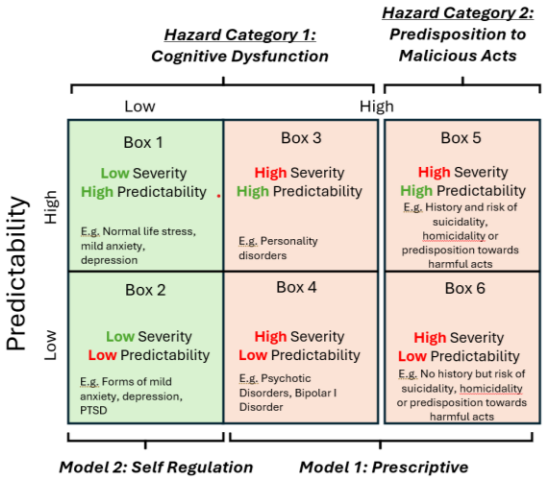

Impaired learning and memory
Trusted Peer Support
Family: Evidence Level: I
Airmen/Pilot
BEH Behavioural
? Unknown
AME Medical Exam
Family: Evidence Level: I
AME/FAA
ST Socio technical
+ Good
Special Issuance for Mental Health Conditions
Family: Evidence Level: B
FAA Specialist / FAA
ST Socio technical
++ Very Good
Neuropsychological Testing
Family: Evidence Level: B
FAA Specialist / FAA
BEH Behavioural
++ Very Good
Periodic Operational Assessment (e.g., Simulator or Check Ride)
Family: Evidence Level: A
FAA/Airline Examiner
A-HW Active hardware
+ Good
Self Assessment/ Reporting (IM SAFE)
Family: Evidence Level: I
Airmen/Pilot
BEH Behavioural
? Unknown
Executive dysfunction, reduced attention and concentration
Lower processing speed
Suicidal ideation
Inadequate or inappropriate pilot response
Failure of barrier dependent on performance of pilot with depression

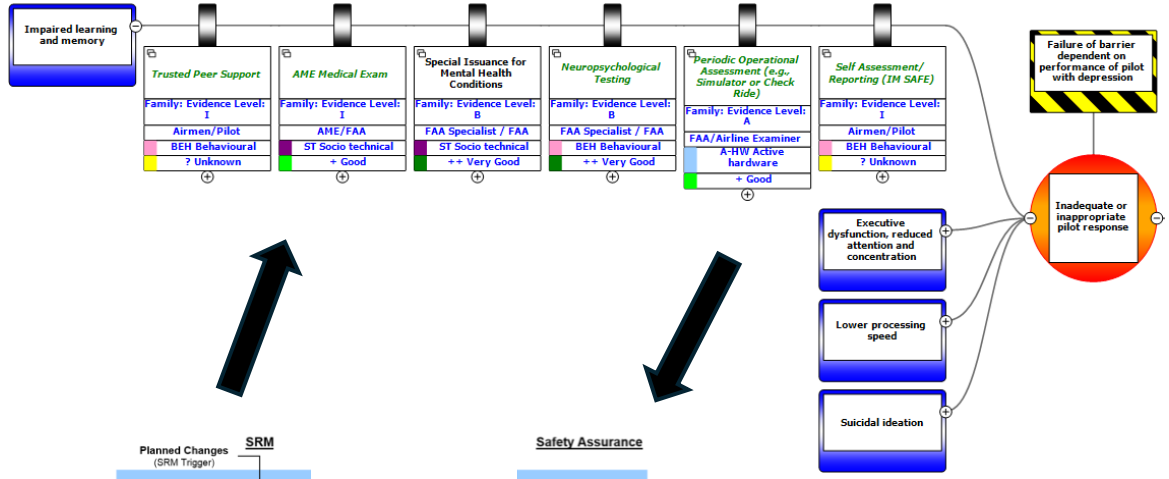

Planned Changes
(SRM Trigger)
SRM
Description & Context
System Analysis
Specific Information
Identify Hazards
Analysis
Analyze Safety Risk
Assessment
Assess Safety Risk
Evaluate Proposed Controls
Risk Not Accepted
Action: Problem Resolution
Control Safety Risk

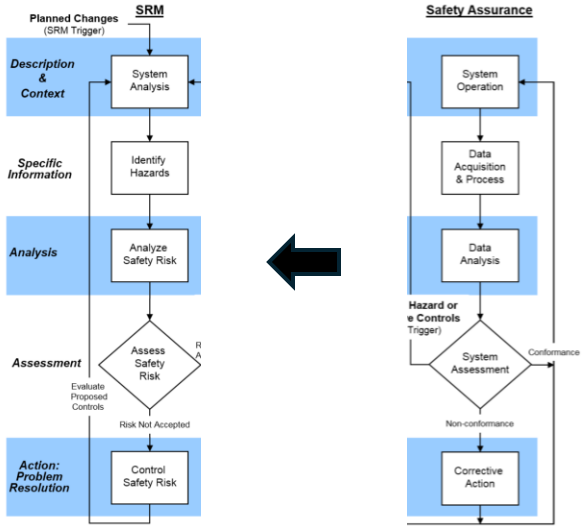

Hazard Category 1:
Cognitive Dysfunction
Hazard Category 2:
Predisposition to
Malicious Acts
Low
High
Predictability
High
Low
Box 1
Low Severity
High Predictability
E.g. Normal life stress, mild anxiety, depression
Box 3
High Severity
High Predictability
E.g. Personality disorders
Box 5
High Severity
High Predictability
E.g. History and risk of suicidality, homicidality or predisposition towards harmful acts
Box 2
Low Severity
Low Predictability
E.g. Forms of mild anxiety, depression, PTSD
Box 4
High Severity
Low Predictability
E.g. Psychotic Disorders, Bipolar I Disorder
Box 6
High Severity
Low Predictability
E.g. No history but risk of suicidality, homicidality or predisposition towards harmful acts
Model 2: Self Regulation
Model 1: Prescriptive


Impaired learning and memory
Trusted Peer Support
Family: Evidence Level: I
Airmen/Pilot
BEH Behavioural
? Unknown
AME Medical Exam
Family: Evidence Level: I
AME/FAA
ST Socio technical
+ Good
Special Issuance for Mental Health Conditions
Family: Evidence Level: B
FAA Specialist / FAA
ST Socio technical
++ Very Good
Neuropsychological Testing
Family: Evidence Level: B
FAA Specialist / FAA
BEH Behavioural
++ Very Good
Periodic Operational Assessment (e.g. Simulator or Check Ride)
Family: Evidence Level: A
FAA/Airline Examiner
A-HW Active hardware
+ Good
Self Assessment/ Reporting (IM SAFE)
Family: Evidence Level: I
Airmen/Pilot
BEH Behavioural
? Unknown
Executive dysfunction, reduced attention and concentration
Lower processing speed
Suicidal ideation
Inadequate or inappropriate pilot response
Failure of barrier dependent on performance of pilot with depression


SRM
Planned Changes
(SRM Trigger)
Description & Context
System Analysis
Specific Information
Identify Hazards
Analysis
Analyze Safety Risk
Assessment
Assess Safety Risk
Evaluate Proposed Controls
Risk Not Accepted
Action: Problem Resolution
Control Safety Risk
Safety Assurance
System Operation
Data Acquisition & Process
Data Analysis
System Assessment
Conformance
Non-conformance
Corrective Action


Hazard Category 1:
Cognitive Dysfunction
Hazard Category 2:
Predisposition to
Malicious Acts
Low
High
Predictability
High
Low
Box 1
Low Severity
High Predictability
E.g. Normal life stress, mild anxiety, depression
Box 3
High Severity
High Predictability
E.g. Personality disorders
Box 5
High Severity
High Predictability
E.g. History and risk of suicidality, homicidality or predisposition towards harmful acts
Box 2
Low Severity
Low Predictability
E.g. Forms of mild anxiety, depression, PTSD
Box 4
High Severity
Low Predictability
E.g. Psychotic Disorders, Bipolar I Disorder
Box 6
High Severity
Low Predictability
E.g. No history but risk of suicidality, homicidality or predisposition towards harmful acts
Model 2: Self Regulation
Model 1: Prescriptive


Impaired learning and memory
Trusted Peer Support
Family: Evidence Level: I
Airmen/Pilot
BEH Behavioural
? Unknown
AME Medical Exam
Family: Evidence Level: I
AME/FAA
ST Socio technical
+ Good
Special Issuance for Mental Health Conditions
Family: Evidence Level: B
FAA Specialist / FAA
ST Socio technical
++ Very Good
Neuropsychological Testing
Family: Evidence Level: B
FAA Specialist / FAA
BEH Behavioural
++ Very Good
Periodic Operational Assessment (e.g., Simulator or Check Ride)
Family: Evidence Level: A
FAA/Airline Examiner
A-HW Active hardware
+ Good
Self Assessment/ Reporting (IM SAFE)
Family: Evidence Level: I
Airmen/Pilot
BEH Behavioural
? Unknown
Executive dysfunction, reduced attention and concentration
Lower processing speed
Suicidal ideation
Inadequate or inappropriate pilot response
Failure of barrier dependent on performance of pilot with depression


SRM
Planned Changes
(SRM Trigger)
Description & Context
System Analysis
Specific Information
Identify Hazards
Analysis
Analyze Safety Risk
Assessment
Assess Safety Risk
Evaluate Proposed Controls
Risk Not Accepted
Action: Problem Resolution
Control Safety Risk

Safety Assurance
System Operation
Data Acquisition & Process
Data Analysis
System Assessment
Conformance
Non-conformance
Corrective Action

A Proposed Framework to Regulate Mental Health in Airline Pilots

William R. Hoffman; Anne Suh; Timothy Sprott; Kate Manderson; Quay Snyder; Malcolm Sparrow; Anthony Tvaryanas

INTRODUCTION: The current regulatory approach to U.S. airline pilot mental health may have unintended negative consequences including healthcare avoidance and screening imprecision. An alternative approach should aim to address these factors while maintaining safety. The authors summarize the following related to mental health in U.S. airline pilots: 1) current regulatory approach and limitations, 2) available regulatory tools within the Sparrow fundamentals, and 3) a proposed novel regulatory approach. The authors propose the simultaneous utilization of multiple models to minimize the negative consequences of healthcare avoidance and screening imprecision. The proposed framework aims to address current limitations.

KEYWORDS: mental health, aerospace medicine, aerospace psychology, screening, public health, regulatory design, occupational medicine.

Hoffman WR, Suh A, Sprott T, Manderson K, Snyder Q, Sparrow M, Tvaryanas A. *A proposed framework to regulate mental health in airline pilots*. Aerosp Med Hum Perform. 2024; 95(12):1–4.

Knowledge Check 2:

Which one of the following is true?

A. Safety Risk Management (SRM) portion of a Safety Management System (SMS) determines need for and adequacy of risk controls in a system

B. Bow Tie Analysis includes all portions of the SMS process

C. Multiple regulatory approaches cannot be used to control the risks related to mental health in aviation

D. SMS aims to eliminate all risk in a regulated system

E. All of the above

Knowledge Check 2:

Which one of the following is true?

A. **Safety Risk Management (SRM) portion of a Safety Management System (SMS) determines need for and adequacy of risk controls in a system**

B. Bow Tie Analysis includes all portions of the SMS process

C. Multiple regulatory approaches cannot be used to control the risks related to mental health in aviation

D. SMS aims to eliminate all risk in a regulated system

E. All of the above

Single-Blinded Randomized Controlled Study of Peer Support in Aviation Personnel

William R. Hoffman, MD, Quay Snyder, MD MSPH, Anthony Tvaryanas, MD PhD, MPH&TM, et al.

Project 5

(1) Review Healthcare Avoidance

(2) Mental Health in Safety Management

(3) Mental Health in Regulatory Design

William.r.hoffman43.mil@health.mil