DoD HFACS

Department of Defense Human Factors Analysis and Classification System

A mishap investigation and data analysis tool

Executive Summary

This Department of Defense Human Factors (DoD HF) Guide explains procedures for investigating and reporting all DoD mishaps. It supports DoDI 6055.7, *Accident Investigation, Reporting, and Record Keeping.* The DODI directs DOD components to "Establish procedures to provide for the cross-feed of human error data using a common human error categorization system that involves human factors taxonomy accepted among the DoD Components and U.S. Coast Guard." It is intended for use by all persons who investigate, report and analyze DoD mishaps, and is particularly tailored to the needs of persons assigned to Interim Safety Boards and formal Safety Investigation Boards following all Classes of mishaps. There are myriad potential human factors, all of which need to be assessed for relevancy during a mishap investigation. No investigator, flight surgeon, physiologist, human factors analyst or aviation psychologist can be expected to be fully familiar with all potential human factors

When using this human factors model, the investigator should consider applying the model to three distinct areas of consideration: environmental, individual and the event or mishap. The mishap crew, operator, or team reacts to the environment to which they are exposed. The environmental factors cover not only the physical environment to which the individual members are exposed, but also the organizational and supervisory environments and specific physical and technological preconditions. The individual factors cover acts, preconditions and supervision factors. The mishap factors can cross all four tiers of the model. The investigator can apply this model by entering at any tier that is specifically related to environmental, individual or mishap factors discovered during the analysis. This model can be used as either a primary or secondary tool to investigate both active and latent failures. Our model is designed to present a systematic, multidimensional approach to error analysis. This human factors model covers human error from three perspectives:

- Cognitive Viewpoint and Human System Interaction and Integration
- Human-to-Human Interaction
- Sociocultural and Organization

When using our DoD HF Taxonomy for either primary investigation or secondary analysis, we must assume error can mean several things:

- Error as the failure itself. For example: The operator's decision was an error (decision, perceptual, or skill-based errors).
- Error as the cause of failure. For example: This event was due to human error (failure to provide guidance).
- Error as a process or, more specifically, as a departure from some kind of standard (exceptional, routine, intentional or unintentional).

A reasonable synthesis of these assumptions, as suggested by Senders and Moray (1991), is the following: Human error occurs when human action is performed that was either (1) not intended by the actor, (2) not desired according to some specified set of rules or by some external observer, or (3) contributed to the task or system "going outside its acceptable limits."

This DoD Guide starts with a brief history of the development of the DoD HFACS, followed by an introduction and description of the human factor and human performance application of this model. The Guide concludes with a high-level structural overview of the taxonomy and definitions.

History

The Secretary of Defense published a memorandum 19 May 2003 stating, "World-class organizations do not tolerate preventable accidents. Our accident rates have increased recently, and we need to turn this situation around. I

challenge all of you to reduce the number of mishaps and accident rates by at least 50% in the next two years." These goals are achievable, and will directly increase our operational readiness. We owe no less to the men and women who defend our Nation." This memorandum resulted in the creation of the DOD Safety Oversight Committee to provide guidance to the DOD and individual services on best practices and methods to accomplish this mandate. The Secretary of Defense established the Defense Safety Oversight Council to:

- Review accident and incident trends, ongoing safety initiatives, private sector and other governmental agency best practices, and to make recommendations to the Secretary of Defense for safety improvement policies, programs, and investments
- Assess, review and advise on improving all aspects of the coordination, relevance, efficiency, efficacy, timeliness and viability of existing DoD-wide safety and injury prevention information management systems
- Promote the development and implementation of safety initiatives, including Systems Safety for Acquisitions and operations, to improve mission success as well as preserve human and physical resources throughout DoD
- Coordinate with other federal agencies and industry leaders, to facilitate communication, coordination, and integration of best practices into DoD planning, development and implementation of initiatives and programs that support research to improve human performance, safety education standards/procedures, and equipment

The Aviation Safety Improvement Task Force (ASI-TF) was established to meet these DOD requirements. The ASI-TF subsequently established the Human Factors Working Group (HFWG)with a charter to identify data-driven, benefit-focused, human-factor and human-performance safety strategies designed to identify hazards, mitigate risk and reduce aviation mishaps inherent in aircraft operations throughout DoD. The ASI-TF chair directed the HFWG to accomplish the following tasks:

- Promote common Human Factors taxonomy, investigation, and Analysis system for DoD-wide implementation
- Recommend standardization of human factor and human performance terminology
- Provide human factors subject matter experts to all ASI-TF working groups, and hazard identification and intervention analysis teams
- Identify and analyze top human factor and human performance mishap focus areas
- Identify, catalog and recommend approaches to improve organizational/cultural assessments

This guide is produced to meet the first two tasks of the Human Factors Working Group. The guide was initially developed to investigate aviation mishaps, and therefore uses an aviation-centric language. During production the authors have attempted to modify definitions to ensure the tool can be used in the investigation of multiple types of events. This guide was developed based on the evolution of the works produced by Jens Rasmussen, James Reason as well as Douglas Wiegmann and Scott Shappell. As this dynamic document evolves, we plan to ensure that it can be seamlessly applied across all services, and will be used to investigate aviation, ground, weapons, afloat, space and off-duty mishaps and events.

Introduction

Mishap or event investigation can be extremely difficult, time-consuming and stressful, but it can also be rewarding when we recognize that the contributions we make will improve safety. A thorough mishap investigation is absolutely necessary to determine the cascading events causal to a mishap, and to recommend corrective actions to prevent recurrence. This guide provides the accident investigator with a proven template that aids in organizing the investigation while providing a detailed analysis of human factors for on-scene investigation and post-hoc mishap data analysis, revealing previously unidentified human-error trends and hazards.

Human error continues to plague both military and civilian mishaps. Analysis indicates that human error is identified as a causal factor in 80 to 90 percent of mishaps, and "operator error" is present in 50 to 60 percent of all mishaps, and is therefore the single greatest mishap hazard. Yet, simply writing off mishaps to "operator error" is a simplistic, if not naïve, approach to mishap causation and hazard identification. Further, it is well established that mishaps are rarely attributed to a single cause, or in most instances, even a single individual. Rather, mishaps are the end result of myriad latent failures or conditions that precede active failures (Shappell in "*The Naval Flight Surgeon's Pocket Reference to Aircraft Mishap Investigation"*). The goal of a mishap or event

investigation is to identify these failures and conditions in order to understand why the mishap occurred and how it might be prevented from happening again.

This reference is an adjunct to formal instructions that govern mishap investigation and is not meant to supplant the other references that address service-specific guidance for mishap investigation. Use this guide as a ready reference in the field to ensure that your data retrieval is complete and that you preserve perishable evidence. This guide is also designed to ensure uniformity of inter-service human factors definitions and data driven analysis.

Description

This guide is designed for use as a comprehensive event/mishap, human error investigation, data identification, analysis and classification tool. It is designed for use by all members of an investigation board in order to accurately capture and recreate the complex layers of human error in context with the individual, environment, team and mishap or event.

In the past, investigators have thrown human factors analysis to the medical investigator and have asked him or her to do this work on their own. This practice has sometimes produced human error analyses that differed considerably from the boards' investigation and findings of fact. Integrating human factors analysis into all aspects of the investigation will result in a much more coherent final product.

As described by Reason (1990), *active failures* are the actions or inactions of operators that are believed to cause the mishap. Traditionally referred to as "error", they are the last "acts" committed by individuals, often with immediate and tragic consequences. For example, an aviator forgetting to lower the landing gear before touch down or showing off by flying low through a box canyon will yield relatively immediate, and potentially grave, consequences. In contrast, *latent failures* or *conditions* are errors that exist within the organization or elsewhere in the supervisory chain of command that effect the tragic sequence of events characteristic of a mishap. For example, it is not difficult to understand how tasking crews or teams at the expense of quality crew rest can lead to fatigue and ultimately errors (active failures) in the cockpit. Viewed from this perspective then, the actions of individuals are the end result of a chain of factors originating in other parts (often the upper echelons) of the organization. The problem is that these latent failures or conditions may lie dormant or undetected for some period of time prior to their manifestation as a mishap.

The question for mishap investigators and analysts alike is how to identify and mitigate these active and latent failures or conditions. One approach is the "Domino Theory" which promotes the idea that, like dominoes stacked in sequence, mishaps are the end result of a series of errors made throughout the chain of command.

A "modernized" version of the domino theory is Reason's "Swiss Cheese" model that describes the levels at which active failures and latent failures/conditions may occur within complex operations (see Figure 1).
Working backward from the mishap, the first level of Reason's model depicts those *Unsafe Acts of Operators* (operator, maintainers, facility personnel, etc.) that ultimately lead to a mishap. Traditionally, this is where most mishap investigations have focused their examination of human error, and consequently where most causal factors are uncovered. After all, it is typically the actions or inactions of individuals that can be directly linked to the mishap. Still, to stop the investigation here only uncovers part of the story.

What makes Reason's model particularly useful in mishap investigation is that it forces investigators to address latent failures and conditions within the causal sequence of events. For instance, latent failures or conditions such as fatigue, complacency, illness, and the physical/technological environment all effect individual performance but can be overlooked by investigators with even the best of intentions. These particular latent failures and conditions are described within the context of Reason's model as *Preconditions for Unsafe Acts*. Likewise, *Supervision* can promote unsafe conditions of operators and ultimately unsafe acts will occur. For example, if an Operations Officer were to pair a below average team leader with a very junior/inexperienced crew, the result is increased risk of mission failure. Regardless, whenever a mishap does occur, the crew naturally bears a part of the responsibility and accountability. However, often the latent failures or conditions at the supervisory level are equally responsible for poor hazard analysis and subsequent increased mission risk, and may ultimately cause the mishap. In this particular example, the crew was set up for the opportunity for failure.

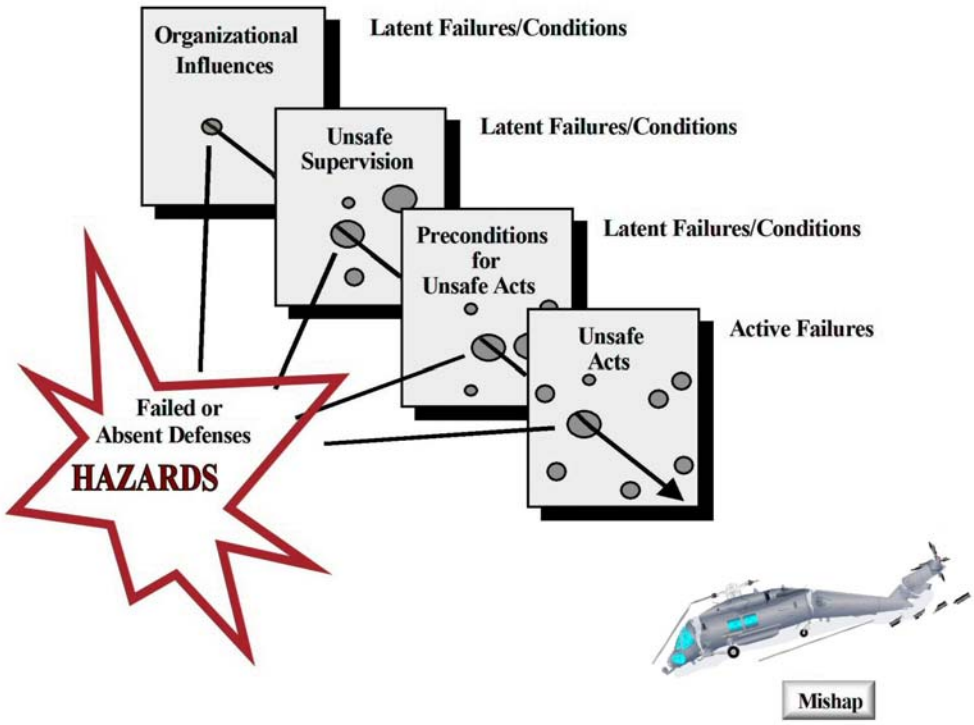

Figure 1. The "Swiss Cheese" Model (adapted from Reason, 1990)

Reason's model does not stop at supervision; it also considers *Organizational Influences* that can impact performance at all levels. For instance, in times of fiscal constraints, funding may be short and may lead to limited training opportunities. Supervisors are sometimes pressed to task "non-proficient" crews with complex missions. Not surprisingly, unintended and unrecognized errors may appear, and mission performance will consequently suffer. As such, hazards and risks at all levels must be addressed if any mishap investigation process is going to be effective.

The investigation process then endeavors to detect and identify the "holes (*hazards*) in the cheese" (see Figure 1). So how do we identify these hazards? *Aren't they really too numerous to define? After all, every mishap is unique, so the hazards will always be different for each mishap ... right?* Well, it turns out that each mishap is not unique from its predecessors. In fact, most mishaps have very similar causes. They are due to the same holes in the cheese, so to speak. The hazards identified in each new mishap are not unique to that mishap. Therefore, if you know what these system failures/hazards or "holes" are, you can better identify their roles in mishaps -- or better yet, detect their presence and develop a risk mitigation strategy correcting them **before** a mishap occurs.

Department of Defense (DoD) Human Factors Analysis and Classification System

Drawing upon Reason's (1990) and Wiegmann and Shappell's (2003) concept of active failures and latent failures/conditions, a new DoD taxonomy was developed to identify hazards and risks called the DoD Human Factors Analysis and Classification System. DOD-HFACS describes four main tiers of failures/conditions: 1) Acts, 2) Preconditions, 3) Supervision, and 4) Organizational Influences (Figure 2). A brief description of the major tiers with associated categories and sub-categories follows, beginning with the tier most closely tied to the mishap.

Attachment 1 is the in-depth reference document, and contains all the currently accepted definitions for the sub-codes that fall within the 4 major tiers of human error. This document is subject to review and update every 6 months by the Human Factors Working Group of the Joint Services Safety Chiefs. For comments please contact the Command Flight Surgeon of the Naval Safety Center.

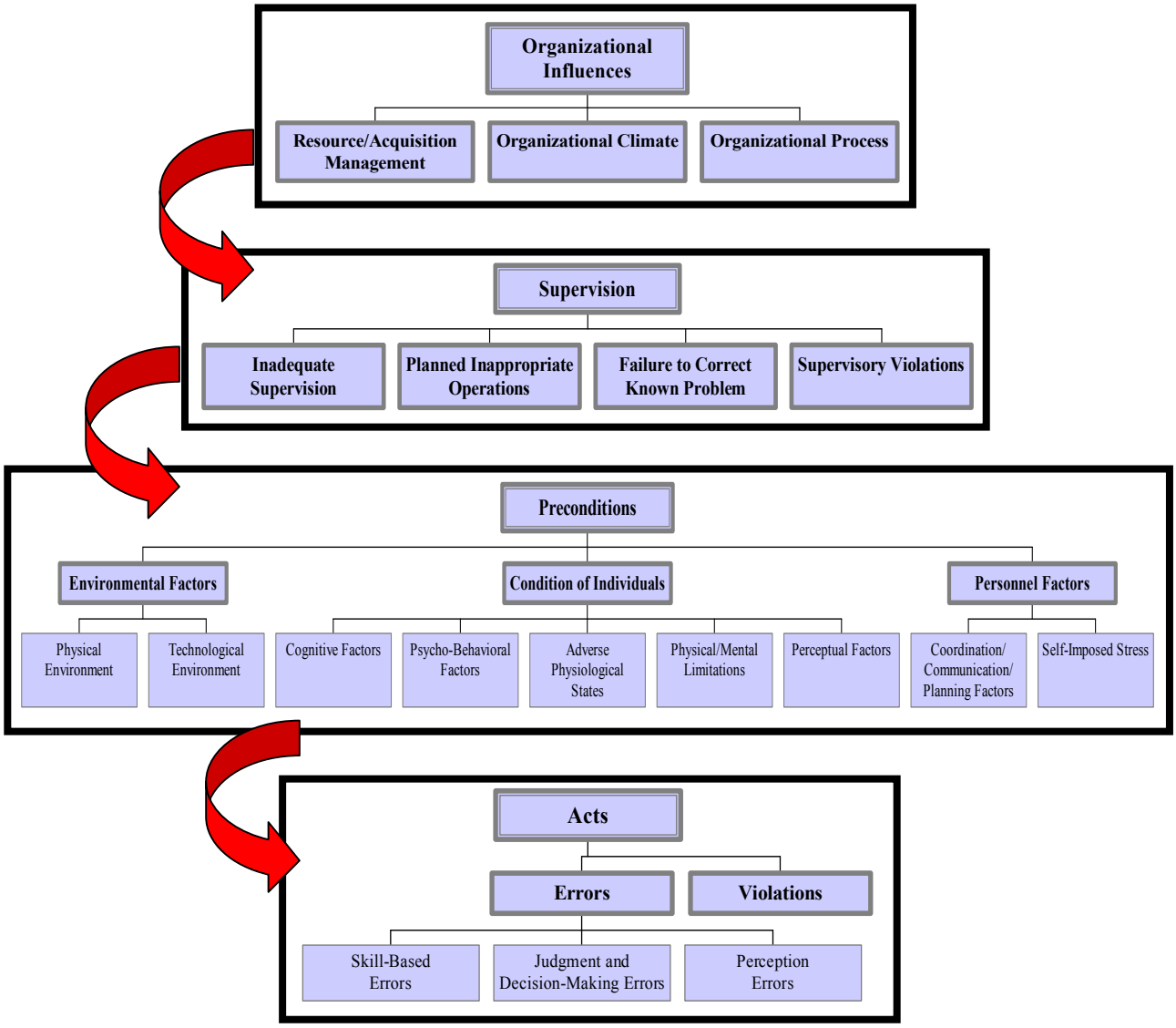

Figure 2. DOD HFACS Model

Note *In the electronic version of this document each of the HFACS Model boxes are hyper-linked to more in-depth descriptions*

1. Acts

Acts are those factors that are most closely tied to the mishap, and can be described as active failures or actions committed by the operator that result in human error or unsafe situation. We have identified these active failures or actions as *Errors and Violations* (see Figure 3).

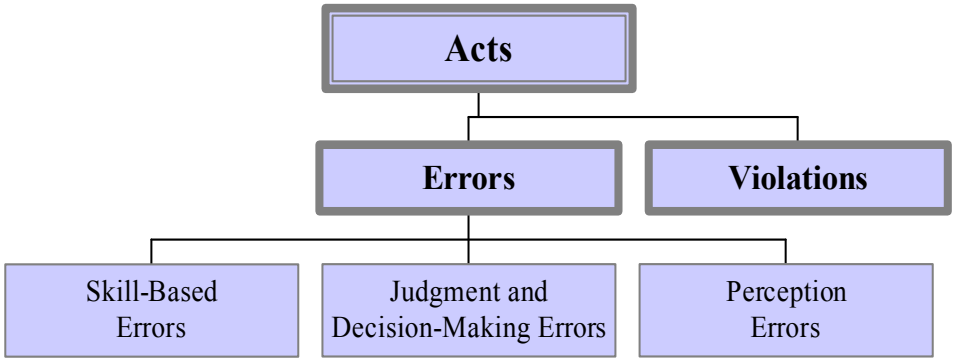

Figure 3. Categories of Acts of Operators

Errors: Errors are factors in a mishap when mental or physical activities of the operator fail to achieve their intended outcome as a result of skill-based, perceptual, or judgment and decision making errors, leading to an unsafe situation. Errors are unintended. We classified Errors into three types: *Skill-Based*, *Judgment and Decision Making*, and P*erception Errors*. Using this error analysis process, the investigator must first determine if an individual or team committed an active failure. If so, the investigator must then decide if an error or violation occurred. Once this is done, the investigator can further define the error.

> **Skill-based Errors**: skill based errors are factors in a mishap when errors occur in the operator's execution of a routine, highly practiced task relating to procedure, training or proficiency and result in an unsafe a situation. Skill-based Errors are unintended behaviors. (Table 1)
>
> **Judgment and Decision Making Errors**: Judgment and Decision making errors are factors in a mishap when behavior or actions of the individual proceed as intended yet the chosen plan proves inadequate to achieve the desired end-state and results in an unsafe situation (Table 1).
>
> **Perception Errors**: Perception errors are factors in a mishap when misperception of an object, threat or situation (such as visual, auditory, proprioceptive, or vestibular illusions, cognitive or attention failures) results in human error (Table 1).

Violations: Violations are factors in a mishap when the actions of the operator represent willful disregard for rules and instructions and lead to an unsafe situation. Unlike errors, violations are deliberate. (Table 1)

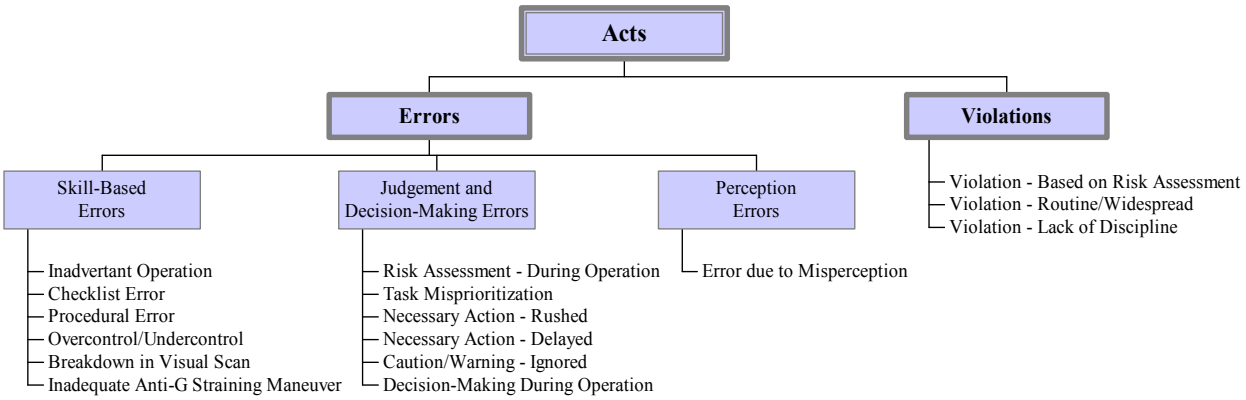

Table 1 Acts

2. Preconditions

Preconditions are factors in a mishap if active and/or latent preconditions such as conditions of the operators, environmental or personnel factors affect practices, conditions or actions of individuals and result in human error or an unsafe situation (Figure 4). In this error analysis model preconditions include *Environmental Factors*, *Condition of the Individuals* and *Personnel Factors*.

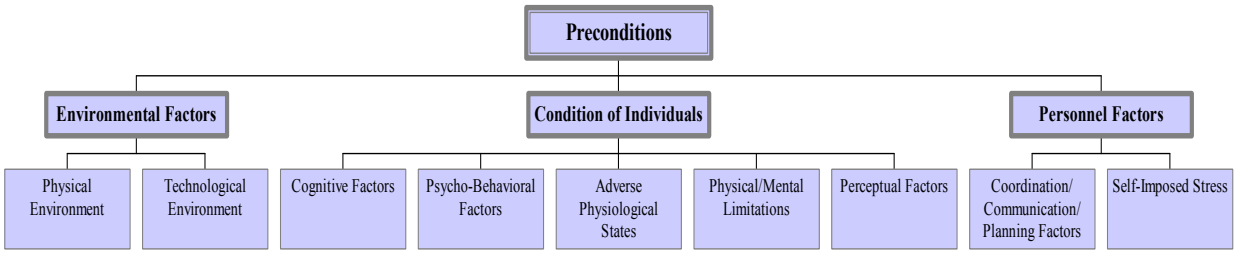

Figure 4. Categories of Preconditions for Unsafe Acts

Environmental Factors: Environmental factors are factors in a mishap if *physical* or *technological* factors affect practices, conditions and actions of individual and result in human error or an unsafe situation. Environmental factors include:

> **Physical Environment**: Physical environment are factors in a mishap if environmental phenomena such as weather, climate, white-out or dust-out conditions affect the actions of individuals and result in human error or an unsafe situation. (Table 2)
>
> **Technological Environment**: Technological environment are factors in a mishap when cockpit/vehicle/workspace design factors or automation affect the actions of individuals and result in human error or an unsafe situation. (Table 2)

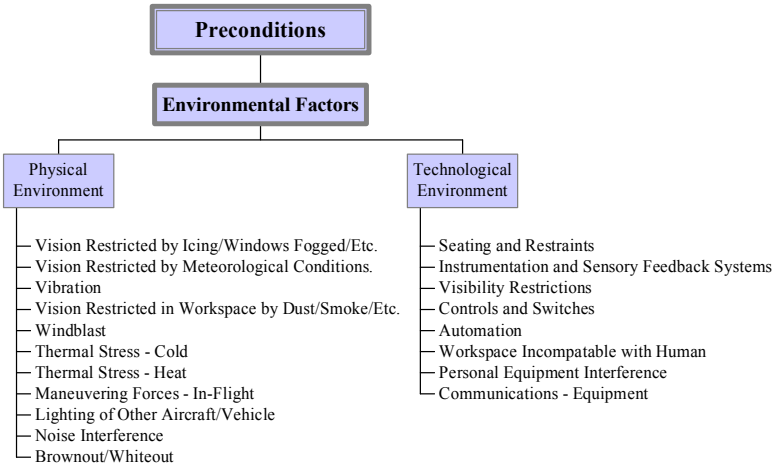

Table 2. Environmental Factors

Condition of the Individual: Condition of the individual are factors in a mishap if cognitive, psycho-behavioral, adverse physical state, or physical/mental limitations affect practices, conditions or actions of individuals and result in human error or an unsafe situation. Condition of the Individuals include:

Cognitive Factors: Cognitive factors are factors in a mishap if cognitive or attention management conditions affect the perception or performance of individuals and result in human error or an unsafe situation. (Table 3)

Psycho-Behavioral Factors: Psycho-Behavioral factors are factors when an individual's personality traits, psychosocial problems, psychological disorders or inappropriate motivation creates an unsafe situation. (Table 3)

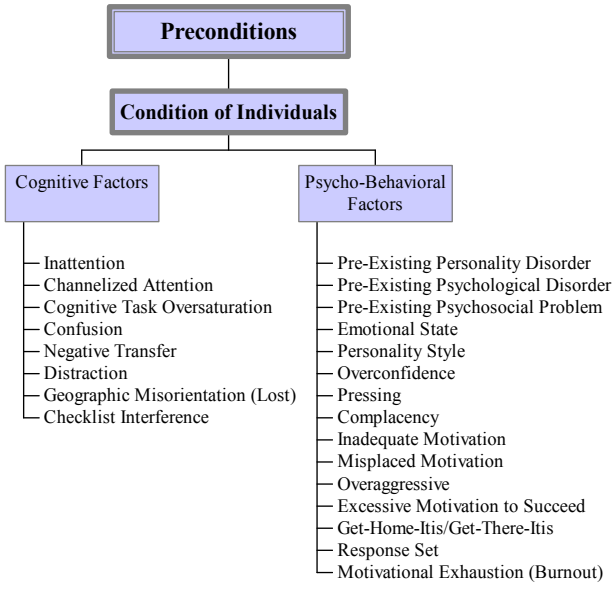

Table 3. Conditions of the individual (part 1)

Adverse Physiological States: Adverse physiological states are factors when an individual experiences a physiologic event that compromises human performance and this decreases performance resulting in an unsafe situation. (Table 4)

Physical/Mental Limitations: Physical/mental limitations are factors in a mishap when an individual lacks the physical or mental capabilities to cope with a situation, and this insufficiency causes an unsafe situation. This often, *but not always*, indicates an individual who does not possess the physical or mental capabilities expected in order to perform the required duties safely. (Table 4)

Perceptual Factors: Perceptual factors are factors in a mishap when misperception of an object, threat or situation (visual, auditory, proprioceptive, or vestibular conditions) creates an unsafe situation. If investigators identify spatial disorientation (SD) in a mishap the preceding causal illusion should also be identified. Vice versa, if an illusion is identified as a factor in a mishap then the investigator should identify the resultant type of SD. (Table 4)

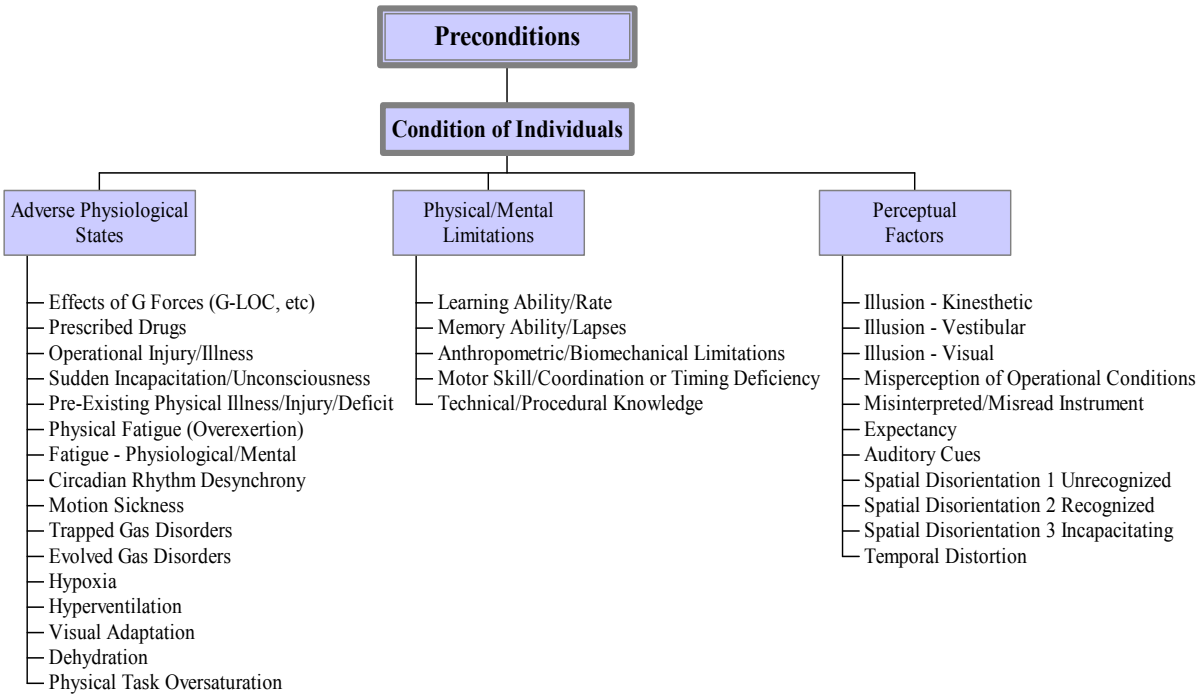

Table 4. Conditions of the individual (part 2)

Personnel Factors: Personnel factors are factors in a mishap if self-imposed stressors or crew resource management affects practices, conditions or actions of individuals, and result in human error or an unsafe situation. Personnel factors include:

Coordination / Communication / Planning: Coordination / communication / planning are factors in a mishap where interactions among individuals, crews, and teams involved with the preparation and execution of a mission that resulted in human error or an unsafe situation

Self-Imposed Stress: Self-imposed stress are factors in a mishap if the operator demonstrates disregard for rules and instructions that govern the individuals readiness to perform, or exhibits poor judgment when it comes to readiness and results in human error or an unsafe situation. These are often violations of established rules that are in place to protect people from themselves and a subsequent unsafe condition. One example of self-imposed stress is drinking alcohol prior to operating a motor vehicle.

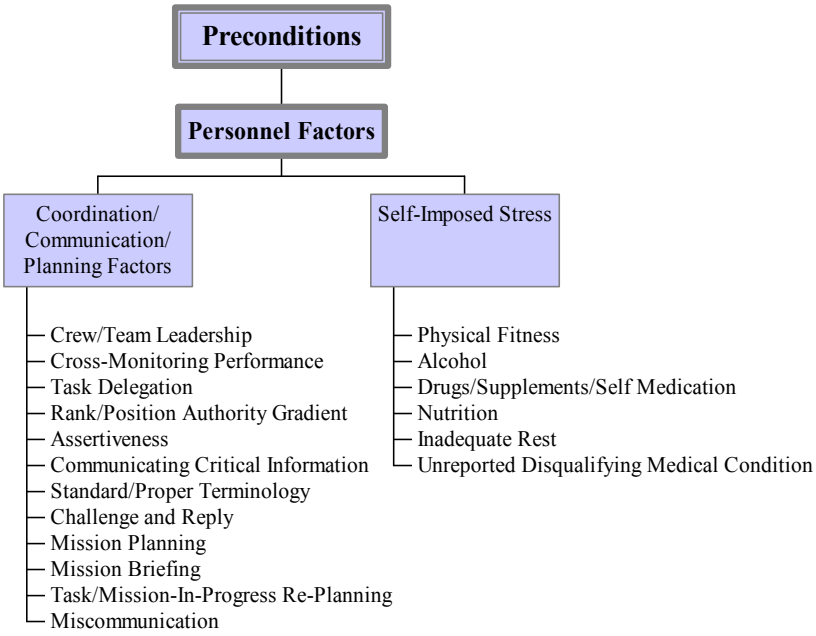

Table 5. Personnel Factors

3. Supervision

The Human Factors Working Group has determined that a mishap event can often be traced back to the supervisory chain of command. As such, there are four major categories of Unsafe Supervision: *Inadequate Supervision*, *Planned Inappropriate Operations*, *Failed to Correct a Known Problem*, and *Supervisory Violations* (see Figure 5).

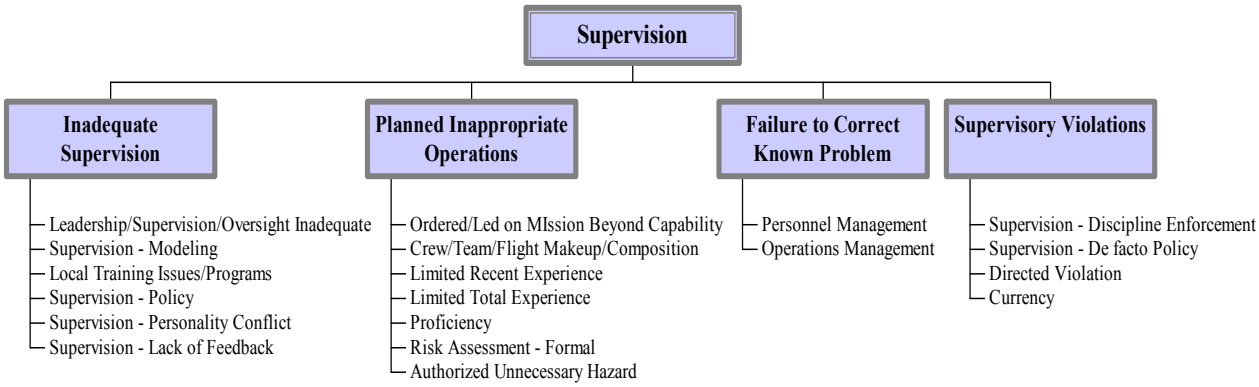

Figure 5 / Table 6. Categories of Unsafe Supervision

Inadequate Supervision: The role of supervisors is to provide their personnel with the opportunity to succeed. To do this, supervisors must provide guidance, training opportunities, leadership, motivation, and the proper role model, regardless of their supervisory level. Unfortunately, this is not always the case. It is easy to imagine a situation where adequate CRM training was not provided to an operator or team member. Conceivably, the operator's coordination skills would be compromised, and if put into a non-routine situation (e.g., emergency), would be at risk for errors that might lead to a mishap. Therefore, the category Inadequate Supervision accounts for those times when supervision proves inappropriate, improper, or may not occur at all (see Table 6). Inadequate Supervision is a factor in a mishap when supervision proves inappropriate or improper and fails to identify a hazard, recognize and control risk, provide guidance, training and/or oversight and results in human error or an unsafe situation.

Planned Inappropriate Operations: Occasionally, the operational tempo or schedule is planned such that individuals are put at unacceptable risk, crew rest is jeopardized, and ultimately performance is adversely affected. Such Planned Inappropriate Operations, though arguably unavoidable during emergency situations, are not acceptable during normal operations. Included in this category are issues of crew pairing and improper manning. For example, it is not surprising to anyone that problems can arise when two individuals with marginal skills are paired together. During a period of downsizing and/or increased levels of operational commitment, it is often more difficult to manage crews. However, pairing weak or inexperienced operators together on the most difficult missions may not be prudent (see Table 6). Planned Inappropriate Operations is a factor in a mishap when supervision fails to adequately assess the hazards associated with an operation and allows for unnecessary risk. It is also a factor when supervision allows non-proficient or inexperienced personnel to attempt missions beyond their capability or when crew or flight makeup is inappropriate for the task or mission.

Failure to Correct a Known Problem: Failed to Correct a Known Problem refers to those instances when deficiencies among individuals, equipment, training or other related safety areas are "known" to the supervisor, yet are allowed to continue uncorrected. For example, the failure to consistently correct or discipline inappropriate behavior certainly fosters an unsafe atmosphere and poor command climate (see Table 6). Failure to Correct Known Problem is a factor in a mishap when supervision fails to correct known deficiencies in documents, processes or procedures, or fails to correct inappropriate or unsafe actions of individuals, and this lack of supervisory action creates an unsafe situation.

Supervisory Violations: Supervisory Violations, on the other hand, are reserved for those instances when supervisors willfully disregard existing rules and regulations. For instance, permitting an individual to operate an aircraft without current qualifications is a flagrant violation that invariably sets the stage for the tragic sequence of events that predictably follow (see Table 6). Supervisory Violations is a factor in a mishap when supervision, while managing organizational assets, willfully disregards instructions, guidance, rules, or operating instructions and this lack of supervisory responsibility creates an unsafe situation.

4. Organizational Influences

Fallible decisions of upper-level management directly effect supervisory practices, as well as the conditions and actions of operators. These latent conditions generally involve issues related to *Resource/Acquisition Management, Organizational Climate,* and *Organizational Processes* (see Figure 6). Organizational Influences are factors in a mishap if the communications, actions, omissions or policies of upper-level management directly or indirectly affect supervisory practices, conditions or actions of the operator(s) and result in system failure, human error or an unsafe situation.

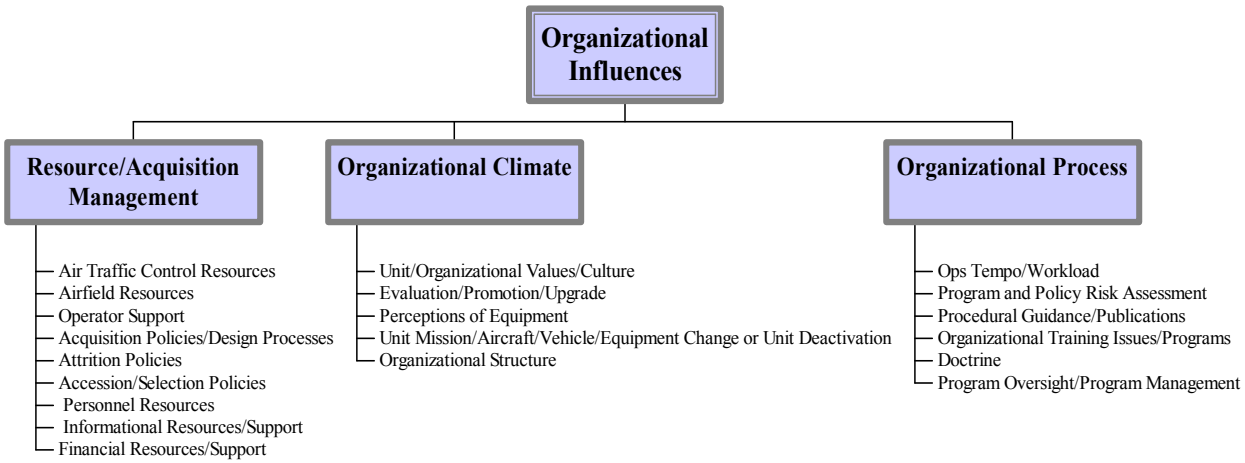

Figure 6 / Table 7. Categories of Organizational Influences

Resource / Acquisition Management: This category refers to the management, allocation, and maintenance of organizational resources--human, monetary, and equipment/facilities. The term "human" refers to the management of operators, staff, and maintenance personnel. Issues that directly influence safety include selection (including background checks), training, and staffing/manning. "Monetary" issues refer to the management of nonhuman resources, primarily monetary resources. For example, excessive cost cutting and lack of funding for proper equipment have adverse effects on operator performance and safety. Finally, "equipment/facilities" refers to issues related to equipment design, including the purchasing of unsuitable equipment, inadequate design of workspaces, and failures to correct known design flaws. Management should ensure that human-factors engineering principles are known and utilized and that existing specifications for equipment and workspace design are identified and met (see Table 7). Resource / Acquisition Management is a factor in a mishap if resource management and/or acquisition processes or policies, directly or indirectly, influence system safety and results in poor error management or creates an unsafe situation.

Organizational Climate: Organizational Climate refers to a broad class of organizational variables that influence worker performance. It can be defined as the situational consistencies in the organization's treatment of individuals. In general, Organizational Climate is the prevailing atmosphere or environment within the organization. Within the present classification system, climate is broken down into three categories--structure, policies, and culture. The term "structure" refers to the formal component of the organization. The "form and shape" of an organization are reflected in the chain-of-command, delegation of authority and responsibility, communication channels, and formal accountability for actions. Organizations with maladaptive structures (i.e., those that do not optimally match to their operational environment or are unwilling to change) will be more prone to mishaps. "Policies" refer to a course or method of action that guides present and future decisions. Policies may refer to hiring and firing, promotion, retention, raises, sick leave, drugs and alcohol, overtime, accident investigations, use of safety equipment, etc. When these policies are ill-defined, adversarial, or conflicting, safety may be reduced. Finally, "culture" refers to the unspoken or unofficial rules, values, attitudes, beliefs, and customs of an organization ("The way things really get done around here."). Other issues related to culture include organizational justice, psychological contracts, organizational citizenship behavior, *esprit de corps*, and union/management relations. All these issues affect attitudes about safety and the value of a safe working environment (see Table 7). Organizational Climate is a factor in a mishap if organizational variables including environment, structure, policies, and culture influence individual actions and results in human error or an unsafe situation.

Organizational Processes: This category refers to the formal process by which "things get done" in the organization. It is subdivided into three broad categories--operations, procedures, and oversight. The term "operations" refers to the characteristics or conditions of work that have been established by management. These characteristics include operational tempo, time pressures, production quotas, incentive systems, and schedules. When set up inappropriately, these working conditions can be detrimental to safety. "Procedures" are the official or formal procedures as to how the job is to be done. Examples include performance standards, objectives, documentation, and instructions about procedures. All of these, if inadequate, can negatively impact employee supervision, performance, and safety. Finally, "oversight" refers to monitoring and checking of resources, climate, and processes to ensure a safe and productive work environment. Issues here relate to organizational self-study, risk management, and the establishment and use of safety programs (see Table 7). Organizational Processes is a factor in a mishap if organizational processes such as operations, procedures, operational risk management and oversight negatively influence individual, supervisory, and/or organizational performance and results in unrecognized hazards and/or uncontrolled risk and leads to human error or an unsafe situation.

DOD HFACS

Quick user instruction and in-depth Nanocodes (definitions)

HFACS Quick Users Guide

After any event investigators must gather human factors evidence. One method to do this is to start with the event outcome and create a time line documenting each step that leads up to the event. As you probe backwards determine whether a material (a part failed) event occurred or an individual committed or failed to commit an act the resulted in the outcome event.

At each step the investigator must document who committed the act then utilize the taxonomy to further classify the act. Once the investigator has identified the nanocode that reflects the act he/she must dig deeper.

The next step is to look evaluate the preconditions that resulted in the unsafe act. A method that may help evaluating preconditions is to review each of the categories and sub categories in this tier of HFACS and rule in or eliminate the various preconditions that lead to the act. Once the investigator has fully devolved into the preconditions and has recorded all preconditions for the act the focus must move on to supervisory and subsequent organizational issues that contributed to the precondition.

I recommend that for each nanocode chosen the investigator write a short narrative discussing the nanocode

Conduct an evaluation of each item in the time line. This should give the investigator a thorough human factors picture of all the events that lead up to the mishap.

DoD HFACS Nanocodes

Acts

Are those factors that are most closely tied to the mishap, and can be described as active failures or actions committed by the operator that result in human error or unsafe situation.

Errors (AExxx)

Are factors in a mishap when mental or physical activities of the operator fail to achieve their intended outcome as a result of skill-based, perceptual, or judgment and decision making errors leading to an unsafe situation. Errors are unintended.

Skill-Based Errors (AE1xx)

Are factors in a mishap when errors occur in the operator's execution of a routine, highly practiced task relating to procedure, training or proficiency and result in an unsafe a situation.

AE101 Inadvertent Operation
Inadvertent Operation is a factor when individual's movements inadvertently activate or deactivate equipment, controls or switches when there is no intent to operate the control or device. This action may be noticed or unnoticed by the individual.

AE102 Checklist Error
Checklist Error is a factor when the individual, either through an act of commission or omission makes a checklist error or fails to run an appropriate checklist and this failure results in an unsafe situation.

AE103 Procedural Error
Procedural Error is a factor when a procedure is accomplished in the wrong sequence or using the wrong technique or when the wrong control or switch is used. This also captures errors in navigation, calculation or operation of automated systems.

AE104 Overcontrol/ Undercontrol
Overcontrol/Undercontrol is a factor when an individual responds inappropriately to conditions by either overcontroling or undercontroling the aircraft/vehicle/system. The error may be a result of preconditions or a temporary failure of coordination.

AE105 Breakdown in Visual Scan
Breakdown in Visual Scan is a factor when the individual fails to effectively execute learned / practiced internal or external visual scan patterns leading to unsafe situation.

AE106 Inadequate Anti-G Straining Maneuver

Inadequate Anti-G Straining Maneuver is a factor when the individuals AGSM is improper, inadequate, poorly timed or non-existent and this leads to adverse neuro-circulatory effects.

Judgment and Decision-Making Errors (AE2xx)

Are factors in a mishap when behavior or actions of the individual proceed as intended yet the chosen plan proves inadequate to achieve the desired end-state and results in an unsafe situation.

AE201 Risk Assessment – During Operation
Risk Assessment – During Operation is a factor when the individual fails to adequately evaluate the risks associated with a particular course of action and this faulty evaluation leads to inappropriate decision and subsequent unsafe situation. This failure occurs in real-time when formal risk-assessment procedures are not possible.

AE202 Task Misprioritization
Task Misprioritization is a factor when the individual does not organize, based on accepted prioritization techniques, the tasks needed to manage the immediate situation.

AE203 Necessary Action – Rushed
Necessary Action – Rushed is a factor when the individual takes the necessary action as dictated by the situation but performs these actions too quickly and the rush in taking action leads to an unsafe situation.

AE204 Necessary Action – Delayed
Necessary Action – Delayed is a factor when the individual selects a course of action but elects to delay execution of the actions and the delay leads to an unsafe situation.

AE205 Caution/Warning – Ignored
Caution/Warning – Ignored is a factor when a caution or warning is perceived and understood by the individual but is ignored by the individual leading to an unsafe situation.

AE206 Decision-Making During Operation
Decision-Making During Operation is a factor when the individual through faulty logic selects the wrong course of action in a time-constrained environment.

Perception Errors (AE3xx)

Are factors in a mishap when misperception of an object, threat or situation, (such as visual, auditory, proprioceptive, or vestibular illusions, cognitive or attention failures, etc), results in human error.

AE301 Error due to Misperception
Error due to Misperception is a factor when an individual acts or fails to act based on an illusion; misperception or disorientation state and this act or failure to act creates an unsafe situation.

Violations (AVxxx)

Are factors in a mishap when the actions of the operator represent willful disregard for rules and instructions and lead to an unsafe situation. Violations are deliberate.

AV001 Violation - Based on Risk Assessment

Violation- Based on Risk Assessment is a factor when the consequences/risk of violating published procedures was recognized, consciously assessed and honestly determined by the individual, crew or team to be the best course of action. Routine "work-arounds" and unofficial procedures that are accepted by the community as necessary for operations are also captured under this code.

AV002 Violation - Routine/Widespread

Violation - Routine/Widespread is a factor when a procedure or policy violation is systemic in a unit/setting and not based on a risk assessment for a specific situation. It needlessly commits the individual, team, or crew to an unsafe course-of-action. These violations may have leadership sanction and may not routinely result in disciplinary/administrative action. Habitual violations of a single individual or small group of individuals within a unit can constitute a routine/widespread violation if the violation was not routinely disciplined or was condoned by supervisors. These violations may also be referred to as "Routine Violations."

AV003 Violation - Lack of Discipline

Violation - Lack of Discipline is a factor when an individual, crew or team intentionally violates procedures or policies without cause or need. These violations are unusual or isolated to specific individuals rather than larger groups. There is no evidence of these violations being condoned by leadership. These violations may also be referred to as "exceptional violations." (NOTE: These violations may also carry UCMJ consequences. Boards should consult the Judge Advocate of the convening authority.)

Preconditions

Are factors in a mishap if active and/or latent preconditions such as conditions of the operators, environmental or personnel factors affect practices, conditions or actions of individuals and result in human error or an unsafe situation.

Environmental Factors (PExxx)

Are factors in a mishap if *physical* or *technological* factors affect practices, conditions and actions of individual and result in human error or an unsafe situation.

Physical Environment (PE1xx)

Are factors in a mishap if environmental phenomena such as weather, climate, white out or brown out conditions affect the actions of individuals and result in human error or an unsafe situation.

PE101 Vision Restricted by Icing/Windows Fogged/Etc
Vision Restricted by Icing/Windows Fogged/Etc is a factor when it is determined by the investigator that icing or fogging of the windshield/windscreen or canopy restricted the vision of the individual to a point where normal duties were affected.

PE102 Vision Restricted by Meteorological Conditions
Vision Restricted by Meteorological Conditions is a factor when weather, haze, or darkness restricted the vision of the individual to a point where normal duties were affected.

PE103 Vibration
Vibration is a factor when the intensity or duration of the vibration is sufficient to cause impairment of vision or adversely effect the perception of orientation.

PE104 Vision Restricted in Workspace by Dust/Smoke/Etc.
Vision restricted in workspace by dust/smoke/etc. is a factor when dust, smoke, etc. inside the cockpit, vehicle or workstation restricted the vision of the individual to a point where normal duties were affected.

PE105 Windblast
Windblast is a factor when the individual's ability to perform required duties is degraded during or after exposure to a windblast situation.

PE106 Thermal Stress – Cold
Thermal Stress – Cold is a factor when the individual is exposed to cold resulting in compromised function.

PE107 Thermal Stress – Heat
Thermal Stress – Heat is a factor when the individual is exposed to heat resulting in compromised function.

PE108 Maneuvering Forces – In-Flight
Maneuvering Forces – In-Flight is a factor when acceleration forces of longer than one second cause injury, prevent or interfere with the performance of normal duties. Do not use this code to capture G-induced loss of consciousness

PE109 Lighting of Other Aircraft/Vehicle
Lighting of Other Aircraft/Vehicle is a factor when the absence, pattern, intensity or location of the lighting of other aircraft/vehicle prevents or interferes with safe task accomplishment.

PE110 Noise Interference
Noise Interference is a factor when any sound not directly related to information needed for task accomplishment interferes with the individual's ability to perform that task.

PE111 Brownout/Whiteout
Brownout/Whiteout is a factor when dust, snow, water, ash or other particulates in the environment are disturbed by the aircraft, vehicle or person and cause a restriction of vision to a point where normal duties are affected

Technological Environment (PE2xx)
Are factors in a mishap when cockpit / vehicle / control station / workspace design factors or automation affect the actions of individuals and result in human error or an unsafe situation.

PE201 Seating and Restraints
Seating and Restraints is a factor when the design of the seat or restraint system, the ejection system, seat comfort or poor impact-protection qualities of the seat create an unsafe situation.

PE202 Instrumentation and Sensory Feedback Systems
Instrumentation and Sensory Feedback Systems is a factor when instrument factors such as design, reliability, lighting, location, symbology or size are inadequate and create an unsafe situation. This includes NVDs, HUD, off-bore-site and helmet-mounted display systems and inadequacies in auditory or tactile situational awareness or warning systems such as aural voice warnings or stick shakers.

PE203 Visibility Restrictions
Visibility Restrictions is a factor when the lighting system, windshield / windscreen / canopy design, or other obstructions prevent necessary visibility and create an unsafe situation. This includes glare or reflections on the canopy / windscreen / windshield. Visibility restrictions due to weather or environmental conditions are captured under PE101 or PE102.

PE204 Controls and Switches
Controls and Switches is a factor when the location, shape, size, design, reliability, lighting or other aspect of a control or switch is inadequate and this leads to an unsafe situation.

PE205 Automation
Automation is a factor when the design, function, reliability, use guidance, symbology, logic or other aspect of automated systems creates an unsafe situation.

PE206 Workspace Incompatible with Human
Workspace Incompatible with Human is a factor when the workspace is incompatible with the mission requirements and mission safety for this individual.

PE207 Personal Equipment Interference
Personal Equipment Interference is a factor when the individual's personal equipment interferes with normal duties or safety.

PE208 Communications – Equipment
Communications - Equipment is a factor when comm. equipment is inadequate or unavailable to support mission demands. (i.e. aircraft/vehicle with no intercom) This includes electronically or physically blocked transmissions. Communications can be voice, data or multi-sensory.

Condition of Individuals (PCxxx)

Are factors in a mishap if cognitive, psycho-behavioral, adverse physical state, or physical/mental limitations affect practices, conditions or actions of individuals and result in human error or an unsafe situation.

Cognitive Factors (PC1xx)

Are factors in a mishap if cognitive or attention management conditions affect the perception or performance of individuals and result in human error or an unsafe situation.

PC101 Inattention
Inattention is a factor when the individual has a state of reduced conscious attention due to a sense of security, self-confidence, boredom or a perceived absence of threat from the environment which degrades crew performance. (This may often be a result of highly repetitive tasks. Lack of a state of alertness or readiness to process immediately available information.)

PC102 Channelized Attention
Channelized Attention is a factor when the individual is focusing all conscious attention on a limited number of environmental cues to the exclusion of others of a subjectively equal or higher or more immediate priority, leading to an unsafe situation. May be described as a tight focus of attention that leads to the exclusion of comprehensive situational information.

PC103 Cognitive Task Oversaturation
Cognitive Task Oversaturation is a factor when the quantity of information an individual must process exceeds their cognitive or mental resources in the amount of time available to process the information.

PC104 Confusion
Confusion is a factor when the individual is unable to maintain a cohesive and orderly awareness of events and required actions and experiences a state characterized by bewilderment, lack of clear thinking, or (sometimes) perceptual disorientation.

PC105 Negative Transfer
Negative Transfer is a factor when the individual reverts to a highly learned behavior used in a previous system or situation and that response is inappropriate or degrades mission performance.

PC106 Distraction
Distraction is a factor when the individual has an interruption of attention and/or inappropriate redirection of attention by an environmental cue or mental process that degrades performance.

PC107 Geographic Misorientation (Lost)
Geographic Misorientation (Lost) is a factor when the individual is at a latitude and/or longitude different from where he believes he is or at a lat/long unknown to the individual and this creates an unsafe situation.

PC108 Checklist Interference
Checklist Interference is a factor when an individual is performing a highly automated/learned task and is distracted by anther cue/event that results in the interruption and subsequent failure to complete the original task or results in skipping steps in the original task.

Psycho-Behavioral Factors (PC2xx)
Are factors when an individual's personality traits, psychosocial problems, psychological disorders or inappropriate motivation creates an unsafe situation.

PC201 Pre-Existing Personality Disorder
Pre-existing Personality Disorder is a factor when a qualified professional determines the individual met Diagnostic and Statistical Manual criteria for a personality disorder.

PC202 Pre-Existing Psychological Disorder
Pre-existing Psychological Disorder is a factor when a qualified professional determines the individual met Diagnostic and Statistical Manual criteria for a psychological disorder.

PC203 Pre-Existing Psychosocial Problem

Pre-existing Psychosocial Problem is a factor when a qualified professional determines the individual met Diagnostic and Statistical Manual criteria for a psychosocial problem.

PC204 Emotional State
Emotional State is a factor when the individual is under the influence of a strong positive or negative emotion and that emotion interferes with duties.

PC205 Personality Style
Personality style is a factor when the individual's personal interaction with others creates an unsafe situation. Examples are authoritarian, over-conservative, impulsive, invulnerable, submissive or other personality traits that result in degraded crew performance.

PC206 Overconfidence
Overconfidence is a factor when the individual overvalues or overestimates personal capability, the capability of others or the capability of aircraft/vehicles or equipment and this creates an unsafe situation.

PC207 Pressing
Pressing is a factor when the individual knowingly commits to a course of action that presses them and/or their equipment beyond reasonable limits.

PC208 Complacency
Complacency is a factor when the individual's state of reduced conscious attention due to an attitude of overconfidence, undermotivation or the sense that others "have the situation under control" leads to an unsafe situation.

PC209 Inadequate Motivation
Motivation – Inadequate is a factor when the individual's motivation to accomplish a task or mission is weak or indecisive.

PC210 Misplaced Motivation
Misplaced Motivation is a factor when an individual or unit replaces the primary goal of a mission with a personal goal.

PC211 Overaggressive
Overaggressive is a factor when an individual or crew is excessive in the manner in which they conduct a mission.

PC212 Excessive Motivation to Succeed
Motivation to Succeed – Excessive is a factor when the individual is preoccupied with success to the exclusion of other mission factors leading to an unsafe situation.

PC213 Get-Home-Itis/Get-There-Itis
Get-Home-Itis/Get-There-Itis is a factor when an individual or crew is motivated to complete a mission or reach a destination for personal reasons, thereby short cutting necessary procedures or exercising poor judgment, leading to an unsafe situation.

PC214 Response Set
Response set is a factor when the individual has a cognitive or mental framework of expectations that predispose them to a certain *course of action* regardless of other cues.

PC215 Motivational Exhaustion (Burnout)
Motivational Exhaustion (Burnout) is a factor when the individual has the type of exhaustion associated with the wearing effects of high operations and personal tempo where their operational requirements impinge on their ability to satisfy their personal requirements and leads to degraded cognitive or operational capability.

Adverse Physiological States (PC3xx)

Are factors when an individual experiences a physiologic event that compromises human performance and this decreases performance and results in an unsafe situation.

PC301 Effects of G Forces (G-LOC, etc)
Effects of G Forces (G-LOC, etc) is a factor when the individual experiences G-induced loss of consciousness (GLOC), greyout, blackout or other neuro-circulatory affects of sustained acceleration forces.

PC302 Prescribed Drugs
Prescribed Drugs is a factor when the individual uses a prescribed drug with measurable effect interfering with performance.

PC303 Operational Injury/Illness
Operational Injury/Illness is a factor when an injury is sustained or illness develops from the operational environment or *during* the mission and this injury or illness results in an unsafe situation. This includes toxic exposure. Details of injury, illness or toxic exposure should be captured in the medical investigation. Do not use this code to capture injury or illness that does not cause an unsafe situation or contribute to the mishap sequence.

PC304 Sudden Incapacitation/Unconsciousness
Sudden Incapacitation/Unconsciousness is a factor when the individual has an abrupt loss of functional capacity / conscious awareness. (NOT GLOC) Capture medical causes for the incapacitation in the AFSAS medical module.

PC305 Pre-Existing Physical Illness/Injury/Deficit
Pre-Existing Physical Illness/Injury/Deficit is a factor when a physical illness, injury or deficit that existed at the time the individual boarded the aircraft or began the mission/task causes an unsafe situation. This includes situations where wavered physical defects contribute to an unsafe situation and situations where vision deficit or loss of prosthetic devices during the mission cause an unsafe situation. An individual must board

the aircraft or begin the mission/task with prior knowledge of illness/injury/deficit otherwise mark and rate PC303. Details of injury, illness or deficit should be captured in the medical investigation. Do not use this code to capture injury or illness that does not cause an unsafe situation or contribute to the mishap sequence. (i.e. medevac patient whose condition deteriorates during flight).

PC306 Physical Fatigue (Overexertion)
Physical Fatigue (Overexertion) is a factor when the individual's diminished physical capability is due to overuse (time/relative load) and it degrades task performance. (The effects of prolonged physical activity, or the effects of brief but relatively extreme physical activity, either of which taxes a person's physical endurance or strength beyond the individual's normal limits.)

PC307 Fatigue - Physiological/Mental
Fatigue - Physiological/Mental is a factor when the individual's diminished physical or mental capability is due to an inadequate recovery, as a result of restricted or shortened sleep or physical or mental activity during prolonged wakefulness. Fatigue may additionally be described as acute, cumulative or chronic.

PC308 Circadian Rhythm Desynchrony
Circadian Rhythm Desynchrony is a factor when the individual's normal, 24-hour rhythmic biological cycle (circadian rhythm) is disturbed and it degrades task performance. This is caused typically by night work or rapid movement (such as one time zone per hour) across several time zones. Referred to as "shift lag" and "jet lag." (Time in the new time zone will lead to adaptation and recovery; the amount of time depends on the number of time zones crossed and the direction of travel. Recovery from shift lag may never occur.)

PC309 Motion Sickness
Motion Sickness is a factor when the symptoms of motion sickness impair normal performance. Motion sickness symptoms include nausea, sweating, flushing, vertigo, headache, stomach awareness, malaise, and vomiting.

PC310 Trapped Gas Disorders
Trapped Gas Disorders are a factor when gasses in the middle ear, sinuses, teeth, or intestinal tract expand or contract on ascent or descent causing an unsafe situation. Also capture alternobaric vertigo under this code. If the alternobaric vertigo induces spatial disorientation you must mark and rate PC508, PC509 or PC510.

PC311 Evolved Gas Disorders
Evolved gas disorders are a factor when inert-gas evolves in the blood causing an unsafe situation. This includes, chokes, CNS, bends or parasthesias or other conditions caused by inert-gas evolution.

PC312 Hypoxia
Hypoxia is a factor when the individual has insufficient oxygen supply to the body sufficient to cause an impairment of function.

PC313 Hyperventilation
Hyperventilation is a factor when the effect of ventilating above the physiological demands of the body causes the individual's performance capabilities to be degraded.

PC314 Visual Adaptation
Visual Adaptation is a factor when the normal human limitation of dark-adaptation rate affects safety, for example, when transitioning between aided and unaided night vision.

PC315 Dehydration
Dehydration is a factor when the performance of the operator is degraded due to dehydration as a result of excessive fluid losses due to heat stress or due to insufficient fluid intake.

PC316 Physical Task Oversaturation
Physical Task Oversaturation is a factor when the number or complexity of manual tasks in a compressed time period exceeds an individual's capacity to perform.

Physical/Mental Limitations (PC4xx)

Are factors in a mishap when an individual, temporarily or permanently lacks the physical or mental capabilities to cope with a situation and this insufficiency causes an unsafe situation.

PC401 Learning Ability/Rate
Learning Ability – Rate is a factor when the individual's relative efficiency with which new information is acquired, and relatively permanent adjustments made in behavior or thinking, are not consistent with mission demands.

PC402 Memory Ability/Lapses
Memory Ability/Lapses is a factor when the individual is unable or has lapses in the ability to recall past experience needed for safe mission completion. (Experience includes any information a person receives through any means, any cognitive functions he or she performed on that information, and any response he or she made as a result of it.)

PC403 Anthropometric/Biomechanical Limitations
Anthropometric/Biomechanical limitations are a factor when the size, strength, dexterity, mobility or other biomechanical limitations of an individual creates an unsafe situation. It must be expected that the average individual qualified for that duty position could accomplish the task in question.

PC404 Motor Skill/Coordination or Timing Deficiency
Motor Skill/Coordination or Timing Deficiency is a factor when the individual lacks the required psychomotor skills, coordination or timing skills necessary to accomplish the task attempted.

PC405 Technical/Procedural Knowledge
Technical/Procedural Knowledge is a factor when an individual was adequately exposed to the information needed to perform the mission element but did not absorb it. Lack of knowledge implies no deficiency in the training program, but rather the failure of the individual to absorb or retain the information. (Exposure to information at a point in the past does not imply "knowledge" of it.)

Perceptual Factors (PC5xx)

Are factors in a mishap when misperception of an object, threat or situation, (visual, auditory, proprioceptive, or vestibular conditions) creates an unsafe situation

PC501 Illusion – Kinesthetic
Illusion – Kinesthetic is a factor when somatosensory stimuli of the ligaments, muscles, or joints cause the individual to have an erroneous perception of orientation, motion or acceleration leading to degraded performance. (If this illusion leads to spatial disorientation you must mark and rate PC508, PC509 or PC510.)

PC502 Illusion – Vestibular
Illusion – Vestibular is a factor when stimuli acting on the semicircular ducts or otolith organs of the vestibular apparatus cause the individual to have an erroneous perception of orientation, motion or acceleration leading to degraded performance. (If this illusion leads to spatial disorientation you must mark and rate PC508, PC509 or PC510.)

PC503 Illusion – Visual
Illusion – Visual is a factor when visual stimuli result in an erroneous perception of orientation, motion or acceleration, leading to degraded performance. (If this illusion leads to spatial disorientation you must mark and rate PC508, PC509 or PC510.)

PC504 Misperception of Operational Conditions
Misperception of Operational Conditions is a factor when an individual misperceives or misjudges altitude, separation, speed, closure rate, road/sea conditions, aircraft/vehicle location within the performance envelope or other operational conditions and this leads to an unsafe situation.

PC505 Misinterpreted/Misread Instrument
Misinterpreted/Misread Instrument is a factor when the individual is presented with a correct instrument reading but its significance is not recognized, it is misread or is misinterpreted.

PC506 Expectancy
Expectancy is a factor when the individual's expects to perceive a certain reality and those expectations are strong enough to create a *false perception* of the expectation.

PC507 Auditory Cues
Auditory Cues is a factor when the auditory inputs are correctly interpreted but are misleading or disorienting. Also when the inputs are incorrectly interpreted and cause an impairment of normal performance.

PC508 Spatial Disorientation (Type 1) Unrecognized
Spatial Disorientation is a failure to correctly sense a position, motion or attitude of the aircraft or of oneself within the fixed coordinate system provided by the surface of the earth and the gravitational vertical. Spatial Disorientation (Type 1) Unrecognized is a factor when a person's cognitive awareness of one or more of the following varies from reality: attitude; position; velocity; direction of motion or acceleration. Proper control inputs are not made because the need is unknown.

PC509 Spatial Disorientation (Type 2) Recognized
Spatial Disorientation is a failure to correctly sense a position, motion or attitude of the aircraft or of oneself within the fixed coordinate system provided by the surface of the earth and the gravitational vertical. Spatial Disorientation (Type 2) is a factor when recognized perceptual confusion is induced through one or more of the following senses: visual; vestibular; auditory; tactile; proprioception or kinesthetic. Proper control inputs are still possible.

PC510 Spatial Disorientation (Type 3) Incapacitating
Spatial Disorientation is a failure to correctly sense a position, motion or attitude of the aircraft or of oneself within the fixed coordinate system provided by the surface of the earth and the gravitational vertical. Spatial Disorientation (Type 3) Incapacitating is a factor when an individual is unable to make proper control inputs for safe operation of the aircraft or system due to a conflict (often extreme) between the sensory systems identified in type 2.

PC511 Temporal Distortion
Temporal Distortion is a factor when the individual experiences a compression or expansion of time relative to reality leading to an unsafe situation. (Often associated with a "fight or flight" response.)

Personnel Factors (PPxxx)

Are factors in a mishap if self imposed stressors or crew resource management affect practices, conditions or actions of individuals and result in human error or an unsafe situation.

Coordination/Communication/Planning Factors(PP1xx)

Refer to interactions among individuals, crews, and teams involved with the preparation and execution of a mission that resulted in human error or an unsafe situation.

PP101 Crew/Team Leadership
Crew/Team Leadership is a factor when the crew/team leadership techniques failed to facilitate a proper crew climate, to include establishing and maintaining an accurate and shared understanding of the evolving mission and plan on the part of all crew or team members.

PP102 Cross-Monitoring Performance
Cross-monitoring performance is a factor when crew or team members failed to monitor, assist or back-up each other's actions and decisions.

PP103 Task Delegation
Task delegation is a factor when the crew or team members failed to actively manage the distribution of mission tasks to prevent the overloading of any crewmember.

PP104 Rank/Position Authority Gradient
Rank/position authority gradient is a factor when the differences in rank of the team, crew or flight caused the mission performance capabilities to be degraded. Also conditions where formal or informal authority gradient is too steep or too flat across a crew, team or flight and this condition degrades collective or individual performance.

PP105 Assertiveness
Assertiveness is a factor when individuals failed to state critical information or solutions with appropriate persistence.

PP106 Communicating Critical Information
Communicating critical information is a factor when known critical information was not provided to appropriate individuals in an accurate or timely manner.

PP107 Standard/Proper Terminology
Standard/proper terminology is a factor when clear and concise terms, phrases hand signals, etc per service standards and training were not used.

PP108 Challenge and Reply
Challenge and reply is a factor when communications did not include supportive feedback or acknowledgement to ensure that personnel correctly understand announcements or directives.

PP109 Mission Planning
Mission planning is a factor when an individual, crew or team failed to complete all preparatory tasks associated with planning the mission, resulting in an unsafe situation. Planning tasks include information collection and analysis, coordinating activities within the crew or team and with appropriate external agencies, contingency planning, and risk assessment.

PP110 Mission Briefing

Mission briefing is a factor when information and instructions provided to individuals, crews, or teams were insufficient, or participants failed to discuss contingencies and strategies to cope with contingencies.

PP111 Task/Mission-In-Progress Re-Planning
Task/mission-in-progress re-planning is a factor when crew or team members fail to adequately reassess changes in their dynamic environment during mission execution and change their mission plan accordingly to ensure adequate management of risk.

PP112 Miscommunication
Miscommunication is a factor when correctly communicated information is misunderstood, misinterpreted, or disregarded.

Self-Imposed Stress (PP2xx)

Is a factor in a mishap if the operator demonstrates disregard for rules and instructions that govern the individuals readiness to perform, or exhibits poor judgment when it comes to readiness and results in human error or an unsafe situation.

PP201 Physical Fitness
Physical Fitness is a factor when the relative physical state of the individual, in terms of a regular rigorous exercise program or a physically active lifestyle, is not adequate to support mission demands.

PP202 Alcohol
Alcohol is a factor when the acute or residual effects of alcohol impaired performance or created an unsafe situation.

PP203 Drugs/Supplements/Self medication
Drugs/Supplements/Self-medication is a factor when the individual takes any drug, other than prescribed, that interferes with performance. This includes nicotine or caffeine in sufficient quantities to cause impairment of normal function. This also includes any chemical compound taken for purposes of prevention of disease, treatment of disease, weight management, mood alteration, birth control or sleep management, etc. The effects may be direct or residual. Alcohol is captured under PP206.

PP204 Nutrition
Nutrition is a factor when the individual's nutritional state or poor dietary practices are inadequate to fuel the brain and body functions resulting in degraded performance

PP205 Inadequate Rest
Inadequate rest is a factor when the opportunity for rest was provided but the individual failed to take the opportunity to rest.

PP206 Unreported Disqualifying Medical Condition

Unreported Disqualifying Medical Condition is a factor when the operator intentionally operates/flies with a known disqualifying medical condition that results in an unsafe situation.

Supervision

Is a factor in a mishap if the methods, decisions or policies of the supervisory chain of command directly affect practices, conditions, or actions of individual and result in human error or an unsafe situation.

Inadequate Supervision (SIxxx)

Is a factor in a mishap when supervision proves inappropriate or improper and fails to identify hazard, recognize and control risk, provide guidance, training and/or oversight and results in human error or an unsafe situation.

SI001 Leadership/Supervision/Oversight Inadequate
Leadership/Supervision/Oversight Inadequate is a factor when the availability, competency, quality or timeliness of leadership, supervision or oversight does not meet task demands and creates an unsafe situation. Inappropriate supervisory pressures are also captured under this code.

SI002 Supervision – Modeling
Supervision – Modeling is a factor when the individual's learning is influenced by the behavior of peers and supervisors and when that learning manifests itself in actions that are either inappropriate to the individual's skill level or violate standard procedures and lead to an unsafe situation.

SI003 Local Training Issues/Programs
Local Training Issues/Programs are a factor when one-time or recurrent training programs, upgrade programs, transition programs or any other local training is inadequate or unavailable (etc) and this creates an unsafe situation. (Note: the failure of an individual to absorb the training material in an adequate training program does not indicate a training program problem. Capture these factors under PC401 "Learning ability/rate" or PC405 "Technical/Procedural Knowledge." The failure of an individual to recall learned information under stress or while fatigued despite attending an adequate training program does not indicate a training program problem. Capture these factors under PC402 "Memory/ Ability lapses" or other cognitive factors such as PC104 "Confusion," PC106 "Distraction," PC105 "Negative Transfer," etc.)

SI004 Supervision – Policy
Supervision – Policy is a factor when policy or guidance or lack of a policy or guidance leads to an unsafe situation.

SI005 Supervision – Personality Conflict
Supervision – Personality Conflict is a factor when a supervisor and individual member experience a "personality conflict" that leads to a dangerous error in judgment / action.

SI006 Supervision – Lack of Feedback
Supervision – Lack of Feedback is a factor when information critical to a potential safety issue had been provided to supervisory or management personnel without feedback to the source (failure to close the loop).

Planned Inappropriate Operations (SPxxx)

Is a factor in a mishap when supervision fails to adequately assess the hazards associated with an operation and allows for unnecessary risk. It is also a factor when supervision allows non-proficient or inexperienced personnel to attempt missions beyond their capability or when crew or flight makeup is inappropriate for the task or mission.

SP001 Ordered/Led on Mission Beyond Capability
Ordered/Led on Mission Beyond Capability is a factor when supervisor / management directs personnel to undertake a mission beyond their skill level or beyond the capabilities of their equipment.

SP002 Crew/Team/Flight Makeup/Composition
Crew/Team/Flight Makeup/Composition is a factor when, in the opinion of the investigator, the makeup of the crew or of the flight should have reasonably raised obvious safety concerns in the minds of crewmembers involved in the mission, or in any other individual directly related to the scheduling of this mission.

SP003 Limited Recent Experience
Limited Recent Experience is a factor when the supervisor selects an individual who's experience for either a specific maneuver, event or scenario is not sufficiently current to permit safe mission execution.

SP004 Limited Total Experience
Limited Total Experience is a factor when a supervisor selects an individual who's individual has performed a maneuver, or participated in a specific scenario, infrequently or rarely.

SP005 Proficiency
Proficiency is a factor when and individual is not proficient in a task, mission or event.

SP006 Risk Assessment – Formal
Risk Assessment – Formal is a factor when supervision does not adequately evaluate the risks associated with a mission or when pre-mission risk assessment tools or risk assessment programs are inadequate.

SP007 Authorized Unnecessary Hazard

Authorized Unnecessary Hazard is a factor when supervision authorizes a mission or mission element that is unnecessarily hazardous without sufficient cause or need. Includes intentionally scheduling personnel for mission or operation that they are not qualified to perform.

Failure to Correct Known Problem (SFxxx)

Is a factor in a mishap when supervision fails to correct known deficiencies in documents, processes or procedures, or fails to correct inappropriate or unsafe actions of individuals, and this lack of supervisory action creates an unsafe situation.

SF001 – Personnel Management
Personnel management is a factor when a supervisor fails to identify an operator or aviator who exhibits recognizable risky behaviors or unsafe tendencies or fails to institute remedial actions when an individual is identified with risky behaviors or unsafe tendencies.

SF002 – Operations Management
Operations management is a factor when a supervisor fails to correct known hazardous practices, conditions or guidance that allows for hazardous practices within the scope of his/her command

Supervisory Violations (SVxxx)

Is a factor in a mishap when supervision while managing organizational assets willfully disregards instructions, guidance, rules, or operating instructions and this lack of supervisory responsibility creates an unsafe situation.

SV001 Supervision – Discipline Enforcement (Supervisory act of omission)
Supervision – Discipline Enforcement is a factor when unit (organizational) and operating rules have not been enforced by the normally constituted authority.

SV002 Supervision – Defacto Policy
Supervision – Defacto Policy is a factor when unwritten or "unofficial" policy perceived and followed by the individual, which has not been formally established by the properly constituted authority, leads to an unsafe situation.

SV003 Directed Violation
Directed Violation is a factor when a supervisor directs a subordinate to violate existing regulations, instructions or technical guidance.

SV004 Currency
Currency is a factor when an individual has not met the general training requirements for his job/weapon system and is considered "non-current" and supervision/leadership inappropriately allows the individual to perform the mission element for which the individual is non-current.

Organizational Influences

Are factors in a mishap if the communications, actions, omissions or policies of upper-level management directly or indirectly affect supervisory practices, conditions or actions of the operator(s) and result in system failure, human error or an unsafe situation.

Resource/Acquisition Management (ORxxx)

Is a factor in a mishap if resource management and/or acquisition processes or policies, directly or indirectly, influence system safety and results in poor error management or creates an unsafe situation.

OR001 Air Traffic Control Resources
Air Traffic Control Resources is a factor when inadequate monitoring of airspace, enroute nav-aids or language barriers in air traffic controllers cause an unsafe situation. Note: If the unsafe acts of an individual air traffic controller are determined to be a factor in a mishap then the controller must be added and investigated as a mishap person.

OR002 Airfield Resources
Airfield Resources are a factor when runways, taxiways, ramps, terminal ATC resources or nav-aids, lighting systems, SOF/RSU resources or the environment surrounding the airfield are inadequate or unsafe. If the airfield or environment created a visual illusion that contributed to the mishap sequence you must also mark and rate PC503 "Illusion - Visual."

OR003 Operator Support
Operator Support is a factor when support facilities (dining, exercise, quarters, medical care, etc) or opportunity for recreation or rest are not available or adequate and this creates an unsafe situation. This includes situations where leave is not taken for reasons other than the individual's choice.

OR004 Acquisition Policies/Design Processes
Acquisition Policies/Design Processes is a factor when the processes through which aircraft, vehicle, equipment or logistical support are acquired allows inadequacies or when design deficiencies allow inadequacies in the acquisition and the inadequacies create an unsafe situation.

OR005 Attrition Policies
Attrition Policies is a factor when the process through which equipment is removed from service is inadequate and this inadequacy creates an unsafe situation**.**

OR006 Accession/Selection Policies
Accession/Selection Policies is a factor when the process through which individuals are screened, brought into the service or placed into specialties is inadequate and creates an unsafe situation.

OR007 Personnel Resources
Personnel Resources is a factor when the process through which manning, staffing or personnel placement or manning resource allocations are inadequate for mission demands and the inadequacy causes an unsafe situation.

OR008 Informational Resources/Support
Informational Resources/Support is a factor when weather, intelligence, operational planning material or other information necessary for safe operations planning are not available.

OR009 Financial Resources/Support
Financial Resources/Support is a factor when an organization or operation does not receive the financial resources to complete its assigned mission and this deficiency creates an unsafe situation.

Organizational Climate (OCxxx)

Is a factor in a mishap if organizational variables including environment, structure, policies, and culture influence individual actions and results in human error or an unsafe situation.

OC001 Unit/Organizational Values/Culture
Unit/Organizational Values/Culture is a factor when explicit/implicit actions, statements or attitudes of unit leadership set unit/organizational values (culture) that allow an environment where unsafe mission demands or pressures exist.

OC002 Evaluation/Promotion/Upgrade
Evaluation/Promotion/Upgrade is a factor when an individual perceives that their performance on a task will inappropriately impact an evaluation, promotion or opportunity for upgrade and this pressure creates an unsafe situation. Other inappropriate supervisory pressures are captured under SI001 Supervision – Inadequate.

OC003 Perceptions of Equipment
Perceptions of Equipment is a factor when over or under confidence in an aircraft, vehicle, device, system or any other equipment creates an unsafe situation.

OC004 Unit Mission/Aircraft/Vehicle/Equipment Change or Unit Deactivation
Unit Mission/Aircraft/Vehicle/Equipment Change or Unit Deactivation is a factor when the process of changing missions/aircraft/vehicle/equipment or an impending unit deactivation creates an unsafe situation.

OC005 Organizational Structure
Organizational Structure is a factor when the chain of command of an individual or structure of an organization is confusing, non-standard or inadequate and this creates an unsafe situation.

Organizational Processes (OPxxx)

Is a factor in a mishap if organizational processes such as operations, procedures, operational risk management and oversight negatively influence individual, supervisory, and/or organizational performance and results in unrecognized hazards and/or uncontrolled risk and leads to human error or an unsafe situation.

OP001 Ops Tempo/Workload
Ops Tempo/Workload is a factor when the pace of deployments, workload, additional duties, off-duty education, PME, or other workload-inducing condition of an individual or unit creates an unsafe situation.

OP002 Program and Policy Risk Assessment
Program and Policy Risk Assessment is a factor when the potential risks of a large program, operation, acquisition or process are not adequately assessed and this inadequacy leads to an unsafe situation.

OP003 Procedural Guidance/Publications
Procedural Guidance/Publications is a factor when written direction, checklists, graphic depictions, tables, charts or other published guidance is inadequate, misleading or inappropriate and this creates an unsafe situation.

OP004 Organizational Training Issues/Programs
Organizational Training Issues/Programs are a factor when one-time or initial training programs, upgrade programs, transition programs or other training that is conducted outside the local unit is inadequate or unavailable (etc) and this creates an unsafe situation. (Note: the failure of an individual to absorb the training material in an adequate training program does not indicate a training program problem. Capture these factors under PC401 "Learning Ability/Rate" or PC405 "Technical/Procedural Knowledge." The failure of an individual to recall learned information under stress or while fatigued despite attending an adequate training program does not indicate a training program problem. Capture these factors under PC402 "Memory/ Ability lapses" or other cognitive factors such as PC104 "Confusion," PC106 "Distraction," PC105 "Negative Transfer" or one of the forms of Fatigue, etc.)

OP005 Doctrine
Doctrine is a factor when the doctrine, philosophy or concept of operations in an organization is flawed or accepts unnecessary risk and this flaw or risk acceptance leads to an unsafe situation or uncontrolled hazard.

OP006 Program Oversight/Program Management
Program Oversight/Program Management is a factor when programs are implemented without sufficient support, oversight or planning and this leads to an unsafe situation.