DoD-HFACS: An Introduction

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DoD-HFACS Topics

- Development and Philosophy
- What It Looks Like
- How It’s Used
A standard set of definitions of human factors and system failures organized into a taxonomy of system failure.

Based on Human Factors Analysis and Classification System (HFACS) by Doug Weigmann & Scott Shappell

Categorization of system failure in complex systems
- Latent Failures
- Active Failures

Brings together human factors, Operations, humans systems, systems safety and Engineering Issues
- Man, Machine, Medium, Mission, Management

Philosophy of mishap analysis that focuses on the system instead of the individual

DoD-HFACS is foundation of new Air Force Safety Automated System (AFSAS) HF module

HF data will be required for certain report classes across safety spectrum
Roles of HFACS

- Investigation Guide
- Database Structure
- Analysis Format
What HFACS is …

- Model of system failure in large, complex systems
- Based on science and accepted models
- Philosophy of mishap analysis
  - Focuses on the system instead of the individual
What HFACS isn’t…

- It’s not a crutch for the lazy investigator
- It’s not pre-loaded with solutions
After Reason (1990)
Ok, So what does it look like???
Skill-Based Errors
AE1xx

Judgement & Decision-Making Errors
AE2xx

Misperception Errors
AE3xx

Violations
AV0xx

Errors
AE0xx

ACTS

AE201 Risk Assessment – During Operation
AE202 Task Misprioritization
AE203 Necessary Action - Rushed
AE204 Necessary Action - Delayed
AE205 Caution/Warning – Ignored
AE206 Decision-Making During Operation
PC101 Inattention
PC102 Channelized Attention
PC103 Cognitive Task Oversaturation
PC104 Confusion
PC105 Negative Transfer
PC106 Distraction
PC107 Geographic Misorientation (Lost)
PC108 Checklist Interference
Inadequate Supervision SI0xx
Planned Inappropriate Operations SP0xx
Failure to Correct Known Problem SF0xx
Supervisory Violations SV0xx

SI001 Leadership/Supervision/Oversight Inadequate
SI002 Supervision - Modeling
SI003 Local Training Issues/Programs
SI004 Supervision – Policy
SI005 Supervision – Personality Conflict
SI006 Supervision – Lack of Feedback
ORGANIZATIONAL INFLUENCES

- Resource/Acquisition Management (OR0xx)
- Organizational Climate (OC0xx)
- Organizational Process (OP0xx)

Subcategories:
- OC001 Unit/Organizational Values/Culture
- OC002 Evaluation/Promotion/Upgrade
- OC003 Perceptions of Equipment
- OC004 Unit Mission/Aircraft/Vehicle/Equipment Change or Unit Deactivation
- OC005 Organizational Structure
“All models are wrong, but some are useful.”
George Box (1979)

“George is right.”
Wurmy (2004)
Questions?

To access the DoD HFACS Guide go to:


Or

Google:

“DoD HFACS”
Headquarters U.S. Air Forces in Europe

BACKUP SLIDES FOLLOW
Headquarters U.S. Air Forces in Europe

HFACS - The Painful Details
ORGANIZATIONAL INFLUENCES

Resource/Acquisition Management OR0xx
Organizational Climate OC0xx
Organizational Process OP0xx

OP001 Ops Tempo/Workload
OP002 Program and Policy Risk Assessment
OP003 Procedural Guidance/Publications
OP004 Organizational Training Issues/Programs
OP005 Doctrine
OP006 Program Oversight/Program Management
SUPERVISION

- Inadequate Supervision SI0xx
- Planned Inappropriate Operations SP0xx
- Failure to Correct Known Problem SF0xx
- Supervisory Violations SV0xx
Inadequate Supervision SI0xx
Planned Inappropriate Operations SP0xx
Failure to Correct Known Problem SF0xx
Supervisory Violations SV0xx

SP001 Ordered/Led on Mission Beyond Capability
SP002 Crew/Flight Makeup/Composition
SP003 Limited Recent Experience
SP004 Limited Total Experience
SP005 Proficiency
SP006 Risk Assessment – Formal
SP007 Authorized Unnecessary Hazard
Inadequate Supervision
SI0xx

Planned Inappropriate Operations
SP0xx

Failure to Correct Known Problem
SF0xx

Supervisory Violations
SV0xx

SF001 Personnel Management
SF002 Operations Management
Inadequate Supervision SI0xx
Planned Inappropriate Operations SP0xx
Failure to Correct Known Problem SF0xx
Supervisory Violations SV0xx

SV001 Supervision - Discipline Enforcement
SV002 Supervision - Defacto Policy
SV003 Directed Violation
SV004 Currency
PE101 Vision Restricted by Icing/Windows Fogged/Etc
PE102 Vision Restricted by Meteorological Conditions
PE103 Vibration
PE104 Vision Restricted in Workspace by Dust/Smoke/Etc
PE105 Windblast
PE106 Thermal Stress - Cold
PE107 Thermal Stress - Heat
PE108 Maneuvering Forces - In-flight
PE109 Lighting of Other Aircraft/Vehicle
PE110 Noise Interference
PE111 Brownout/Whiteout
PE201 Seating and Restraints
PE202 Instrumentation and Sensory Feedback Systems
PE203 Visibility Restrictions
PE204 Controls and Switches
PE205 Automation
PE206 Workspace Incompatible with Human
PE207 Personal Equipment Interference
PE208 Communications - Equipment
PC201 Pre-Existing Personality Disorder
PC202 Pre-Existing Psychological Disorder
PC203 Pre-Existing Psychosocial Problem
PC204 Emotional State
PC205 Personality Style
PC206 Overconfidence
PC207 Pressing
PC208 Complacency

PC209 Inadequate Motivation
PC210 Misplaced Motivation
PC211 Overaggressive
PC212 Excessive Motivation to Succeed
PC213 Get-Home-Itis / Get-There-Itis
PC214 Response Set
PC215 Motivational Exhaustion
PC301 Effects of G-Forces (GLOC, Etc)
PC302 Prescribed Drugs
PC303 Operational Injury/Illness
PC304 Sudden Incapacitation/Unconsciousness
PC305 Pre-Existing Illness/Injury/Deficit
PC306 Physical Fatigue
PC307 Fatigue – Physiological/Mental
PC308 Circadian Rhythm Desynchrony

PC309 Motion Sickness
PC310 Trapped Gas Disorders
PC311 Evolved Gas Disorders
PC312 Hypoxia
PC313 Hyperventilation
PC314 Visual Adaptation
PC315 Dehydration
PC316 Physical Task Oversaturation
PC401 Learning Ability/Rate
PC402 Memory Ability/Lapses
PC403 Anthropometric/Biomechanical Limitations
PC404 Motor Skill/Coordination or Timing Deficiency
PC405 Technical/Procedural Knowledge
PC501 Illusion - Kinesthetic
PC502 Illusion - Vestibular
PC503 Illusion - Visual
PC504 Misperception of Operational Conditions
PC505 Misinterpreted/Misread Instruments
PC506 Expectancy
PC507 Auditory Cues
PC508 Spatial Disorientation Type 1
PC509 Spatial Disorientation Type 2
PC510 Spatial Disorientation Type 3
PC511 Temporal Distortion
PP101 Crew/Team Leadership
PP102 Cross-Monitoring Performance
PP103 Task Delegation
PP104 Rank/Position Authority Gradient
PP105 Assertiveness
PP106 Communication Critical Information
PP107 Standard/Proper Terminology
PP108 Challenge and Reply
PP109 Mission Planning
PP110 Mission Briefing
PP111 Task/Mission-In-Progress Re-Planning
PP112 Miscommunication
PP201 Physical Fitness
PP202 Alcohol
PP203 Drugs/Supplements/Self Medication
PP204 Nutrition
PP205 Inadequate Rest
PP206 Unreported Disqualifying Medical Condition
ACTS

- Skill-Based Errors AE1xx
- Judgement & Decision-Making Errors AE2xx
- Misperception Errors AE3xx
- Errors AE0xx
- Violations AV0xx
Skill-Based Errors
AE1xx
Judgement & Decision-Making Errors
AE2xx
Misperception Errors
AE3xx

Errors AE0xx
Violations AV0xx

AE101 Inadvertent Operation
AE102 Checklist Error
AE103 Procedural Error
AE104 Overcontrol/Undercontrol
AE105 Breakdown in Visual Scan
AE106 Inadequate Anti-G Straining Maneuver
ACTS

Errors
AE0xx

Violations
AV0xx

Skill-Based
Errors
AE1xx

Judgement &
Decision-Making
Errors
AE2xx

Misperception
Errors
AE3xx

AE301 Error Due to Misperception
ACTS

Errors
AE0xx

Violations
AV0xx

Skill-Based
Errors
AE1xx

Judgement &
Decision-Making Errors
AE2xx

Misperception
Errors
AE3xx

AV001 Violation – Based on Risk Assessment
AV002 Violation – Routine/Widespread
AV003 Violation – Lack of Discipline
After Reason (1990)
Applying HFACS
The USN Analysis Process

Event / Mishap-Centric Concept
Applying HFACS
The USN Analysis Process

Event / Mishap-Centric Concept W/ HFACS MX
Applying HFACS

Person-Centric Investigation Process

Person-Centric Concept

- HFACS
- MAJCOM/CC
- Wing/CC
- Sq/CC
- MP
- Wingman
- Mx
Applying HFACS
The USAF Investigation Process

- MAJCOM/CC
- Wing/CC
- Sq/CC
- ATC
- Mx
- MP
- Wingman

Preconditions
Supervisory
Organizational
Acts

U.S. Air Forces in Europe
Applying HFACS
Ground Mishap
Applying HFACS

Split Concept Investigation Process

Split Concept

Organizational

Supervisory

Preconditions

Acts

MAJCOM/CC

Sq/CC

Wing/CC

Mx

MP

Wingman
Headquarters U.S. Air Forces in Europe

HFACS Case Study