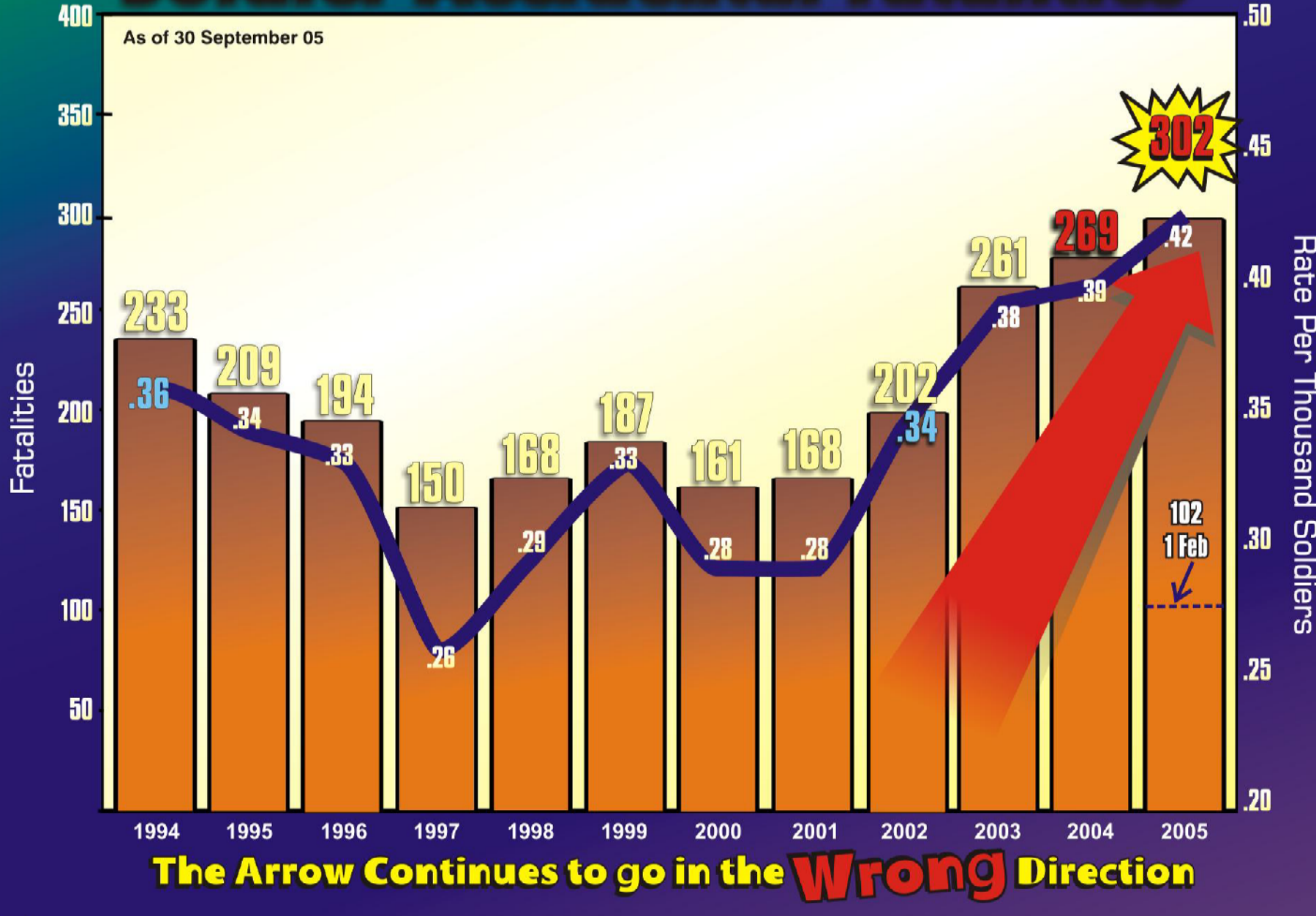
Enabling Army Level Risk Mitigation

U.S. ARMY COMBAT READINESS CENTER®

Fall 05 TEMAC

EDMONDS5-01

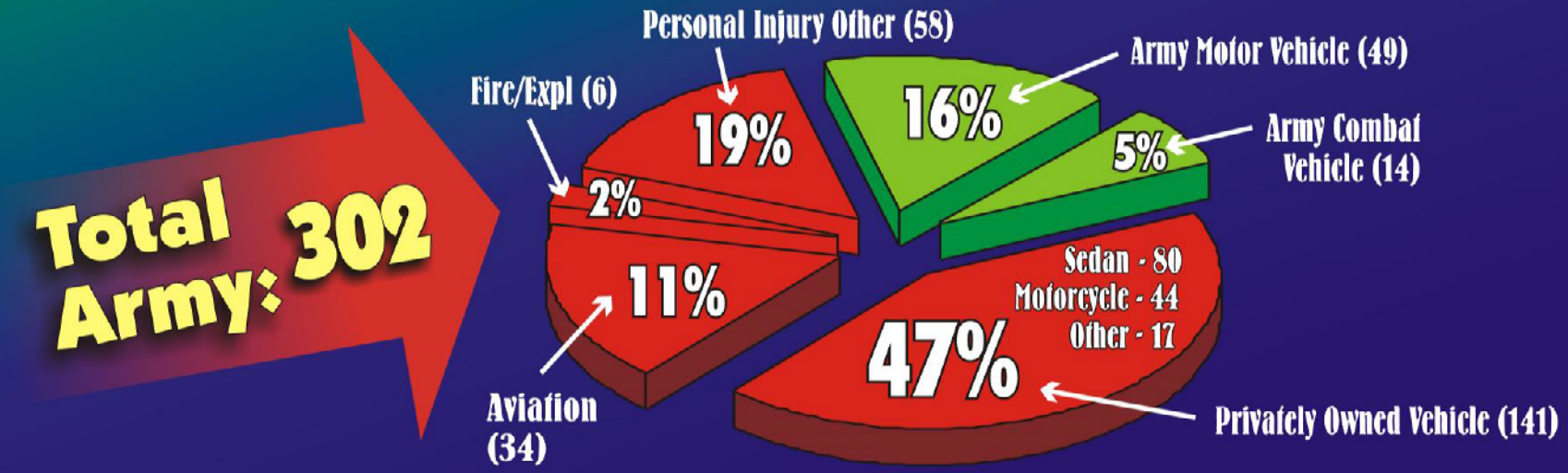
Soldier Accidental Fatalities



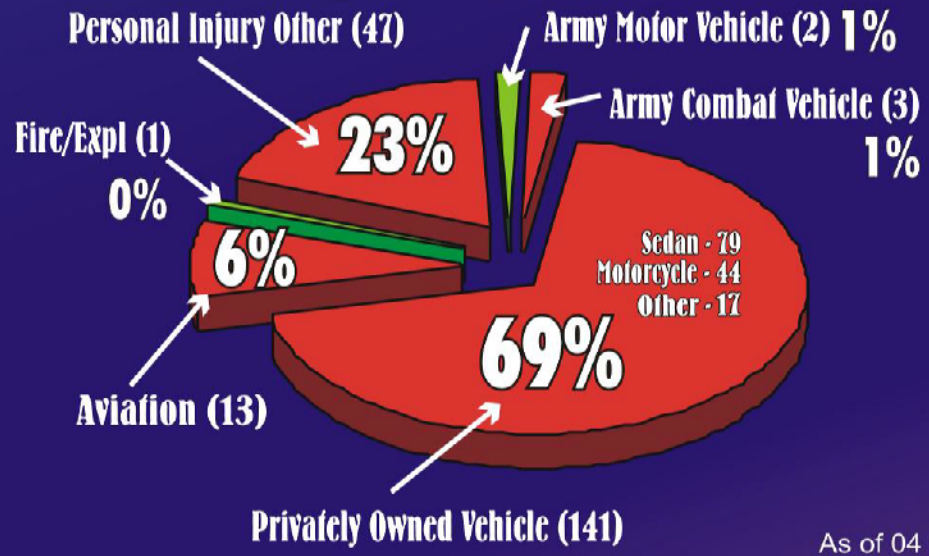
The Arrow Continues to go in the Wrong Direction

ASP5-18

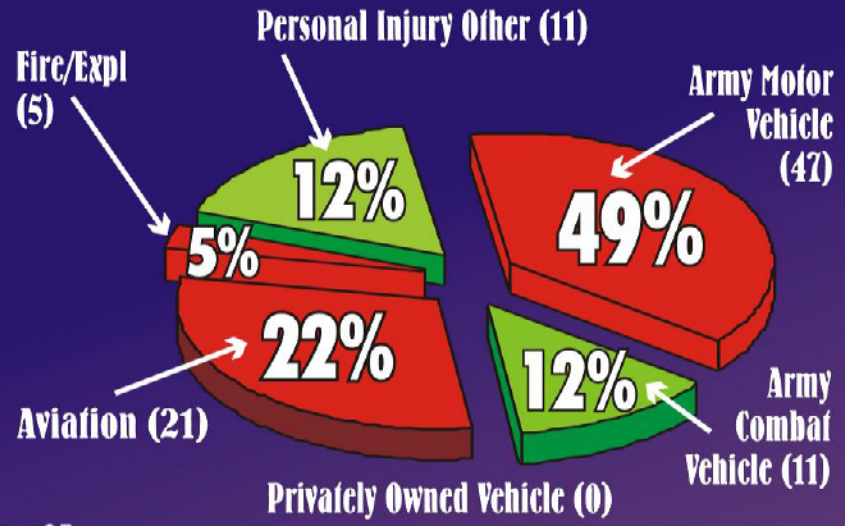
FY05 Soldier Accidental Fatalities



Everywhere Else: 207



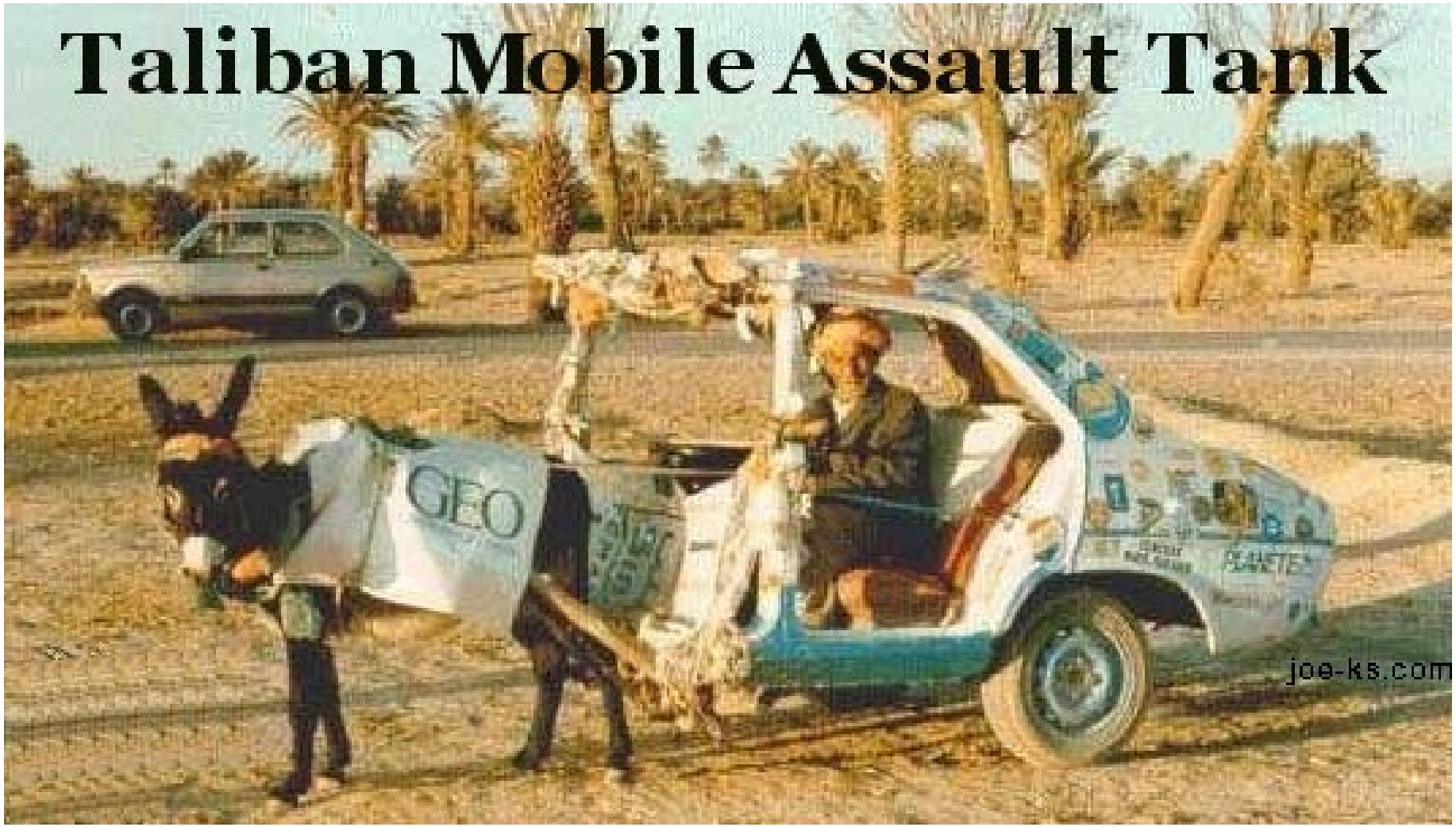
CENTCOM AOR: 95



As of 04 October 05

PCC5-12B

Is this an Enemy Threat?



Where's the Risk?

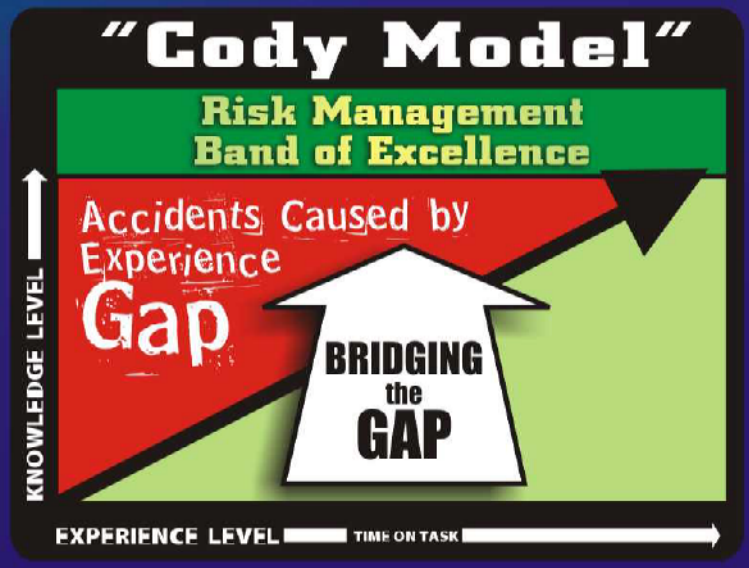
COMPOSITE RISK MANAGEMENT

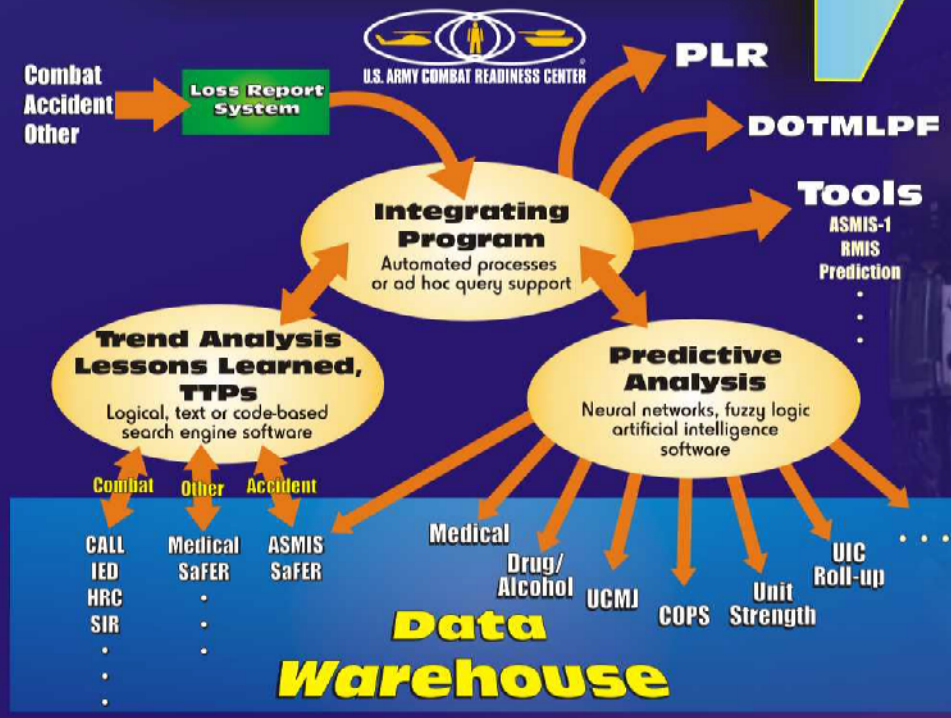
Combat → MANPADS, Small Arms, RPG → Risk Management

Accident → Wire Hazards, Brownout, Fatigue, IIMC → Risk Management

Risk Management → Successful Risk Management

"Cody Model"





CRC Process

Accident Investigation

CAI →
IAI →

Quick Turn
Known facts back to the Field

PLR

Within 48 Hours

Fatality Data
Combat, Medical, Criminal, & Suicide

Report Loss
Immediate Notification

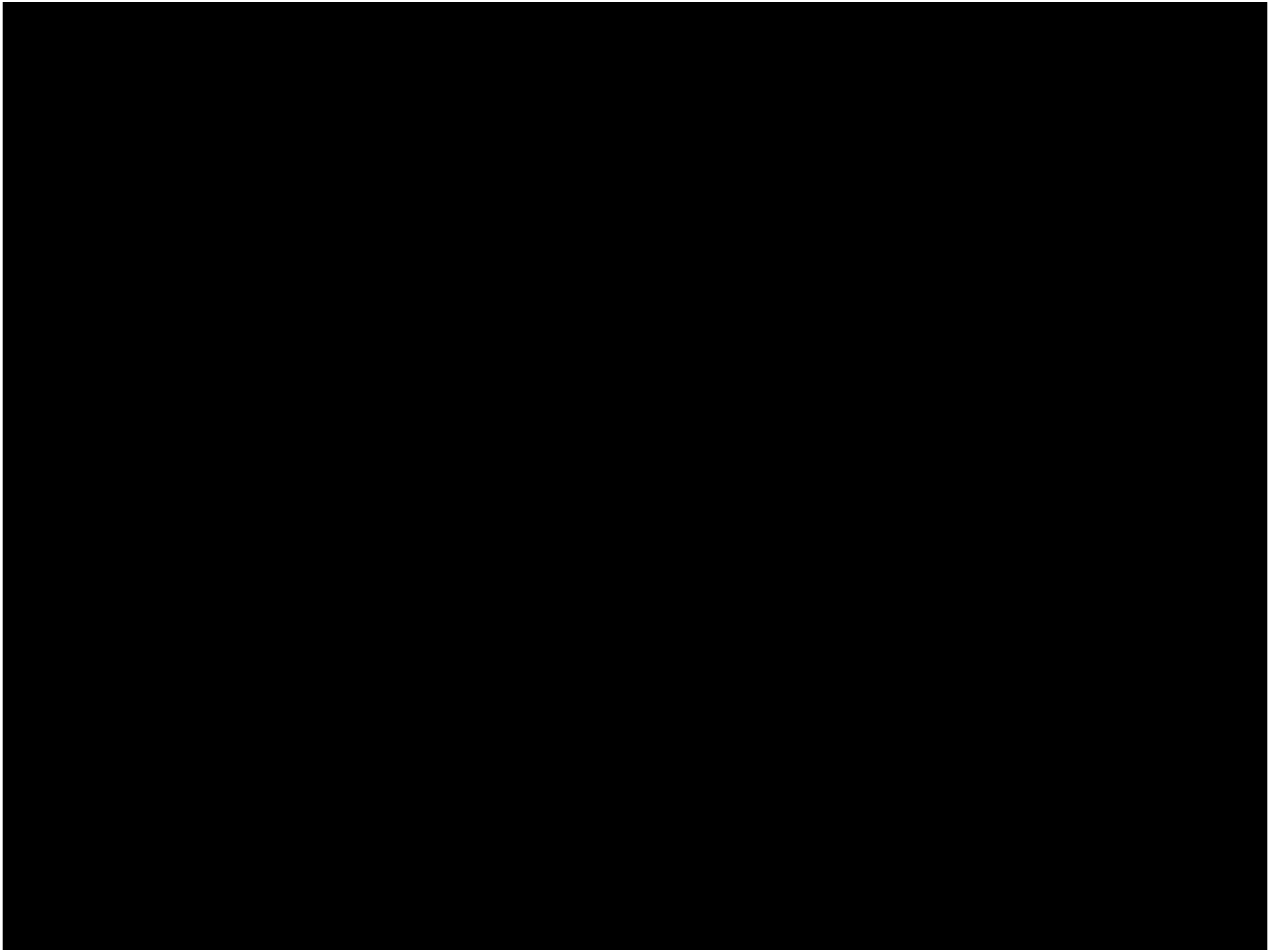
Within 24 Hours

Loss Occurs

The Army
Operations & Training

6 weeks

Close the Loop
Learn & Apply
CALL, TTPs



OVERCOMING OUR CULTURAL DILEMMA

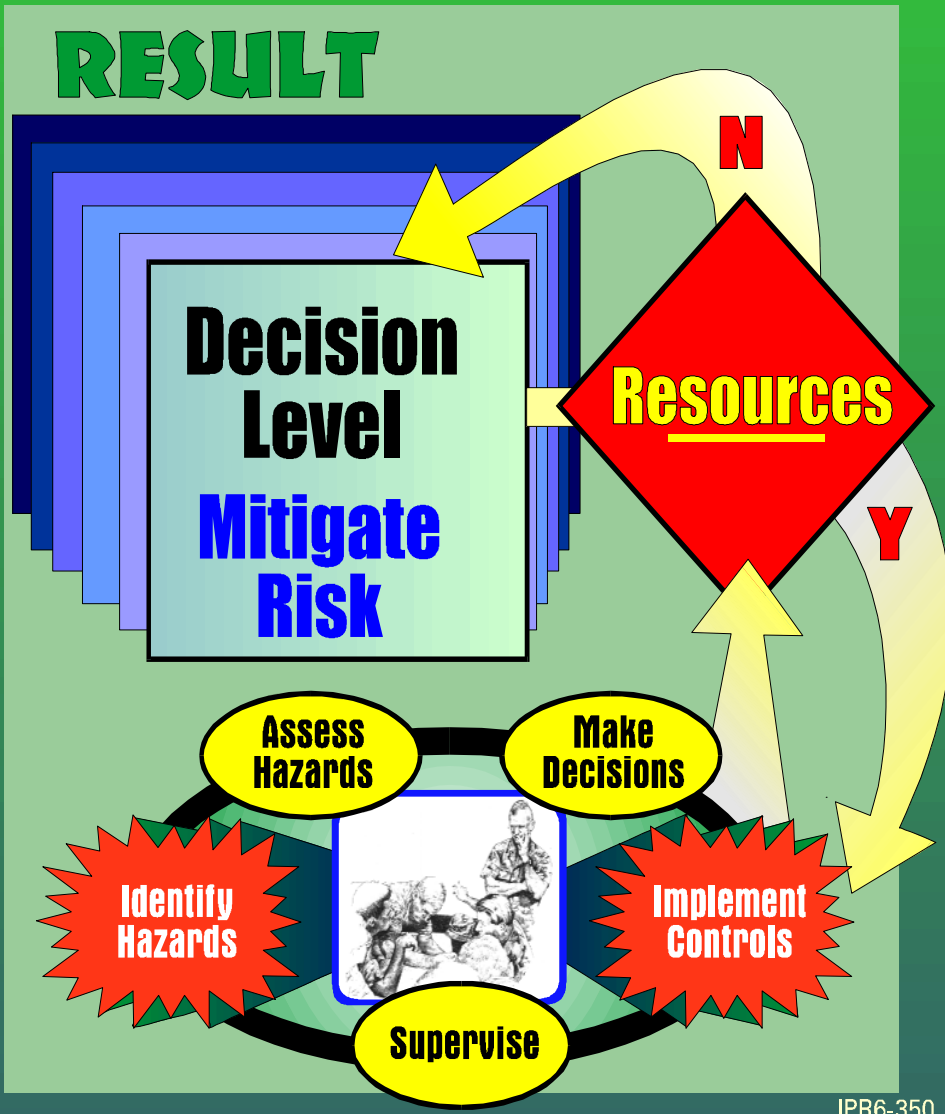
REALITY

- Do more with less
- Reluctance to say no
- Ability to accept change
- HOOAH Factor

REQUIREMENT

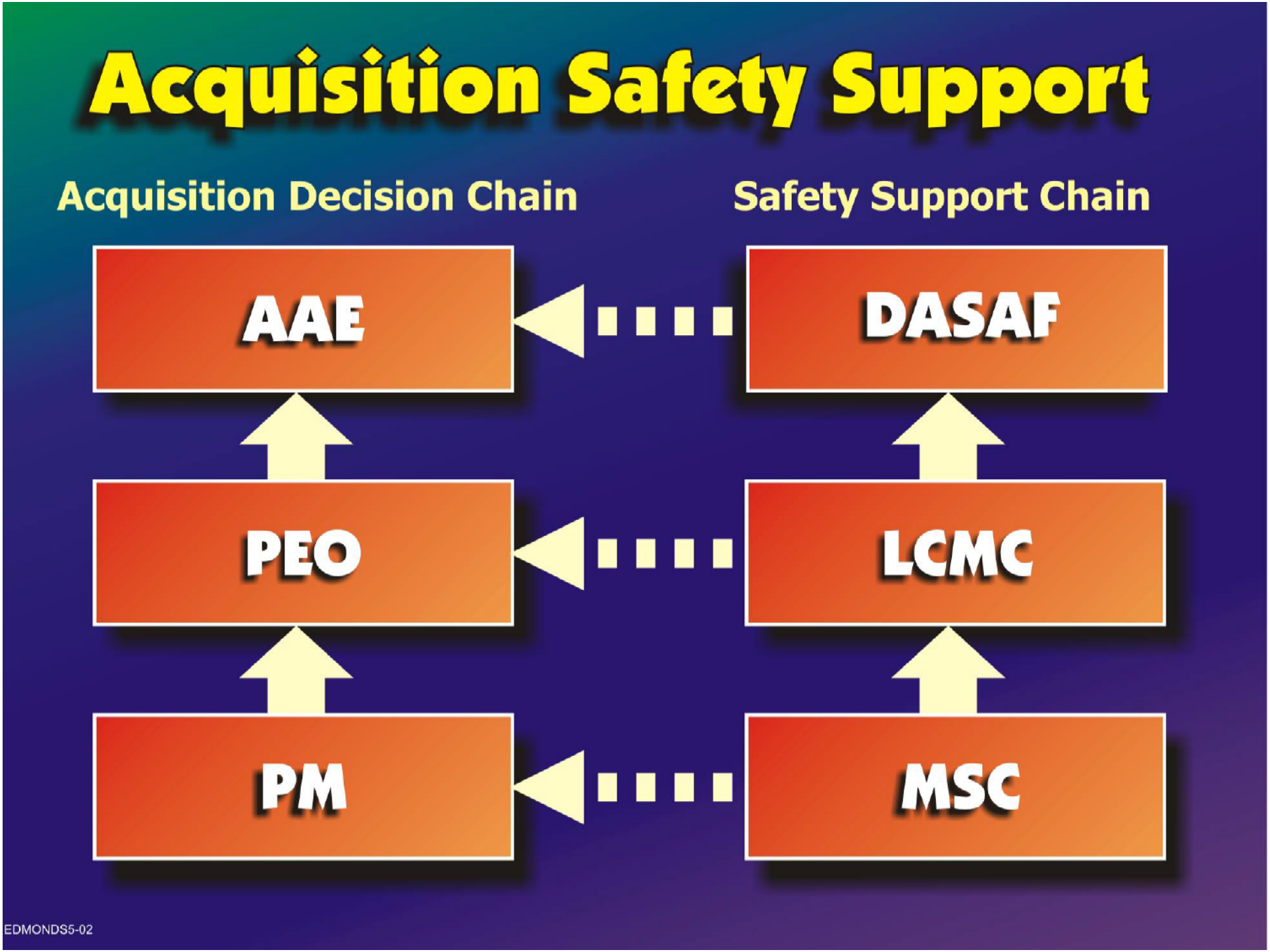
Conscious Decision to Control Hazards or Accept Risks

RESULT



IPR6-350

Acquisition Safety Support



EDMONDS5-02

Risk Management Roles

- **AAE**
  - Define Army safety, health, and environmental risk management policies and act as the risk decision authority for high risk residual hazards associated with Army systems.
  - Fund and evaluate safety, health, and environmental research and development programs to address resolution of generic systemic safety, health and environmental problems.
- **PEO**
  - Safety Officer for assigned systems. Act as the risk decision authority for medium risk residual safety hazards.
- **PM**
  - Responsible for identifying all hazards, eliminating or mitigating when possible, and providing an assessment of hazards that are not eliminated.
- **DASAF**
  - **Assist integrating agents, provide Risk Management information, assess Risk Management performance**

Reference AR 70-1 & AR 385-16

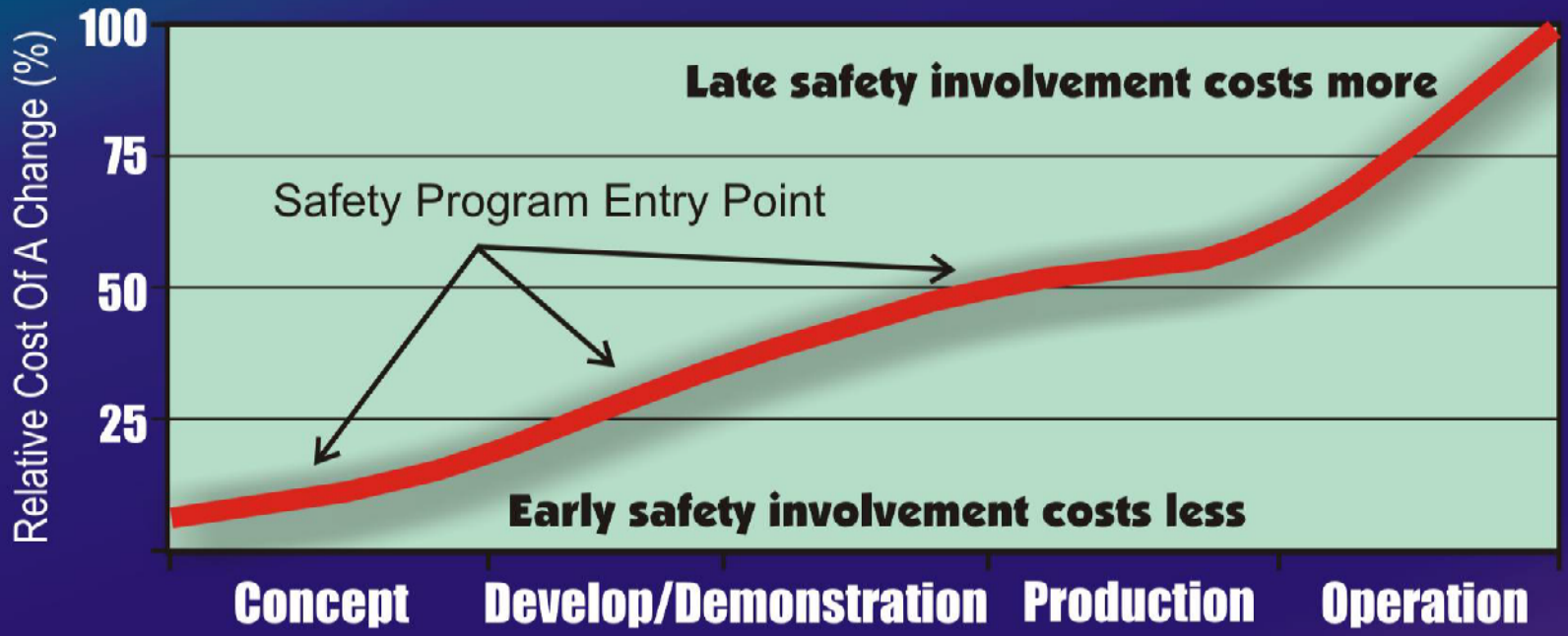
System Safety Primary Objectives

- Ensure hazard control measures are designed in up front & not trained out
- Ensure lessons learned are applied to new developments; don't reinvent the wheel (TIMING DEPENDENT- you've got to get in early to apply them)
- Ensure hazards are "risk managed"; residual risk accepted by the appropriate authority.
- Apply risk management throughout the life cycle

AR 385-16

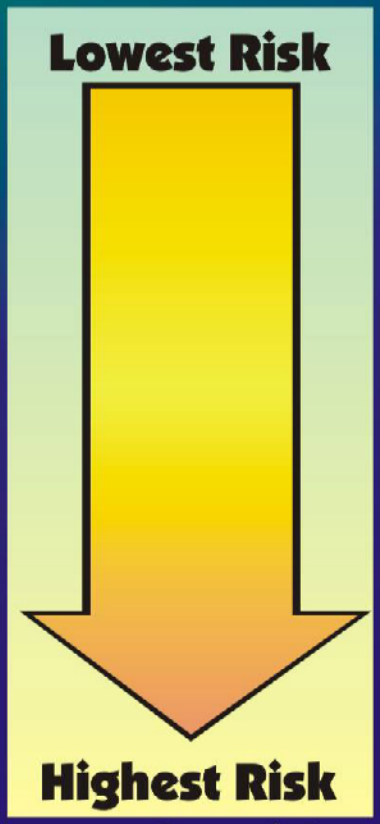
Implement System Safety Early

Over a program's lifecycle it costs less to integrate safety EARLY



Pay Me Now, or Pay Me Much More Later!!!

Order of Precedence



- **Design for Minimum Hazard**
  - Best to design risk out of System
- **Incorporate Safety Devices/Features**
  - If can't design out, design controls in (H/W Devices & S/W Features as Interlocks)
- **Provide Warning Devices**
  - Generate adequate visual or audible warning signal
- **Develop Procedures & Training**
  - Susceptible to Personnel Turnover
  - Susceptible to Human Error

The goal is to "design out" not "train out" hazards

IMPROVING COMBAT READINESS THROUGH DESIGN SELECTION

Composite Risk Management Occurs at Each Level

All Losses are at a Unit Level but all Controls are not!

Unit Level
Higher Level
Army Level

Risk Management occurring at the system level and throughout the lifecycle prevents unnecessary safety challenges for Soldiers

Unit Level: At this level, the Soldier can never get rid of the hazard—IT WILL ALWAYS BE WITH HIM

Both the Risk and the Controls transferred to the Soldier through procedures and training

- **TTP**
  - Rollover Drills
  - Water Egress Drills
- **Increases task load**
  - Subject to human error
- **Limited risk reduction**
  - -Does not reduce severity; reduces probability by only one level

Higher Level: Additional procedural/training controls tax available manpower and mission effectiveness with no reduction in the severity of the risk

- Risk transferred to the Soldier reduces mission effectiveness
  - Develop/modify TTP
  - Provide training range
  - Provide additional manning to support increased operational tasks
    - Mission resources diverted to training
    - Increases exposure to hazard

Army Level: Best position for risk mitigation—SOLDIERS CAN'T AFFORD TO PAY FOR ARMY LEVEL HAZARDS

- Hazard identified, assessed and controlled to an acceptable level of risk (using Order of Precedence)
  - Possible control alternatives:
    - Design: alternate egress access when inverted (reduces severity and probability)
    - Safety Devices: combat door latch wrenches (reduces probability only)
    - Residual risk reduced to level acceptable at the PM Level
- Residual risk mitigated; not transferred to the Soldier
  - Lower order of precedence controls (i.e. TTP) would have required risk acceptance at the AAE level
    - Procedural/training: Rollover Drill

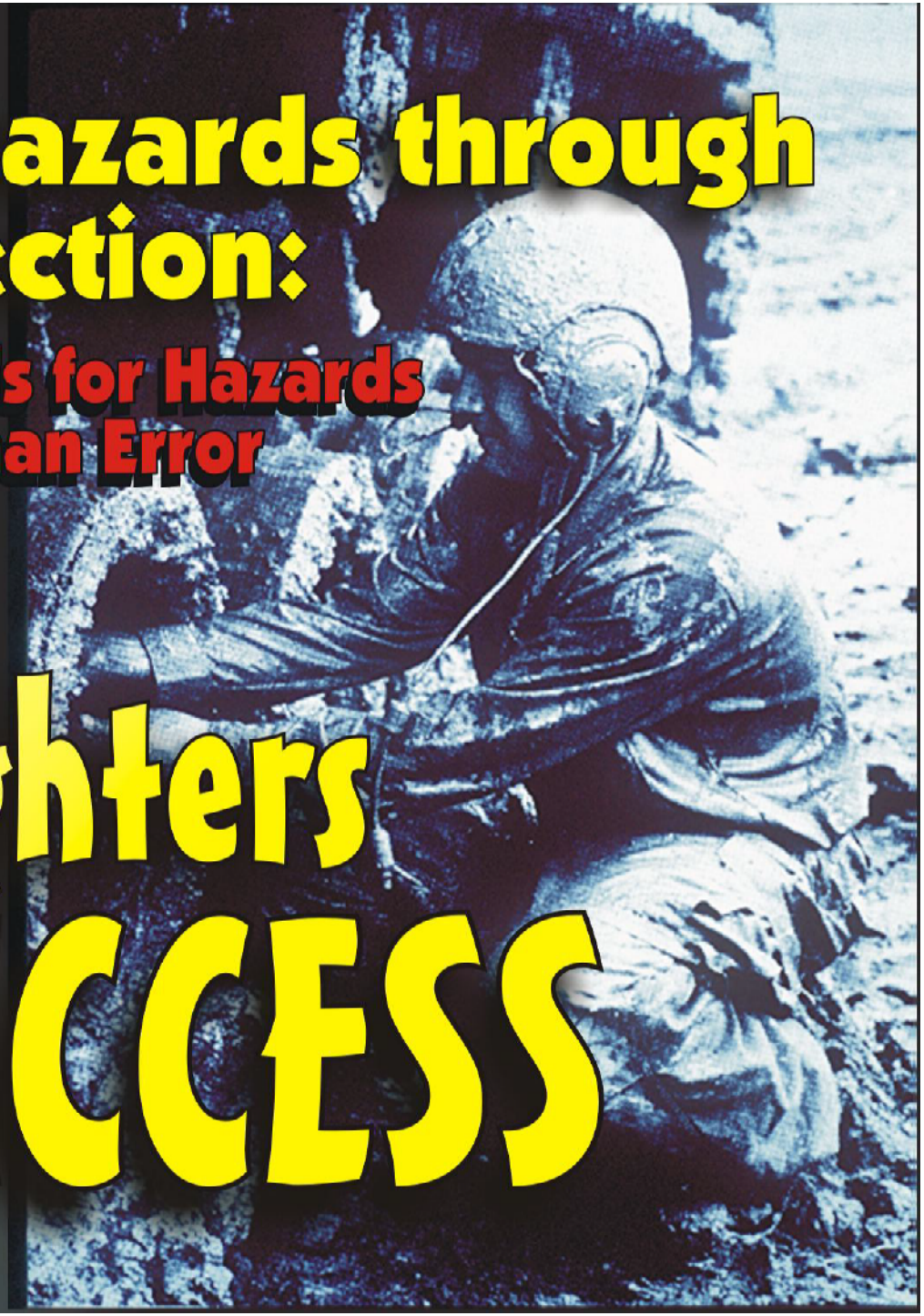
Summary

- **USACRC supports the ASP by—**
  - Reviewing total Army operations from platoon-level to HQDA-level daily to identify RMI opportunities for keeping soldiers safe
  - Providing information & tools that commanders can use to make informed risk decisions
  - Assessing risk management performance

Supporting commanders' safety programs worldwide

Eliminate Hazards through Design Selection:

Procedural Controls for Hazards are Subject to Human Error

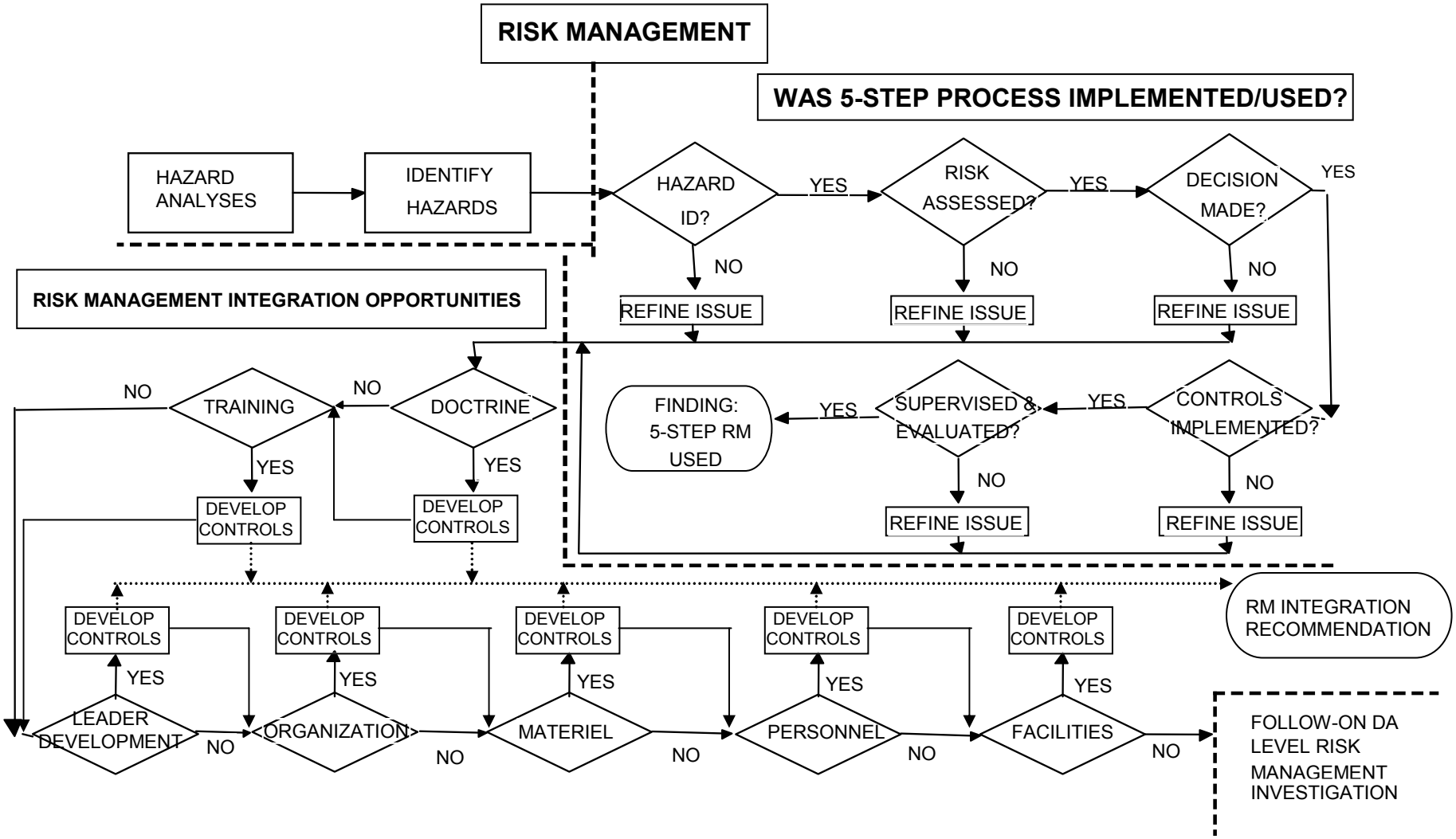


Set Warfighters Up for SUCCESS

EDMONDS4-14

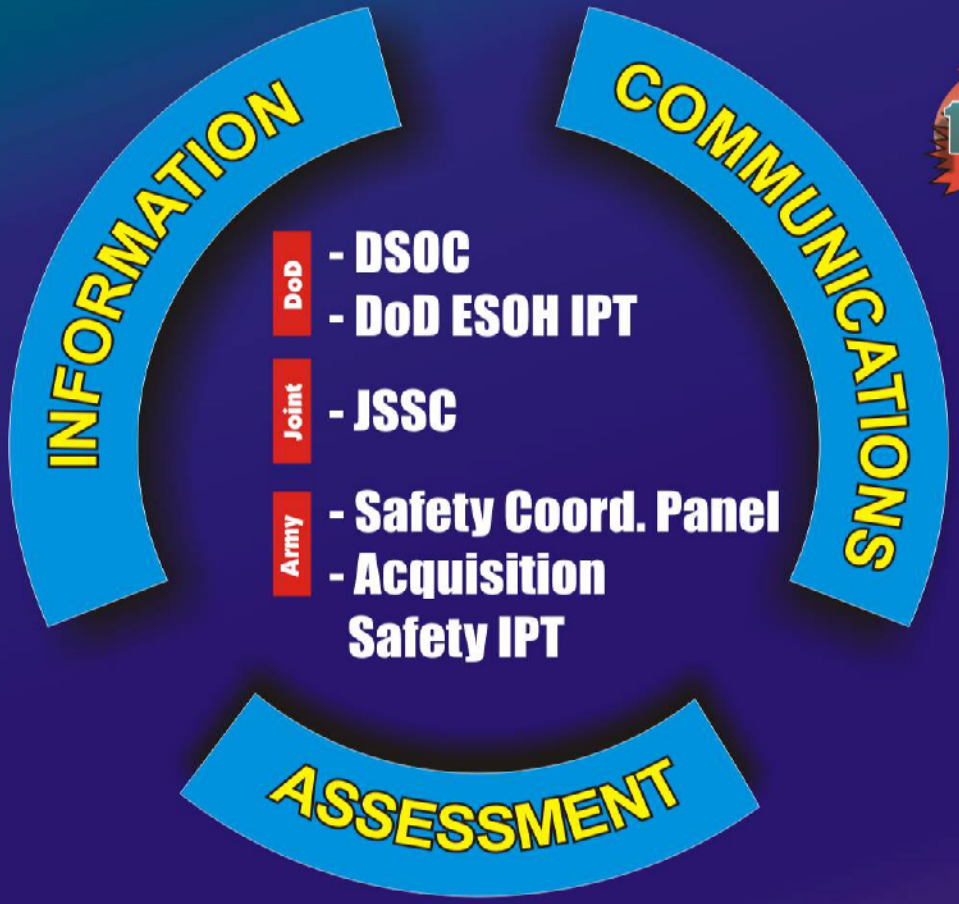
BACKUP SLIDES

RISK MANAGEMENT PROCESS FLOW



Where we're engaged in supporting acquisition safety.

- Developing hazards/ controls information for disseminating historical safety lessons learned for new systems (ASMIS-1)
- Synchronizing acquisition & safety policies
- Reviewing DAU coursework safety content

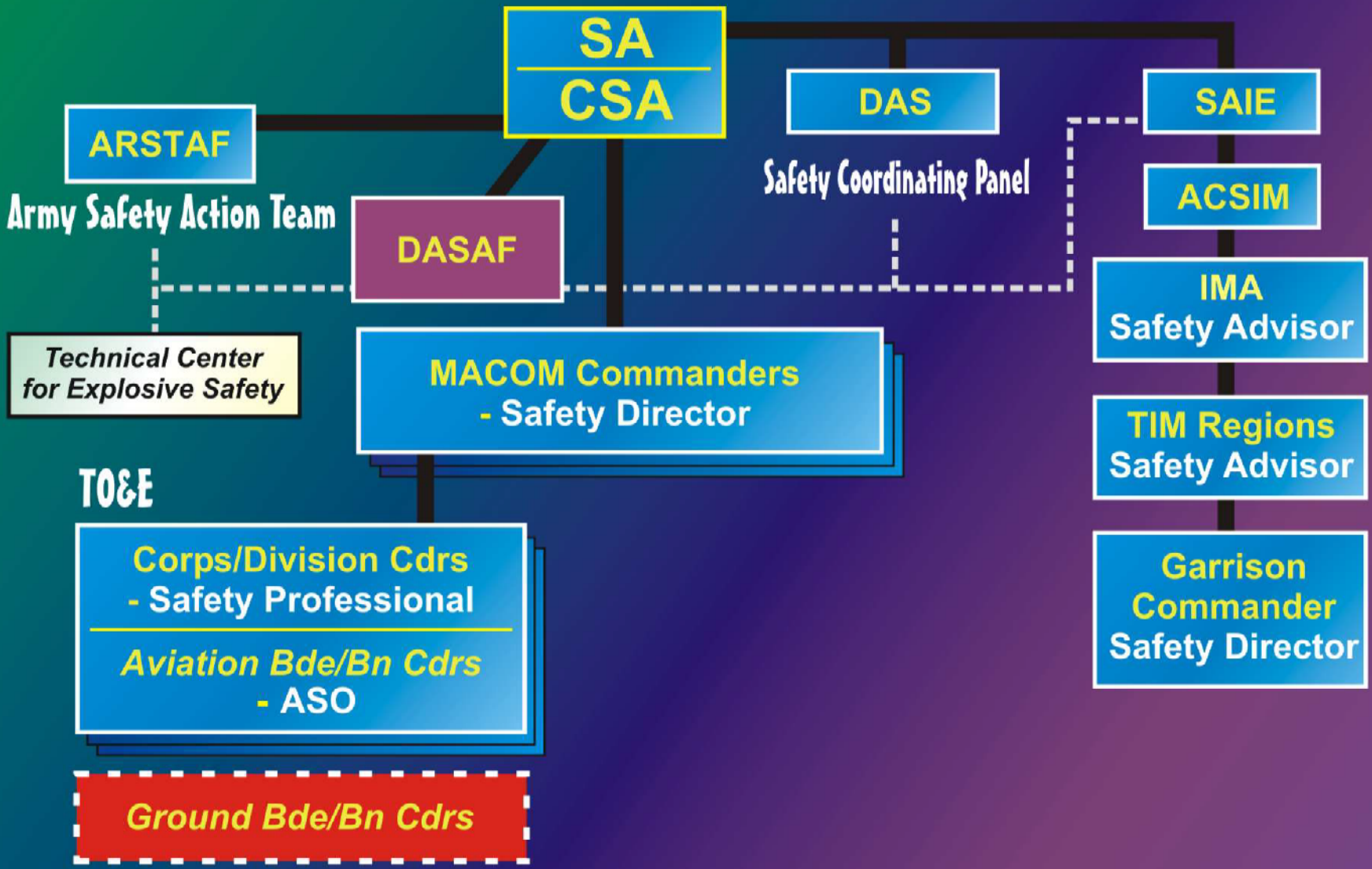


- Safety Campaign Plan
- JSSC MOA "System Safety in Materiel Acquisitions"
- DASAF Memo "Eliminating Hazards through Design Selection"
- ASA(ALT) Bulletin

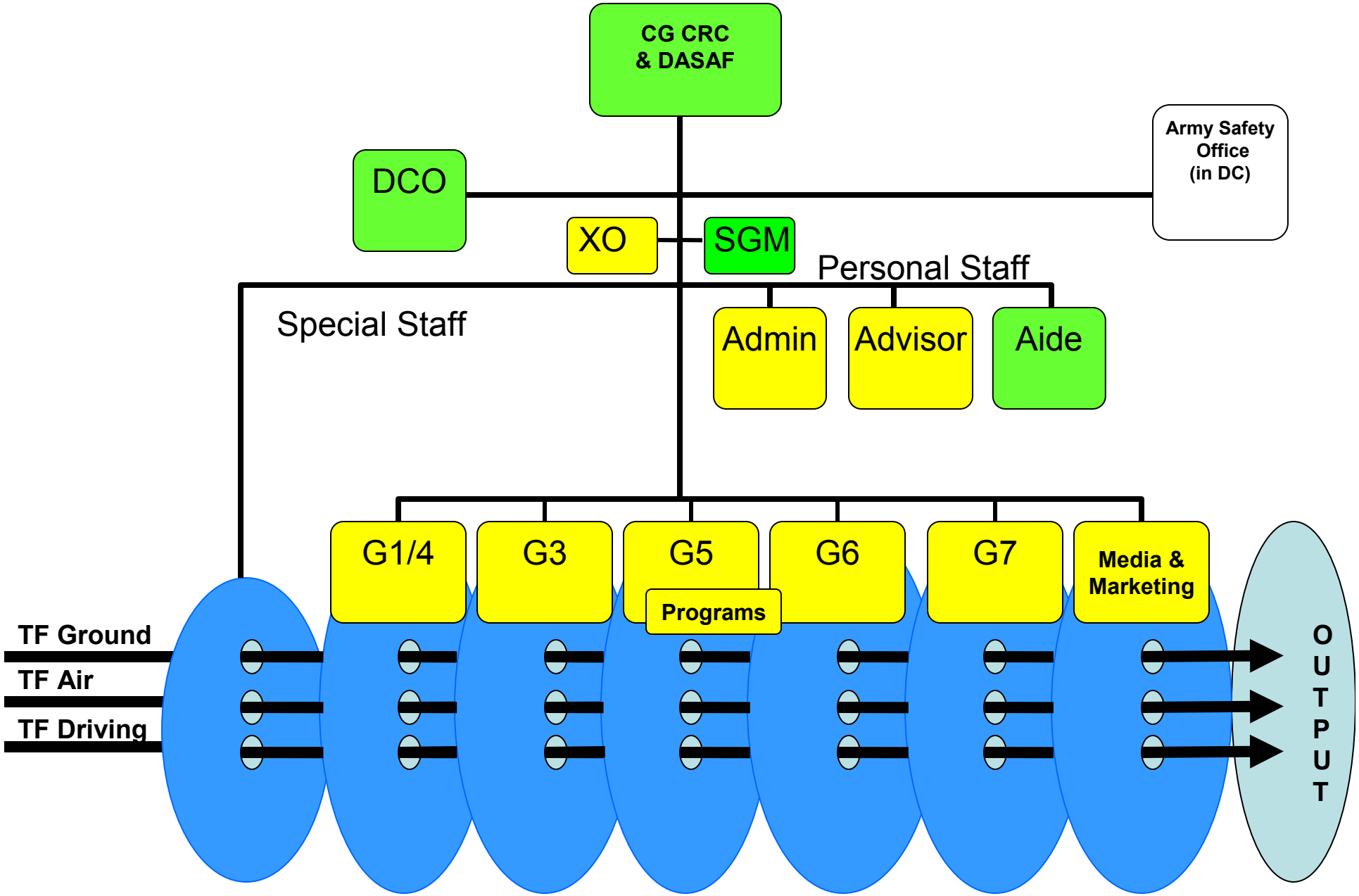
- Providing Independent Safety Assessments at MDRs/IPRs for ACAT I & II
- Participating in program IPTs & SSWGs to provide proactive guidance
- Conducting Accident Investigations of selected accidents
- Review of System Safety Risk Assessments & Safety Notification Messages

EDMONDS5-02

Army Safety Program Key Players & Interfaces

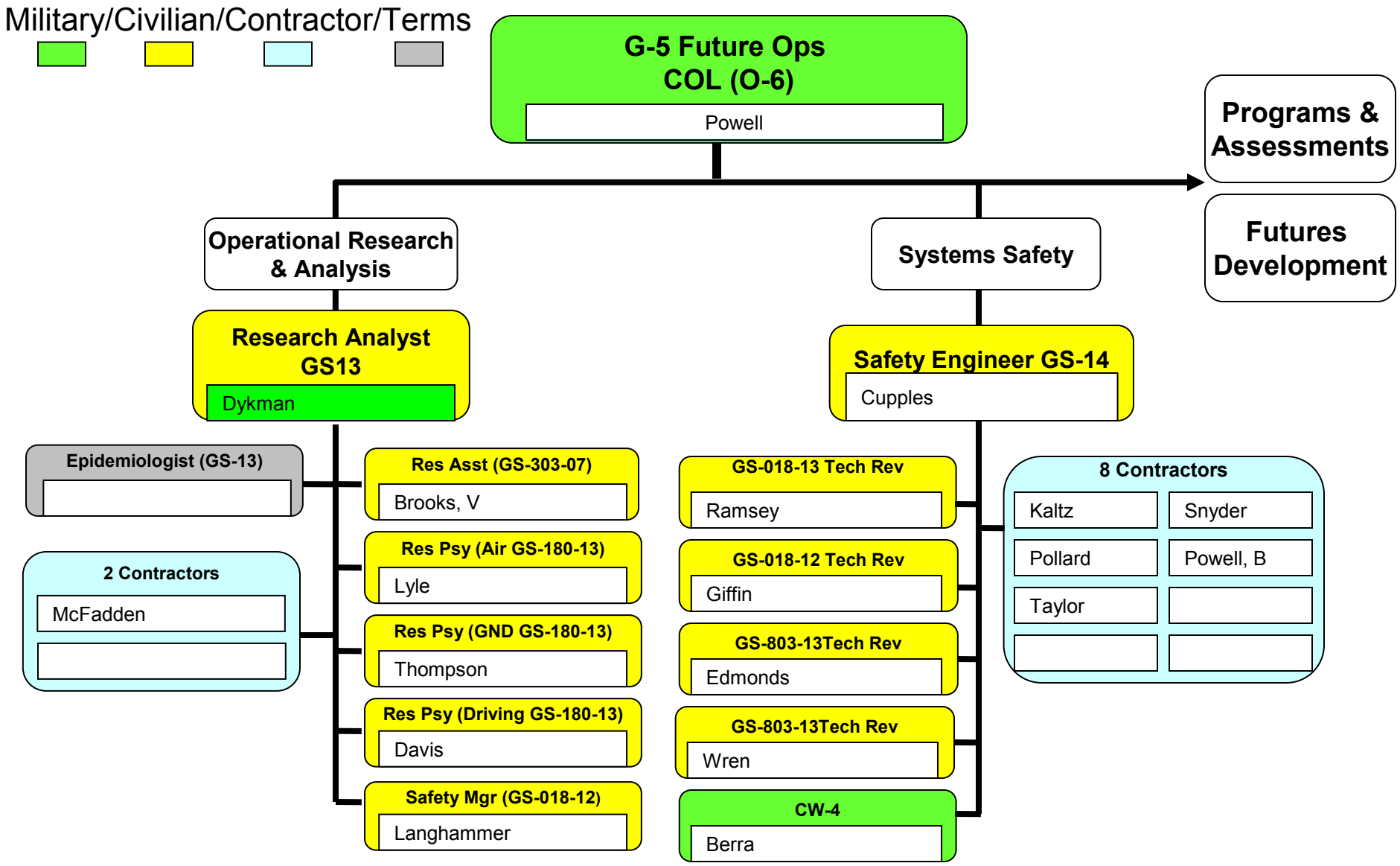


U.S. Army Combat Readiness Center (CRC)



Composite Risk Management Is The Key To Success

Assessing risk from multiple hazards cumulatively!


Military/Civilian/Contractor/Terms
G-5 Future Ops
COL (O-6)
Powell
Programs & Assessments
Futures Development
Operational Research & Analysis
Systems Safety
Research Analyst GS13
Dykman
Safety Engineer GS-14
Cupples
Epidemiologist (GS-13)
Res Asst (GS-303-07)
Brooks, V
2 Contractors
McFadden
Res Psy (Air GS-180-13)
Lyle
Res Psy (GND GS-180-13)
Thompson
Res Psy (Driving GS-180-13)
Davis
Safety Mgr (GS-018-12)
Langhammer
GS-018-13 Tech Rev
Ramsey
GS-018-12 Tech Rev
Giffin
GS-803-13Tech Rev
Edmonds
GS-803-13Tech Rev
Wren
CW-4
Berra
8 Contractors
Kaltz
Snyder
Pollard
Powell, B
Taylor

SUPERVISE & EVALUATE "FEEDBACK"

- USACRC provides the independent "honest broker" feedback
- How?
  - System Safety Advocacy
  - ISA's

- If we don't perform this step of the cycle, the risk management process is incomplete.

Integrating Agents:

OPPORTUNITY FOR WORLD CLASS SAFETY PERFORMANCE

PROJECT THE FORCE

Integrating Agent: CG FORSCOM

Power Projection
- Planning
- Training
- Warfighting

Force Projection Platforms
- Deployment
- Mobilization
- Redeployment
- Demobilization

DEVELOP THE FORCE

Integrating Agent: CG TRADOC

DOCTRINE
- RM connected to Strategic Plan
  - Embed emerging but mature doctrine & TTP
  - FM 101-5

TRAINING
- RM standardization
- RM in tng development
- RM integration in lesson plans and MTPs

COMBAT DEVELOPMENT
- Human performance synergy
- Accident investigation & followup
  - Materiel issues
  - SSRA in Battle Labs

LEADER DEVELOPMENT
- Embed RM in BCTP
- Embed RM in Prairie Warrior

SUSTAIN THE FORCE

Integrating Agent: CG AMC

- Materiel acquisition policy changes
- Strengthened acquisition process by codifying system safety risk assessment procedures
- World class performance by PEOs and PMs
- Handoff info about hazards to soldiers

FAAVALUE

EDMONDS5-10

A Major Subjective Analysis Shortfall…

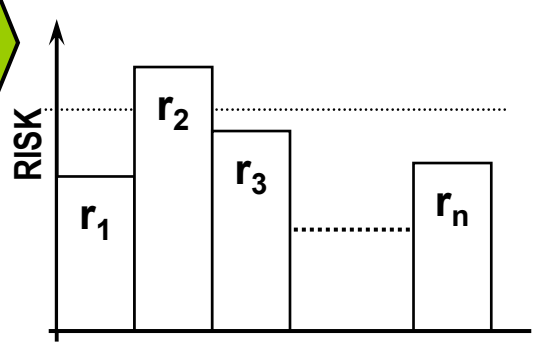
All **"Line-Item Inventory" Hazard Analysis / Risk Assessment methods * suffer this shortfall:**

THE ANALYTICAL CONSTRUCT

HAZ-ARDS	SEV-ERITY	PROB-ABILITY	RISK
h_1	s_1	p_1	r_1
h_2	s_2	p_2	r_2
h_3	s_3	p_3	r_3
⋮	⋮	⋮	⋮
h_n	s_n	p_n	r_n

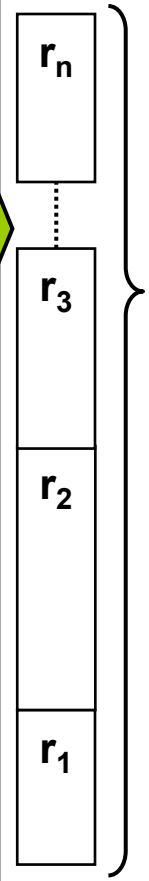
- **Examples:**
  Preliminary Hazard Analysis
  Failure Modes and Effects Analysis
  Functional Hazard Analysis

THE ANALYST'S VIEW of SYSTEM RISK



RISK SUMMATION METHODS ARE NEEDED!

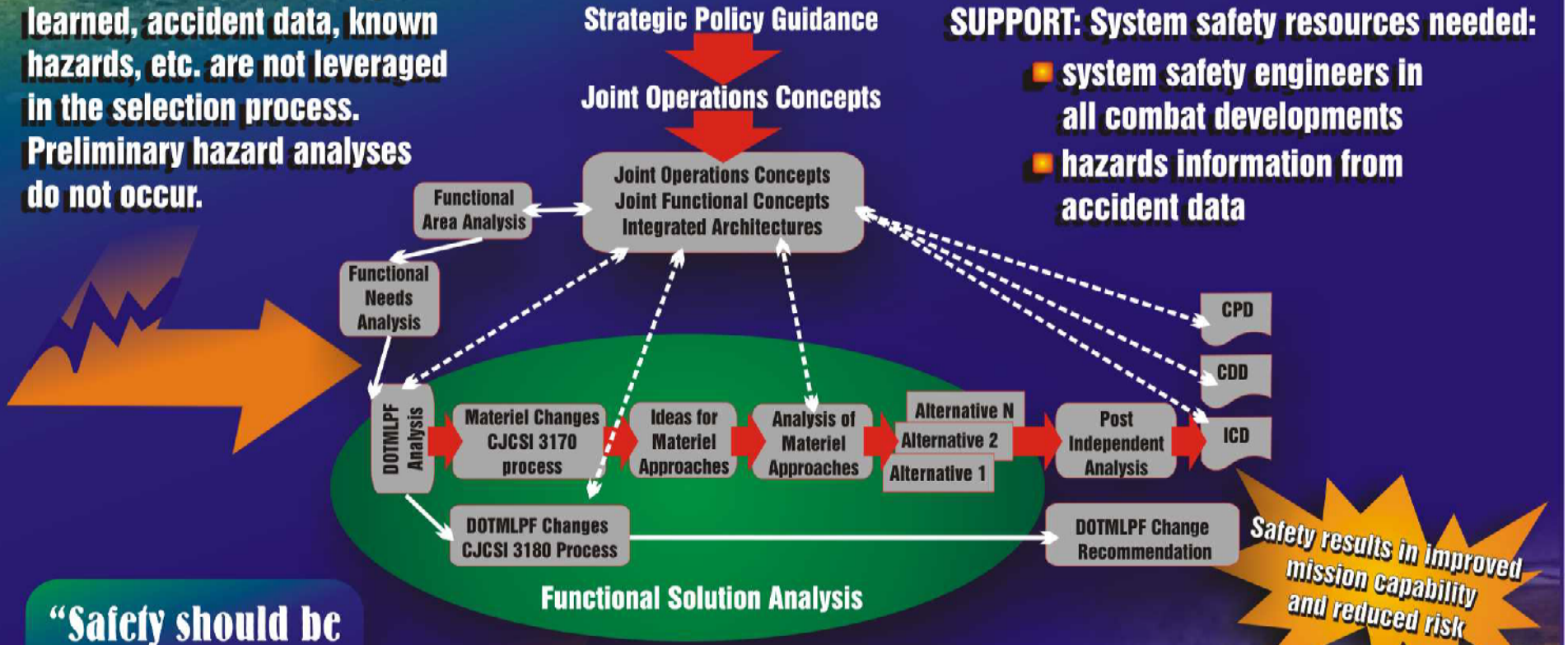
REAL WORLD SYSTEM RISK



$$R_T = \sum (s_1 \times p_1) + (s_2 \times p_2) + (s_3 \times p_3) + \vdots + (s_n \times p_n) +$$

Establishing Safety Performance in the Capability Identification Process

PROBLEM: Historical safety lessons learned, accident data, known hazards, etc. are not leveraged in the selection process. Preliminary hazard analyses do not occur.



SUPPORT: System safety resources needed:

- system safety engineers in all combat developments
- hazards information from accident data

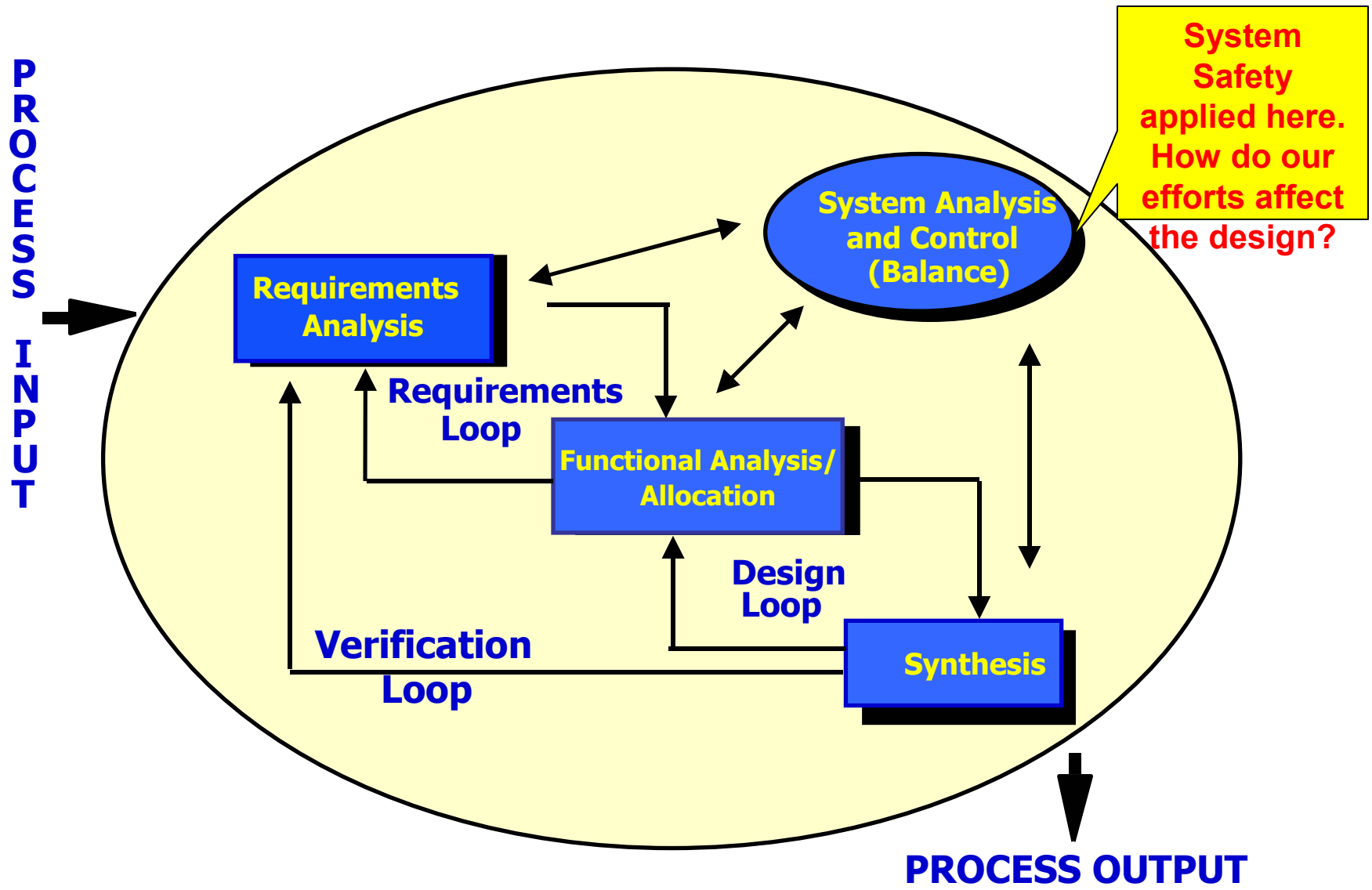
Safety results in improved mission capability and reduced risk

"Safety should be a requirement up front and across the DOTML-PF"

– Hon. Claude Bolton, AAE

RESULTS: Safety performance criteria established in requirements documentation.

Systems Engineering Process



Where we can help you...

- **Supporting risk management decisions**
  - System Safety Risk Assessments (SSRA)
  - Army Safety Action Team (ASAT)
- **Providing hazards information from Army accidents to influence design selection**
- **Coordinating safety investment strategies to fund safety improvements**
  - Safety Coordinating Panel (SCP)
- **Analyzing and communicating safety information**
  - *Countermeasure, Flightfax, Impax,* PLRs

Where we need your help...

- Ensuring an effective SSMP is developed & executed as part of the acquisition strategy
- Providing design solutions for recurrent hazards that produce accidents
- Enabling acquisition leaders to routinely assess safety performance
- Integrating system safety within the overall systems engineering process
- Establishing safety performance capabilities for the user

Where's the Risk?

COMPOSITE RISK MANAGEMENT

Combat

IED
Small Arms
RPG

Risk Management

Accident

Air
Ground
Driving

Risk Management

Successful Risk Management

MISSION ACCOMPLISHED

What's going to kill me & my buddies, Enemy or Accident?

CR5-05