

# Submarine Safety Symposium

9 -10 October 2013 - Dock Museum, Barrow-in-Furness



Sponsored by

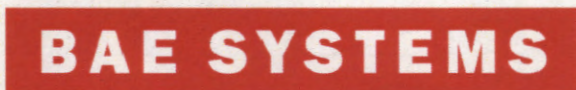
**BAE SYSTEMS**

Sponsored by BAE Systems



# Submarine Safety Symposium

9 -10 October 2013 - Dock Museum, Barrow-in-Furness



**Rolls-Royce**



trusted to deliver™



**Ministry  
of Defence**

**Sponsored by BAE Systems**



# Submarine Safety Symposium

9 -10 October 2013 - Dock Museum, Barrow-in-Furness



Sponsored by BAE Systems



# Submarine Safety Symposium

9 -10 October 2013 - Dock Museum, Barrow-in-Furness



Sponsored by BAE Systems





# Preventing High Consequence Events

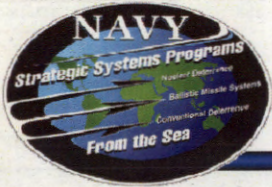




## Problem Statement

- The Navy “owns” the Trident SWS, a public risk technology vulnerable to low likelihood, high consequence events
- History replete with ‘successful’ organizations that suffered from spectacular failure
- By all measures SSP is a successful program
  - The bar has always been high for safety and security
  - In recent years policy/operational emphasis on both has increased
- We do experience unexpected events that warrant attention
- Fukushima was a wake-up call

**Cannot allow the program to cross the threshold to a high consequence event**



## The Fukushima Nuclear Disaster

- **March 2011 earthquake/tsunami/reactor disaster changed Japan's course**
  - Shook the country from the national slumber that dated to the economic slowdown of the early 1990s
  - Precipitated an industry shutdown
- **Japanese Diet established an unprecedented Independent Investigation Commission**
  - Underlined the underpinnings of the nuclear accident in uniquely direct language linked to the human element

“The fundamental causes are to be found in the ingrained conventions of Japanese culture: our reflexive obedience; our reluctance to question authority; our devotion to ‘sticking with the program’; our groupism; and our insularity”

*Kiyoshi Kurokawa, Chairman*



## Objectives

- **Identify the causes of failure** of individual and organizational performance in representative high consequence events
- **Ascertain commonalities in the weaknesses** that could, conceivably, lead to future program performance problems
- **Engage SSP leaders/personnel** with insights developed
  - AWARENESS of the Human Element (HE) weaknesses that arise in organizations
  - AVOIDANCE of pitfalls that others have suffered
  - RESPONSIBILITIES that each individual has (as well as AUTHORITY and ACCOUNTABILITY) to strive to avoid similar error
- **Make recommendations** and develop materials to promote long-term benefit to SSP and Navy/other relevant organizations

**Prevention of high consequence events  
is an all hands mandate**

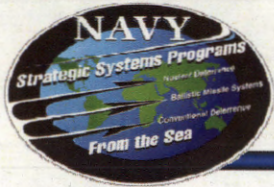




## Public Risk Technologies: Special Circumstances

- **Public Risk Technology Features:**
  - Authority concentrated in a small group of executives
  - Oversight limited because of the specialized nature of the necessary expertise
  - Inherent tension between application of limited resources to public safety or to delivering the benefits of the technology
  - Incentive to downplay risk because “low/acceptable risk” is an essential part of ensuring public trust in the technology
  - Pressure to place disproportionate attention to mission vice risk reduction when resources are restricted
- **Public Risk Technology Challenge:** Deliver an important public good/service effectively, with no high consequence events, and balanced with prudent use of resources

**Objective: Prevention of the ‘big one’ by cultivating the right day to day habits**



## Organizational Habits

---

**“Destructive organizational habits can be found within hundreds of industries and at thousands of firms. And almost always, they are the products of thoughtlessness, of leaders who avoid thinking about the culture and so let it develop without guidance. There are no organizations without institutional habits. There are only places where they are deliberately designed, and places where they are created without forethought.”\***

*\*Charles Duhigg, **The Power of Habit: Why We Do What We Do in Life and Business***



# 'High Consequence Events' Reviewed

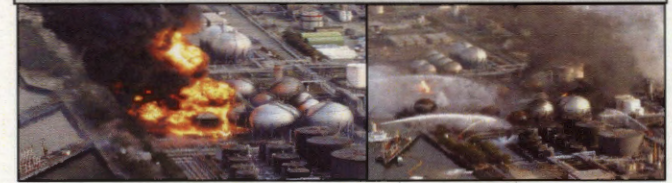
**Benghazi Attack (Sep 2012)**



**Y-12 Complex Breach (Jul 2012)**



**Fukushima Nuclear Plant (Mar 2011)**



**Deepwater Horizon (Apr 2010)**



**B-2 Crash on Takeoff from Guam (Feb 2008)**



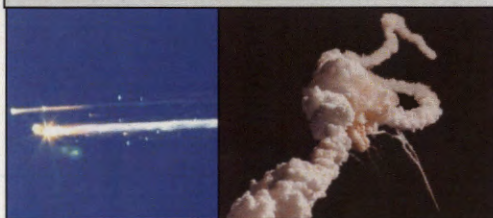
**AF Nuclear Enterprise Events (Jun 2006, Aug 2007)**



**Hurricane Katrina (Aug/Sep 2005)**



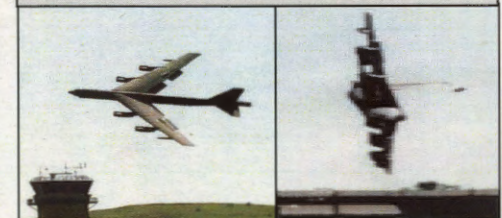
**Shuttle Losses (Jan 1986, Feb 2003)**



**Greenville Collision (Feb 2001)**



**B-52 Air Show Rehearsal (Jun 1994)**





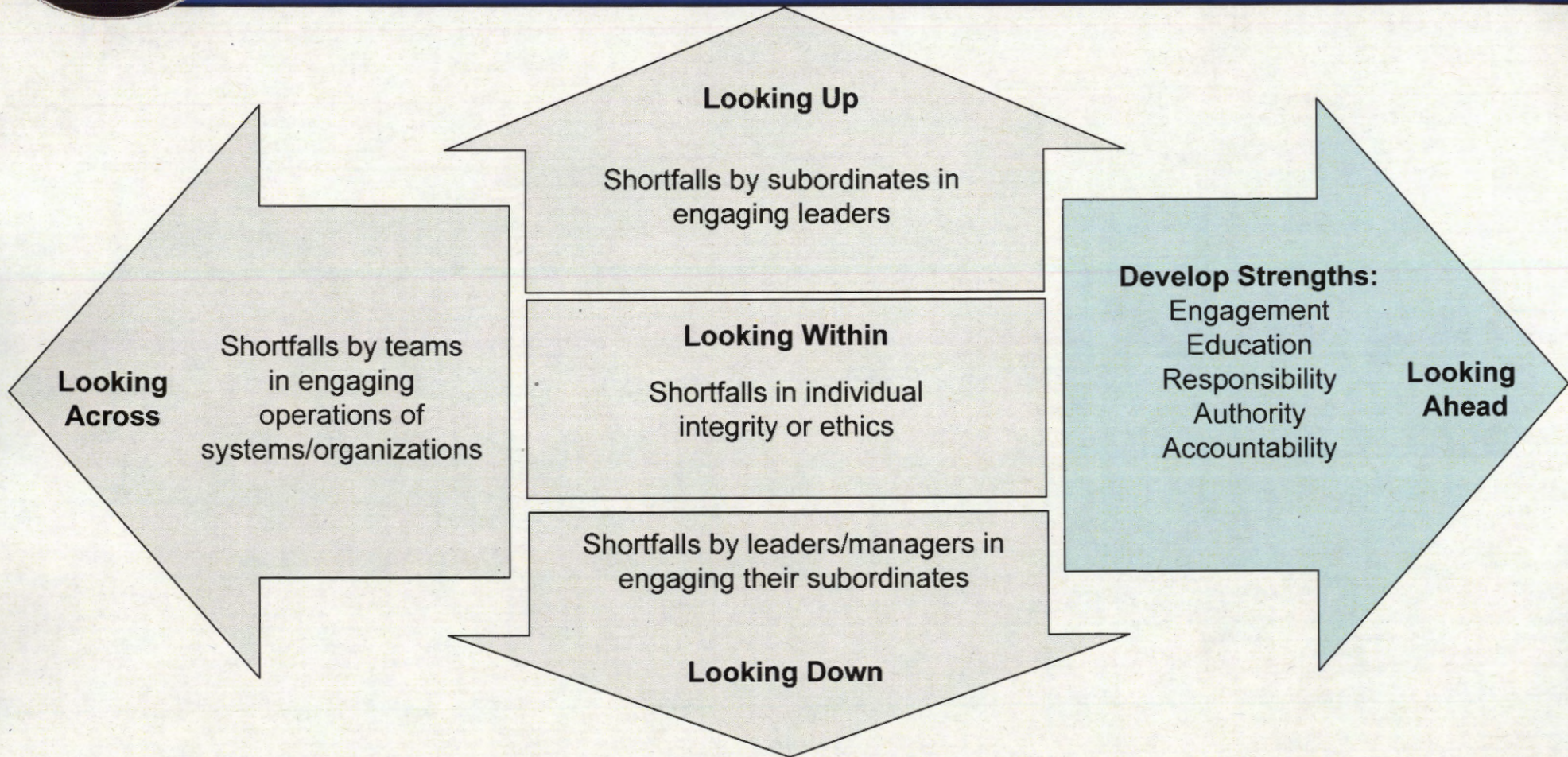
## Key Integrated Finding

### Need Both Technical and Human Element Strengths

- An organization with both *cross-functional technical skill* and *core human element strengths* acts to:
  - **Prevent the occurrence of high consequence events** by avoiding the sequence of “closed switches” that enable such events
  - **Respond effectively if high consequence events do occur**, using established procedures where appropriate, augmented with intelligence and resilience to cope with surprises the procedures don’t cover
- Root cause assessments typically identify technical failures but *not the underlying Human Element causes* that facilitated failures:
  - **Technical/procedural focus:** Personnel errors, training gaps, technical mistakes and documentation shortfalls identified but not the underlying “why”
  - **Human Element weaknesses left unaddressed:** Shortstopping root cause assessment before identifying relevant Human Element weaknesses shortchanges utility, stymies change, and increases likelihood of recurrence



# Human Element Weakness and its Treatment





# Weaknesses Looking Up

## Human Element Weaknesses

- Concealment of dissension
- Sticking to past program decisions
- Reluctance to question authority
- Reflexive obedience



→ Transparent decision support



→ Considered review of past decisions

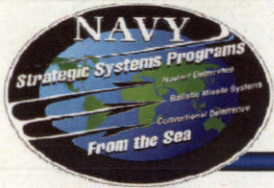


→ Forceful backup



→ Questioning attitude

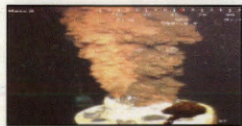
## Corresponding Strengths



# Weaknesses Looking Down

## Human Element Weaknesses

- Tribal knowledge
- Culture of production
- Insularity
- Technical arrogance
- Passive oversight
- Not invented here



## Corresponding Strengths

- Integrated technical understanding
- Culture of risk evaluation
- Encouragement of ideas and criticisms
- Openness to scrutiny and education
- Vertical knowledge/engagement
- Invitation for outside ideas and concerns



# Weaknesses Looking Across

## Human Element Weaknesses

- Not my problem
- Absence of accountability
- Disregard of honest appraisal
- Informal or stove-piped treatment of risk
- Surrender to bureaucratic process
- Groupism
- Focus on inputs vice outputs



## Corresponding Strengths

- Broad system ownership
- Unambiguous assignment of accountability
- Rigorous, open self-appraisal
- Formal, systematic risk acknowledgement
- Embrace of supportive, thoughtful process
- Transparency and technical rigor
- Output-based evaluation





# Weaknesses Looking Within

## Human Element Weaknesses

- **Misplaced loyalties**
- **Who am I to judge?**
- **Situational values**
- **I'm above the rules**
- **Others do it, must be OK**

## Corresponding Strengths



→ **Loyalty to core values**



→ **Personal courage**



→ **Universal standards**



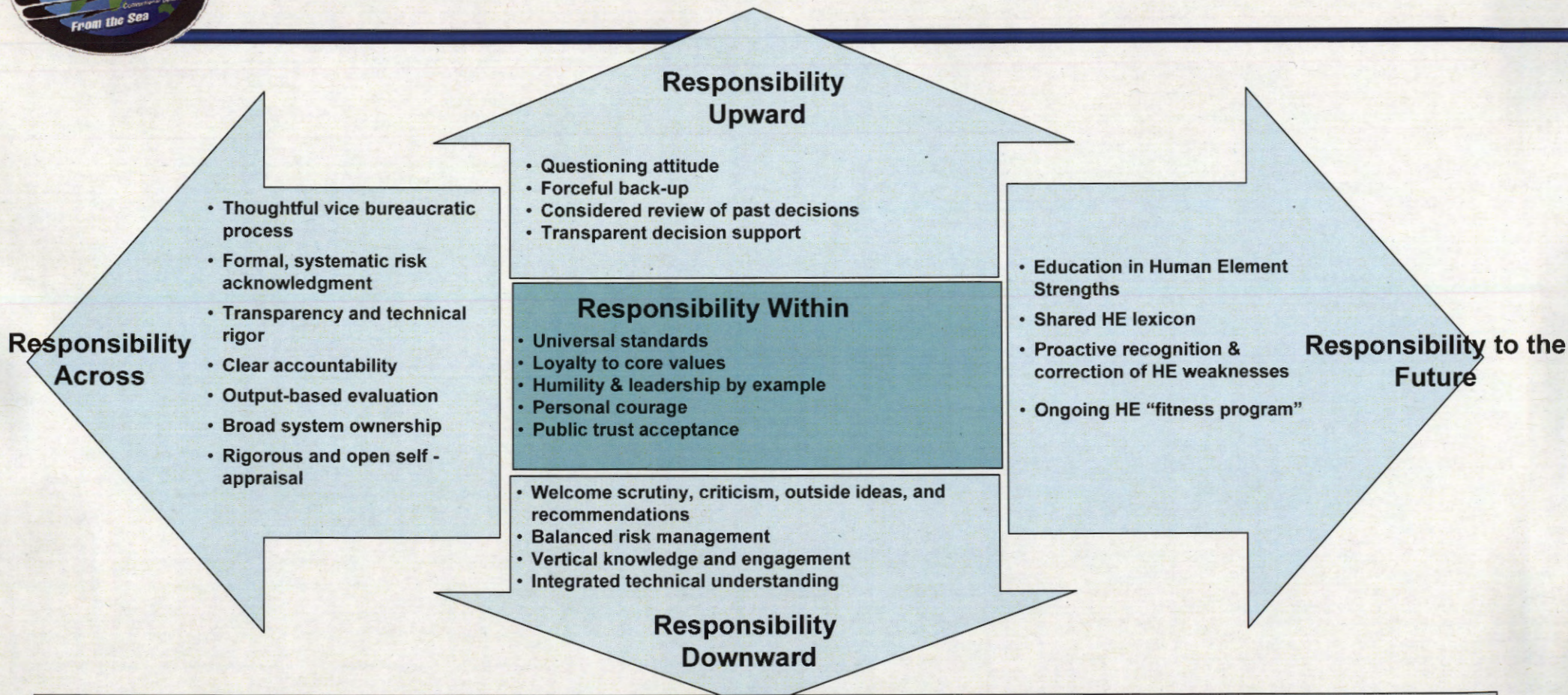
→ **Humility and leadership by example**



→ **Public trust acceptance**



# Visualizing a Strong Human Element (HE)

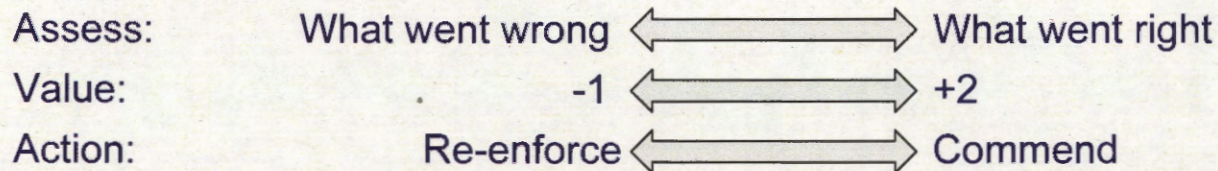


**Need the full package: Responsibilities + Authority + Accountability**



# Accountability

- Accountability is a loaded word => punishment to many
  - Really cuts both ways
- Recognition for a job poorly done or for a job well done
  - Variations from incarceration (negligence or deliberate malfeasance) to award of the Navy Cross
- Consider criminal accountability as -10, and Navy Cross as +10
  - Don't retain criminals; not looking for situations that require heroics
  - We want to occupy the middle ground (preferably to the right)
  - Key is keeping the organization on course with small adjustments, exercising accountability early and often
- For example (in a hot wash):

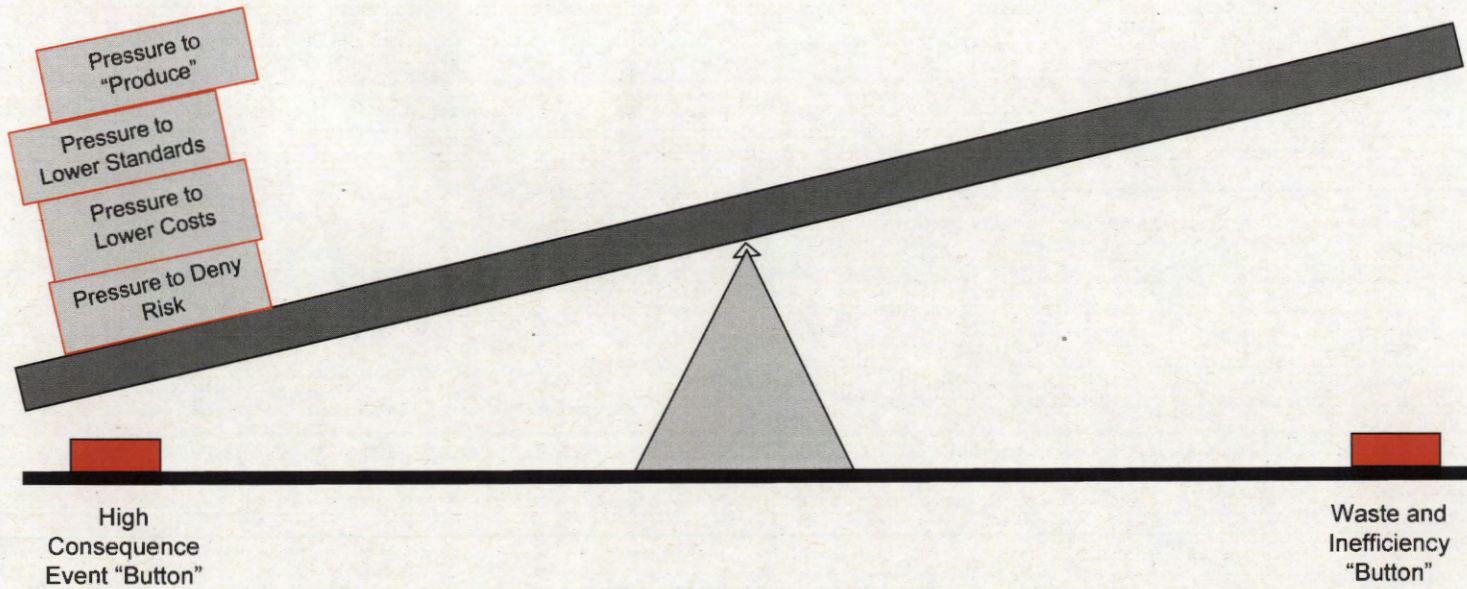


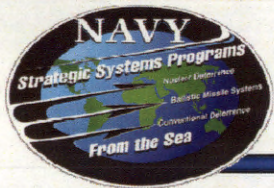
**Accountability for human element strengths: a foundation for prevention of events**



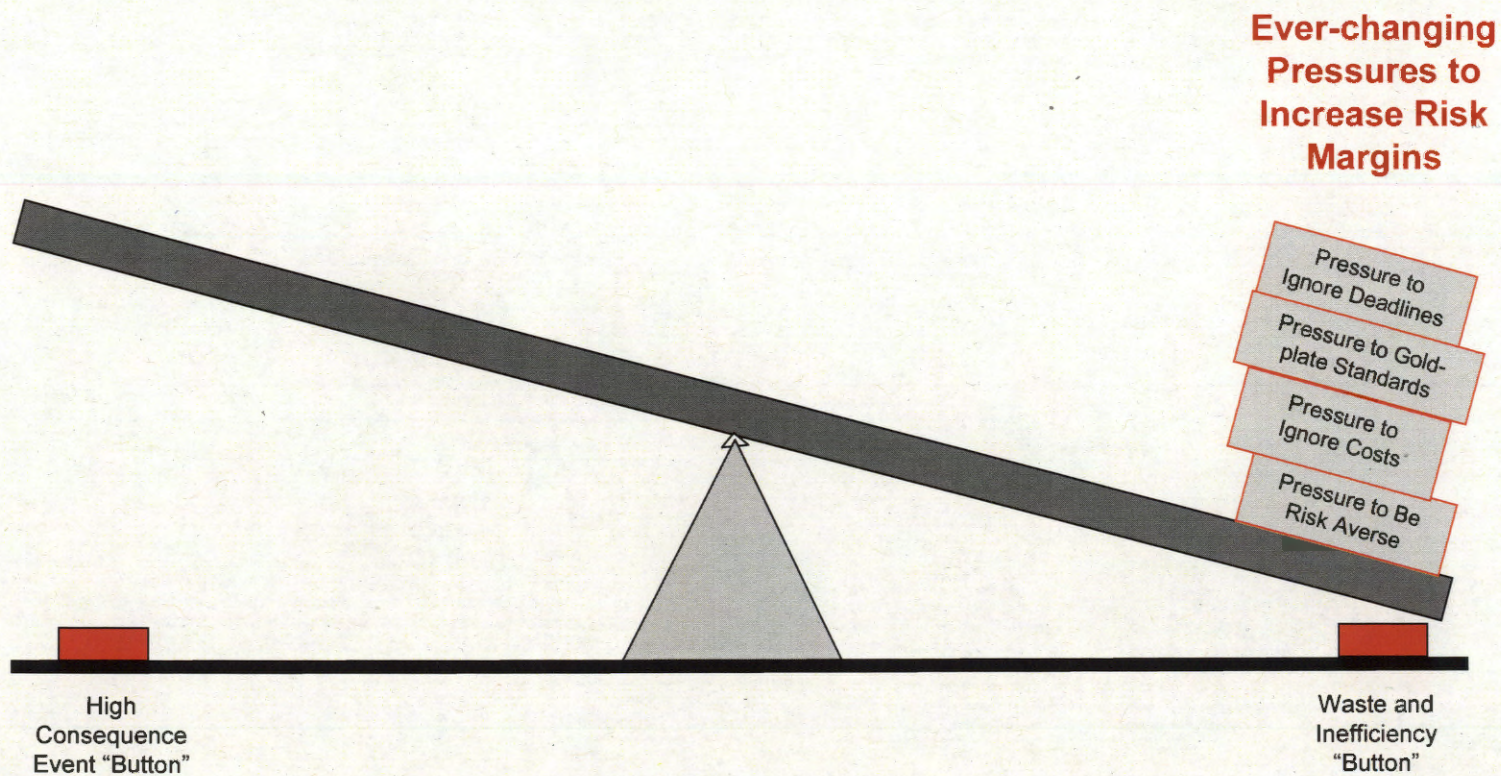
# A Strong Human Element: The Skills Needed to Stay in Balance

**Ever-changing  
Pressures to  
Reduce Risk  
Margins**





# A Strong Human Element: The Skills Needed to Stay in Balance





# A Strong Human Element: The Skills Needed to Stay in Balance

**Ever-changing Pressures to Reduce Risk Margins**

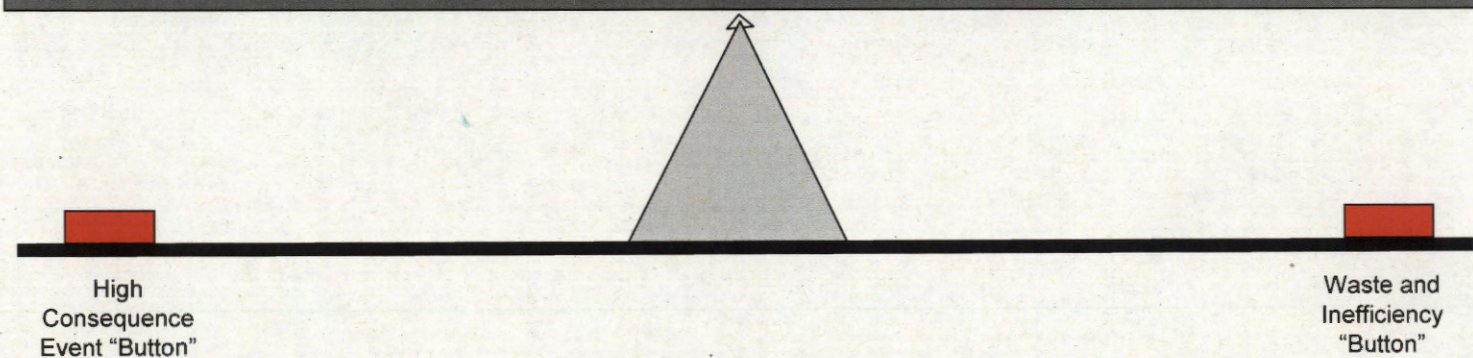
- Pressure to "Produce"
- Pressure to Lower Standards
- Pressure to Lower Costs
- Pressure to Deny Risk

**A healthy Human Element is needed to stay in balance when faced with dynamically changing pressures**

- |                               |                             |                             |
|-------------------------------|-----------------------------|-----------------------------|
| Openness to Critique          | Formal risk Scrutiny        | Broad System View           |
| Forceful Back-up              | Transparent Technical Rigor | Universal Ethical Standards |
| Questioning Attitude          | Rigorous self-appraisal     | Accept Burden of High Bar   |
| Willingness to Re-Think       | Output-based Performance    | Humble Example              |
| Visibility of Split Decisions | Unambiguous Accountability  | Personal Courage            |

**Ever-changing Pressures to Increase Risk Margins**

- Pressure to Ignore Deadlines
- Pressure to Gold-plate Standards
- Pressure to Ignore Costs
- Pressure to Be Risk Averse





## Taking a Lead Angle

---

### A Multipronged Approach

- **Foundation in leadership focus and energy**
- **Development of the right personnel habits**
  - Training, evaluation, feedback
  - Tools for personal use
- **Re-enforcement of the habits**
  - Case study evaluation (inside and outside circumstance)
  - Tools for planning, program development and operations
  - Dynamic self-assessment and lessons programs



## Takeaways

1. Public Risk Technologies carry uniquely high burdens of responsibility
2. SSP and Navy Nuclear Weapons stewardship explicitly a Public Risk Technology
3. Prevention of High Consequence Events requires BOTH
  - Technical expertise and
  - Core Human Element strengths throughout the organization
4. Human Element strengths must balance between accepting excess risk or risk aversion
5. All individuals must have
  - Responsibility,
  - Authority and
  - Accountabilityto demonstrate technical and Human Element strengths
6. The program is moving out to incorporate these ideas in our day to day work

*'Don't be seduced by success; get ahead of the curve'*  
Richard Danzig



# Submarine Safety Symposium

9 -10 October 2013 - Dock Museum, Barrow-in-Furness



Sponsored by BAE Systems



# Submarine Safety Symposium

9 -10 October 2013 - Dock Museum, Barrow-in-Furness



SUBMARINES



Sponsored by BAE Systems



Ministry  
of Defence

# Submarine Safety Symposium

9 -10 October 2013 - Dock Museum, Barrow-in-Furness



Sponsored by

**BAE SYSTEMS**

Sponsored by BAE Systems

