



NASA Safety and Health Managers Meeting

**Cocoa Beach, Florida
February 1-3, 2006**

**Dr. Michael Stamatelatos, Director
Safety and Assurance Requirements Division
Office of Safety and Mission Assurance
NASA Headquarters**



Outline: Two Topics

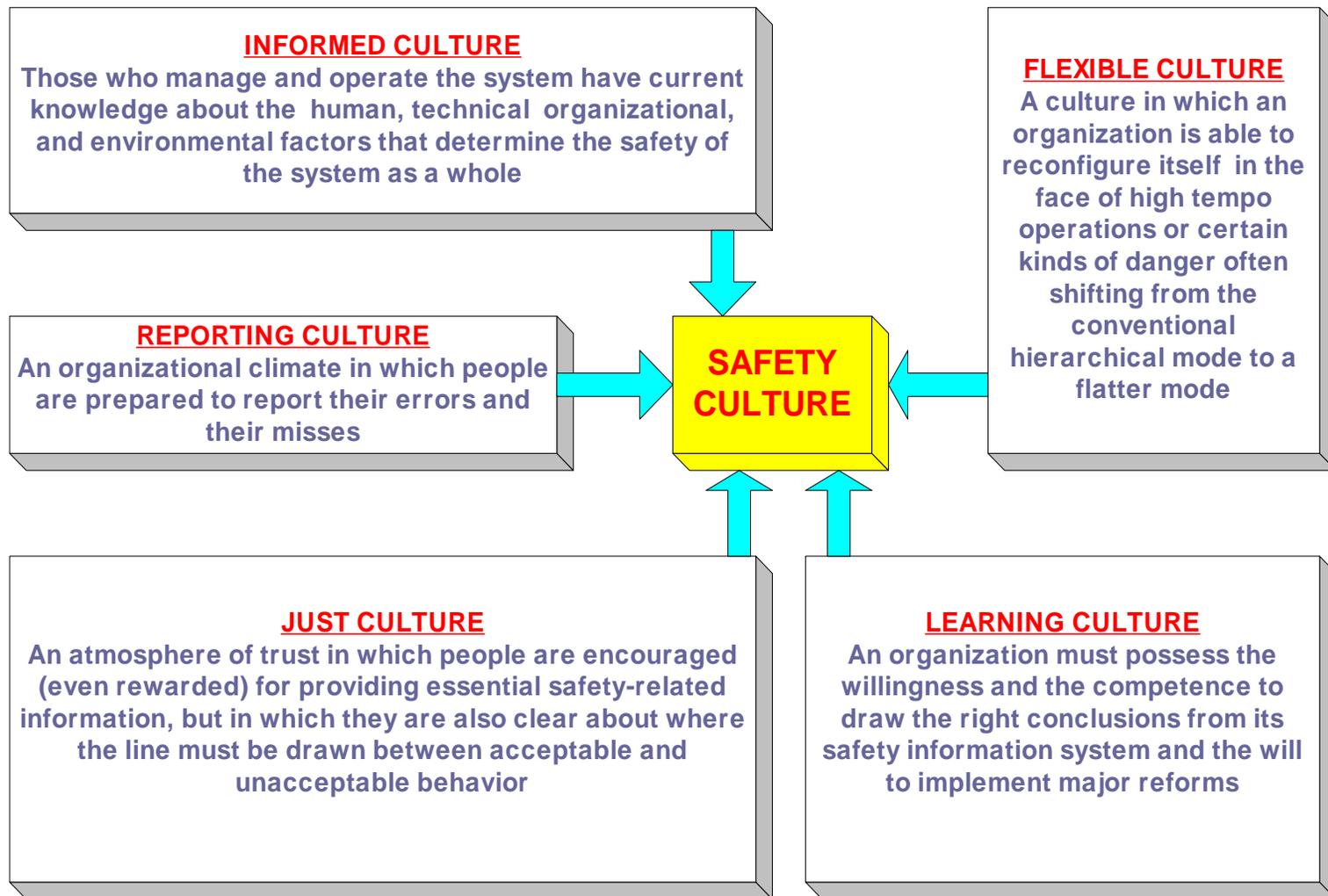
- **Safety Culture**
- **Project SMA Requirements Development Process**



Safety Culture



Safety Culture Components (Reason, 1997)



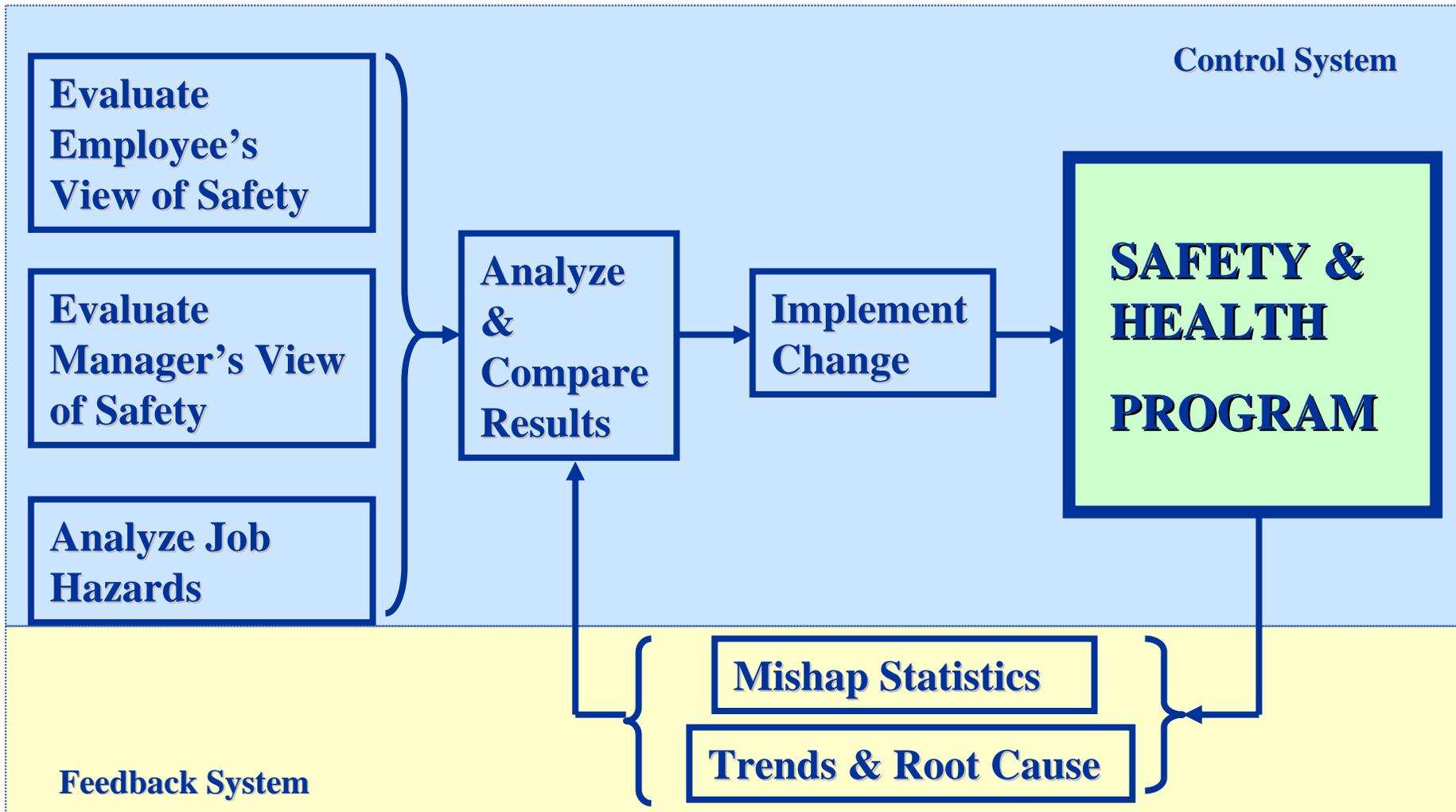


Performance Evaluation Profile (PEP)

- PEP is a center level safety and health management tool to evaluate their safety and health “culture” and to prepare them for self evaluation and show readiness for the OSHA Voluntary Protection Program (VPP).
- NASA Office of Safety and Mission Assurance is the office of primary responsibility for the Performance Evaluation Profile.
- The PEP survey program was originally certified by Dr. Roger Durand, Professor of Marketing at the University of Houston, Clear Lake.
- Since inception, PEP has been given to a total 88,156 NASA employees and managers (both civil service and contractors)
- A comprehensive briefing in the PEP can be found at the following address:

<http://pep.jsc.nasa.gov/media/NarPepPres.ppt>

Performance Evaluation Profile Process Diagram



Behavioral Science Technology, Inc. NASA

(BST) Project at NASA



- **Contract initiated in February 2004 to develop and deploy an organizational culture change initiative within NASA**
- **First task: Conduct an assessment of the current status at NASA and develop an implementation plan**
- **March 2004 report: “Assessment and Plan for Organizational Culture Change at NASA”**
- **Assessment involved administering the BST safety climate and culture diagnostic instrument, including NASA-specific questions, to all Federal employees within the Agency and at JPL**
- **First phase pilot (five months) conducted at Glenn Research Center, Stennis Space Center, Johnson Space Center, Kennedy Space Center and Goddard Space Flight Center**
- **Final report (September 2005): “Improving NASA’s Safety Climate and Culture.”**



High Reliability Organization (HRO)

Professor Karlene Roberts of the Haas School of Business and her team at the University of California, Berkeley developed the HRO which consists of the following five elements:

1. **Process auditing** – a system of ongoing checks to monitor hazardous conditions
2. **Reward system** – expected social compensation or disciplinary action to reinforce or correct behavior
3. **Quality assurance** – policies and procedures that promote high quality performance
4. **Risk management** – how the organization perceives risk and takes corrective action
5. **Command and control** – policies, procedures, and communication processes used to mitigate risk



The Navy Experience with HRO

- In 1966, the Navy lost three F-14 fighter planes from the same squadron; this led to the conclusion in the aviation community that a safety culture diagnostic was needed
- The Command Safety Assessment Survey (CSAS) and the Maintenance Safety Assessment Survey (MSAS) were developed using the five elements of HRO
- CSAS is a management metric that helps unit leaders match training to the needs of the unit, alter supervision, work to change particular cultural views in squadrons, etc.
- CSAS has been validated on more than 80,000 respondents
- For more information on CSAS and MSAS, see <http://www.safetyclimatesurveys.org/index1.asp>



Future Plans

- **Pilot application of the HRO process at NASA:**
 - **Select a center where the HRO survey can be applied**
 - **Conduct the HRO survey with the assistance of the Navy Post-Graduate School in Monterey and their consultants (e.g., Human Factors Associates, Inc.)**
- **Attend HRO Conference in California in April 2006**
- **Organize a workshop at NASA to review and compare safety culture improvement approaches that were performed at NASA (PEP, BST, HRO) and those of other organizations, namely**
 - **US Navy**
 - **Other DOD representatives**
 - **US Nuclear Regulatory Commission**
 - **Federal Aviation Administration**
 - **Institute of Nuclear Power Operations**
 - **US Department of Energy**
 - **Others in the government and commercial sectors**



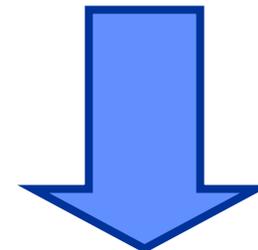
Project SMA Requirements Development Process



Two Approaches

**Top -
Down**

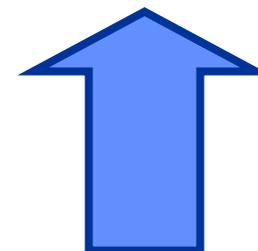
**SMA
Requirements**



**Project
Requirements**

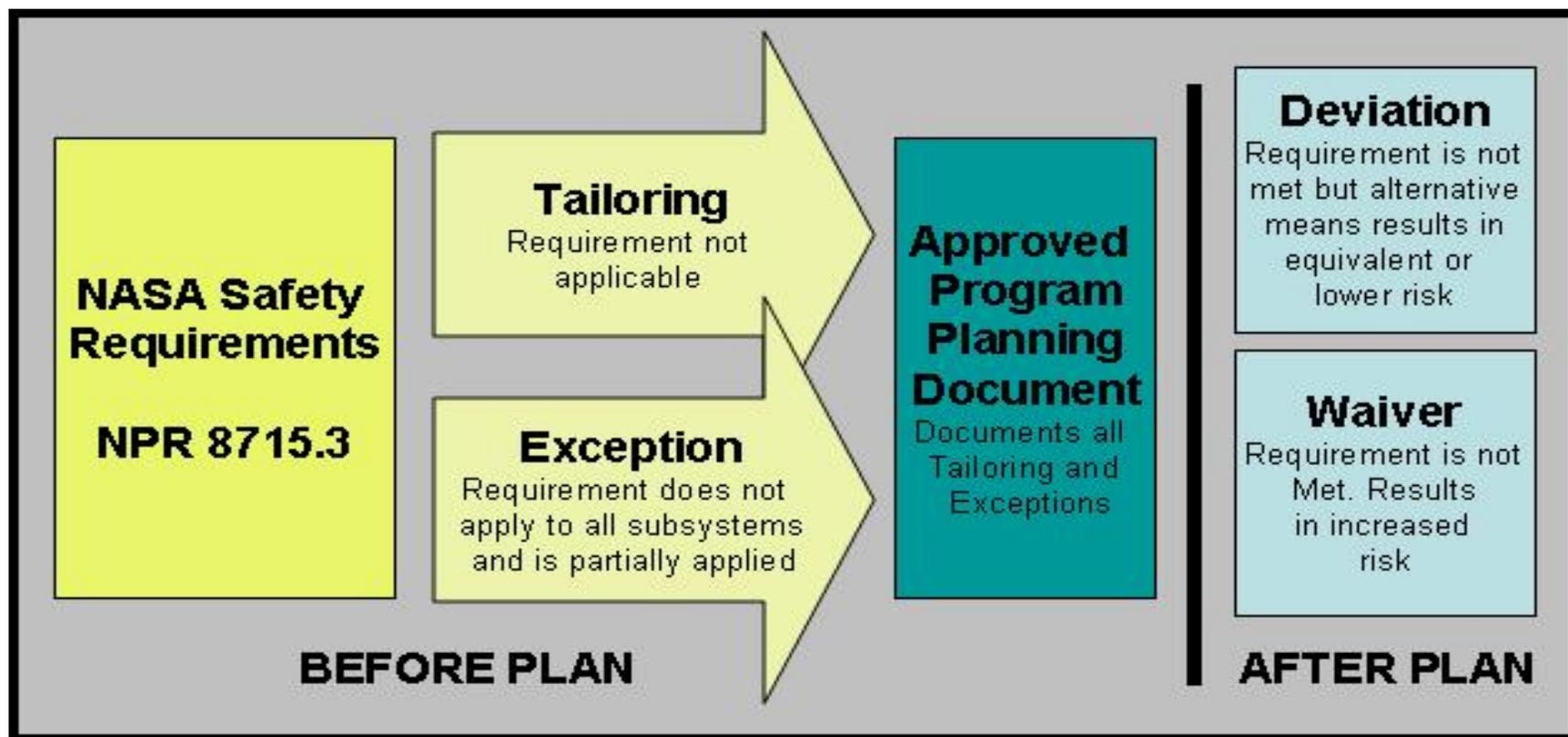
**Bottom -
Up**

**Basic Design
Requirements**





NASA Safety Requirements (A Top-Down Approach)





Terminology

- **Tailoring** - relief from, or adaptation of, a specific requirement that is not exactly applicable to a specific mission, program/project or facility.
- **Exception** - relief from, or an alternative to, a specific requirement, because that requirement does not apply to all subsystems or subparts of a specific mission, program/project, or facility and is only partially applied.
- **Deviation** - relief from a specific requirement, but through alternate means, the mission, program/project, or facility will have an **equivalent or lower level of risk**.
- **Waiver** - relief from a specific requirement where there is an **increase in risk** for a mission, program/project, or facility because the requirement has not been met. The waiver includes a formal acceptance of risk by the responsible mission, program/project, or facility official.

Need an Improved Implementation Process

