
Crew Resource Management & Human Factors in the Organization

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Presentation Outline

- ❑ Why integrated CRM?
- ❑ Implementation Framework
- ❑ Example of an Integrated Approach
- ❑ Pilot Level Considerations
- ❑ Crew Level Considerations
- ❑ Organizational Level Considerations



Why Integrated CRM?

CRM training is often implemented as additional training to be mastered by pilots added on to the technical.

- CRM training is often managed independently from technical training
- CRM often lacks a **COMPREHENSIVE FRAMEWORK** that ensures its status as an ongoing crew improvement process
- CRM often is not implemented **THROUGHOUT THE ORGANIZATION**



Why Integrated CRM?

CRM at many airlines in the US follows the “peanut butter theory” of human factors:

- Back in the earlier days of Human Computer Interaction, Clayton Lewis pointed out that many developers subscribed to the notion that you could spread a little or a lot over the product or process.
- THE PROBLE WAS THAT IT NEVER BECAME FULLY INTEGRATED



Implementation Framework

The growing awareness of the importance of the crew and the organization on skill training and assessment has lead to the:

- ❑ Expansion of the concept of individual skill to the **crew** and **organizational** level
- ❑ Development of methods for skill identification that address the needs of all levels of the organization
- ❑ Move to a more **integrated CRM**



Implementation Framework

The **Individual Level** of the framework is still very important because:

- ❑ Most **training** task analyses evolved from analyses performed at the individual level
- ❑ Resource management skills have substantial **cognitive elements**, and cognitive analysis and modeling have strong roots in the individual performer
- ❑ Skill development starts at the individual and not at the crew or organization level



Implementation Framework

The **Crew Level** is the next level up from the individual and:

- ❑ Is made up of individuals with complimentary skills, a common set of performance goals and standards, acting with mutual accountability
- ❑ The focus is on performance and skill **assessment**, especially with CRM assessment shifting from the individual to crew evaluation.



Implementation Framework

The Organizational Level represents the sociocultural environment encompassing training and assessment:

- ❑ It sets the operating **philosophy** and **policies** that have a strong influence on the development of individual and crew skills
- ❑ It should establish a reward systems to ensure that individuals and crews are motivated to achieve expert performance



Implementation Framework

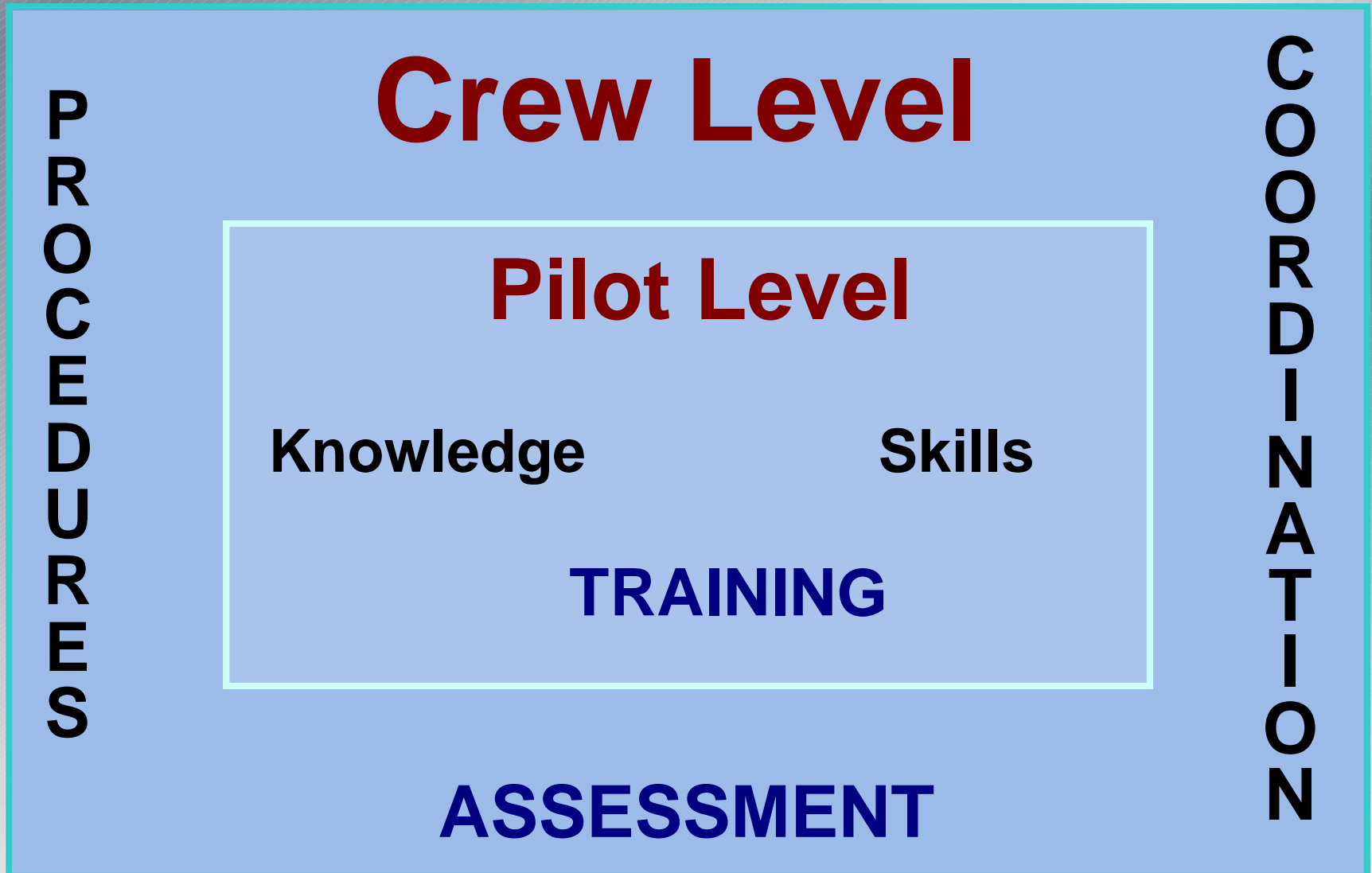
Pilot Level

Knowledge

Skills

TRAINING

Implementation Framework



Implementation Framework



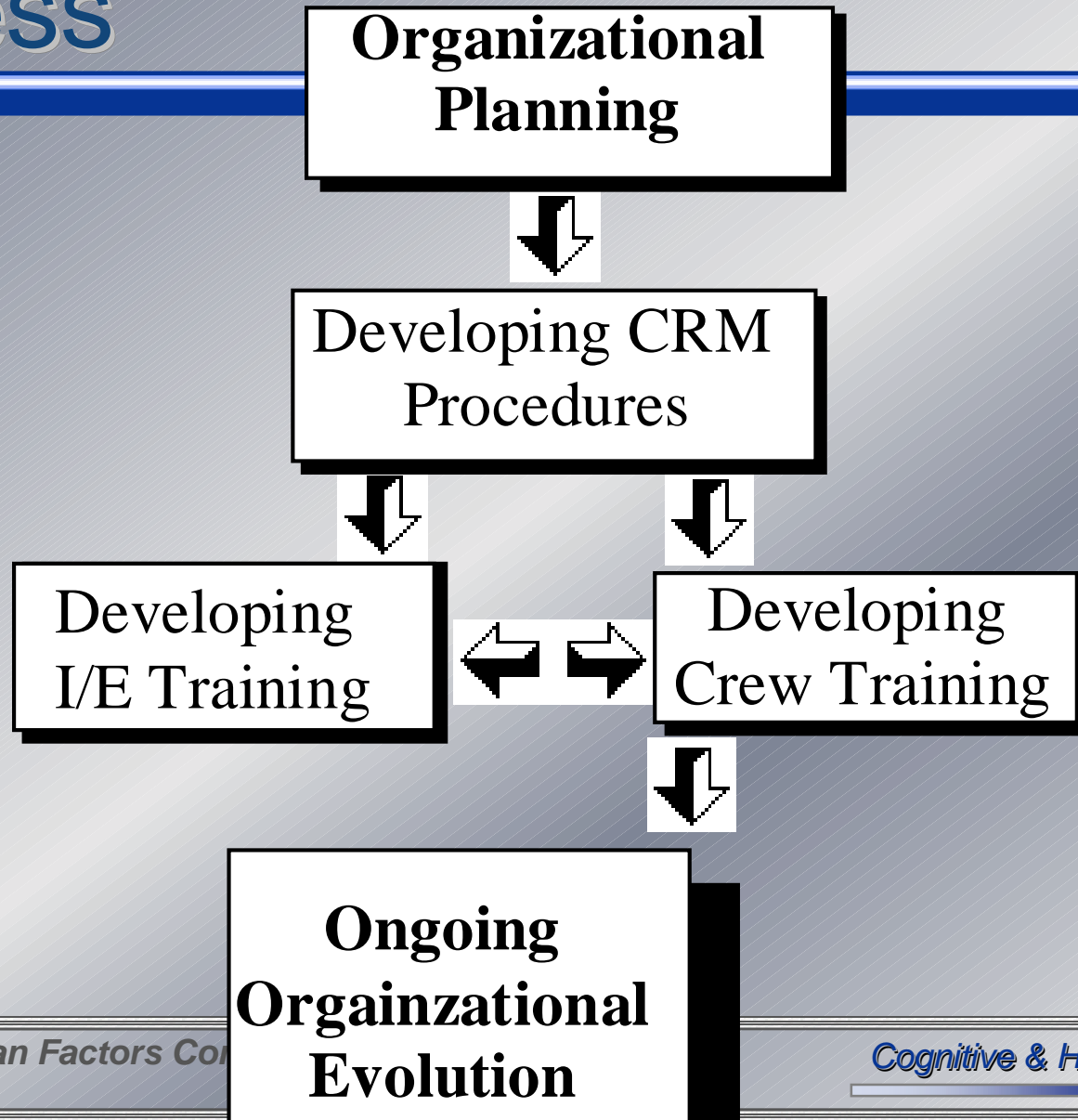
An Integrated Approach - Advanced (CRM)

The complete ACRM process includes:

- Developing **organizational** links
- Identifying and developing CRM procedures working across the organization
- Training instructors and evaluators
- Training airline crews
- Developing crew based assessment
- Establishing an ongoing implementation framework at the organization level



Components of the ACRM Process



Advanced CRM and the Pilot Level

Advanced CRM moves **individual level** training beyond **acceptable** performance:

- ❑ By allowing the individual to concentrate on the appropriate phase of skill development
- ❑ It suggests a training program that goes beyond **acceptable** to **advanced** performance
- ❑ Based on theory of **expert performance**



Expert Performance and Pilot Level

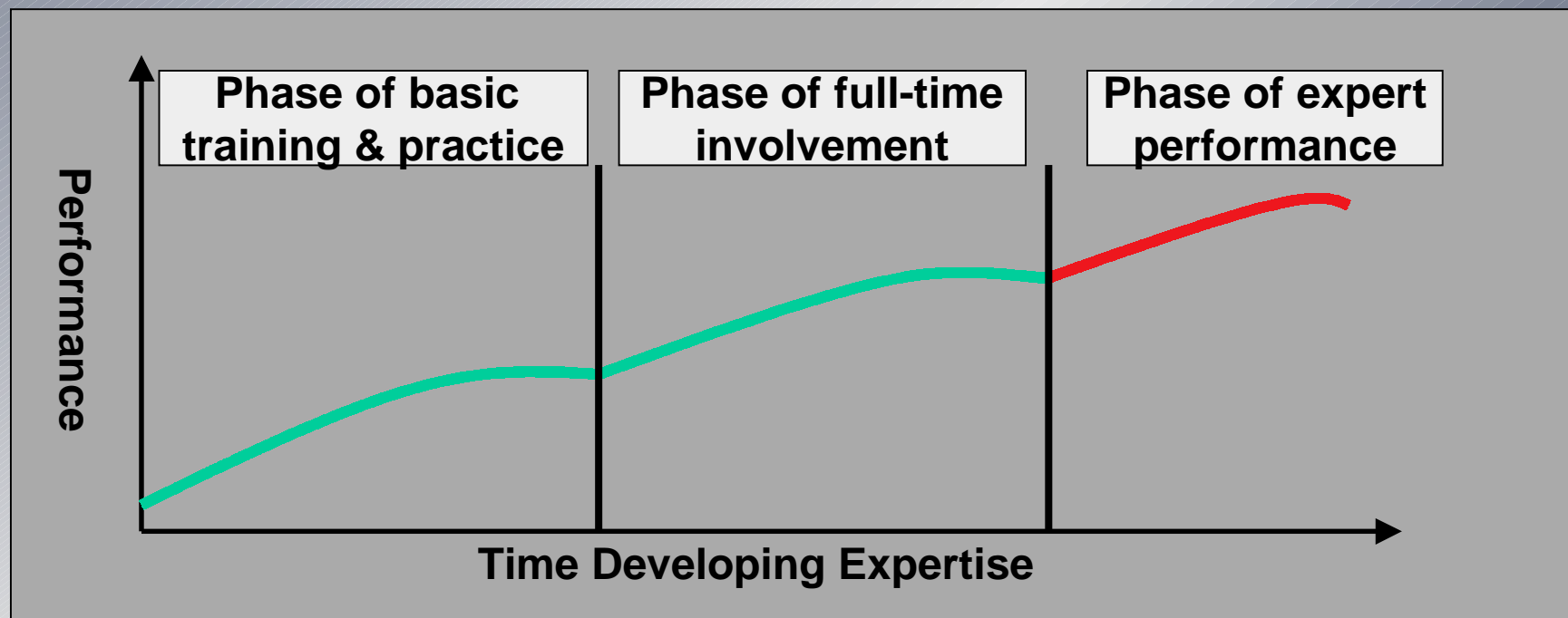
Expert Performance is qualitatively and quantitatively different:

- It requires **full concentration** to be developed
- It has recognizable phases of development over approximately 10 years
- It moves from the acceptable level of performance to superior performance
- It results in measurable increases in performance



Phases of the Individual Pilot's Performance

Expert performance in is usually developed over **10 years** of practice (Ericsson & Charness, 1994):



Training Implications at the Pilot Level

Consideration - Why the Pilot Level?

- In the rush to crew and organizational issues, do not forget the individual level
- The individual pilot has at least three levels of skill development moving from basic to expert
- There are many valuable established CTA techniques at the pilot level
- In training and assessment, the individual pilot level must be taken into account



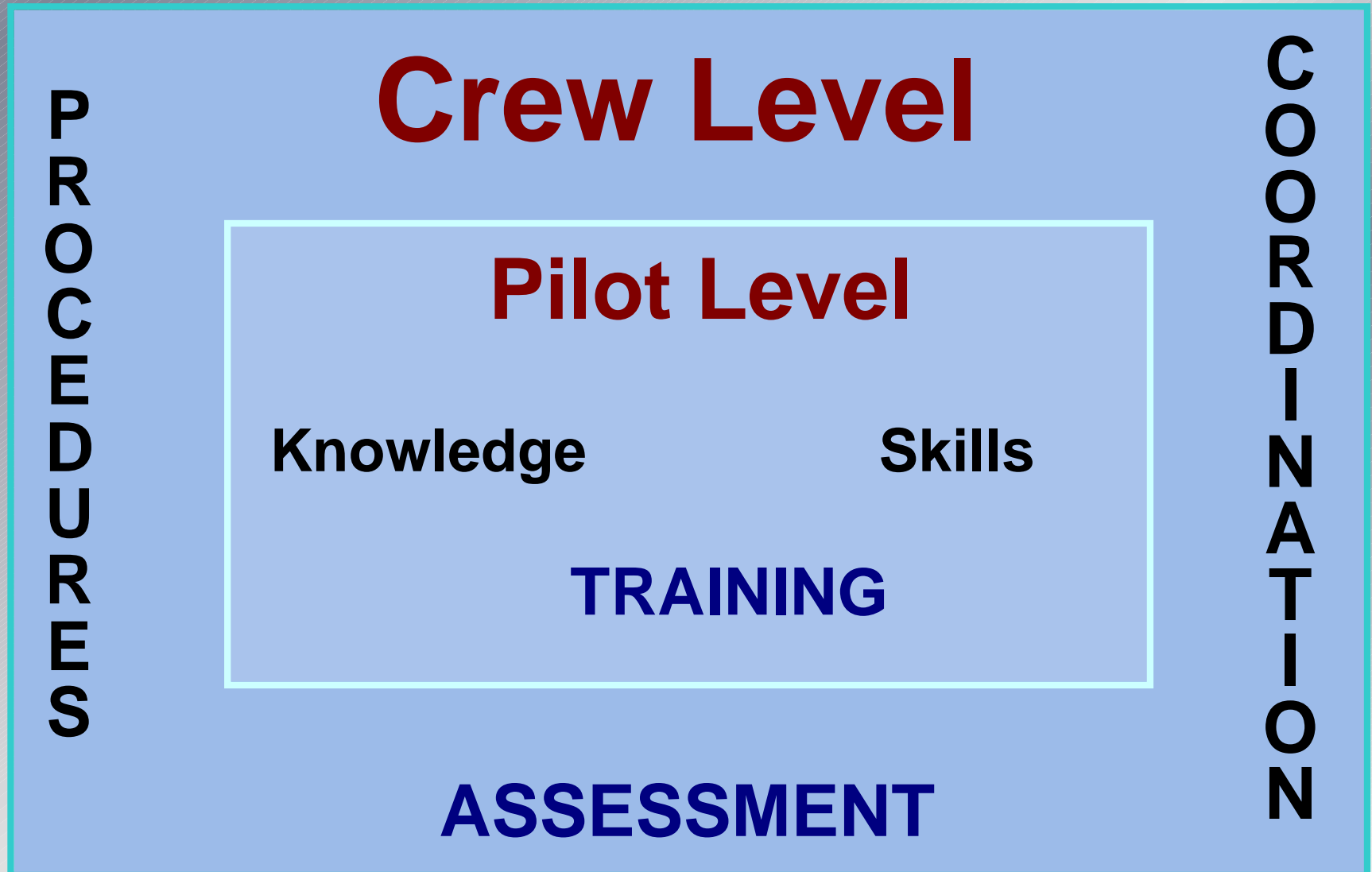
Training Implications at the Pilot Level

Consideration - Scripting the scenario

- ❑ The effectiveness of LOS depends in good part on script detail and proper administration of that script during the simulator session
- ❑ The scenario should be carefully scripted with great attention to the **different operational details** related to the skills being trained



Implications at the Crew Level



Crew Level

Pilot Level

Knowledge

Skills

TRAINING

ASSESSMENT

PROCEDURES

COORDINATION

Training Implications at the Crew Level

Consideration - Skill development

- ❑ Each new CRM procedure has implications for crew training because it places an emphasis on the crew's development of specific CRM skills in operational context
- ❑ Because of this emphasis on CRM skills, instructor/evaluators should have an understanding of the nature of **cognitive skill** development and its implications for the training of these new CRM procedures



Training Implications at the Crew Level

Consideration - Crew level event sets and assessment

- ❑ Crews should be given an explanation of how the event set is used under ACRM to help focus the specific elements of crew performance in the LOFT/LOE assessment
- ❑ The event set helps training and evaluation the move from general **CRM markers** to specific **crew skills** and **behaviors**



Implications at the Organizational Level



Implications at the Organizational Level

Consideration - Extend ISD/CTA from a focus on individual training to organizational human factors:

- CRM skills, with their substantial identification effort, the desirability to involve multiple expert groups, their resulting standards, and the required restructuring of training and assessment calls for the involvement of the entire organization, both top down and bottom up.



Implications at the Organizational Level

Consider the key types of data for reporting at the organizational level including:

- Distribution of overall individual and crew performance by fleet
- Technical and CRM performance by fleet
- Maneuver validation ratings by type of maneuver and by fleet
- Overall crew performance trends by fleet on a short and long-term basis.



Implications at the Organizational Level

Consideration - Use Program Development Team Membership and Formation to Extend Organizational Involvement:

- ❑ Select team members from key organizational elements to ensure the range of needed expertise and to extend organizational involvement.
- ❑ Go beyond the individuals connected with training to include expertise and representation of the operators, supervisors, and managers.



Implications at the Organizational Level

The CRM procedures may be integrated within and outside flight operations and represented in:

- Crew briefings
- Checklists
- Normal procedures
- Abnormal and emergency procedures
- Quick Reference Handbook (QRH)
- Flight Standards or Flight Operations Manuals



Training Implications at the Organizational Level

When planning for the development of I/E training, consider not only the **development** process but also the actual **implementation** of the training.

- Try to plan so that the training will be ready at a point where instructors receive scheduled recurrent training.
- Instructor training should be integrated with the rest of their training and should be treated as an **expansion/modification** of existing training rather than a substantial addition.



Training Implications at the Organizational Level

When presenting CRM procedures to instructors, explain **how each procedure was developed** based on airline needs and incident data.

- I/E training should provide an understanding of the **nature of skill development** and its implications for the training of these new CRM procedures.
- I/Es should be provided with accurate and **immediate rating/assessment feedback** starting with initial assessment training and continuing to **standardization sessions**.



Implications at the Organizational Level

An CRM program should address the following organizational considerations from the start:

- Establishing links to key parts of the organization through ACRM presentations
- Develop formal communication through reviews, briefings, and meetings with key organizational elements
- Develop informal communication activities by including other departments in work sessions
- Develop accurate and relevant **data reports** and **briefings** for key organizational elements



Implications at the Organizational Level

Consideration - Include Organizational Context in skill identification

- ❑ Make sure that organizational constraints and mission requirements are reflected in the skill identification process.
- ❑ Go beyond micro considerations of the task and subtask to those reflected in organizational policies and philosophy when identifying the full range of skill requirements.



The ACRM Manual

It can be accessed by going to the FAA Human Factors home page:

(<http://www.hf.faa.gov/>)

and then going to the Products area.

The manual can also be accessed directly by going to:
<http://www.hf.faa.gov/products/dacrmt/dacrmt.html>



