



# Seminario Internacional de Capacitación por Competencias en la Aviación Civil

Decimotercera Reunión de Directores de Centros de Instrucción de Aviación Civil  
(Lima, Perú, 4 – 5 de noviembre de 2013)



TRAINAIR  
PLUS



**Mag. William Aranda**

# Seminario Internacional de Capacitación por Competencias en la Aviación Civil

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**CAPACITACIÓN E INSTRUCCIÓN POR COMPETENCIAS EN LA AVIACIÓN CIVIL**

*Dedicado a la Memoria de Marcelo Zarco  
(Q.E.P.D.)*



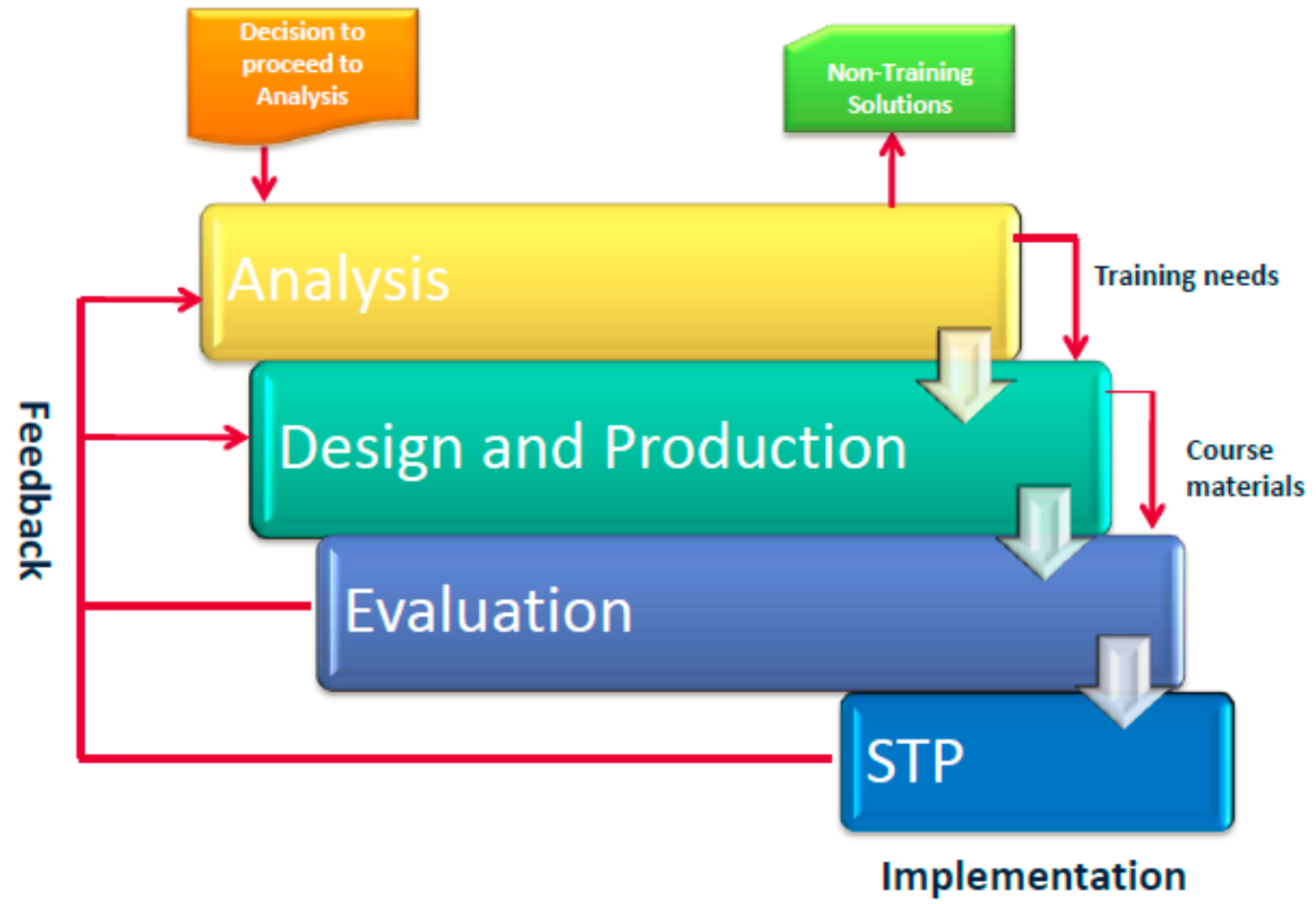
# Ámbitos de Análisis sobre Competencias



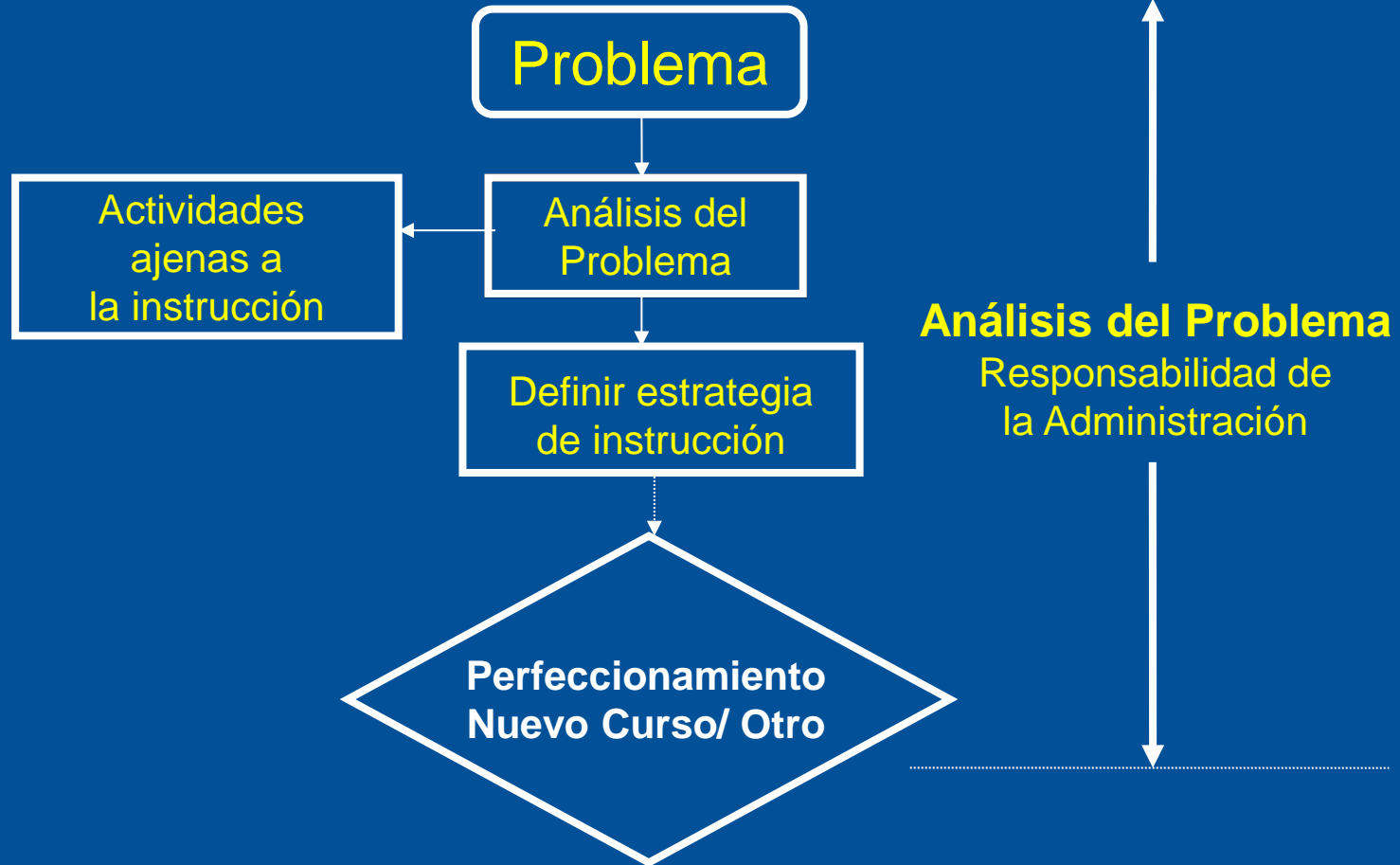
# Proceso de Preparación de Programas de Instrucción (TRAINAIR)

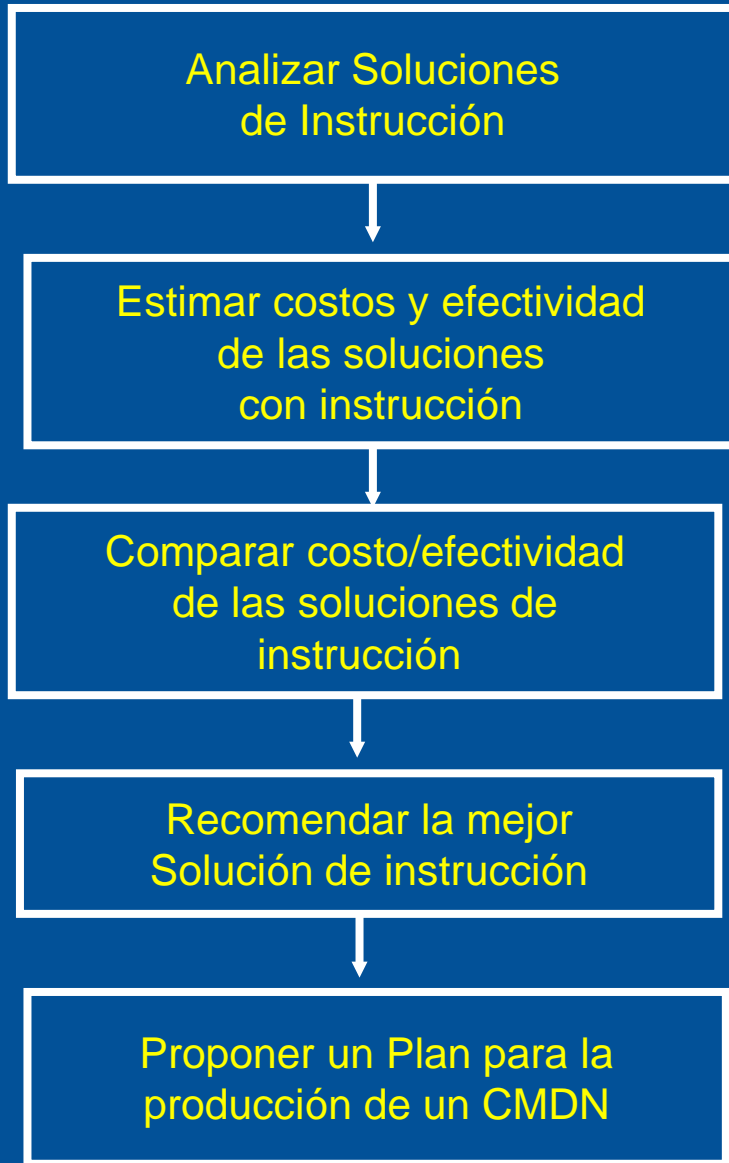


# Proceso de Preparación de Programas de Instrucción (TRAINAIR PLUS)



# Estudio Preliminar





## Análisis de los Requerimientos de Instrucción

Responsabilidad del Preparador de Cursos

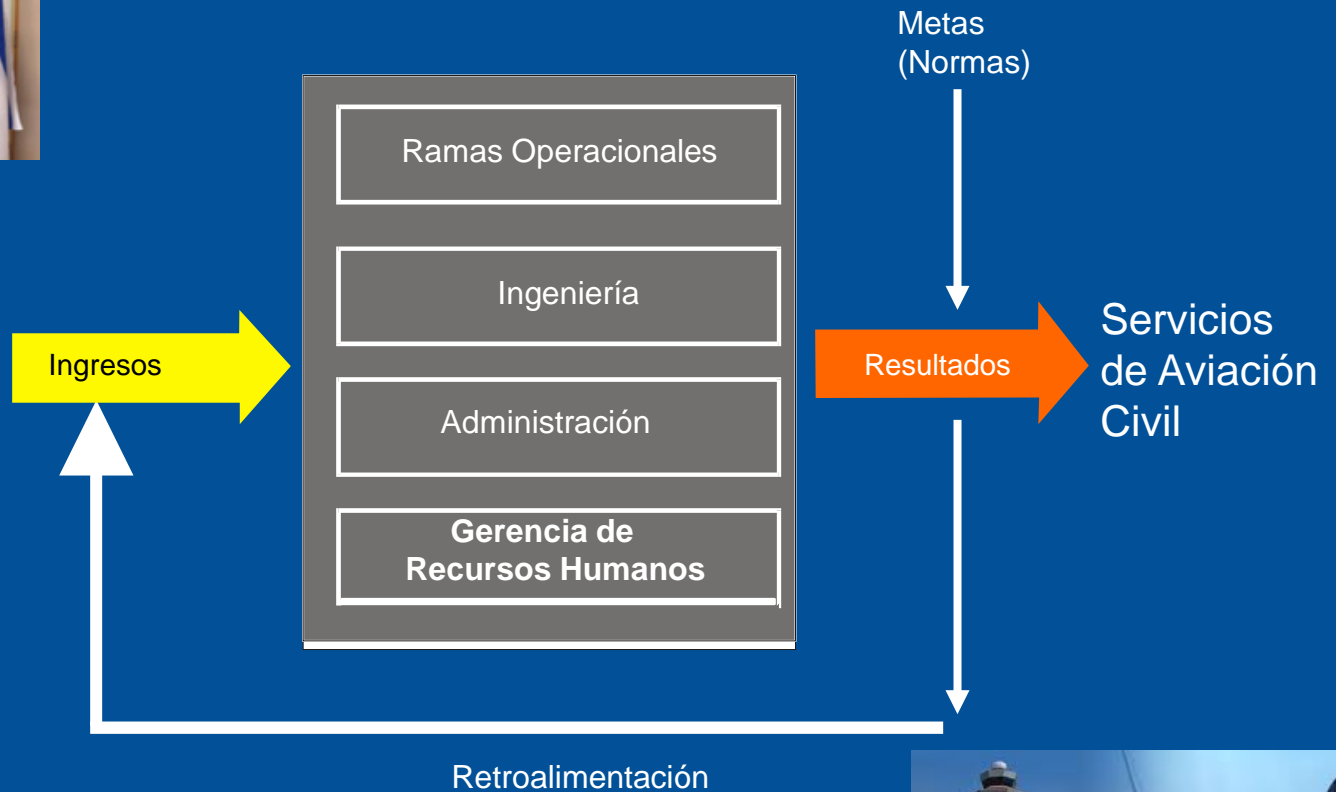


# Enfoque Sistémico



## Sistema de Aviación Civil

- Objetivos
- Potencial humano
- Presupuesto
- Equipamiento



# Enfoque Sistémico

## Administración de los Recursos Humanos



# Enfoque Sistémico

## Instrucción

Metas  
(Normas)

Preparación del curso

Impartición del Curso

Apoyo a la Instrucción

Administración

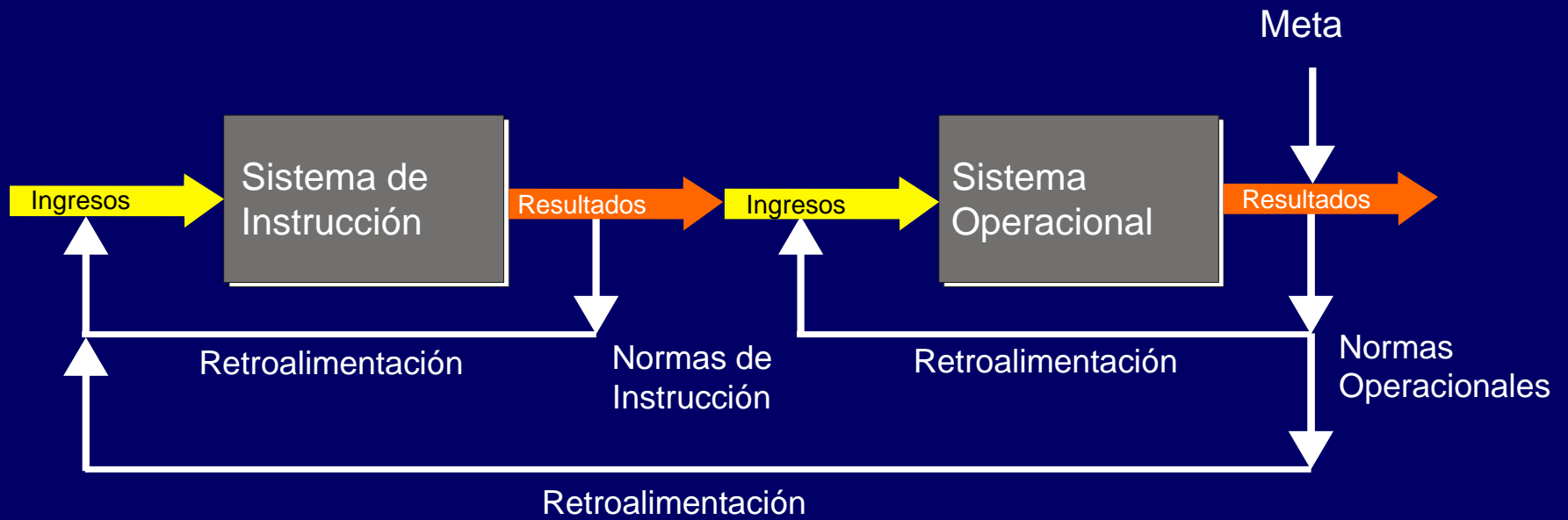
Ingresos

Resultados



Retroalimentación

# Enfoque Sistémico



# Soluciones de Instrucción

La Instrucción puede ser conducida:

En el C.I.A.C.

Mediante Cursos Externos

- En un programa continuo
- Alternando la instrucción con experiencia en el empleo
- Rotando al personal de sus puestos de manera periódica (relevos de un día)
- Mediante clases vespertinas
- En casa, mediante programas de educación a distancia

# Modos de Impartición

	Dependiente del Material	Dependiente del Instructor
Instrucción Grupal	1	3
Instrucción Individualizada	2	4

**CMDNs  
TRAINAIR**

# Niveles de Evaluación del Curso

## 4 Efectos operacionales

¿Se han alcanzado los objetivos de rendimiento operacional de la organización?

## 3 Efectos en Rendimiento en el Trabajo

¿Se ha alcanzado el nivel requerido de rendimiento en el empleo?

## 2 Efectos en Aprendizaje

¿Alcanzaron los alumnos los objetivos de instrucción?

## 1 Reacciones de los Alumnos

¿Se consiguió la reacción deseada de la clase?



# Análisis del Empleo

## Propósito:

Cómo, dónde, y con que información se realiza un trabajo

**Definir las habilidades, conocimientos y actitudes (H/C/A) necesarias**



Determinar los objetivos de rendimiento

# Ejemplo

- Empleo:** Bombero de Aeródromo.
- Función:** Apagar incendios en aviones.
- Tarea:** Preparar equipo contra incendios para su uso.
- Sub-tarea:** Llevar la manguera contra incendios al lugar.
- Elemento:** Ajustar la boquilla.



# Definición de Factores de Tarea

## – **IMPORTANCIA**

- Consecuencias si la tarea no es realizada correcta o completamente.

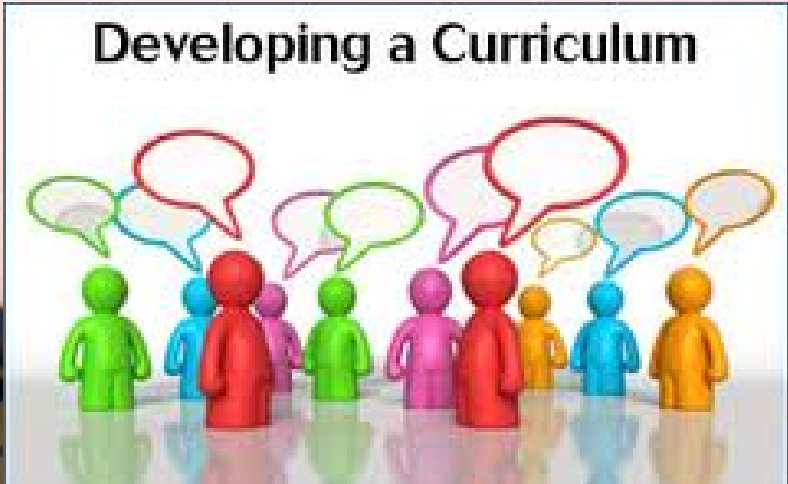
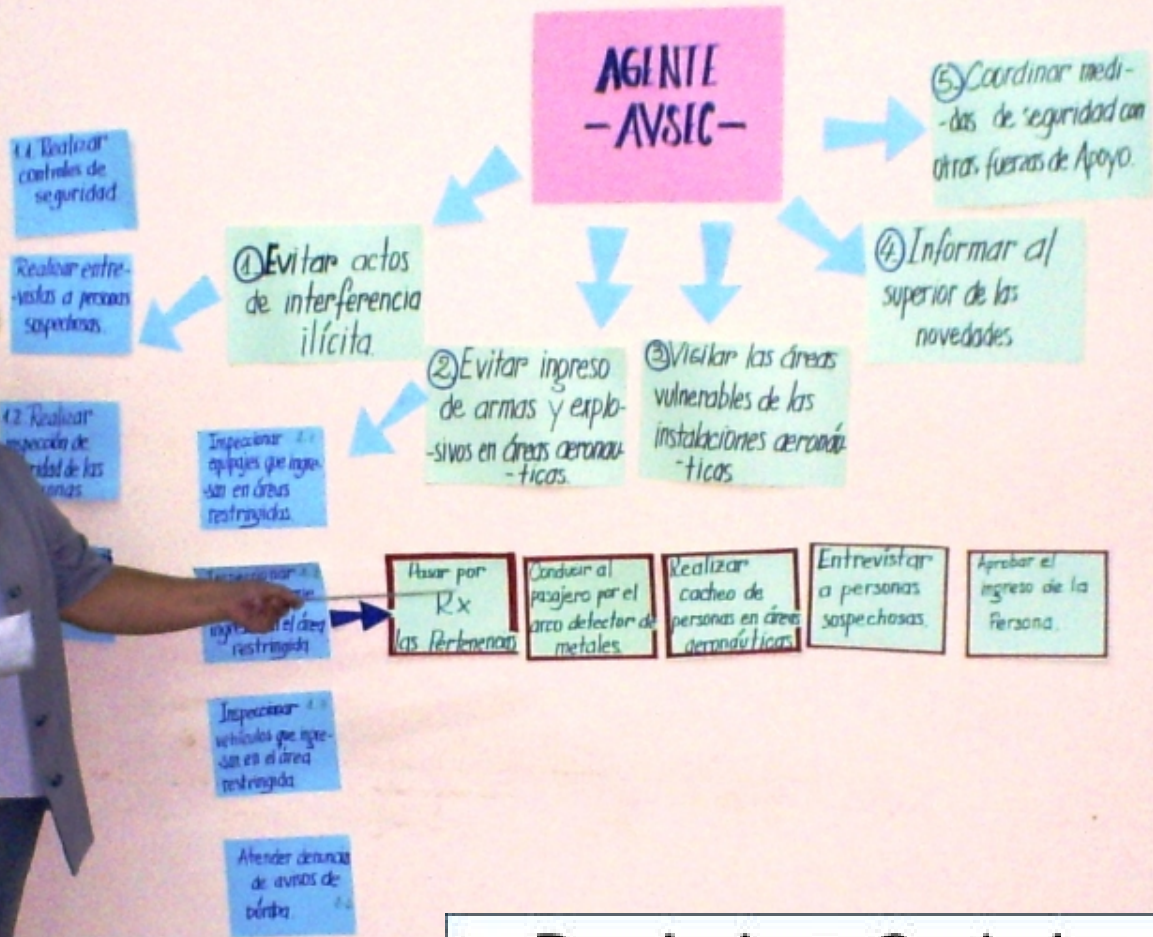
## – **DIFICULTAD**

- Probabilidad de error o falla en la ejecución.

## – **FRECUENCIA**

- Número de días entre la ejecución de la tarea o diariamente, semanalmente, mensualmente.

**Prioridad = Importancia (I) + Dificultad (D) + Frecuencia (F)**



D  
A  
C  
U  
M

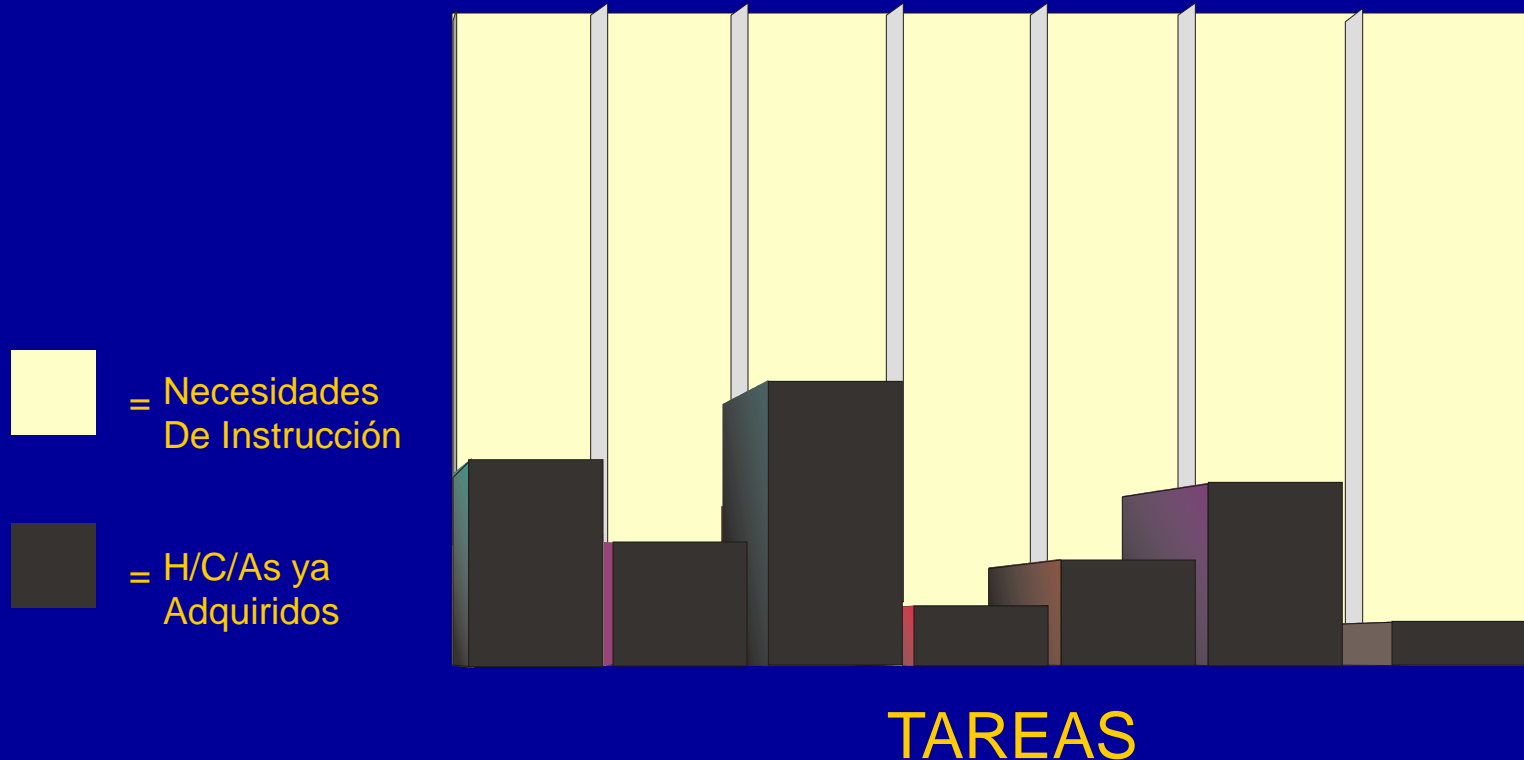
# Información para Prioridad

- Acontecimiento inicial
- cómo es ejecutada la tarea
- H/C/As (habilidades, conocimientos y actitudes)
- insumos (condiciones ambientales, equipo, documentación requerida)
- Normas de ejecución
- Acontecimiento final



# Análisis del Grupo a ser Capacitado

## H/C/A's Requeridos

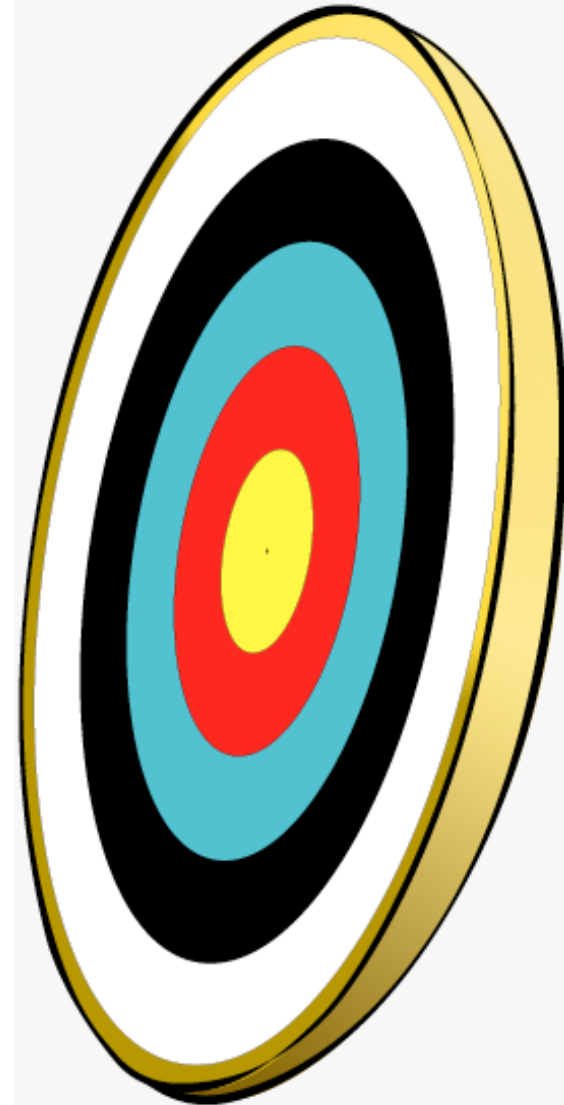


Necesidad de Instrucción:

Diferencia entre lo que los alumnos deben ser capaces de hacer y lo que ya pueden hacer

# Objetivos de Instrucción

- **Objetivo General** (propósito)
  - Resultados generales que se esperan de la instrucción.
- **Objetivos del Curso**
  - Objetivos de ejecución que describen lo que los alumnos serán capaces de hacer cuando termine la instrucción.
- **Objetivos Post-Curso**
  - H/C/As que serán aprendidos en el empleo, después de la instrucción.
- **Objetivos Intermedios**
  - Objetivos de “Progreso” que describen los H/C/As requeridos para cumplir con las sub-tareas y nos lleven hacia el objetivo terminal.



# Los Objetivos Terminales responden a:

**1 - ¿Adónde me estoy dirigiendo?**

**DESEMPEÑO**

(Comportamiento)

**2 - ¿Cómo llegaré allí?**

**CONDICIONES**

**3 - ¿Cómo sabré que llegué?**

**NORMAS**



# ¿Reconoce los 3 Elementos?

- Mecanografíe una carta de negocios, con cualquier procesador de texto, presentando la carta en un estilo estándar de negocios, sin errores de deletreo o tipeo, en menos de 30 minutos.



# Pasos para Formular Objetivos

## 1. Escriba la acción terminal:

- A) Identificar
- B) Analizar
- C) Aplicar

## 2. Escriba las condiciones:

- A) Qué será proporcionado
- B) Qué será denegado

## 3. Establezca el nivel de proficiencia – norma:

- A) Velocidad/ precisión
- B) “De acuerdo con...”



# Tipos de Habilidades

- **Habilidades Intelectuales**
  - Clasificación
    - Definir, identificar.
  - Uso de reglas
    - calcular, corregir, organizar.
  - Discernimiento
    - comparar, juzgar, evaluar.
  - Resolución de problemas
    - analizar, resolver, diagnosticar.
- **Habilidades Físicas (motrices)**
  - manipular, construir, ajustar.



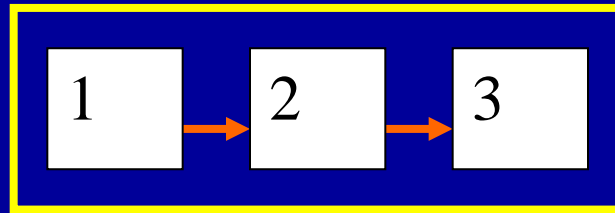
# Regla Estricta

Las pruebas de dominio deben ser elaboradas antes que se determine el contenido.

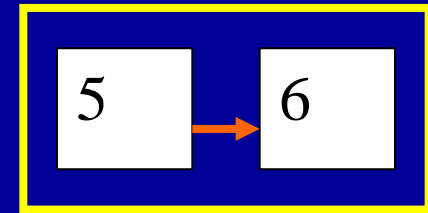


# Secuenciamiento de Objetivos

T1.1

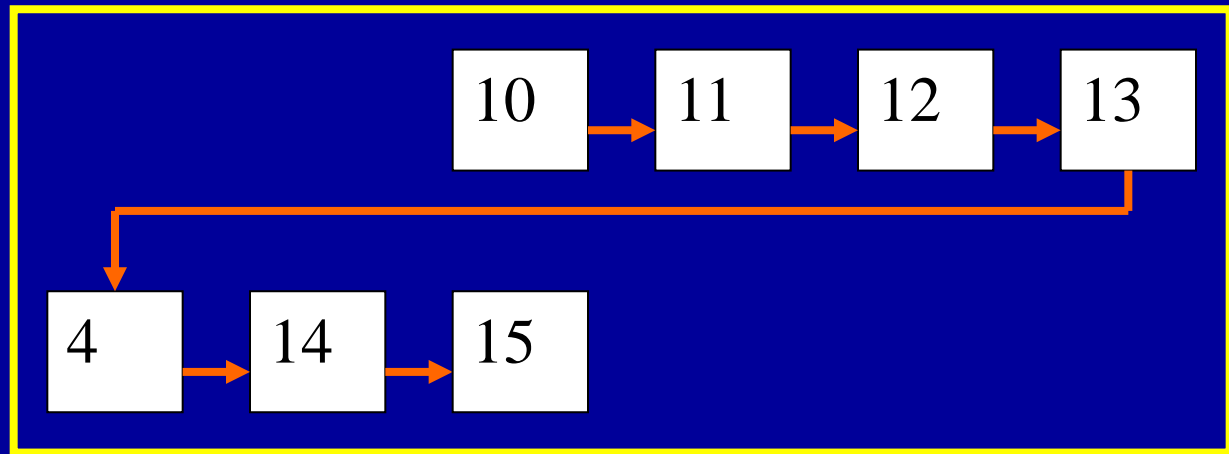


M1



M3

T1.2



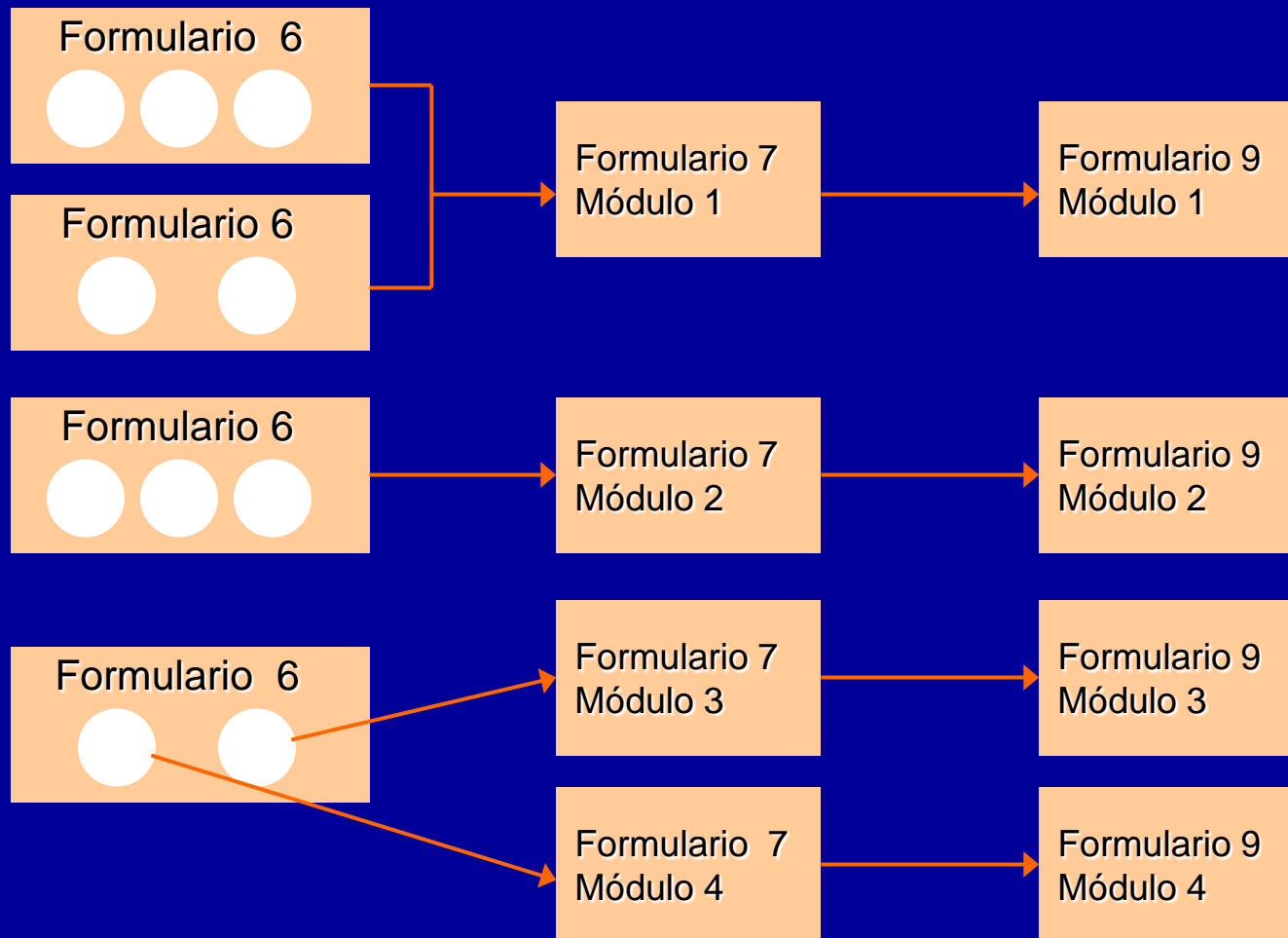
M2

# Secuenciamiento

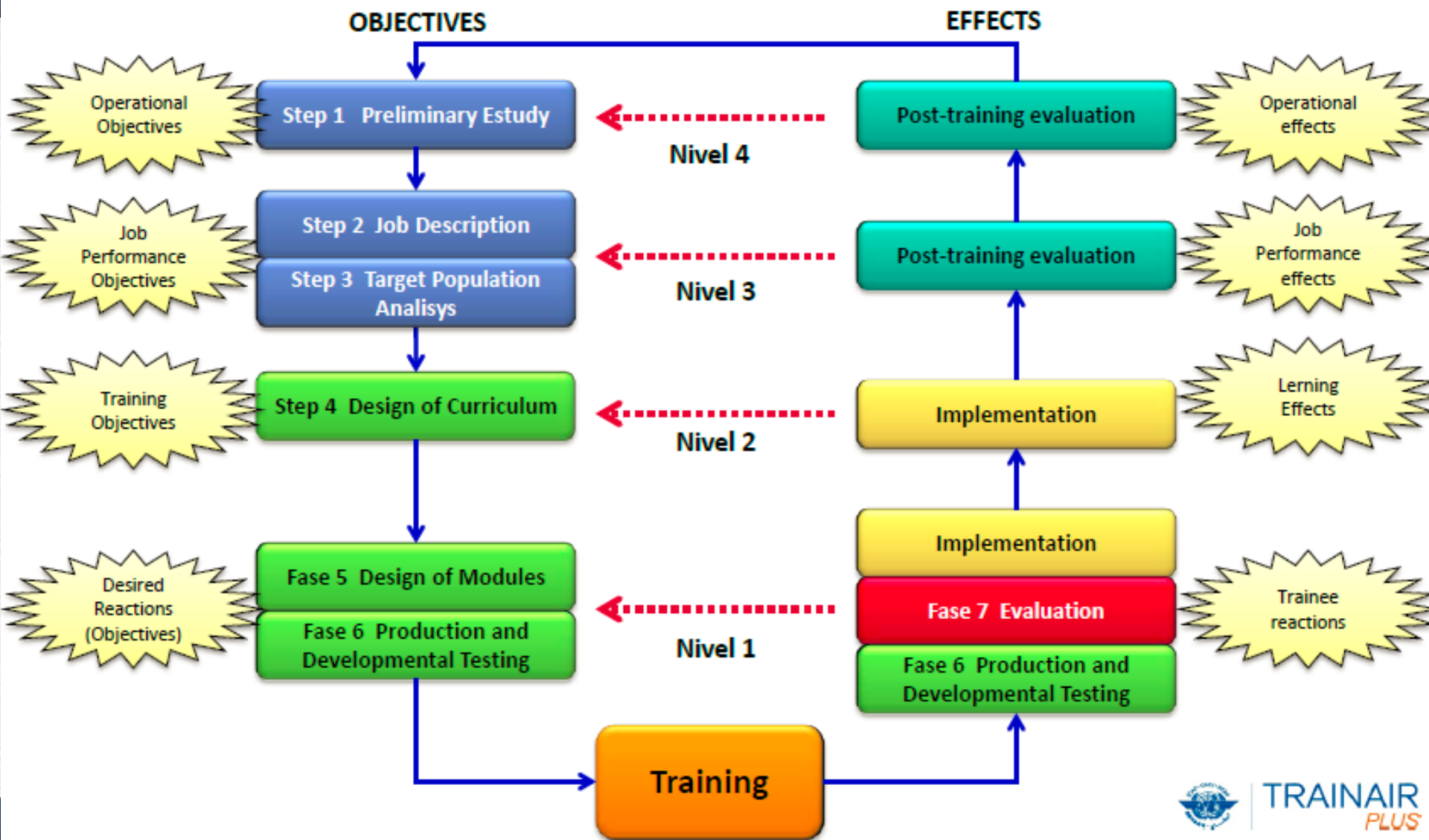
Objetivos  
(derivados del  
Formulario 3)

Bosquejo de  
Módulo

Plan de  
Módulo



# Relación entre Objetivos y Efectos de la Instrucción (TRAINAIR PLUS)



# Enfoque para la industria de la Aviación

## TRAINAIR PLUS Approach

Aviation Industry

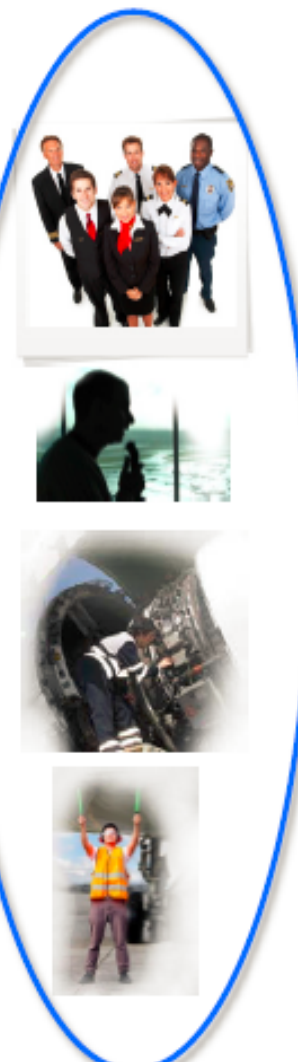
Aviation Professionals



Performance based  
Training packages



Training delivery based  
on TRAINAIR PLUS Methodology



Job  
Performance



# TDG/ ICAO Document 9941



TRAINAIR  
PLUS



**Competency-based training and assessment.** Training and assessment that are characterized by a performance orientation, emphasis on standards of performance and their measurement, and the development of training to the specified performance standards.

## Manual on the Approval of Training Organizations



### 3.3 Syllabus for competency-based training programmes

3.3.1 Modern training programmes should be competency-based.

3.3.2 Competency-based training programmes are based upon a job and task analysis to define the knowledge, skills and attitudes required to perform a job or a task. Such programmes use an integrated approach in which the training in the underlying knowledge to perform a task is followed by practice of the task so that the trainee acquires the underlying knowledge, skills and attitudes related to the task in a more effective way.

Approved by the Secretary General  
and published under his authority

Second Edition — 2012

International Civil Aviation Organization



# ICAO Doc. 9841

1.2 Competency-based training and assessment is defined in Doc 9868 as "training and assessment that are characterized by a performance orientation, emphasis on standards of performance and their measurement, and the development of training to the specified performance standards." It is important to realize that this training process is derived from a thorough job and task analysis and is focused on the achievement of well-defined benchmarked standards of performance as opposed to other training programmes that simply focus on the acquisition of minimum prescribed levels of skill, knowledge and experience.

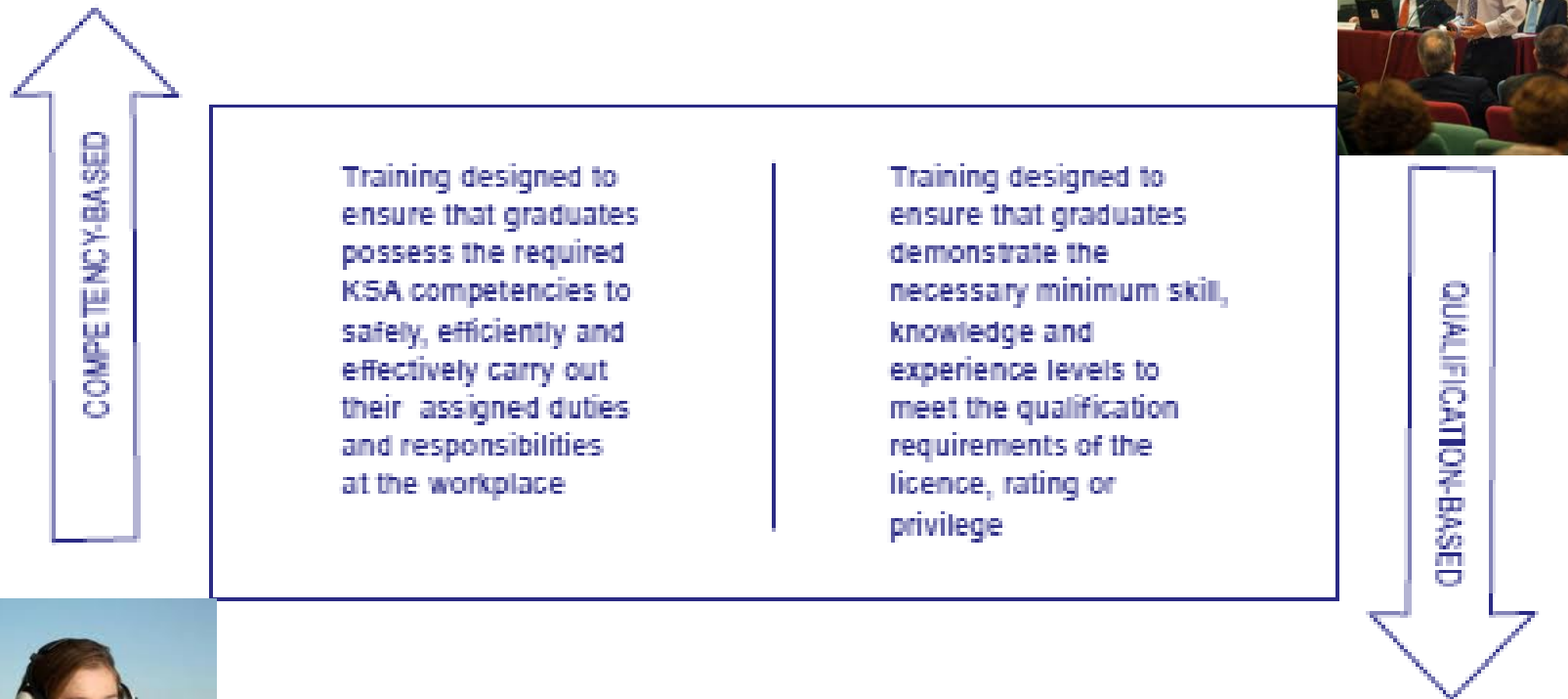
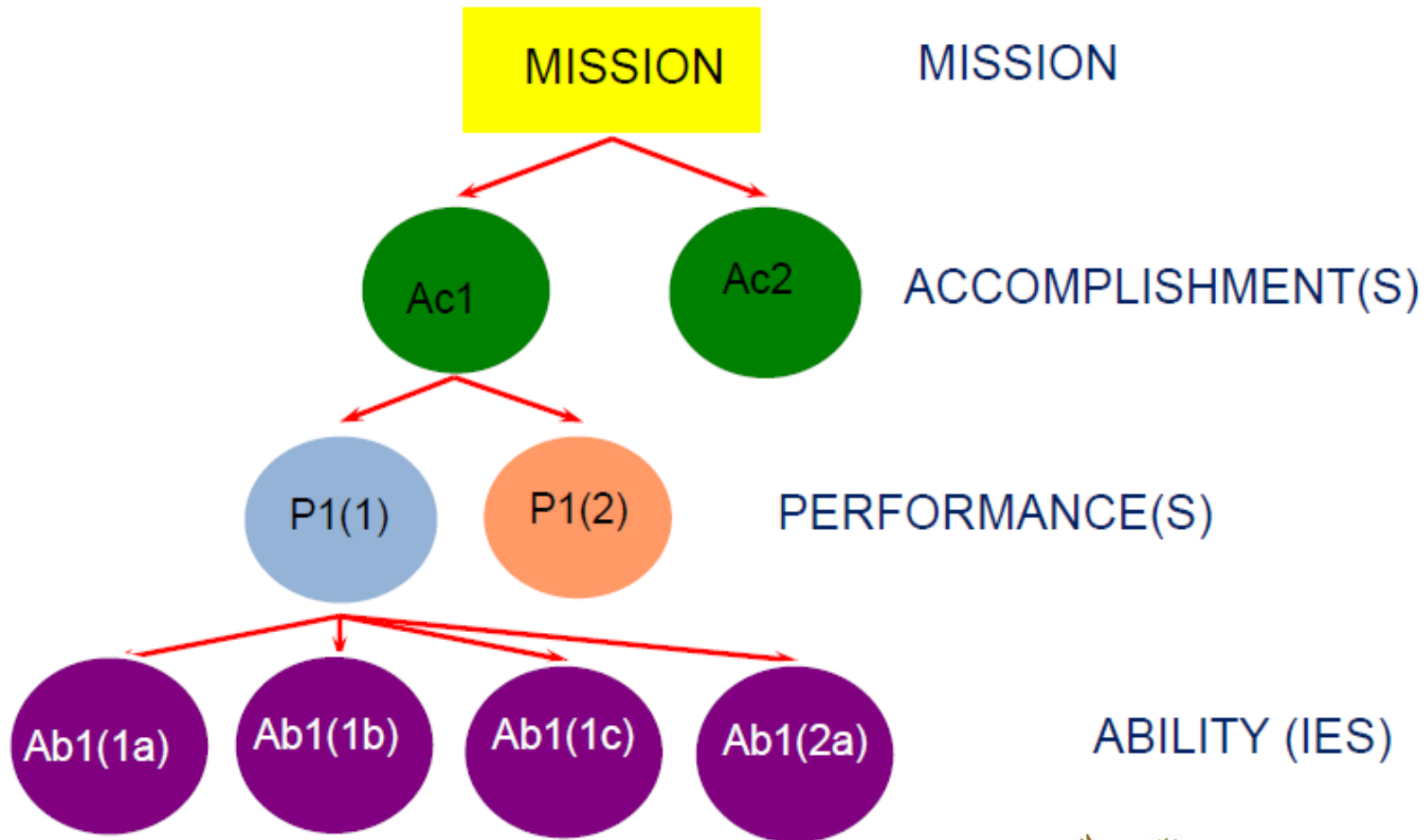


Figure App E-1. Difference between competency-based training and qualification-based training methodologies

A large, detailed image of the Moon, showing its surface with numerous craters and dark lunar maria. A silhouette of an airplane is visible in the lower-left quadrant, flying across the Moon's surface. The text "APLICACIONES PRÁCTICAS" is centered over the Moon.

# APLICACIONES PRÁCTICAS

# Modelo Embry Riddle de Identificación de Competencias



# Modelo Embry Riddle de Identificación de Competencias

## M-A-P-A

➤ ACCOMPLISHMENT

— A job-related  
“knowledge base”



# Modelo Embry Riddle de Identificación de Competencias

## M-A-P-A

### ➤ PERFORMANCE(ES)

- A procedurally based group of skills which summarize “*knowing how*” to do a major aspect of the job.



# Modelo Embry Riddle de Identificación de Competencias

## M-A-P-A

### ➤ ABILITY (IES)



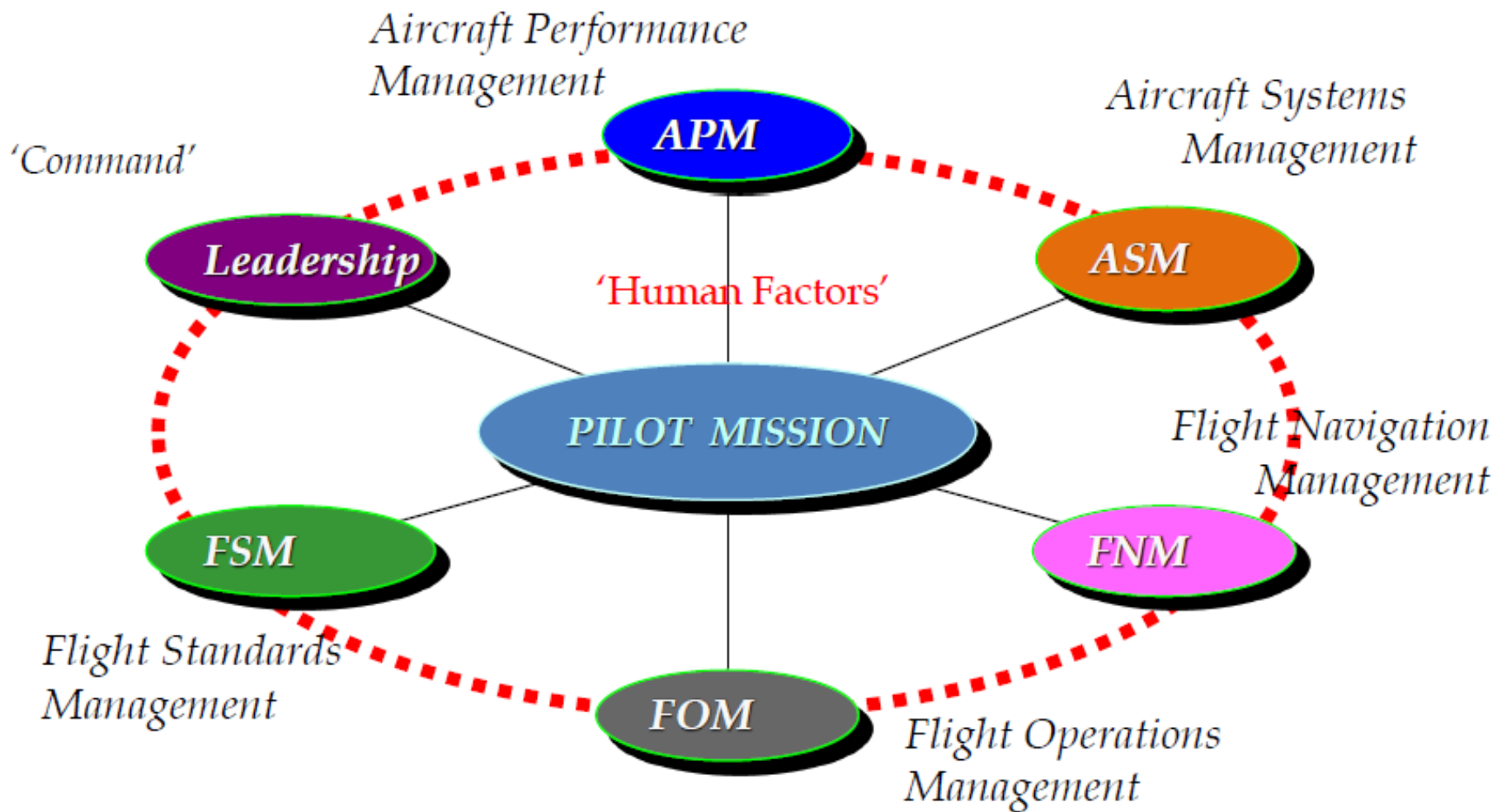
- The individual **cognitive** (thinking), **affective** (attitude), **attribute** (personality and motivation) or **practical skills** which can be taught or shaped through **learning** and **education**.

# Modelo Embry Riddle de Identificación de Competencias

Cognitive	Attributional
<ul style="list-style-type: none"><li>✓ assessing</li><li>✓ deciding</li><li>✓ monitoring</li><li>✓ recognizing</li><li>✓ oral communicating</li><li>✓ critical thinking</li><li>✓ problem-solving</li><li>✓ decision-making</li></ul>	<ul style="list-style-type: none"><li>✓ achievement oriented</li><li>✓ analytical style</li><li>✓ reflective style</li></ul>
Attitudinal	Manipulative
<ul style="list-style-type: none"><li>✓ flexibility</li><li>✓ empathy</li><li>✓ respectfulness</li><li>✓ personal motivation</li><li>✓ impact &amp; influence</li></ul>	<ul style="list-style-type: none"><li>✓ eye-hand coordination</li><li>✓ automaticity skill sequence</li><li>✓ balance and smoothness of bodily movement</li></ul>

# MAJOR DOMAINS OF PILOT ACCOMPLISHMENT

(CAANZ HURDA Project)



# Modelo Embry Riddle de Identificación de Competencias

## M-A-P-A

### *"Airline Pilot"* Accomplishments



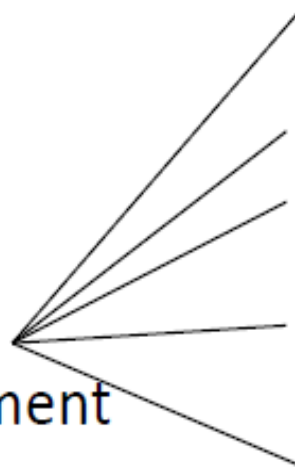
- ✦ Aircraft Systems Management
- ✦ Aircraft Performance Management
- ✦ Navigation Management
- ✦ **Leadership/Command**
- ✦ Flight Crew Standards Management
- ✦ Flight Operations Management

# Modelo Embry Riddle de Identificación de Competencias

## M-A-P-A

### *“Leadership/command” Performances*

➤ Leadership/  
Command Management



- Pilot Planning
- Supervising mission
- Resolving Conflicts
- Managing Critical Incidents
- Managing Crew interactions

# Modelo Embry Riddle de Identificación de Competencias

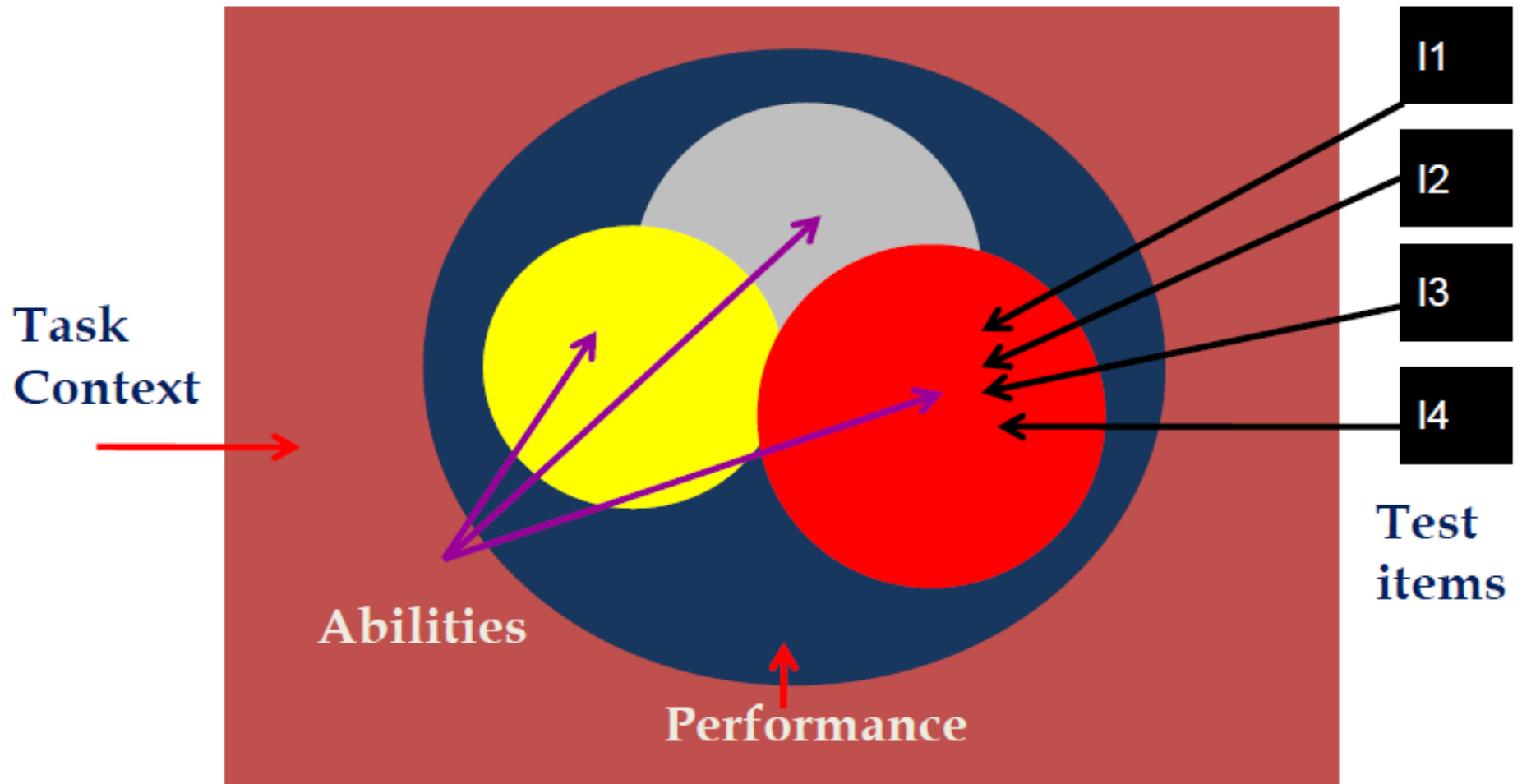
## M-A-P-A

### *Abilities defining “Pilot Planning”*

- ❖ Assessing
  - *Weighing up (factors/issues)*
- ❖ Deciding
  - *Choosing actions (from competing Choices)*
- ❖ Monitoring
  - *Checking for deviations from accepted/expected performance*
- ❖ Recognizing
  - *Discriminating appropriate visual or auditory cues*
- ❖ Oral Communicating
  - *Giving procedural information / chatting /asking questions*
- ❖ Projecting
  - *Perceiving critical operational elements*
  - *Projecting their future status*

# Modelo Embryo Riddle

## Measuring Competencies





# **IATA Training and Qualification Initiative (ITQI) - A Total System Approach to Training**

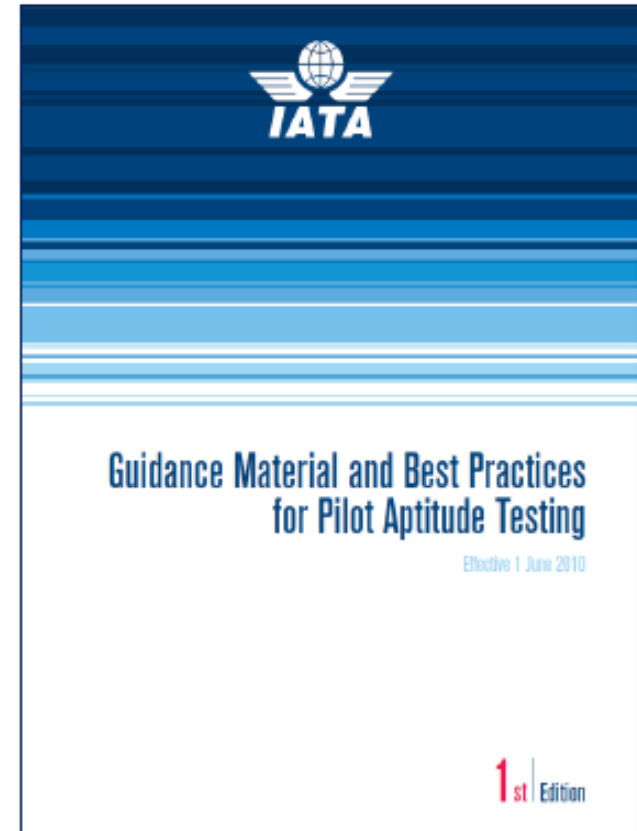


# ITQI - Total System Approach

- From the selection criteria to training process:
  - Selection Criteria (Pilot Aptitude Testing)
  - Multi-Crew Pilot License (MPL)
  - Evidence-Based Training (EBT)
  - Instructor Qualification (IQ)
  - Flight Simulation Training Devices (FSTD)
- Engineering & Maintenance (competency-based training and qualification requirements)

# Pilot Aptitude Testing (PAT)

- To support aviation managers understand, construct and implement a structured pilot selection process
  - IATA Guidance Material and Best Practices for Pilot Aptitude Testing (PAT Manual), first published in 2010
- 2nd Edition of the PAT manual – now available [www.iata.org/itqi](http://www.iata.org/itqi)





# MPL - Multi-Crew Pilot License

- Transition from task-based training to competency-based training
- Focus on commercial airline specific training needs
- Maximise skill development which is relevant to airline operations
- Develop Crew Resource Management (CRM) and Threat and Error Management (TEM) skills



# 8 Core Competencies for Pilots

- ICAO, IATA and IFALPA agreed on a set of 8 core competencies for flight crew
  - Covering all phases of a pilot's career, encompassing selection, ab-initio training, assessment for skills test, recurrent evaluation and training
    - Communication
    - Aircraft Flight Path Management - Manual Control
    - Aircraft Flight Path Management – Automation
    - Leadership and Teamwork
    - Problem Solving and Decision Making
    - Application of Procedures
    - Work Load Management
    - Situational Awareness

# Applying the 8 Core Competencies

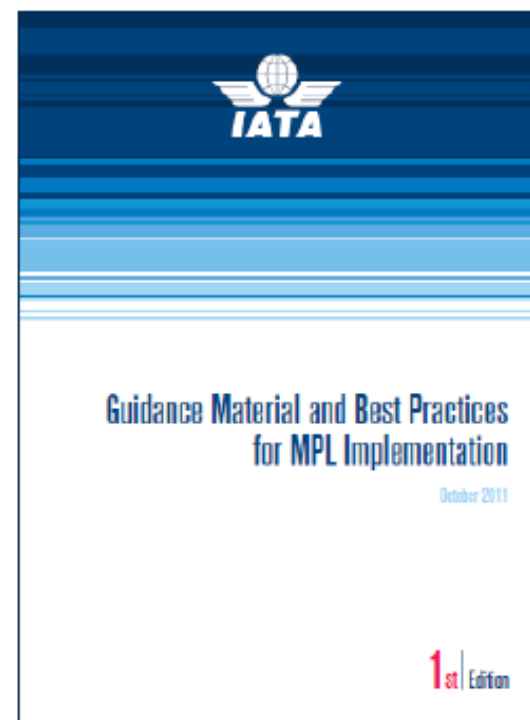
- The selection process of future airline pilots
- The continuous assessment during MPL
- The performance assessment in Evidence Based Training and Checking (EBT)
- The selection and qualification of instructors and examiners





# Multi-Crew Pilot (MPL) - Implementation

- To support MPL implementation
  - IATA developed Guidance Material and Best Practices for MPL Implementation, 1<sup>st</sup> edition published October 2011
- Available for free download on our website: [www.iata.org/itqi](http://www.iata.org/itqi)





# MPL Summary

- Multi-crew environment from the start of training
- Development of Core Competencies rather than task drills
- Application of the TEM principle
- Continuous assessment against a pre-defined norm
- Objective data to drive ongoing student and course improvement
- Instructors are key and need a special preparation



# Evidence-Based Training (EBT)

- What: identify, develop and evaluate the core competencies to operate safely, effectively and efficiently in a commercial air transport environment.
- How: address the most relevant threats according to evidence collected in accidents, incidents, flight operations and training.
- Why: prepare the pilot for the unforeseen event



# Benefits of EBT

- EBT aligns the training content with the actual competencies necessary to handle threats
- Based on actual incidents, accidents and safety data
- Focus on improvement of the 8 core competencies
- EBT modules consist of an evaluation phase, maneuvers training and a scenario-based training phase. Scenarios are the means to evaluate and develop competencies.

# Flight Simulator Training Devices (FSTD)

- In 2009 IATA published the updated 7th edition of the FSTD Design and Performance Data Requirements manual
  - details the airplane data requirements for the design and construction of Flight Simulation Training Devices (FSTD)





# Attractiveness of Aviation

## *The Singapore Situation*

**Dr Michael Lim**

Director, Singapore Aviation Academy  
Civil Aviation Authority of Singapore

**CAAS**  
Civil Aviation Authority of Singapore



# Competency-Based Training

- Singapore's national competency-based framework: Singapore Workforce Skills Qualifications have been developed for aerospace MRO non-certifying staff
  - In effect since 2007, widening industry acceptance
  - Industry HR systems adjusting to changing CBT style of training delivery and assessment



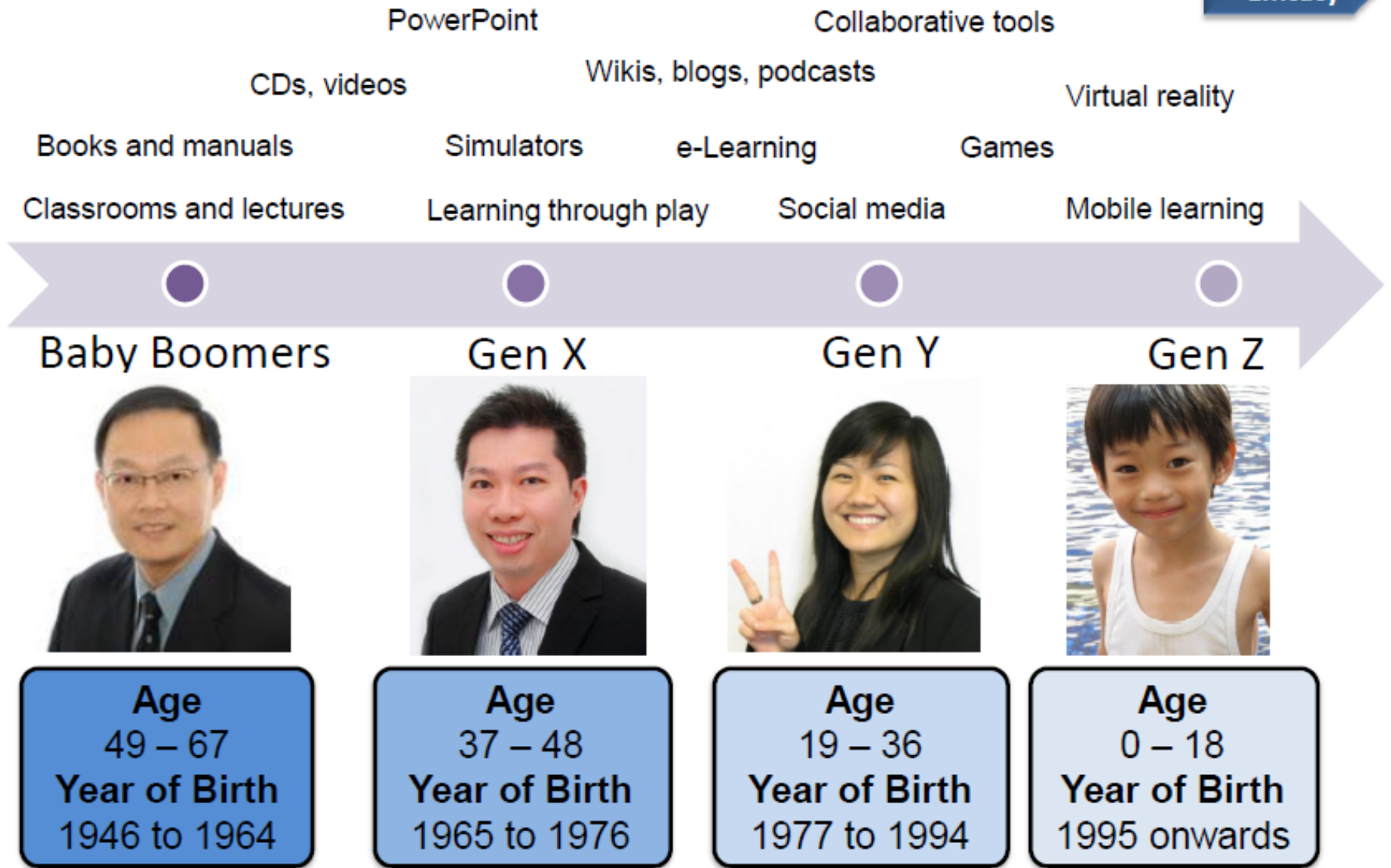
- Singapore's experience with CBT:
  - Requires radical change in instructional tools and delivery
  - Requires significant support and advisory
  - Needs to be regularly updated in line with industry changes
  - Assessment is as key to its success as training

## First fruits: MPL implementation in SG

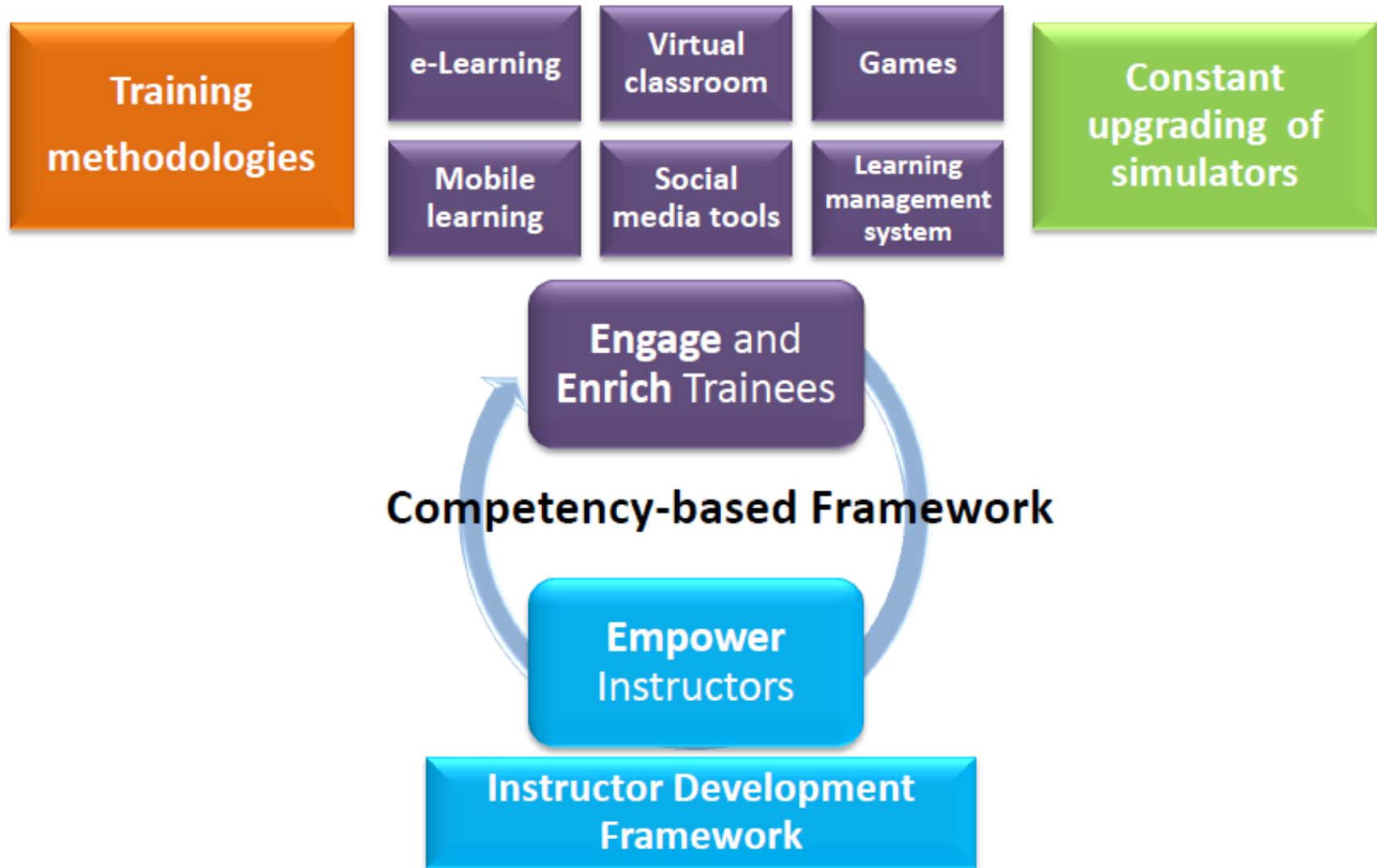
- Multi-Crew Pilot Licence
- ST Aviation Training Academy granted ATO approval in Oct 2009
- Partnership with airline to conduct MPL trial
- 6 cadets completed training and assessment and currently flying
- Full regulations and requirements for MPL developed in 2011

# Understanding the Generations

How they learn



# A Dynamic Model: - Configurations for varying needs



# Youth Outreach

Reaching out

Recruitment

Grow Interest

Build Awareness

- What is interesting about Aviation?
- What are the career paths?
- What specialisation to choose?

- What is Aviation?
- What is the contribution of Aviation?
- What jobs are available?

Vocational Institutions

Polytechnics

Universities

Secondary Schools

Junior Colleges

Primary Schools

Ages 7-12

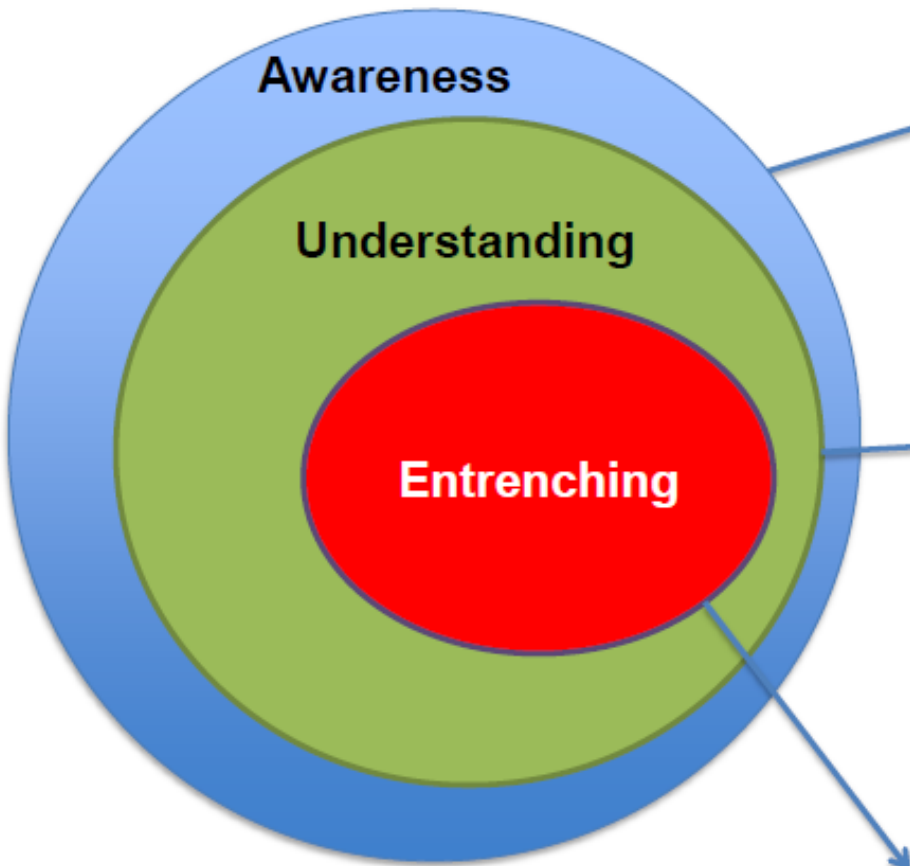
Ages 13-17

Ages 17-19

Ages 17-25

# Youth Outreach Strategies

Reaching  
out



## Lvl 1: Education and Awareness:

- Industry guides, career information
- Website information
- Mass media eg. Social media platforms, TV, newspapers

## Lvl 2: Engagement and 'Touch Time':

- Mass outreach activities such as Open Houses, Career Fairs
- Regular school activities eg. Aviation Learning Journeys and site visits

## Lvl 3: Entrenching Interest:

- Aviation Student Clubs
- Aviation Student Ambassadors
- Aviation Student Challenges
- Seminars for industry and aviation students to network
- Supporting industry internships

# AVIATION LEARNING JOURNEYS

• Launched in Jan 2011

- Over 2,000 students from secondary schools have experienced the ALJ
- 95% indicate they have learnt more about the industry and its opportunities
- 100% satisfaction rate amongst National Education teachers so far

Reaching  
out



# Establishing long-term partnerships

Reaching  
out

- 5-year partnership with the **Singapore Scout Association (SSA)** to expand Air Scouts programme and other aviation related activities
- For a start, SSA has rolled out 2 initiatives, namely the
  - (i) 2-day Young Aviators Badge programme and
  - (ii) Establishment of Aviation/Air Scout clubs in schools



# Positive Change in our Stakeholders

Closer and more **consultative** relationship with schools

Govt – Industry **partnership** to support industry growth through regular consultation

CAAS' feedback **sought** on school curriculum

Greater industry **take-up** of civil aviation management programmes

Students are **engaged** by industry earlier in their formative years and retain a 'lasting impression'

Greater interest in competency based training to improve training **relevancy**

# ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION



Vol. 3, No. 1 – June/July 2013

# TRAINING REPORT

## CONFRONTING THE CHALLENGE

Ensuring adequate numbers of skilled aviation personnel and a safe, secure and sustainable future for global air transport

DEMAND FOR SKILLED AVIATION PERSONNEL

TRAINING CAPACITY

ATTRACTIVENESS OF AVIATION

## ICAO NEXT GENERATION OF AVIATION PROFESSIONALS (NGAP) AND TRAINAIR PLUS REGIONAL SYMPOSIA

THESE EVENTS PROVIDE UNIQUE OPPORTUNITIES TO EXCHANGE VIEWS, BEST PRACTICES AND EXPERIENCES ON HOW TO ENSURE THAT ENOUGH QUALIFIED AND COMPETENT AVIATION PROFESSIONALS ARE AVAILABLE TO OPERATE, MANAGE AND MAINTAIN THE FUTURE OF THE INTERNATIONAL AIR TRANSPORT SYSTEM. THEY ALSO REPRESENT AN IDEAL FORUM TO DISCUSS HUMAN RESOURCES, PARTNERSHIPS AND TRAINING ISSUES WITH ICAO, REGIONAL ORGANIZATIONS, STATES, TRAINING ORGANIZATIONS, OPERATORS AND THE INDUSTRY.



### MARK YOUR CALENDAR

JAMAICA  
MONTEGO BAY  
5 to 7 February 2013

Hosted by:



INDONESIA  
BALI  
23 to 25 April 2013

Hosted by:



TURKEY  
ISTANBUL  
17 to 19 June 2013

Hosted by:



SOUTH AFRICA  
JOHANNESBURG  
10 to 12 December 2013

Hosted by:

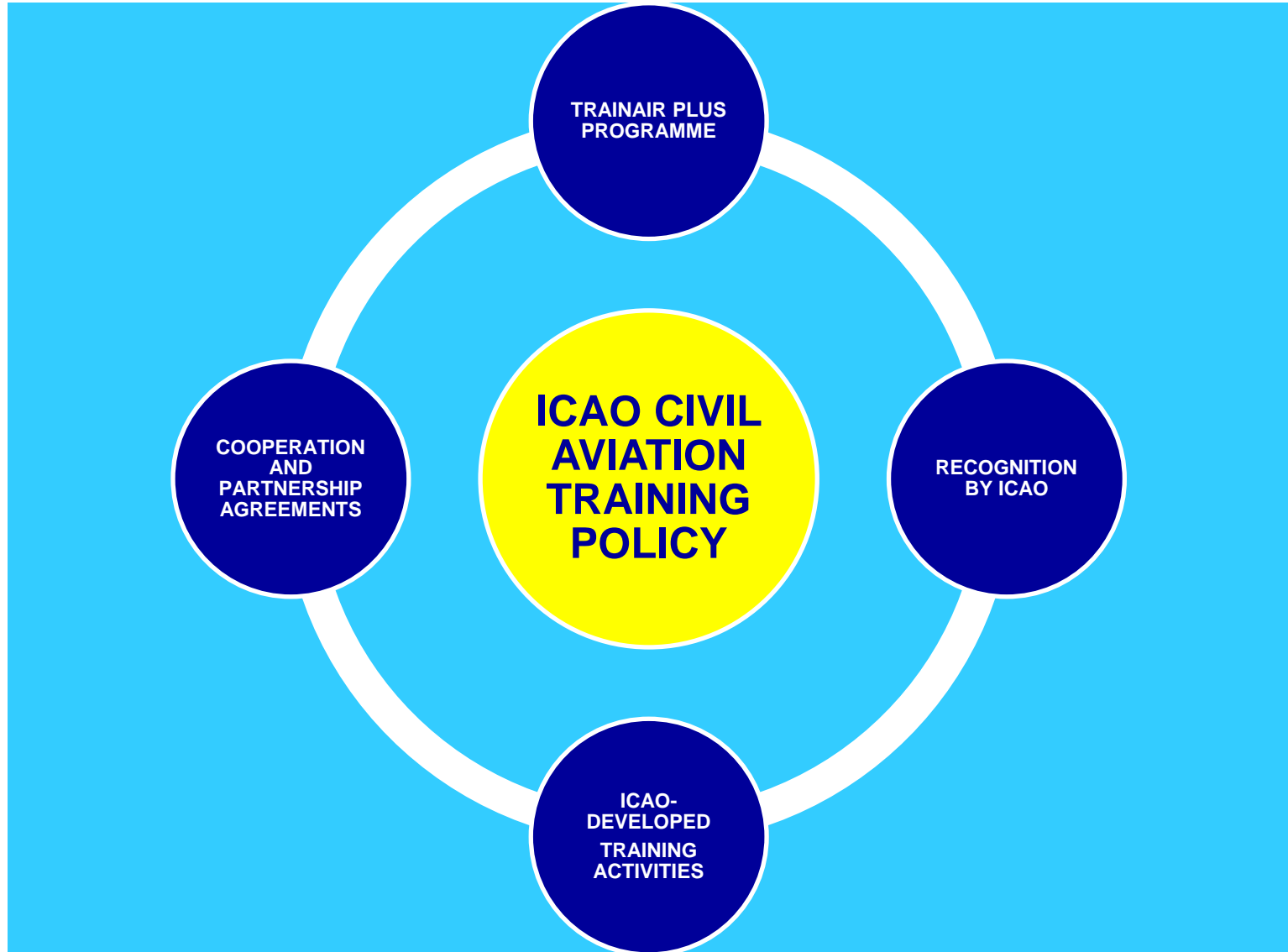


For more information: [www.icao.int/trainairplus](http://www.icao.int/trainairplus)



## THE NEXT GENERATION OF AVIATION PROFESSIONALS

# ICAO Civil Aviation Training Policy



# Objetivo del Seminario



***Identificar los elementos de la gestión del factor humano por competencias, en los ámbitos organizacionales, de capacitación y de instrucción y la forma cómo están interrelacionados.***

# Seminario Internacional de Capacitación por Competencias en la Aviación Civil

**MUCHAS GRACIAS!!!**



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