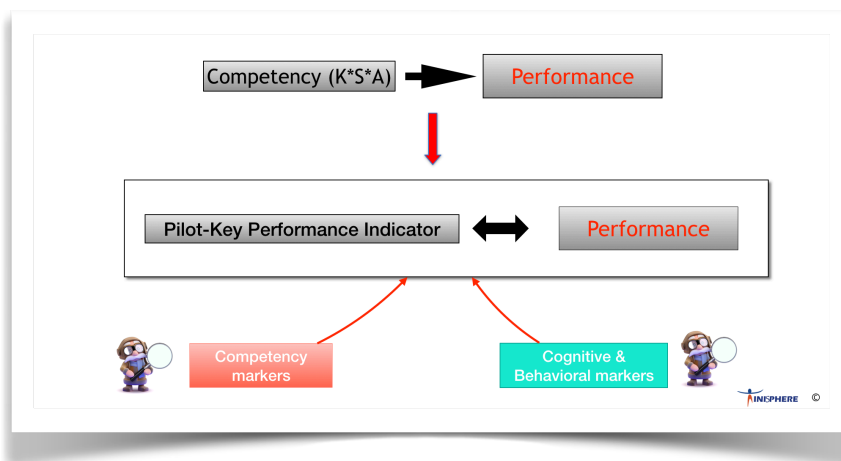


Pilot-Performance Based Training and Assessment model (P-PBTA)

A Conceptual Model of Pilot Performance, Cognitive and Behavioral Interactivity Processes

The assessment model based solely on competency markers « K.S.A ». (Kern) does not account for the complexity of the mental and behavioral processes involved and/or observable in pilots while they are flying. What is more, this difficulty is even greater in the analysis and understanding of an air crash when, with respect to human factors, the investigation focuses primarily on observable behavior (actions, communications, etc.) without truly including the underlying, yet decisive, mental processes.

The “Pilot-PBTA” is an assessment and training model¹ based on a double reading consisting in including so-called “classic” competency markers (Evidence Base Training²) and markers from the cognitive and behavioral sciences³. This feature allows for a more holistic approach to human factors and aims to improve aviation safety.



The goal of this model is to provide instructors and/or examiners with a simple and effective grid to assess and improve pilot performance levels⁴, particularly in terms of managing complex and/or unexpected situations (startle effect).

The methodology consists in an analysis of performance indicators based on the manual of Evidence Base

Training⁵ competency criteria, complemented by an analysis of the same performance indicators using markers from the cognitive and behavioral sciences. This cross-reading enables the inclusion of the underlying mental processes in the assessment of a given situation (e.g.: Rec Training, LOFT, Line training, etc.) and better identification of any points requiring special

¹ See « Annexe A » for P-PBTA components

² « Evidence Based Training applies the principles of competency-based training for safe, effective and efficient airline operations while addressing relevant threats. ICAO has defined competency as the combination of Knowledge, Skills and Attitudes (KSAs) required to perform a task to a prescribed standard under a certain condition. » ICAO, Manual of Evidence-based Training, Doc 9995 AN/497.

³ Stress coping (Lazarus), Self Efficacy (Bandura),...

⁴ This is achieved by means of a "dashboard" which is still in the experimental stage. It is based on a series of hypotheses whose arguments are the subject of a more substantive article. Research, particularly in the field of applied research, should be conducted to confirm the relevance of the model, correct its weaknesses and thus make it fully operational.

⁵ ICAO, Manual of Evidence-based Training, Doc 9995 AN/497

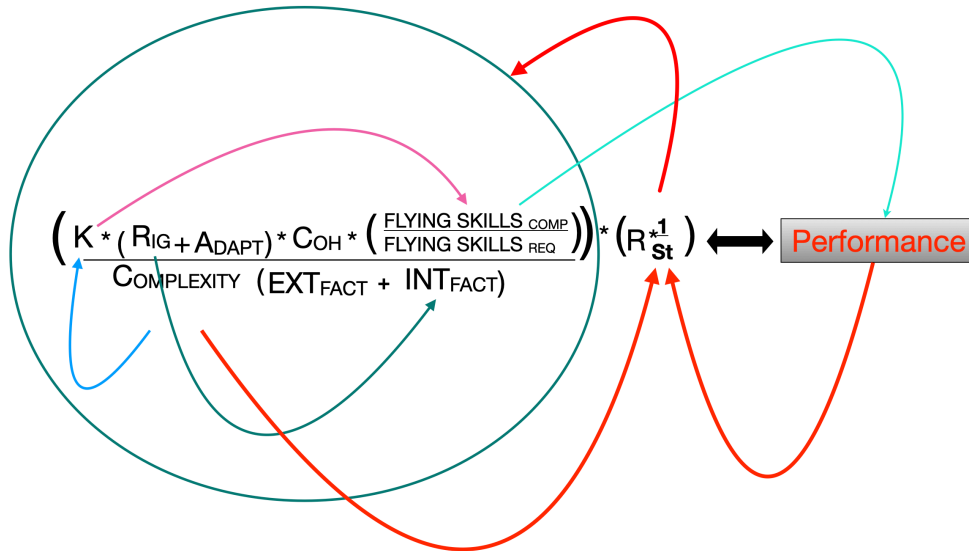
attention. It is an integrated assessment model whose purpose is to make training and remediation programs more focused and effective.

The assessment and training model is applicable both at the individual level and to systemic analysis.

Appendix A

PILOT PERFORMANCE BASED TRAINING & ASSESSMENT CONCEPTUAL MODEL

Pilot performance result from a non-stable dynamic system interactions.



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Competency: « A combination of knowledge, skills and attitude required to perform a task to the prescribed standard». (EBT ICAO Manual)

Knowledge: (Aircraft, self, team, environment...(TKern))

Rigor: Procedures (SOP's, Memory Items,...), work method, discipline

Adaptability: Imagination, option generations, risk assessment, innovation..

Coherence: Strategical adequacy between execution plan and situation seriousness, time availability. Adequacy between « Behavior » and « Situation assessment/awareness »

Flying skills competency: Pilot psychomotor abilities

Flying skills required : depending on automation availability, Aircraft systems integrity/degradation...

Complexity: global situational complexity, sum of:

- external factors: not controlled nor generated by the crew

- internal factors: generated and/or induced by the crew (errors, poor knowledge, lack of rigor...)

Resilience: Systemic stress resistance capability when faced to serious stressors and/or complex and/or unexpected situations

St: « Psychological stress, which results from the interplay of system variables and processes and depends on an appraisal by the person that the person-environment relationship is one harm, threat, or challenge » (Lazarus)

Performance: Global pilot performance required to perform a task to the prescribed standard (competency).

Key words:

Startle, Resilience, Decision making, Knowledge, Rigor, Adaptability, Coherence, Flying Skills, Complexity, Threat, Stress, Competency, Performance