

# Lessons Learned in Building a Globally-Acceptable Knowledge Exam for Professional Pilots

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# Agenda

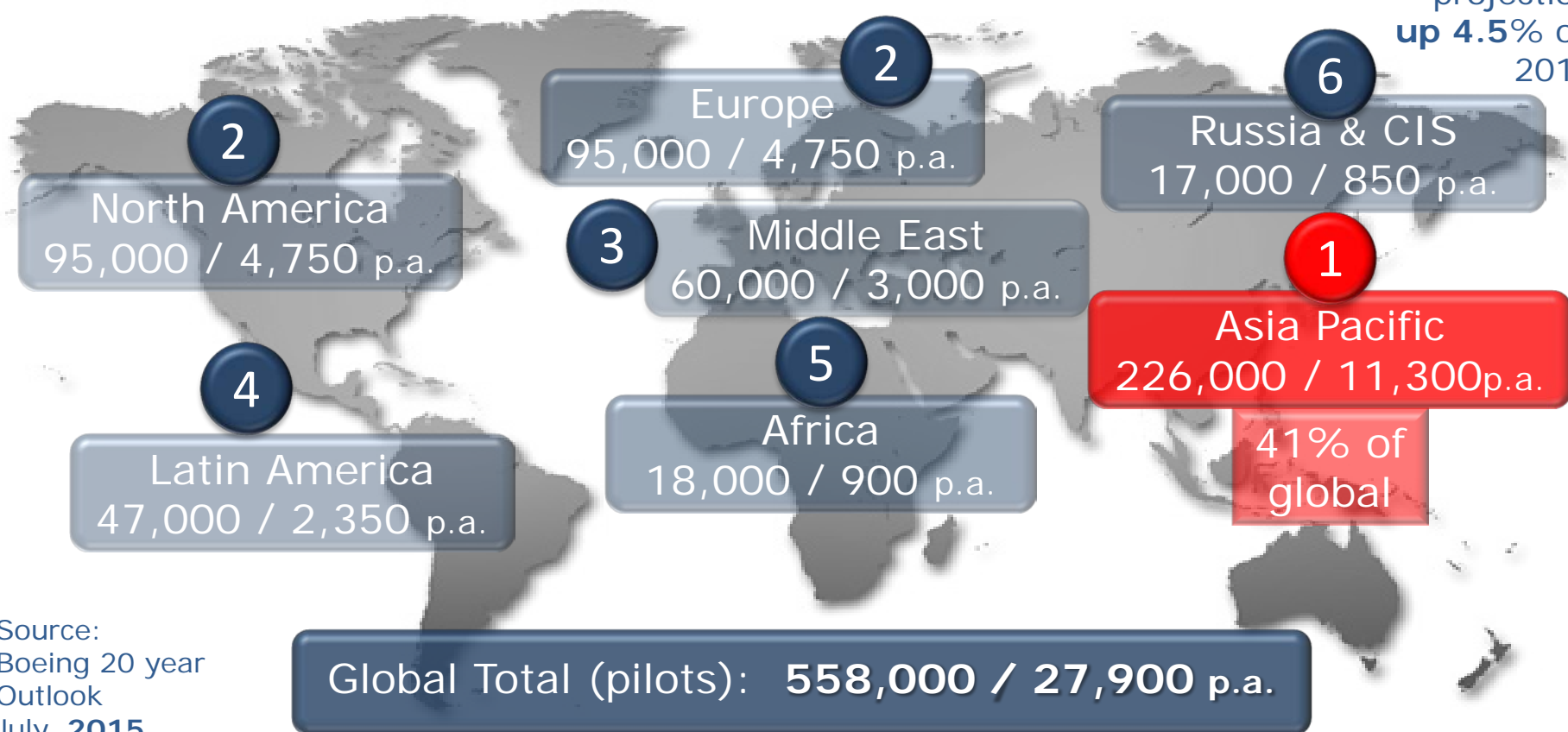
- Introduction
- The Prototype Model
- Lessons Learned
- Next Steps

# Introduction

Finding, selecting & training new pilots



2015 projection up 4.5% on 2014



Source: Boeing 20 year Outlook July, 2015

# Focus on Quality

- Current Status of Knowledge Exams:
  - Major national aviation authorities (NAAs) agree that their knowledge exams are outdated and do not take advantage of the current computer technology to thoroughly assess the requisite knowledge at respective certification/licensing level.
  - Some NAAs acknowledge that their examinations have been compromised.
  - Most NAAs do not have the resources to engage in comprehensive overhaul of the knowledge assessment process.

# What does a comprehensive knowledge assessment process look like?

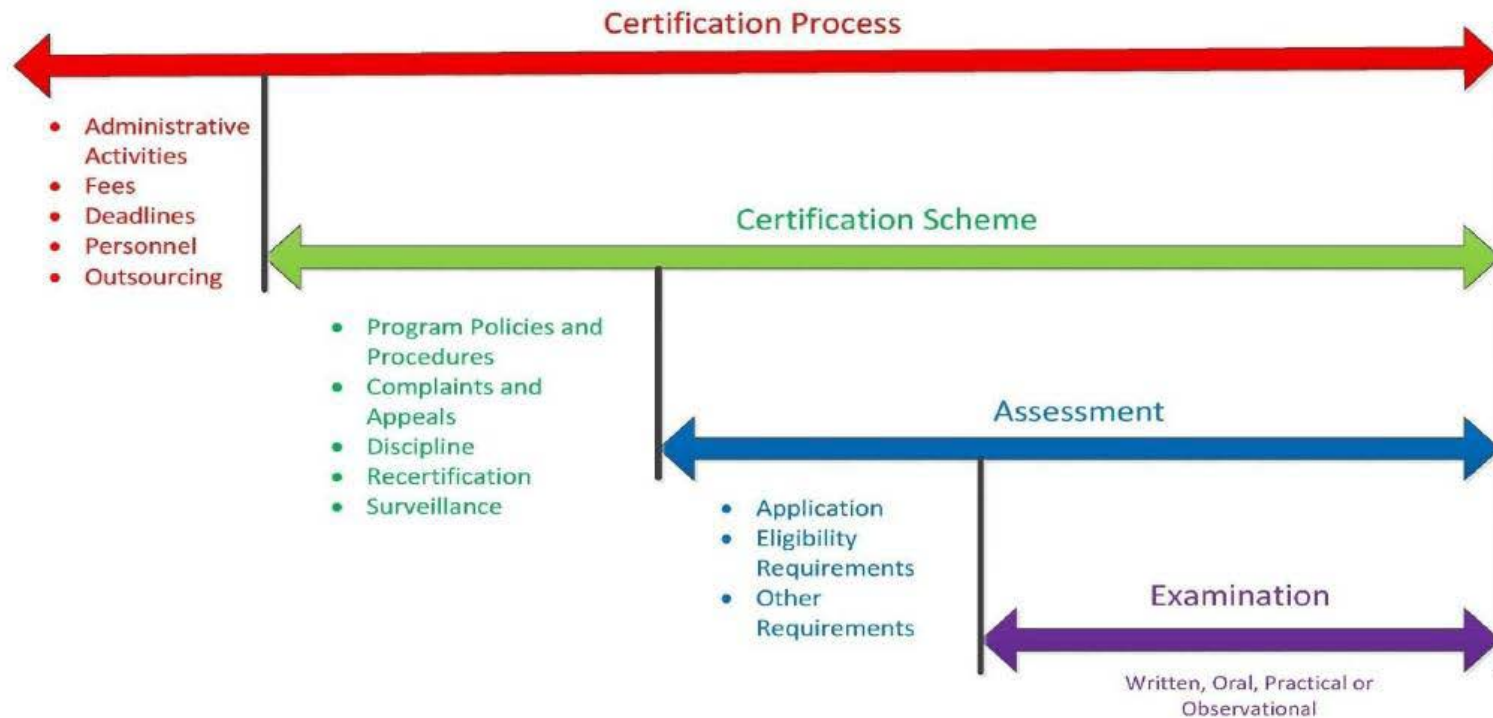
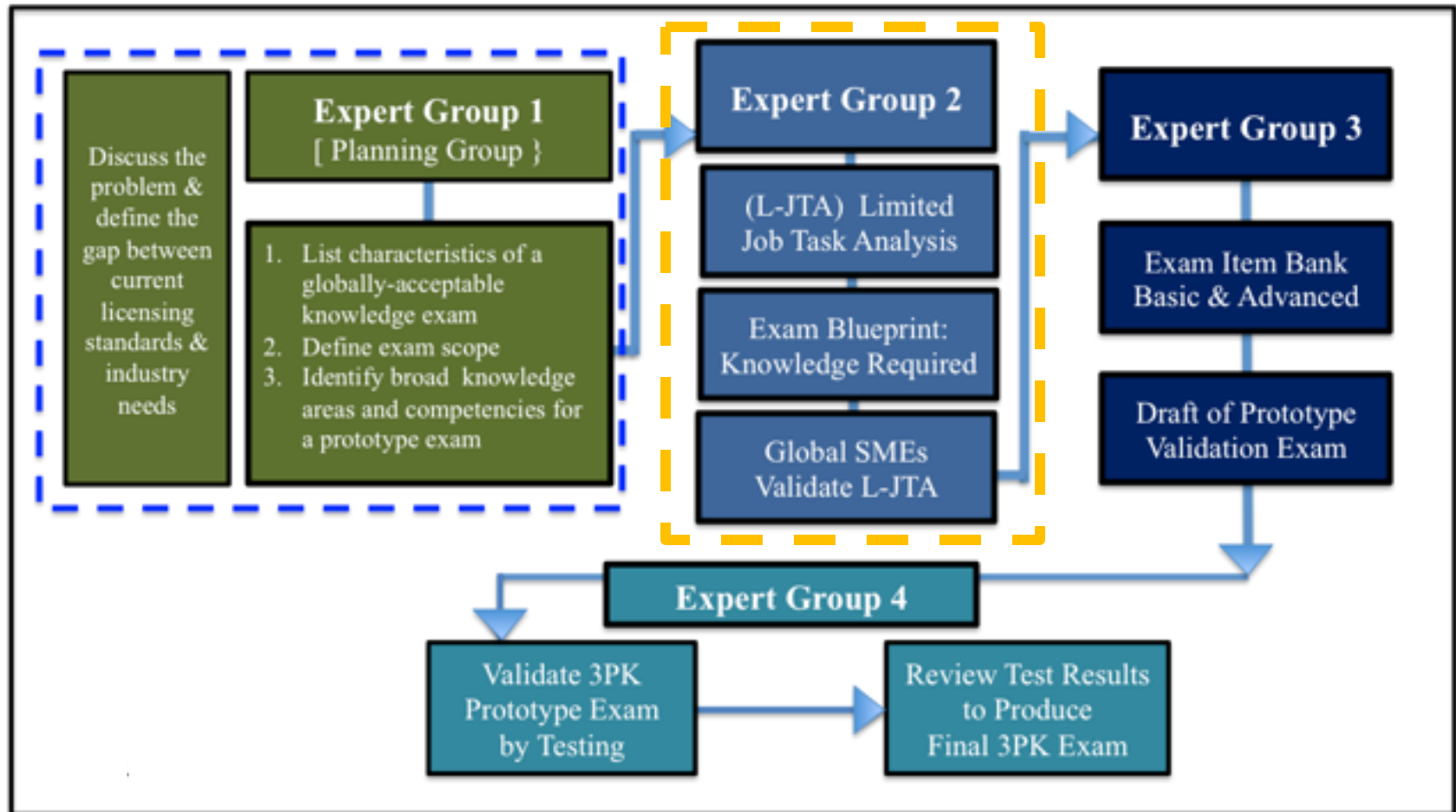


Image Credit: The illustration was provided by Dr. Cynthia Woodley, Professional Testing, Inc.

# The Prototype Model



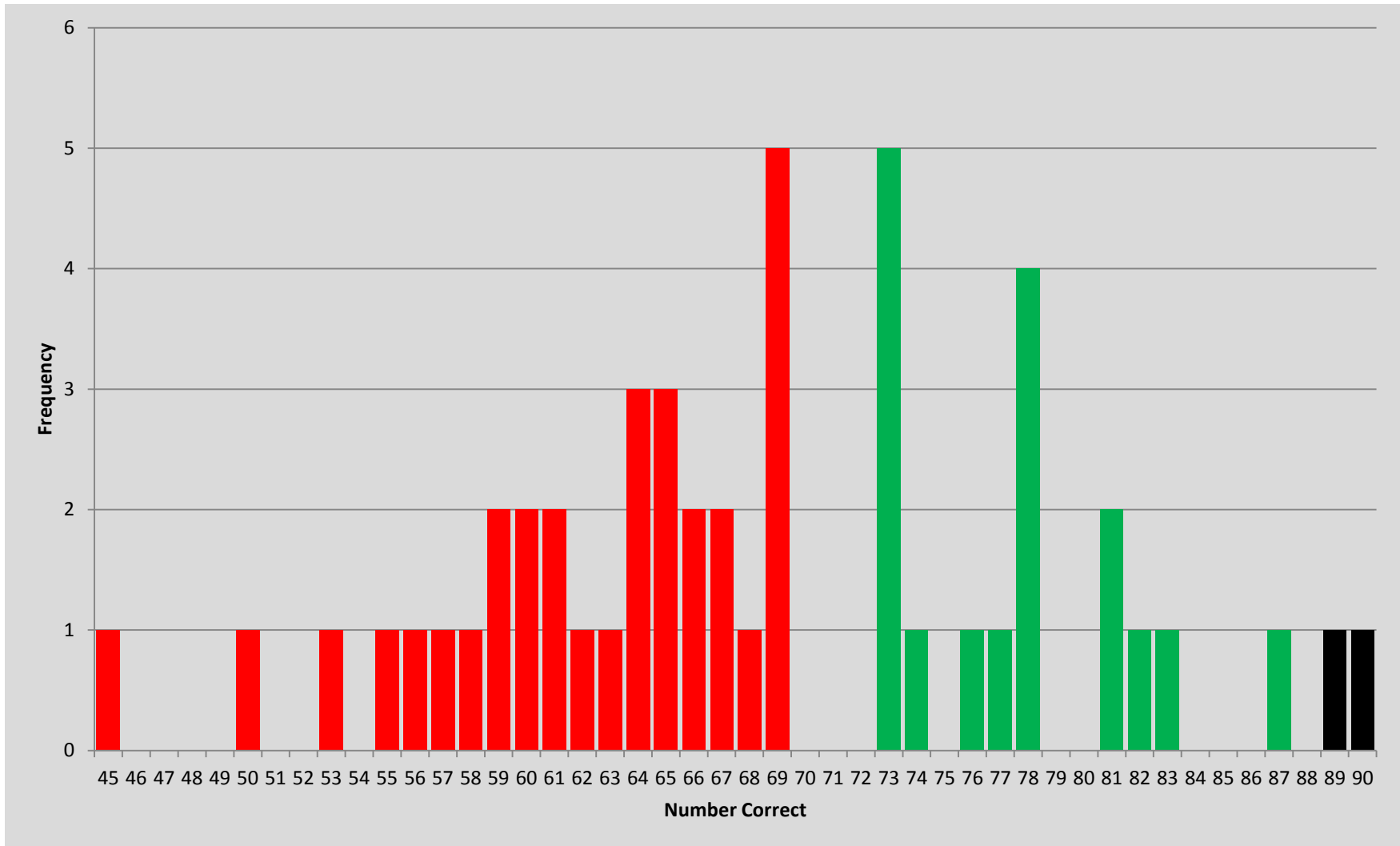
# Results

- Definition of a Professional Pilot
  - *A Professional Pilot is a member of the flight team who uses his/her knowledge, skills and attributes to fly and manage an aircraft in order to provide a safe, efficient and comfortable flight.*
- Definition of the Approach Phase
  - *The **Approach Phase** begins 150 to 200nm prior to touchdown, as the plane nears the top of descent point, and continues through the descent and approach procedure to the Decision Height, Missed Approach Point or flare for landing.*
- Limited JTA
  - *Key tasks, subtasks, and required knowledge*
  - *Validated via an online survey (n=681)*
    - *Synthesize Data: 27%*
    - *Conduct Threat and Error Management: 23%*
    - *Plan the Approach and Landing: 25%*
    - *Communicate with Flight Deck, Cabin, and Ground: 7%*
    - *Manage the Descent: 18%*

# Results

- Exam Development
  - *Over 300 questions were developed*
  - *Two forms were created; one form was tested*
- Exam Results
  - 50 Participants: USA (38), Bahrain (1), Ethiopia (4), India (2), Saudi Arabia (1), Lithuania (1), New Zealand (1), and UK (2)
  - Industry-Level Standard: 70/100; 17 Candidates
  - Mastery-Level Standard: 88/100; 2 Candidates
  - Overall Pass Rate: 38%
  - Index of Dependability
    - Industry-level Standard: 0.792
    - Mastery-level Standard: .957
  - Reliability Index (KR-20): .83





# Lessons Learned

1. We can build on the work done by the IPTC (International Pilot Training Consortium—IATA, RAeS, IFALPA, and ICAO):

## Eight core competencies

1. Communication
2. Aircraft Flight Path Management—Manual Control
3. Aircraft Flight Path Management—Automation
4. Leadership and Teamwork
5. Problem-Solving and Decision-Making
6. Application of Procedures
7. Workload Management
8. Situational Awareness

# Lessons Learned

2. IPTC's Core Competencies could be mapped across phases of flight:
- Preflight and Taxi
  - Take Off
  - Climb
  - Cruise
  - Descent
  - Approach
  - Landing
  - Taxi and Post-Flight

# Lessons Learned

## 3. Some Key Characteristics of the Exam

- Must be relevant—stakeholder-defined and at or above existing regulatory standards
- Must be generic—not aircraft or manufacturer specific, focus on underpinning knowledge
- Must be globally transportable and secure—consider ICAO regulations and secure proctoring protocols
- Must test across the Bloom’s Taxonomy
- Must be compliant with ISO 17021 and 17024 Standards

# Lessons Learned

## 4. Stakeholder Engagement

We must engage representatives from all the stakeholder groups

- Basic Flight Training Providers
- Regulators
- Airlines
- Manufacturers
- Practitioners (Pilots)
- Insurance Companies
- International Trade Organizations
- Others

# Lessons Learned

5. A DACUM Process could be used to develop the Job Task Analysis
  - It is simple, engaging, and effective.
6. A Large Pool of Subject Matter Experts is Required
  - Multiple groups have to be formed
  - Sufficient SMEs have to be available to meet and engage in various stages of exam development, testing, and updates.

# Lessons Learned

7. A Computer-based Testing Company could be used to deliver the exam
- Addresses both security and global transportability concerns
  - Offers testing sites in most major cities around the world

# Lessons Learned

## 8. Preliminary Results Show

### Competency-based knowledge examinations

- Need to be developed
- The DACUM Process can be used for task analysis and online surveys can be used to validate the analysis.
- Practitioners should be engaged in knowledge exam development and testing.
- For an internationally-acceptable exam, it needs to be supported, developed, and implemented across the global stakeholder community



# Next Steps

1. Need endorsements from key stakeholder groups
2. Need funding to engage in the “Test-Train” phase to illustrate how training may bridge the knowledge gaps identified by testing.
3. Need funding to scale-up the test to include all phases of flight.
4. Need a funding mechanism to make this test sustainable.

# Acknowledgements

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- Miles Above Aerosolutions
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- Net Jets
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- Professional Testing, Inc.
- The Royal Aeronautical Society
- Saudi Aviation Flight Academy
- Saint Louis University
- U.K. Civil Aviation Authority
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“Unknown Soldiers”