From Hindsight to Foresight

Evolutionary Aviation Risk Management

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The fundamental questions
The pragmatic answer

Is it safe?

What is “enough”?  

Enough.

How to achieve this?

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From Hindsight to Foresight

• Discussion topics
  – Traditional safety management
  – Path from traditional safety management to integrated risk management
  – Benefits of integrated risk management
  – Examples of an integrated risk management strategy
From Hindsight to Foresight

• Objectives
  – Create an understanding of integrated risk management
  – Create awareness for available integrated risk management products at the international level
Reactive Safety Management

- Accident and incident investigation
- Identification of root cause for accidents and incidents
- Issue recommendation to prevent reoccurrence

Reaction to unforeseen situations – always a state of emergency /urgency
Relatively low technical requirements
Used for attribution of blame
Proactive Safety Management

- Accident and incident investigation
- Identification of root cause of accidents and incidents
- Issue recommendation to prevent reoccurrence
- Surveys, inspection, reports, audits
- Development of a hazard register
- Risk assessment based on identified hazards
- Develop mitigation measures to prevent accidents or incidents

Hazard identification is not an exact science and is rarely purely quantified
Risk assessment seldom free from elements of judgement (bias)
Conducted in times of “normality” and therefore structured
Predictive Safety Management

Requires access to various data and information sources and collection mechanisms (FDM, etc.)
High socio/technological requirements for data handling and visualization
Tendency to be overly quantified (lack of qualified indicators - HF)
Integration of Methodologies

Combines all available data and information from various methodologies (balance between quantified and qualified information)
Increases the validity of derived information
Complex and resource intensive
The Path from Hindsight to Foresight

Value

Difficulty

10 years ago

predictive

proactive

Hindsight

Insight

Today

Foresight

Tomorrow

How can we make it happen?

What will happen?

Why did it happen?

What happened?

[Source: Gartner, Inc. (Stamford, USA)]
Information Sharing

Fundamental tenet of a safe (and secure) air transportation system

Prerequisites to collect, analyze and share information:
- Tools
- Systems
- Legal frameworks

To accurately assess and improve safety performance while optimizing and supporting resource allocation
ICAO efforts in the transition process

Present
– Development of Annex 19 1st Ed. (November 2013)
  • Widened applicability of SMS framework
  • Elevation of SSP framework to a Standard
  • Extended State Safety Oversight
  • Safety Data Collection and Analysis and Legal Protection of Safety Information

– Development of Doc 9859 3rd Ed.
  • Guidance on Safety Management principles and practices

Future
– Amendment of Annex 19 (Final ANC Review Fall 2015)
  • Comprehensive strengthening of SMS and SSP framework
  • Comprehensive developments on Safety Data Collection, Analysis and Exchange
  • Enhanced Legal Protection of Safety Information

– Amendment of Doc 9859
  • Alignment with new principles and practices of Annex 19
Integrated Aviation Analysis at ICAO

Integrated aviation analysis at ICAO support:

– The constant improvement of aviation risk management
– The United Nation Sustainable Development Goals
Integrated Aviation Analysis at ICAO in support of risk management

- Safety data from States & intl. organizations
- Accident/incident data reporting
- Conflict zone information
- Universal Safety Oversight Audit Programme

- Safety Dashboards
- Global Plans (Air Navigation and Safety)
- Safety reports
- Integrated Safety Trend Analysis and Reporting System
- Safety information monitoring service

- Risk Context Statement
- Runway safety initiative
- Fatigue risk management workshops
- Loss of control inflight
- Conflict zone information repository
Integrated Aviation Analysis in support of UN SDGs

ICAO is an official observer on the Inter-agency and Expert Group.

- **Goal 8, Target 8.9** - By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products.

  ICAO’s “Connectivity Opportunities Utilization Indicator” is merged with UNWTO’s tourism and employment indicator

  - measures tourism’s contribution to GDP and employment and with it the efficacy of policy making at the State level aimed at maximizing air connectivity and tourism opportunities.

- **Goal 9, Target 9.1** - Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.

  ICAO proposed the "Percentage of effective implementation in the infrastructure development of aerodromes and ground aids“ indicator.

  - measures directly the quality and reliability factors of a representative infrastructure.
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<tr>
<th>Goal</th>
<th>Description</th>
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<th>AN</th>
<th>SEC</th>
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<tbody>
<tr>
<td>Goal 1</td>
<td>End poverty in all its forms everywhere</td>
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<td>Goal 2</td>
<td>End hunger, achieve food security and improved nutrition and promote sustainable agriculture</td>
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<td>Goal 3</td>
<td>Ensure healthy lives and promote well-being for all at all ages</td>
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<td>Goal 4</td>
<td>Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</td>
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<td>Goal 5</td>
<td>Achieve gender equality and empower all women and girls</td>
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<td>Goal 6</td>
<td>Ensure availability and sustainable management of water and sanitation for all</td>
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<td>Goal 7</td>
<td>Ensure access to affordable, reliable, sustainable and modern energy for all</td>
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<td>Goal 8</td>
<td>Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all</td>
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<td>Goal 9</td>
<td>Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</td>
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<td>Goal 10</td>
<td>Reduce inequality within and among countries</td>
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<td>Goal 11</td>
<td>Make cities and human settlements inclusive, safe, resilient and sustainable</td>
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<td>Goal 12</td>
<td>Ensure sustainable consumption and production patterns</td>
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<td>Goal 13</td>
<td>Take urgent action to combat climate change and its impacts</td>
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<td>Goal 14</td>
<td>Conserve and sustainably use the oceans, seas and marine resources for sustainable development</td>
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<td>Goal 15</td>
<td>Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</td>
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<td>Goal 16</td>
<td>Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels</td>
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<td>Goal 17</td>
<td>Strengthen the means of implementation and revitalize the global partnership for sustainable development</td>
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“Conclusion”

“In hindsight, I believe that our oversight was shortsighted. At least that’s my insight.”
Attachment
Products and Initiatives
(links from main presentation)
Loss of Control In-flight

• Collaboration
  – Airbus, Boeing, Bombardier, CAE, EASA, Embraer, FAA, IATA, IFALPA

• Regional UPRT workshops
  – New UPRT requirements in Annexes 1 and 6 (Nov 2014)
  – Authorities, operators and ATOs
  – Implications of new UPRT SARPs
  – Two days include FSTD demonstrations

• Tools
  – Manual for UPRT (Doc 10011)
  – Manual of Criteria for the Qualification of FSTDs (Doc 9625)
  – Aeroplane Upset Recovery Training Aid (under revision)

• LOC-I website
  – Under development
Runway Safety

- Regional publications – guidance and safety advisories
- RASG runway safety SEIs, DIPs, & related activities
- Runway safety Go-team missions
- ACI APEX Airport Safety Reviews
- ACI survey of airports on RST, SMS and certification implementation & effectiveness
- IATA airport analyses
- IATA unstabilized approach guidance
- US FAA focused airports list
- US FAA Academy ICAO TRAINAIR STP course “Runway Incursion Prevention”
ICAO Safety Dashboards

- Customizable dashboards
- Reflecting what is relevant in real-time
- Based on harmonized metrics
ICAO Risk Context Statement

“The continuing threat of terrorism is most effectively managed by identifying, understanding and addressing the potential risks both to and from civil aviation and the transportation of passengers and goods (baggage, cargo, and mail) by air.”

Security Risk Assessment Process Map

**THREAT IDENTIFICATION**
- Concerns identified (from intelligence & open sources, actual incidents)
- Threat development (identify targets, means, methods of attack)

**DETERMINATION OF RISK**
- Likelihood of attack
- Consequences including worst case scenario
- Current countermeasures (is it adequate?)
- Remaining vulnerabilities after all countermeasures considered

**ANALYSIS OF RESULTS & MITIGATION**
- Is the risk adequately mitigated?
- If “Yes” – no action
- If “No” – further evaluate security measures, and implement revised security