



Project 12: Airport SMS Software Analysis

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The Team

- FAA
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- The Ohio State University
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THE OHIO STATE UNIVERSITY

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Purpose

- Understand the software used by airports to manage their SMS

Goal

- Provide the FAA with guidance towards recommending SMS software for airports, including minimum functionality standards

Software Analysis

- Reviewed commercially available SMS software products

Survey

- Accessed the airport community to see how they're using SMS software

Part I

- Literature review and background

Part II

- Review of commercially available SMS software products

Part III

- Survey of airports that have some level of knowledge of SMS and have used some sort of software to manage their SMS



Part I – SMS Background

Safety Management Systems

- High-Risk Industries
 - Nuclear, maritime, petroleum, rail
- New Era in Aviation Safety
 - 1900 – 1970s = Technical Era
 - 1970s – mid-1990s = Human Factors Era
 - Mid-1990s – Today = Organizational Era



Part I – SMS Background

SMS at Airports

- 2007 Pilot Project #1 22 Participants
- 2008 Pilot Project #2 9 Participants
- 2011 Implementation Study 14 Participants
- 2014 Robertson, Harrison, Ruiz 42 Airports w/ SMS

Identify SMS Software

- Basic Internet search for software related to Safety Management Systems
- 31 different software systems were identified
- 16 of the 31 software systems provided a demonstration or trial
 - 13 airport-specific
 - 3 for general industry

Methodology

- Identify the basic functionalities of the software

The Four SMS Components

Safety Policy

Establishes senior management's commitment to continually improve safety; defines the methods, processes, and organizational structure needed to meet safety goals

Safety Assurance

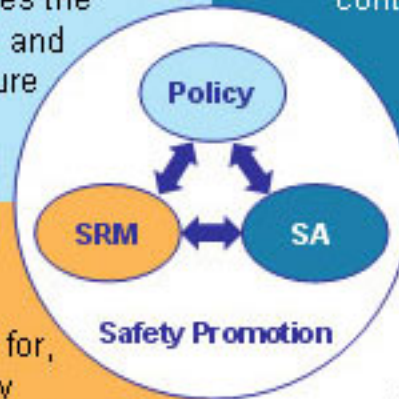
Evaluates the continued effectiveness of implemented risk control strategies; supports the identification of new hazards

Safety Risk Management

Determines the need for, and adequacy of, new or revised risk controls based on the assessment of acceptable risk

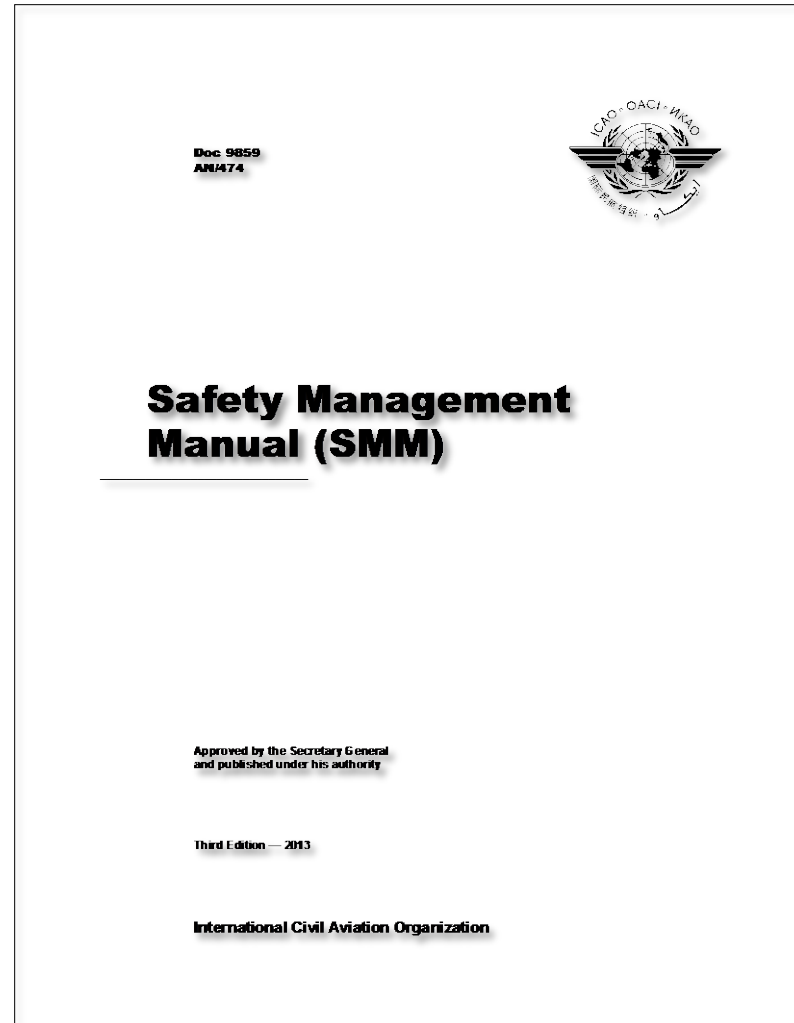
Safety Promotion

Includes training, communication, and other actions to create a positive safety culture within all levels of the workforce



ICAO SMM

- Provided a basis from which we created the list of software functionalities



37 Software Attributes Identified

Administrative
Web-Based
Off-Line Access
Mobile Applications
Individual Login
Public Access
Data Backup
Data Export
Technical Support

Policy and Objectives
SMS Manual Builder
Gap Analysis Tool
Implementation Plan
Document Upload
Software Design Based on ICAO/FAA

Safety Risk Management
Mandatory Hazard Reports
Voluntary Hazard Reporting
Confidential Hazard Reporting
Customizable Surveys
Risk Assessment
Customizable Risk Matrix
Risk Mitigation Planning
Email Notification to Safety Manager
Incident Assignment
Hazard Report Feedback to Original Reporter

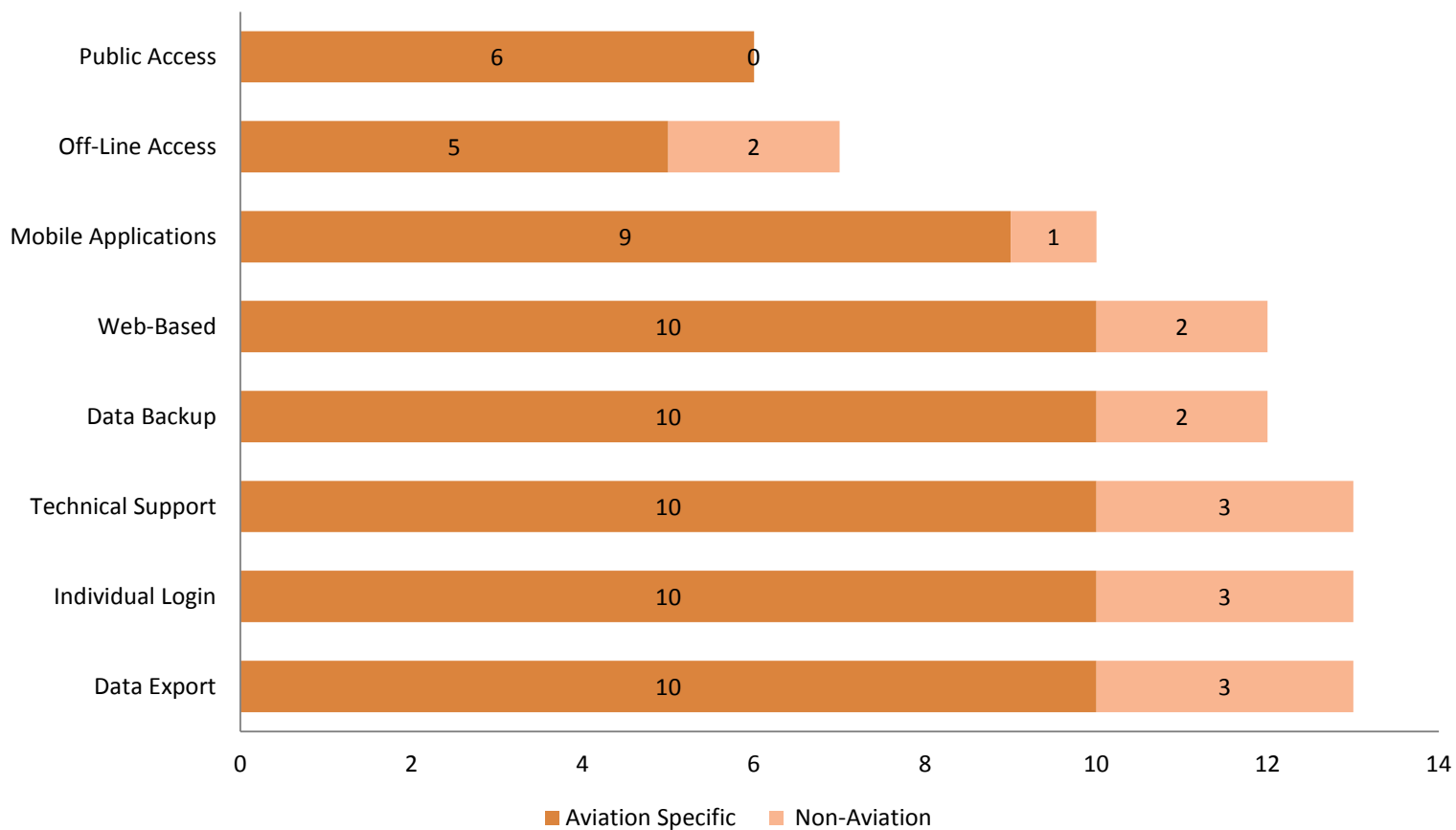
Safety Assurance
Audits
Incident/Accident Investigations
Trend Analysis
Trend Analysis: Mapping with GIS
Customizable Form
Hazard Mitigation Tracking

Safety Promotion
Communication with 3rd Parties
Internal Email Communication
Training Modules
Training Assessment Tools
Integration with a Learning Management System
Training Tracking for all Personnel
Dashboard
Must Read Alerts



Airport SMS Software Evaluation

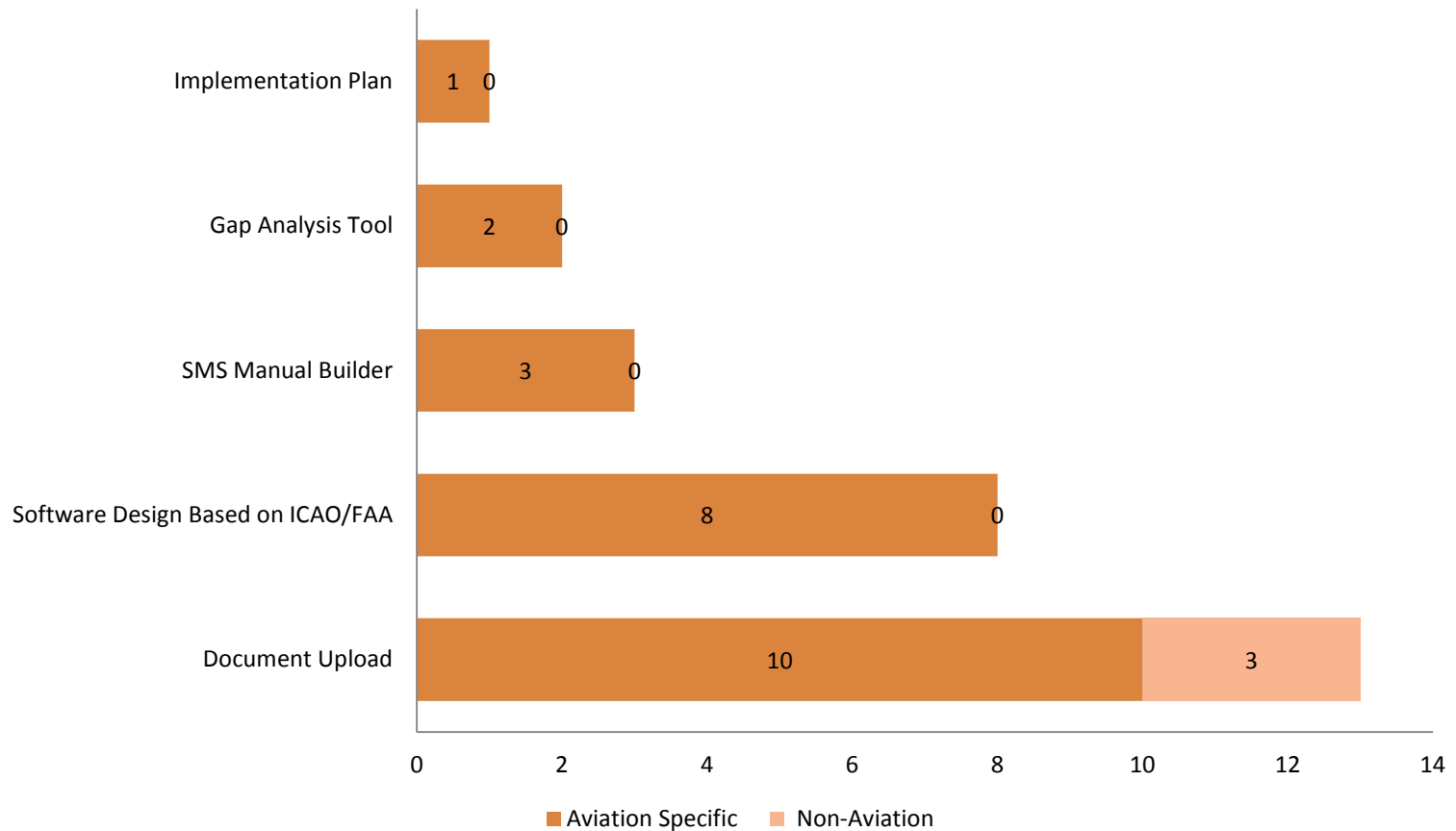
Administrative Capabilities





Airport SMS Software Evaluation

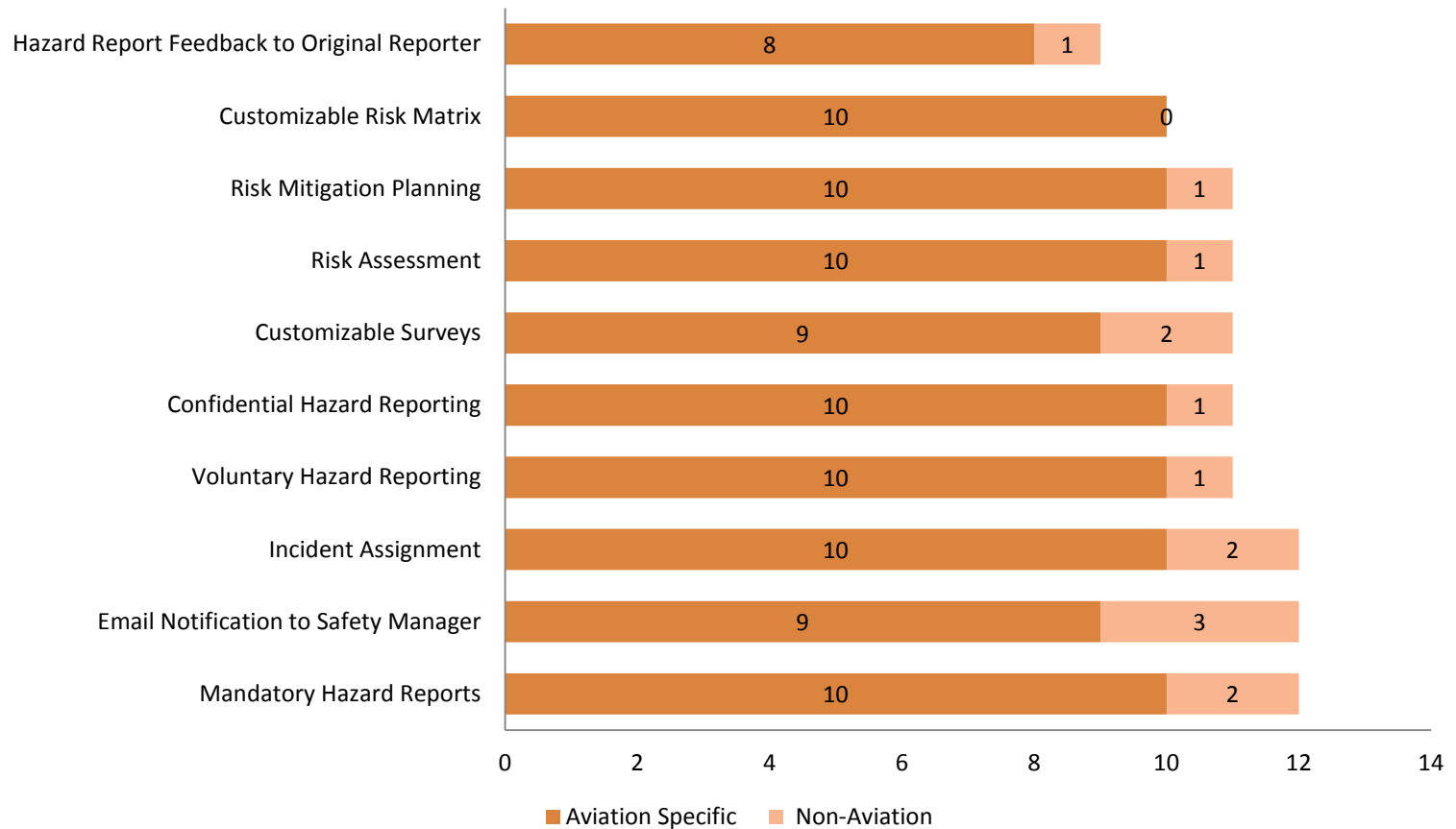
SMS Implementation and Policy Capabilities





Airport SMS Software Evaluation

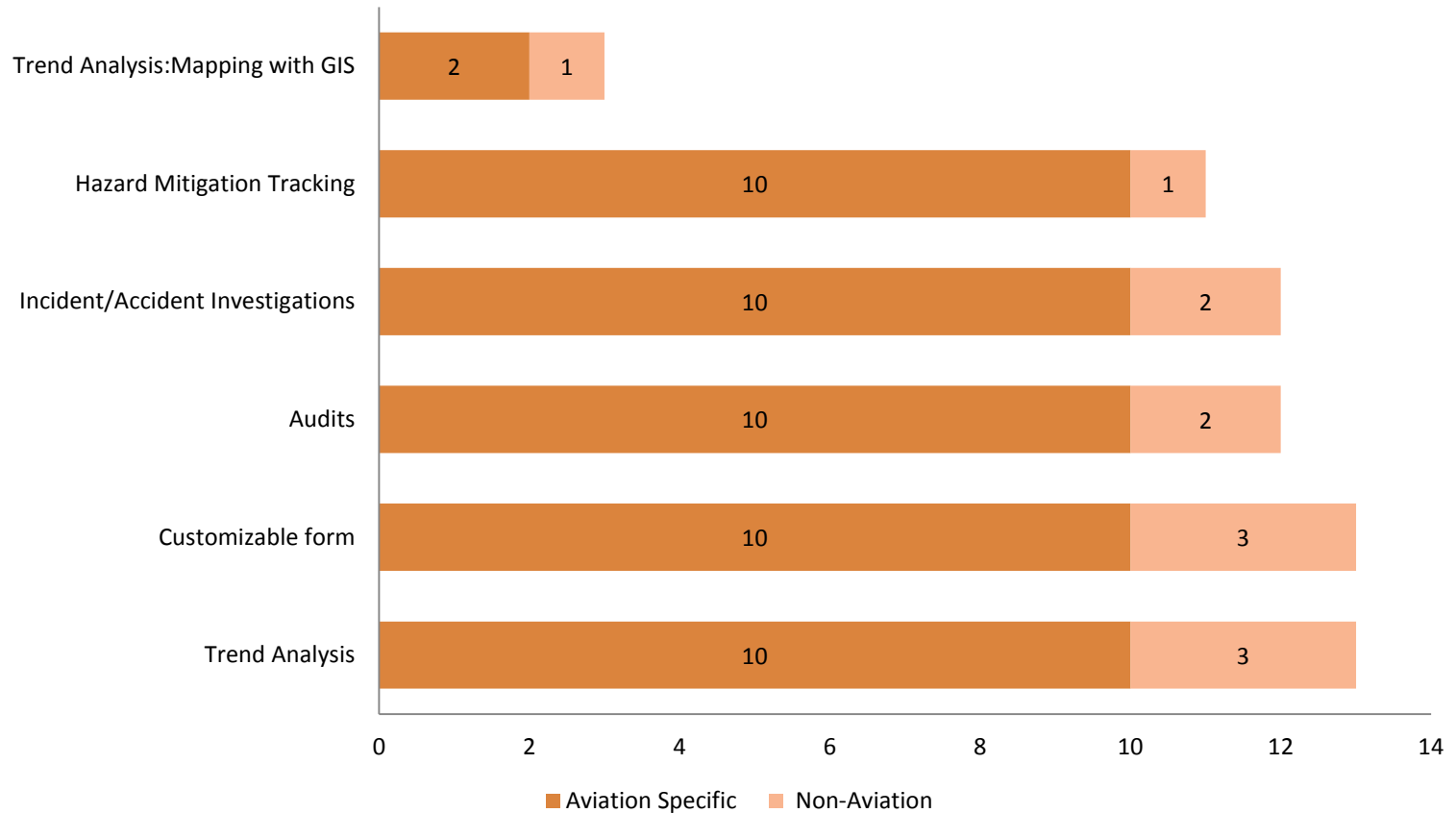
Risk Management Capabilities





Airport SMS Software Evaluation

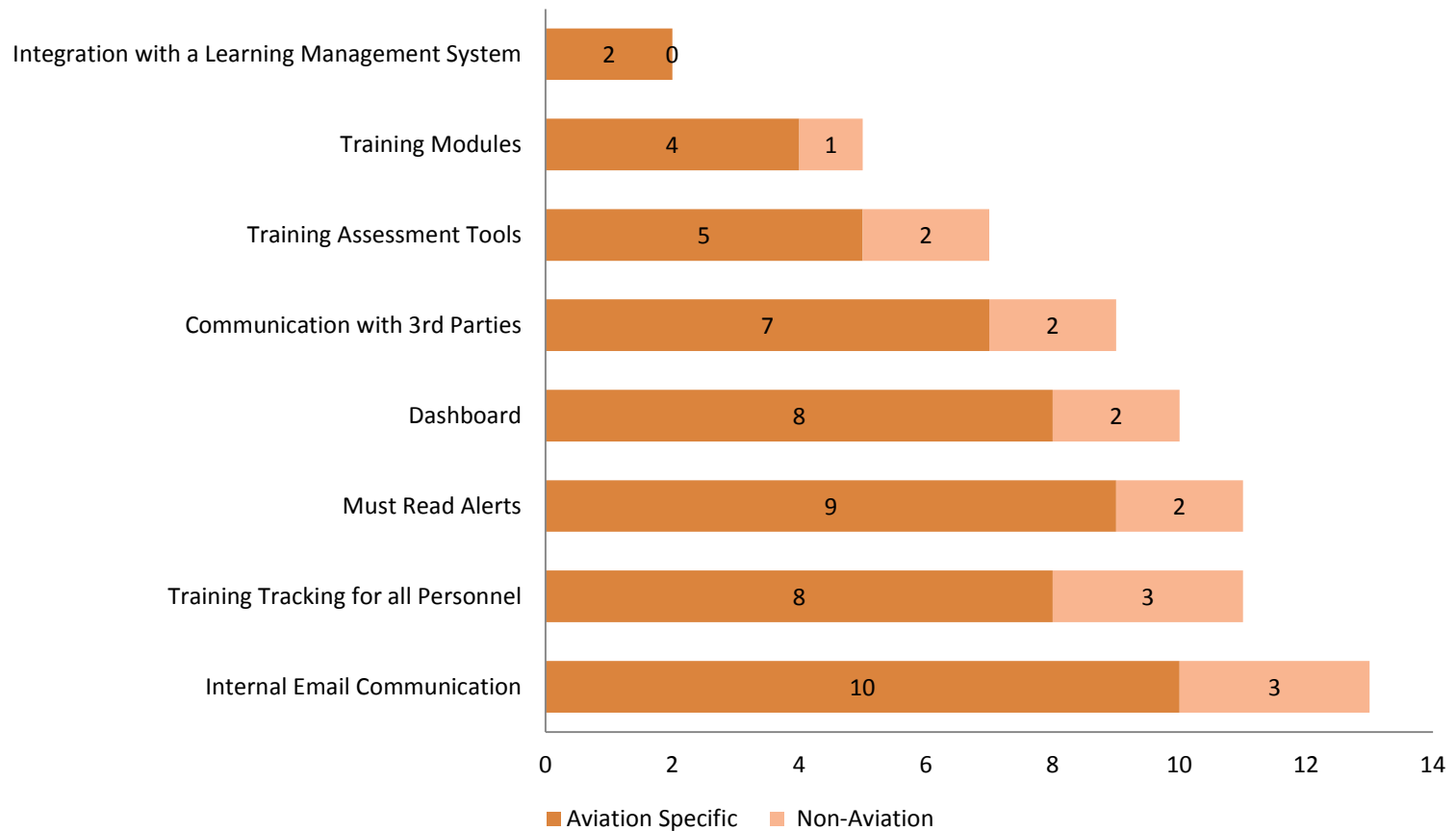
Safety Assurance Capabilities





Airport SMS Software Evaluation

Safety Promotion Capabilities



- Developed a survey to be distributed to 45 domestic civil airports
- Survey Purpose
 - Gauge the safety culture and Safety Management System implementation at airports

SMS programs are considered to encompass 4 primary components: Safety Policy, Safety Promotion, Safety Risk Management, and Safety Assurance.

Please select which components of SMS that your airport has developed and/or implemented over the last 5 years.
(multiple selections permitted)

- Safety Policy
- Safety Promotion
- Safety Risk Management
- Safety Assurance
- None of the Above

How would you describe your airport's transition from a traditional safety program to a more formal SMS program?

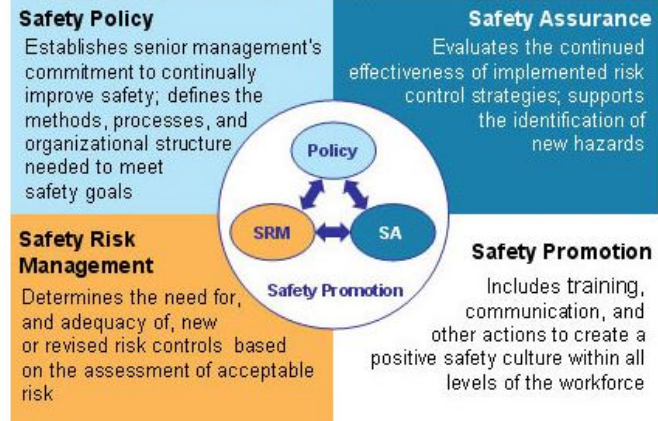
- We currently have a safety program, SMS is not currently under development
- We currently have a safety program, SMS is under development
- We are in the process of transitioning to an SMS program
- We have a fully implemented SMS program

Do you use computer software for any portion of your airport's safety or SMS program?

(This can include any form of software, including MS office products, other spreadsheet or database software, as well as specialized SMS software)

- Yes
- No

The Four SMS Components



- Survey Content
SMS Software Programs

Capabilities and Features

User Satisfaction

Which of the following commercially available SMS software product(s) do you use or SMS program?
(multiple selections permitted)

- AerOSDB SMS Safety Management System
- Aviation Safety Management System
- Aviation SMS Software
- AviSoft/AvStats
- AvSMS
- Integrated Safety Management Systems (ISMS)
- PRISM SMS
- Gael Ltd. Q-Pulse
- Q5SMS
- QPerfect IAMS (Integrated Aviation Management System)
- Quality SMS
- SMS Manager
- SMS Pro
- WBAT
- Software written in-house
- Specialized SMS software not used
- Other (please note brand name)

Please provide your inputs on the following possible capabilities of software that may be used in managing an airports safety or SMS program.
This question is highly important to the research. Completion of this question is most appreciated.

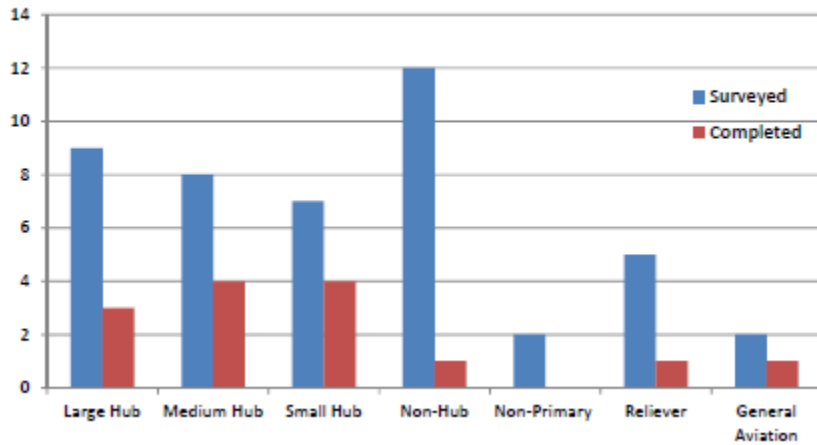
	Does your safety or SMS program use this capability in any software you may be using?		Would you consider this capability a "must have", "nice to have", or "not desired"?		
	Yes	No	Must Have	Nice to Have	Not Desired
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk mitigation tool	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
mapping / GIS capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety Policy Manual creation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dashboard views	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Custom risk matrix creation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Internal e-mail communications capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Incident assignment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Document / Report Sharing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Summary reporting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uploading of documents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Policy implementation plan creation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessed when "off-line"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk assessment tool	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exporting of Data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confidential Hazard Reporting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety trend analysis tool	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hazard Reporting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training assessment tools	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Integration with a training management system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessed via a user login	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Used by the public	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access from web browsers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data backup capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gap analysis tool	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
email notifications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hazard reporting feedback	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety Auditing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Product technical Support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Incident / Accident investigation tool	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3rd party communications capabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessed from a mobile device	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SMS training modules	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Custom hazard reporting form creation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Must read alerts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate how your SMS software product(s) meet the needs of your program with respect to the following characteristics.

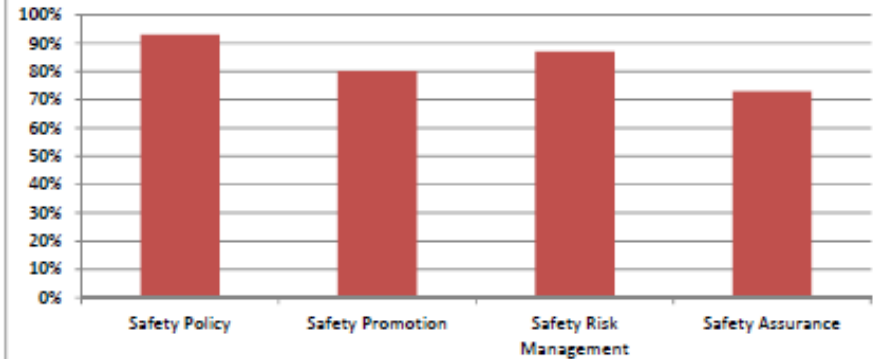
	Very Satisfied (5)	Satisfied (4)	Neutral (3)	Unsatisfied (2)	Very Unsatisfied (1)	N/A
Ease of Use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scalability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of installation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of updating software	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tech Support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Report Generation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training required to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data outputs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inputting of data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Operational Dashboards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Compatibility with other airport software	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall Satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- What works and what does not?

Airports by NPIAS Classification

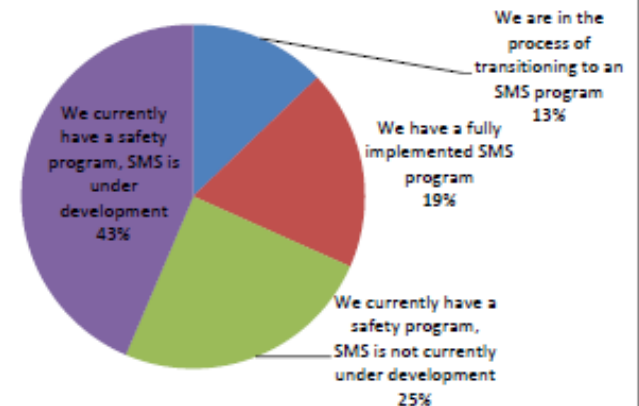


Percentage of Responding Airports that have or had implemented components of SMS over the last 5 years



- Responding airports—Mostly small/medium hubs (NPIAS classification) or Class I (14 CFR Part 139).
- Several airports continue to develop and implement SMS programs, while others have ceased implementation for now.

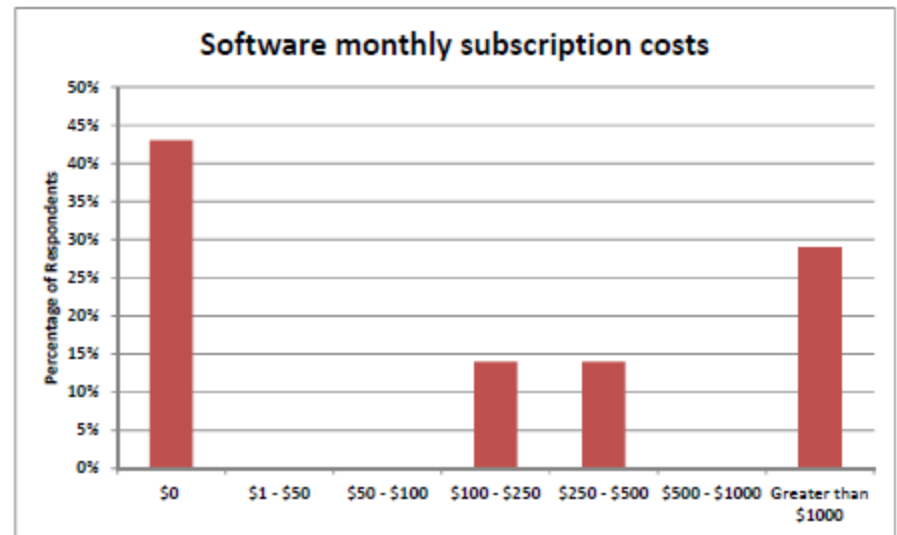
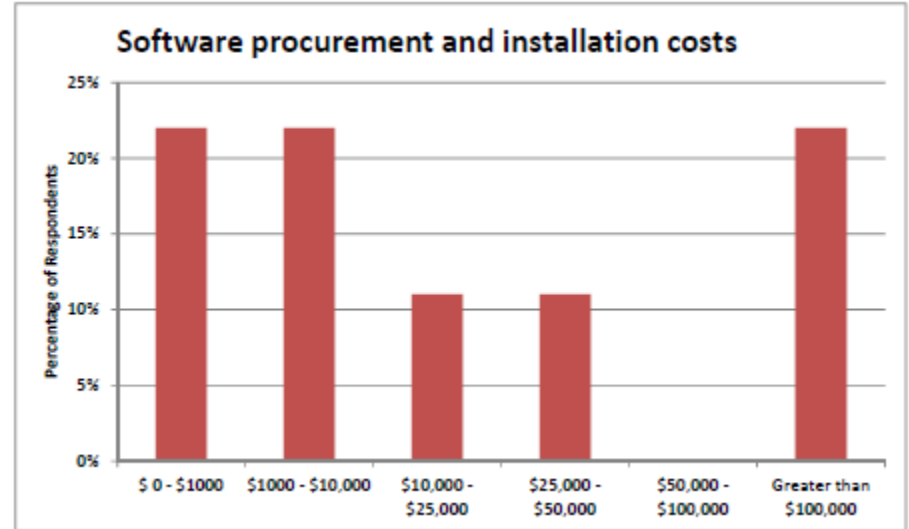
How Responding Airports described their levels of SMS implementation





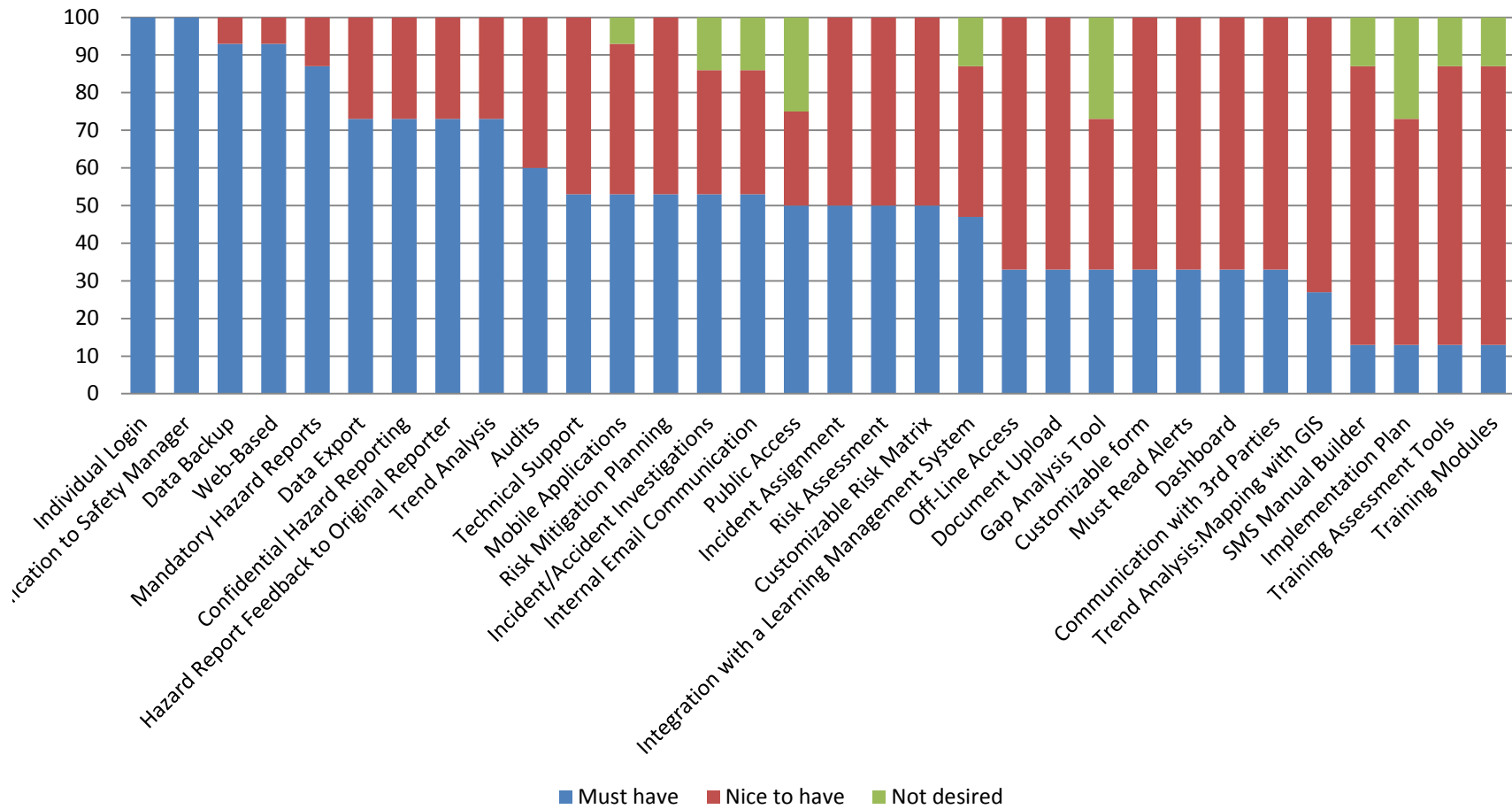
Survey Results

- Most airports had their softwares installed on a local network server, which was accessible from multiple computers on their network.
- Out of the 6 airports paying higher upfront costs, some were paying for in-house built software, while others paid for software products installed by vendors.
- Airports paying less upfront costs instead paid monthly subscription costs.
- About 9 airports said that SMS software was limited to only certain users.

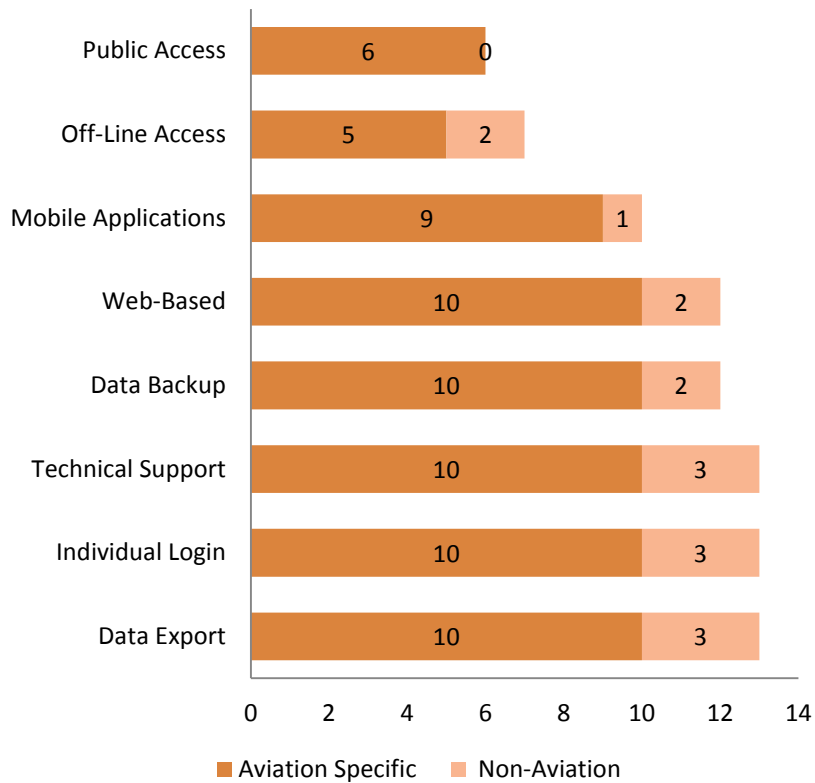




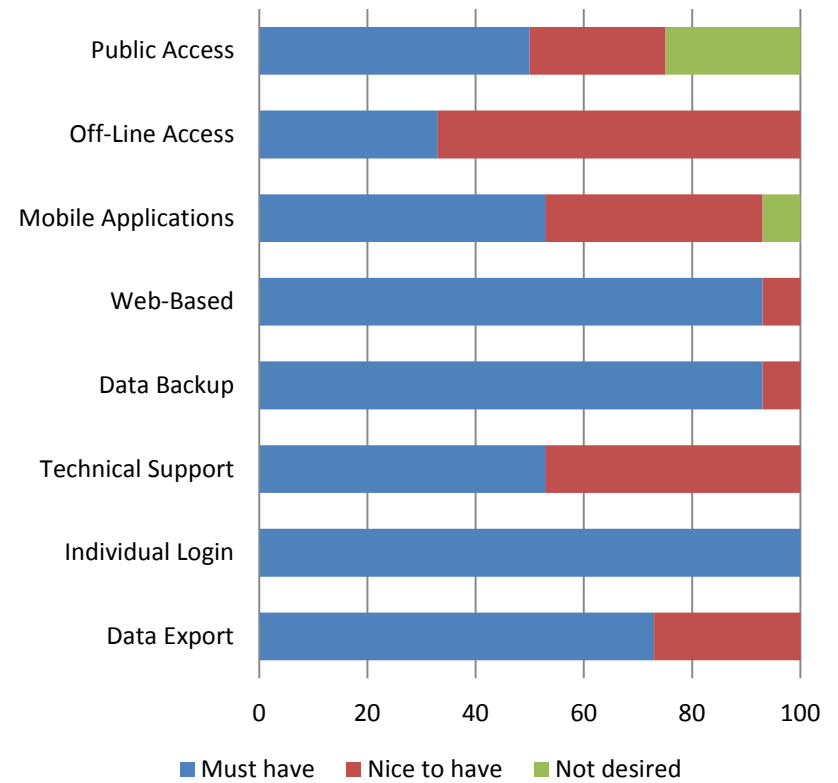
Analysis



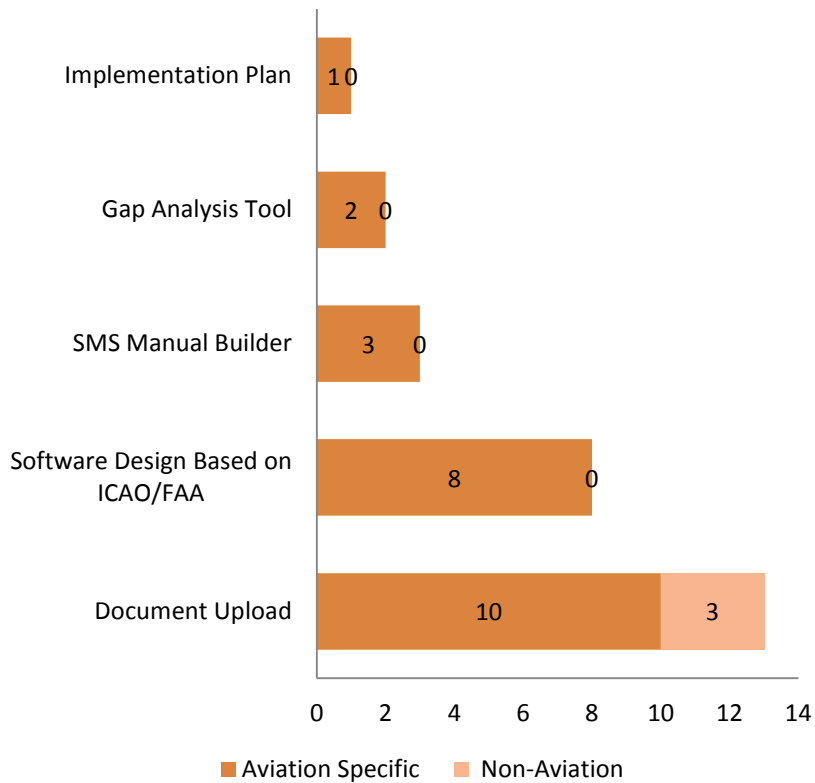
Administrative Capabilities



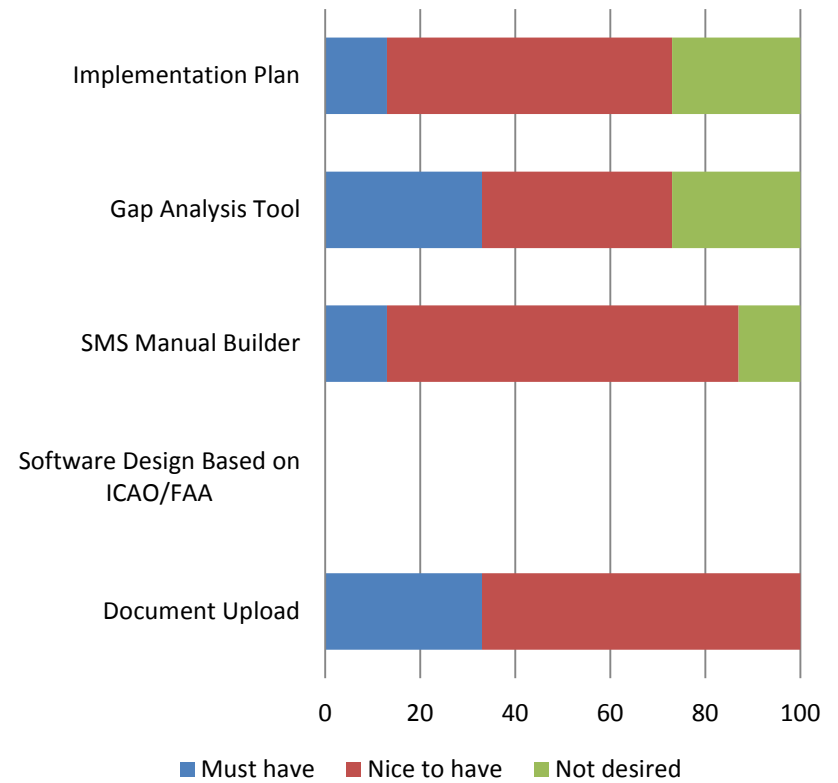
Reported Capability Necessity by Percent



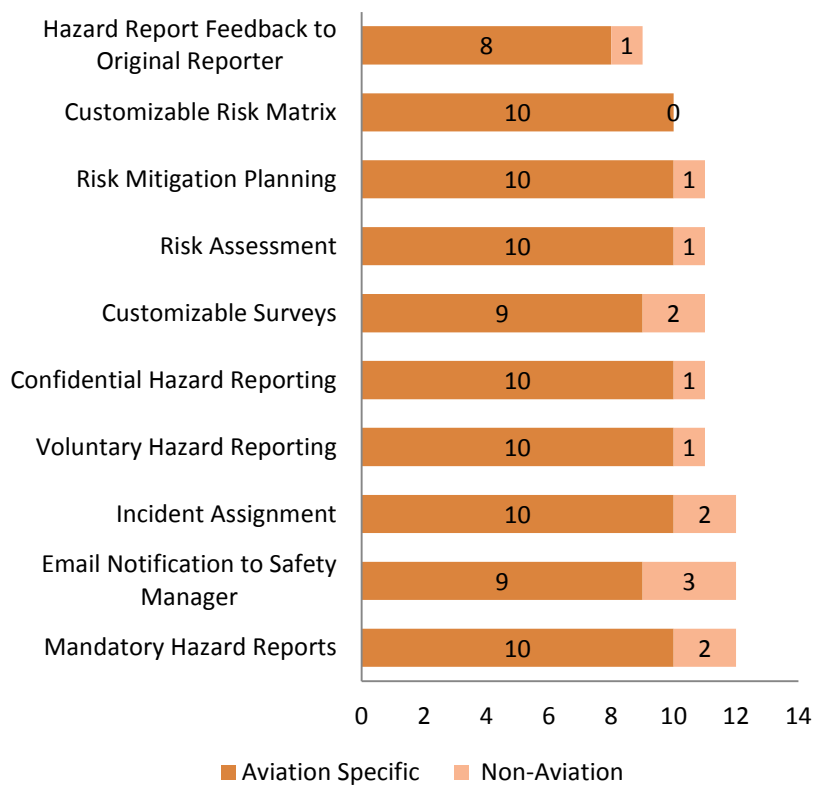
SMS Implementation and Policy Capabilities



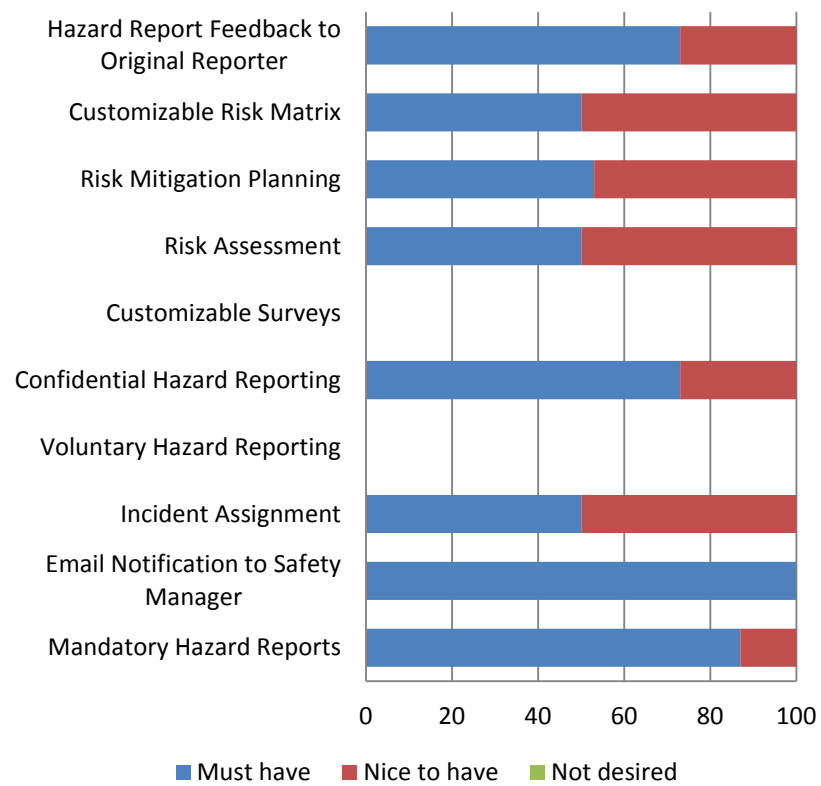
Reported Capability Necessity by Percent



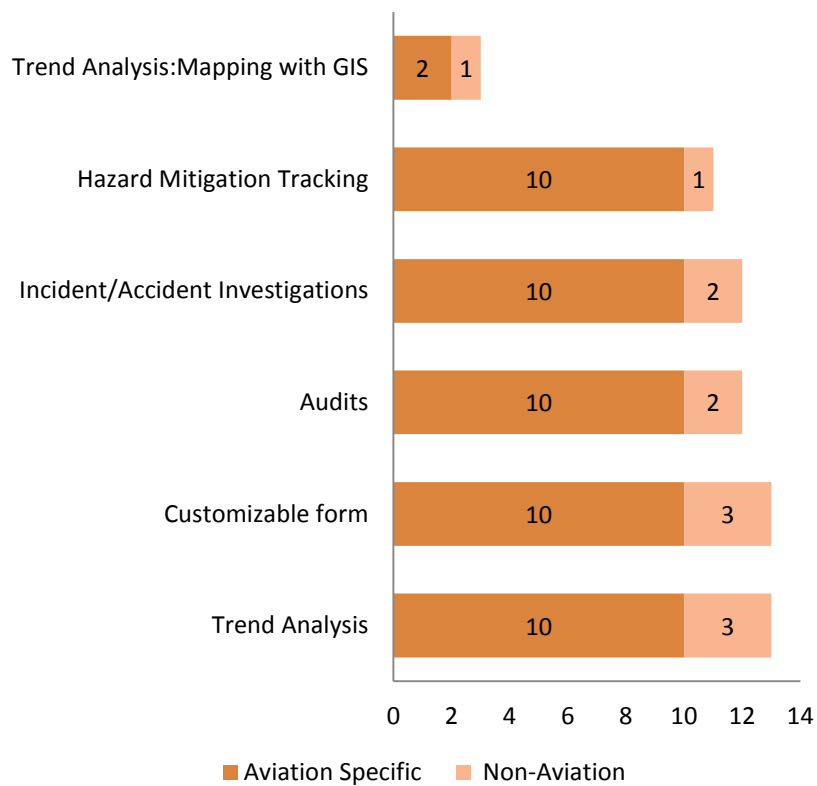
Risk Management Capabilities



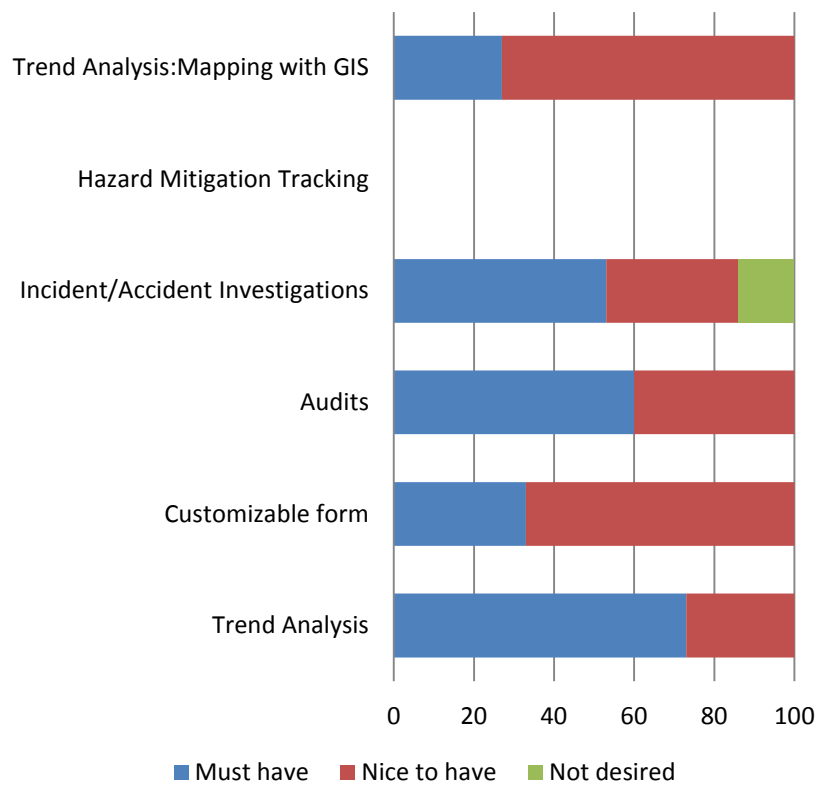
Reported Capability Necessity by Percent



Safety Assurance Capabilities

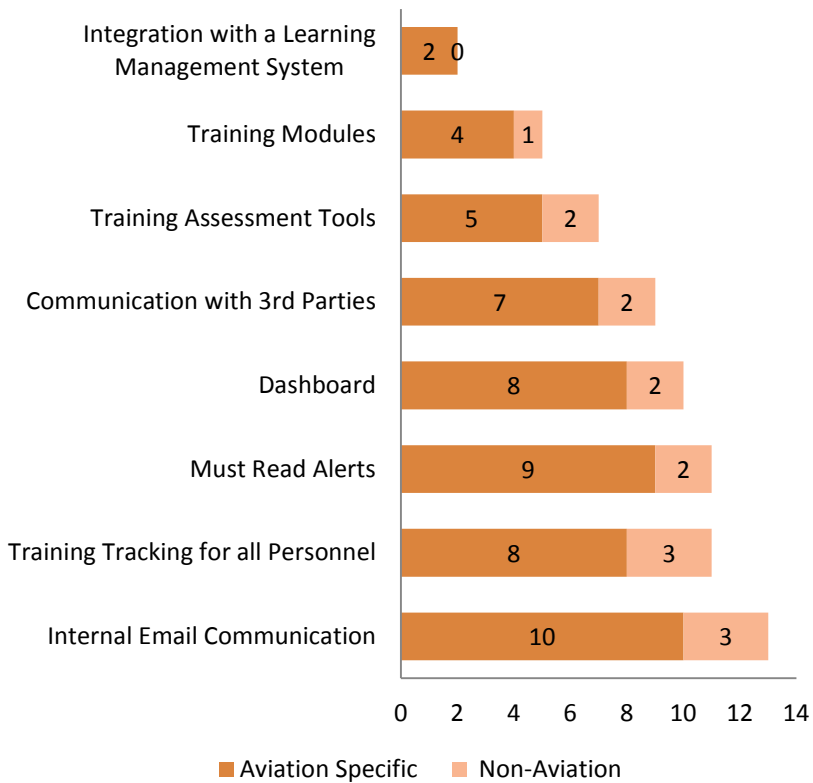


Reported Capability Necessity by Percent

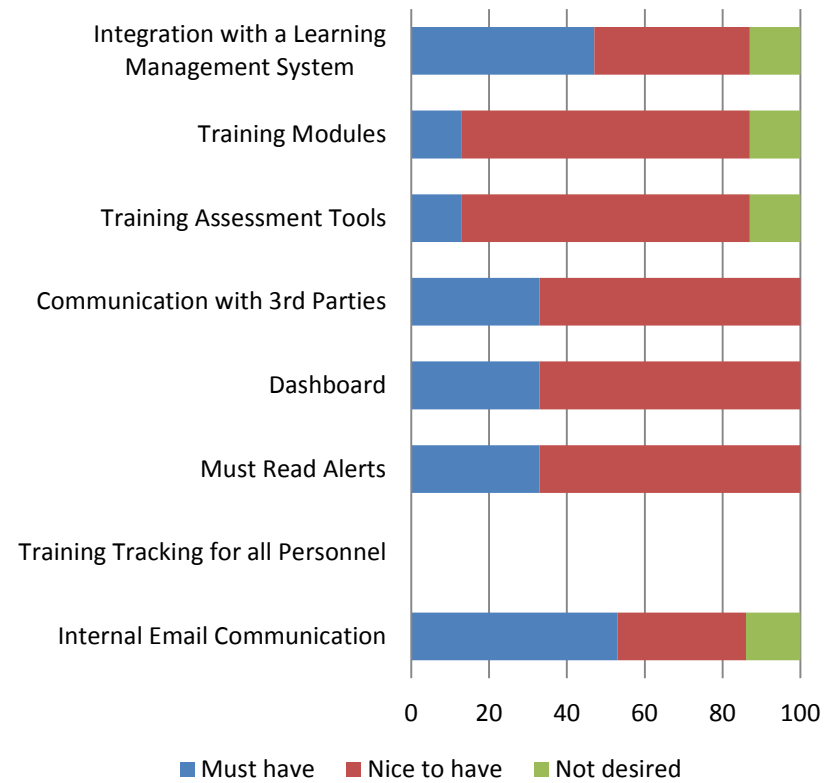




Safety Promotion Capabilities



Reported Capability Necessity by Percent





Thank you!
Questions?