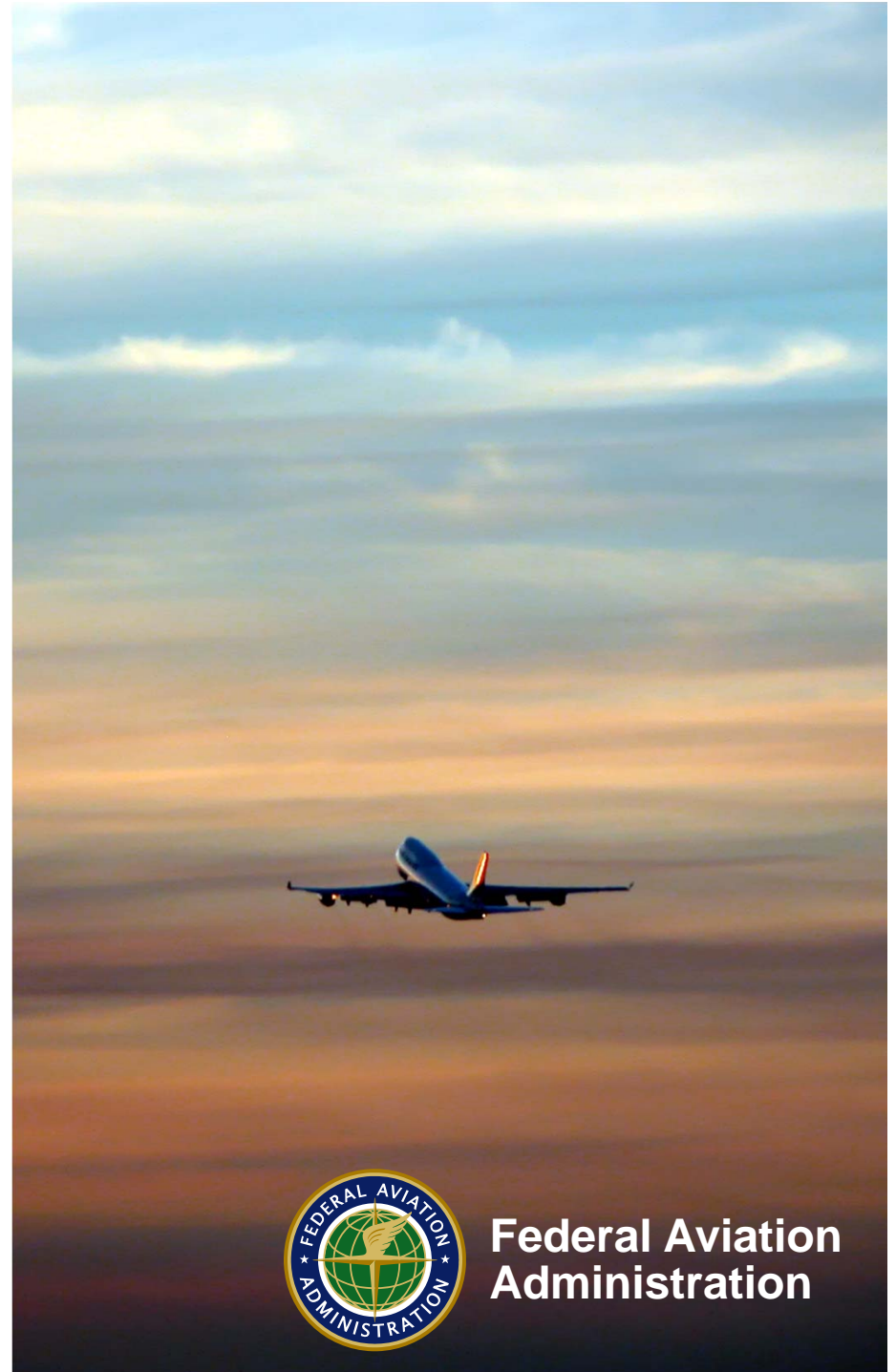# USOAP Critical Element 7
Surveillance Obligations

Presented to: ICAO NACC Region

By: Federal Aviation Administration

Date: February 20-24, 2017

Federal Aviation Administration

Critical Element 7

- **Surveillance Obligations**
  - The establishment of processes, such as inspections and audits, to **proactively** ensure that aviation license, certificate, authorization, and/or approval holders continue to meet the established requirements and function at the level of competency and safety required by the State to undertake an aviation-related activity for which they have been licensed, certified, authorized and/or approved to perform.
  - This includes the surveillance of designated personnel who perform safety oversight functions on behalf of the CAA.
- **The regulatory authority must conduct surveillance of air traffic services that is appropriate for the size and complexity of the aviation system**

What is a Surveillance Program?

- A **surveillance program** is a system of ensuring continuing organizational, as well as individual, professional competency of:
  - license/rating/certificate/approval holders;
  - continuing validity of licenses/ratings/certificates/approvals; and
  - continuing capacity to maintain a safe and regular operation

Applying CE 7 to Air Traffic Oversight

- **A surveillance program should:**
  - Be accomplished on a continuing basis
  - Be thorough
  - Ensure that the standards of a service provider's capability and competence are equal to or exceed those required at the time of original certification
  - Require the service provider to convincingly demonstrate that operations and/or maintenance are being conducted in accordance with requirements and manuals
  - Provide a comprehensive and conclusive assessment of the maintenance of competency (compliance)

Surveillance Strategies

Comprehensive
- Thorough – all requirements/all facilities
- Compliance focus
- Resource intensive

Risk-Based
- Adaptable
- Data-Informed
- Minimize redundancy
- Resource-friendly

Risk-Based Surveillance Program Goals

- Meet safety oversight responsibilities through a **performance-based**, **risk-focused**, and **data-supported** surveillance system

- **Proactively** identify hazards and risks related to mandatory requirements and weak controls

- Address **emerging** issues in the ANSP(s)

Strategies for Effective Surveillance

- **Standardization enables consistent surveillance**
- **Standardization strategies:**
  - Publish important processes and procedures and make them available to the entire organization
    - Examples: Surveillance Process, Audit Process, Compliance Process
  - Create an inspector handbook containing work instructions and job aids
  - Regularly review and update guidance documents
  - Integrate training and guidance documents

Developing a Surveillance Program

- Identify and Analyze Requirements
- Assess System Risk
- Prioritize Surveillance
- Monitor Compliance
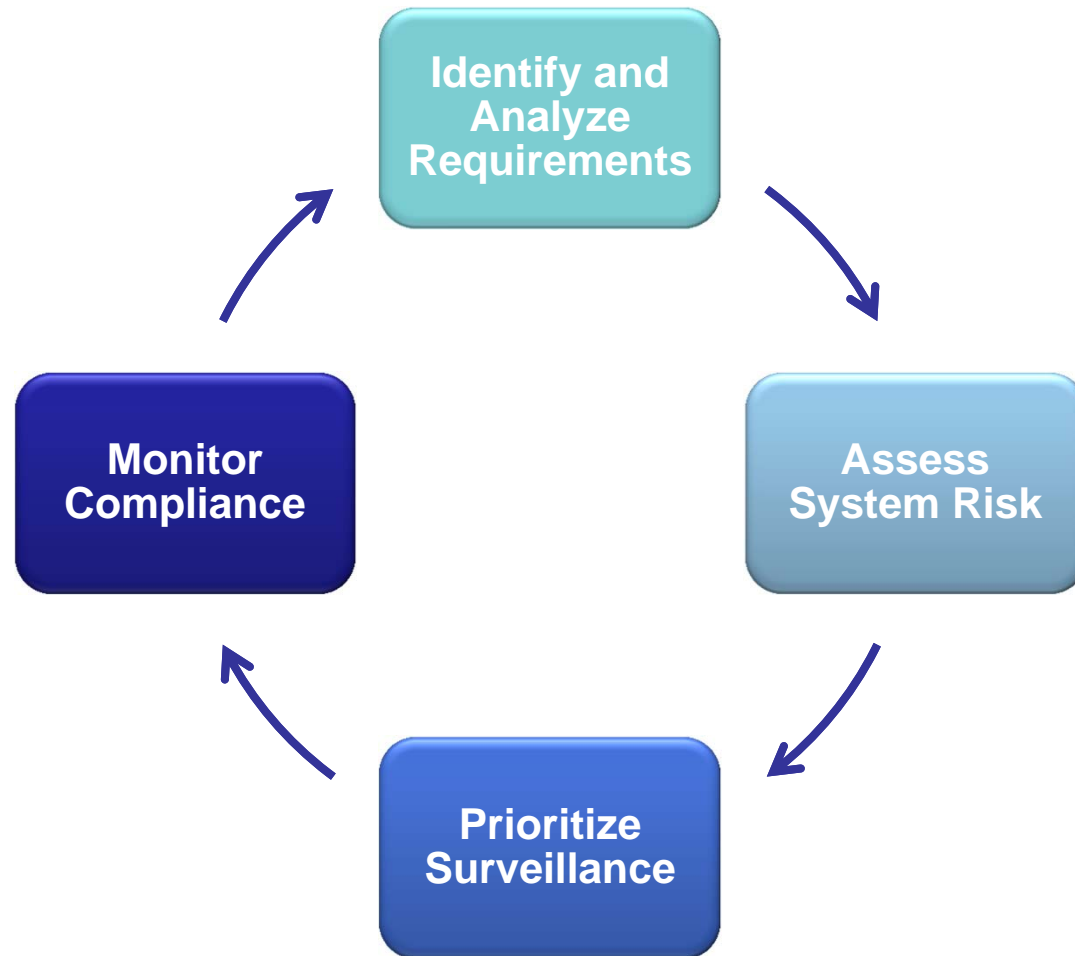
Identify Requirements

- **The process of reviewing requirements applicable to ANSPs enables regulators to focus and prioritize surveillance activities by:**
    - Becoming familiar with ANSP responsibilities
    - Identifying requirements applicable to ANSP(s)
    - Analyzing and prioritizing responsibilities/requirements

Identify Requirements

- **Map national statutes and CAA directives to ICAO Standards and Recommended Practices**
  - Identify specific requirements documents to establish a basis for surveillance
- **Prioritize responsibilities to focus surveillance activities**
  - Key questions to consider:
    - Where does the ANSP invest the majority of its resources?
    - Which services have the greatest potential safety impact on other aviation system users (e.g., pilots and passengers)?
    - Do other organizations also provide oversight of certain services? (avoid duplication)
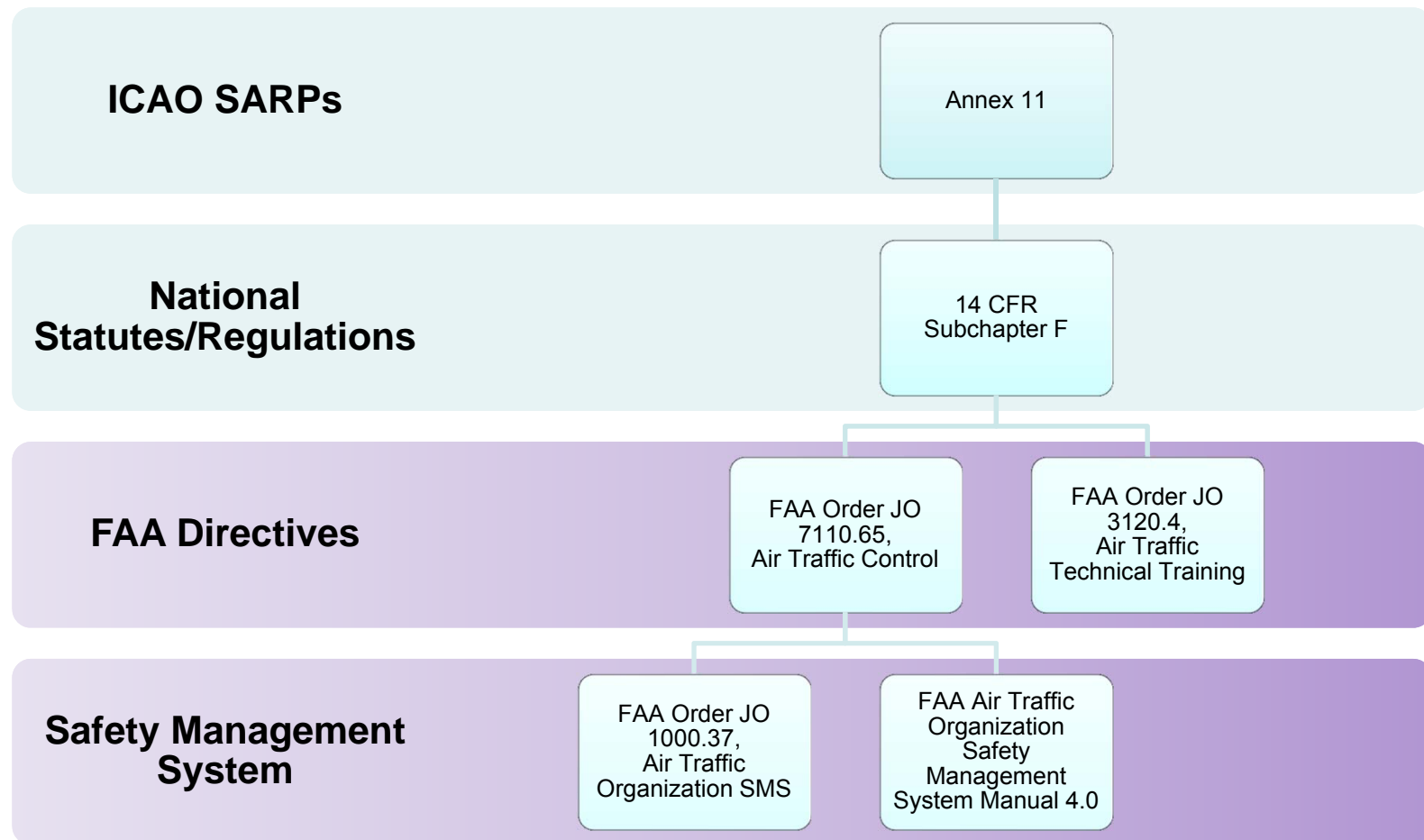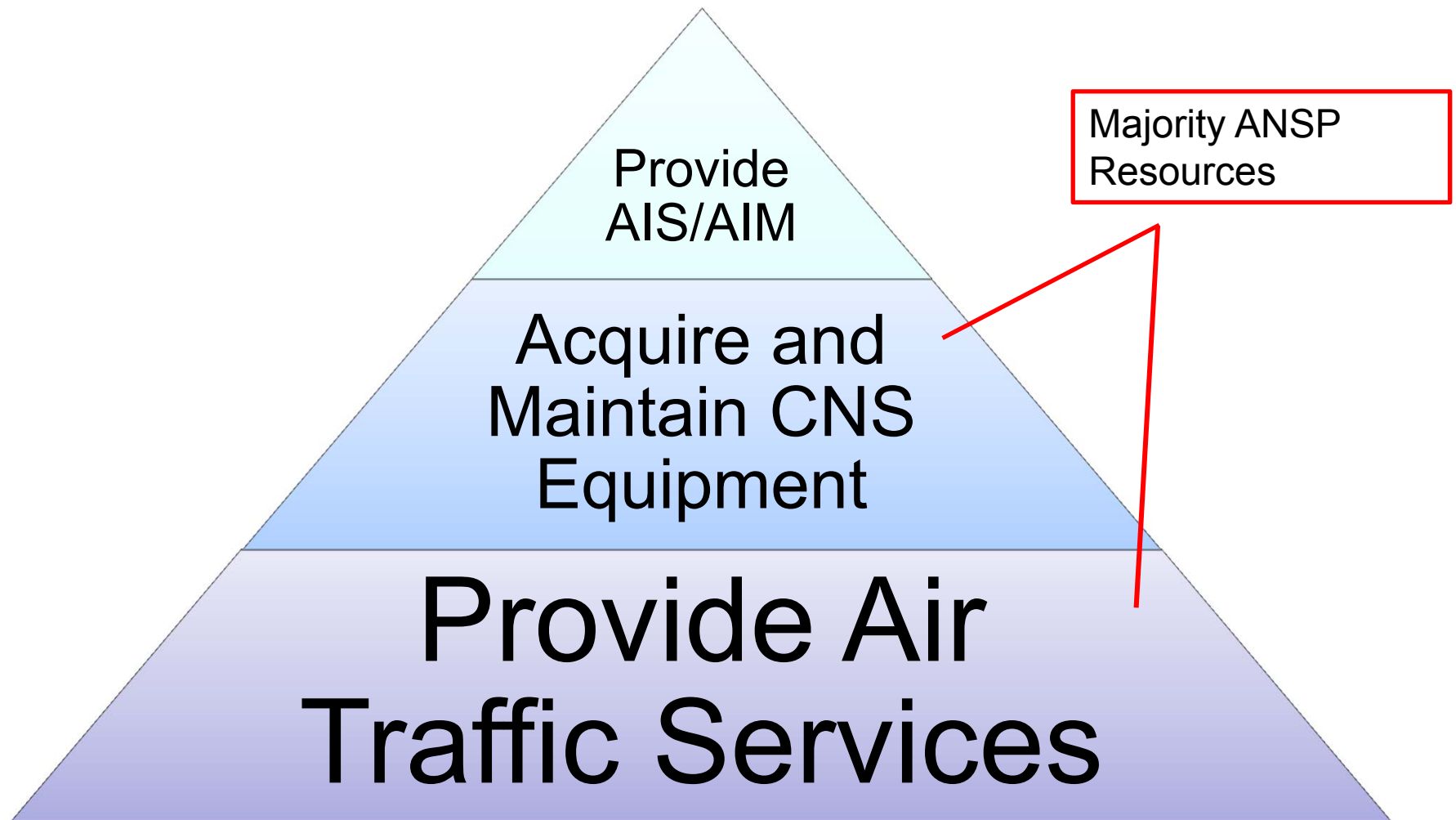
Identify Requirements

- **ANSP responsibilities may be documented in:**
  - ICAO Standards and Recommended Practices and complementary guidance documents
  - National statutes and regulations
  - Civil Aviation Authority directives
  - ANSP Safety Management System

FAA Example: ATS Requirements

ICAO SARPs	Annex 11
National Statutes/Regulations	14 CFR Subchapter F
FAA Directives	FAA Order JO 7110.65, Air Traffic Control / FAA Order JO 3120.4, Air Traffic Technical Training
Safety Management System	FAA Order JO 1000.37, Air Traffic Organization SMS / FAA Air Traffic Organization Safety Management System Manual 4.0

Prioritize Responsibilities

Provide AIS/AIM

Acquire and Maintain CNS Equipment

Provide Air Traffic Services

Majority ANSP Resources

FAA Example: Director's Intent

- **AOV has outlined the following guidelines for FY2017 (1 Oct 2016 – 30 September 2017) surveillance activities across the spectrum of ANS:**

Category	Resource Weight Target
Operations (Air Traffic Services and Technical Operations)	55%
Safety Management System/QA/QC	20%
Aeronautical Information Services	15%
Acquisitions/Human Factors	10%

Reminder: System Baseline

- **A surveillance program should ensure that the standards of a service provider's capability and competence are equal to or exceed those required at the time of original certification**
  - No ICAO requirement to certify ANSPs
  - "Original certification" = baseline for safety oversight
  - The system should be at least as safe as the baseline

Assess System Risks

- **Adopting a risk-based approach to safety oversight enables regulators to prioritize surveillance activities**

- **Effective risk assessment requires:**

  - ✓ A systems safety approach
  - ✓ Data collection and analysis
 - ✓ Risk classification

Data Collection & Analysis

- Robust **safety data collection and analysis** enables a systems safety approach
- **Effective data collection and analysis requires:**
  - Operational data
  - Safety oversight data
  - Data analysis
  - Trend identification

Developing a Systems Safety Approach

Operational data collection **+** Safety oversight data collection **+** Trend Identification **=** System Safety Risks
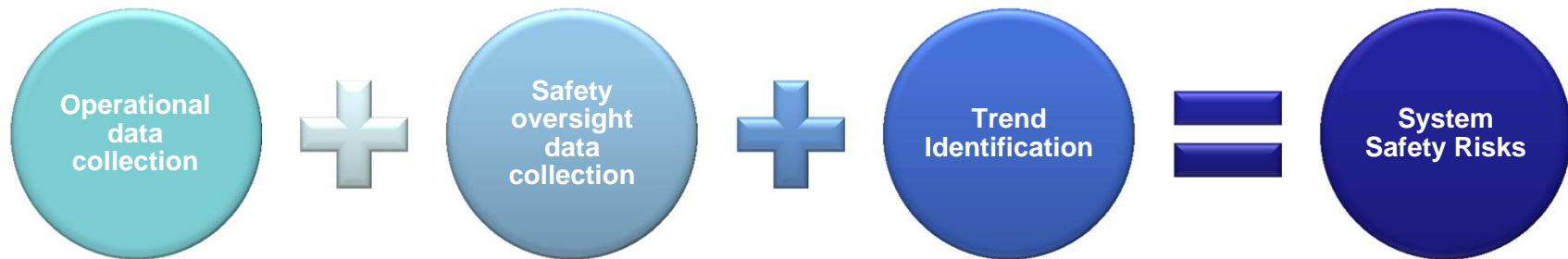
System Statistics

- Number of facilities
- Traffic volume
- Passenger enplanements

Safety Oversight Data

- Continuous monitoring – Service Delivery Points
- Audits, Assessments, Inspections, Investigations

Mandatory Occurrence Reports

- Accidents
- Serious Incidents
- Other occurrences

System Statistics

- **Capture statistics to understand system characteristics and provide context to operational data**
  - Traffic volume
  - Number of airports
  - Number of air traffic facilities
  - Passenger enplanements

Occurrence Reporting

- **Safety occurrence** is the term used to describe all events which have or could have significance in the context of aviation safety
  - Occurrences include:
    - accidents and serious incidents
    - incidents or events that must be reported
    - occurrences of lesser severity which, in the opinion of the reporter, could have safety significance

Reporting Requirements

- **States must:**
  - Establish and operate a mandatory incident reporting system to collect information about actual or potential safety hazards

- **Service providers must:**
  - Report to their national authorities all accidents or serious incidents of which they become aware
  - Develop and maintain within the scope of their SMS a formal process for collecting, recording, acting on and generating feedback about hazards in operations

SKYbrary: Safety Occurrence Reporting (http://www.skybrary.aero/index.php/Safety_Occurrence_Reporting)

Mandatory Reporting

- **Operational personnel are required to report accidents and certain types of incidents**
  - The objective of mandatory occurrence reporting is to prevent safety occurrences, not to attribute blame or liability if they happen

- **The reporting process should be:**
  - As simple as possible
  - Well documented, including details as to what, where, when and to whom to report

- **Reports must be available to regulators!**

SKYbrary: Mandatory Occurrence Reporting (http://www.skybrary.aero/index.php/Mandatory_Occurrence_Reporting)

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Example: EUROCONTROL ESARR2

- **ESARR2 establishes a minimum list of ATM-related occurrences to be reported:**

Near Collision Incidents			
Separation minima infringement	Inadequate separation	Near-CFIT	Runway incursion where avoiding action was necessary
Potential for Collision or Near Collision			
Runway incursions where no avoiding action is necessary	Runway excursion	Aircraft deviation from ATC clearance	Aircraft deviation from applicable ATM regulation
ATM-specific Occurrences			
Inability to provide ATM services	Failure of Communication function	Failure of Surveillance function	Failure of Data Processing and Distribution function
Failure of Navigation function	ATM system security		

SKYbrary: ESARR2-Reporting and Assessment of Safety Occurrences in ATM (http://www.skybrary.aero/index.php/ESARR2)

FAA Example: Mandatory Reports

The Air Traffic Safety Oversight Service requires the Air Traffic Organization to measure the following:

- ATC operational error rates
- Operational deviation rates
- ATO-related accident rates
- Pilot deviations (ATC contributed)
- Losses of standard separation
- Runway incidents (runway incursion rates at controlled airports)
- Near mid-air collisions

- Missed equipment preventative maintenance
- Expired equipment certifications
- Missed periodic flight inspections
- Failure to mitigate high risk hazards identified as part of a safety assessment
- Results of internal audits and surveys

Other Sources of System Information

- Voluntary safety reports
- Reports of unsafe conditions in daily operations
- External safety recommendations (e.g., AIG authority)
- Internal audits (ANSP QA) and prior audits by oversight organization
- ANSP safety analysis that accompanies proposed implementation of new system or procedure

FAA Example: ATO Safety Report

- **Daily "state of the system" briefing**
  - E-mail message distributed each morning
- **The daily Safety Report highlights significant/noteworthy incidents and activities, including:**
  - Accidents
  - Operational incidents
  - Follow-up activities
  - Accident investigation activities

Data Analysis

- **Safety data such as system statistics and occurrence reports should be collected for easy reference and analysis**
  - Create a safety oversight information database
    - Require ANSP to provide access to safety performance monitoring database(s)
    - Require ANSP to provide daily safety reports
- **Consider supplementing operational data with additional information**
    - Meteorological forecasts/reports
    - Aeronautical information products

Trend Identification

- **Trend analysis** is the practice of collecting information and attempting to spot patterns

- **Examination of safety data to identify trends:**

  - Enhances visibility of safety issues at particular airports, ATC facilities, or among groups of operational personnel

  - May predict future events or occurrences

Trend Identification Strategies

- **Detect undesirable trends through analysis of system data**

  - Generate periodic trend reports (charts, graphs, etc.)

- **Analyze airspace, facilities, and operations**

  - Which are the:

    - busiest airports, airways, and airspace segments?

    - most complex airports and airspace?

   - most commonly used and/or complex procedures?

Trend Identification Strategies

- **Collate and compare data to identify interrelationships**
  - Which facilities/locations report the most occurrences?
  - Are there similarities among the occurrences?

- **Use identified trends to inform surveillance decisions**
  - Trends may indicate risks:
    - at individual facilities or groups of facilities
    - in inadequate (weak) or missing requirements

Prioritize Surveillance

Focus surveillance activities

Air Navigation Services Provision
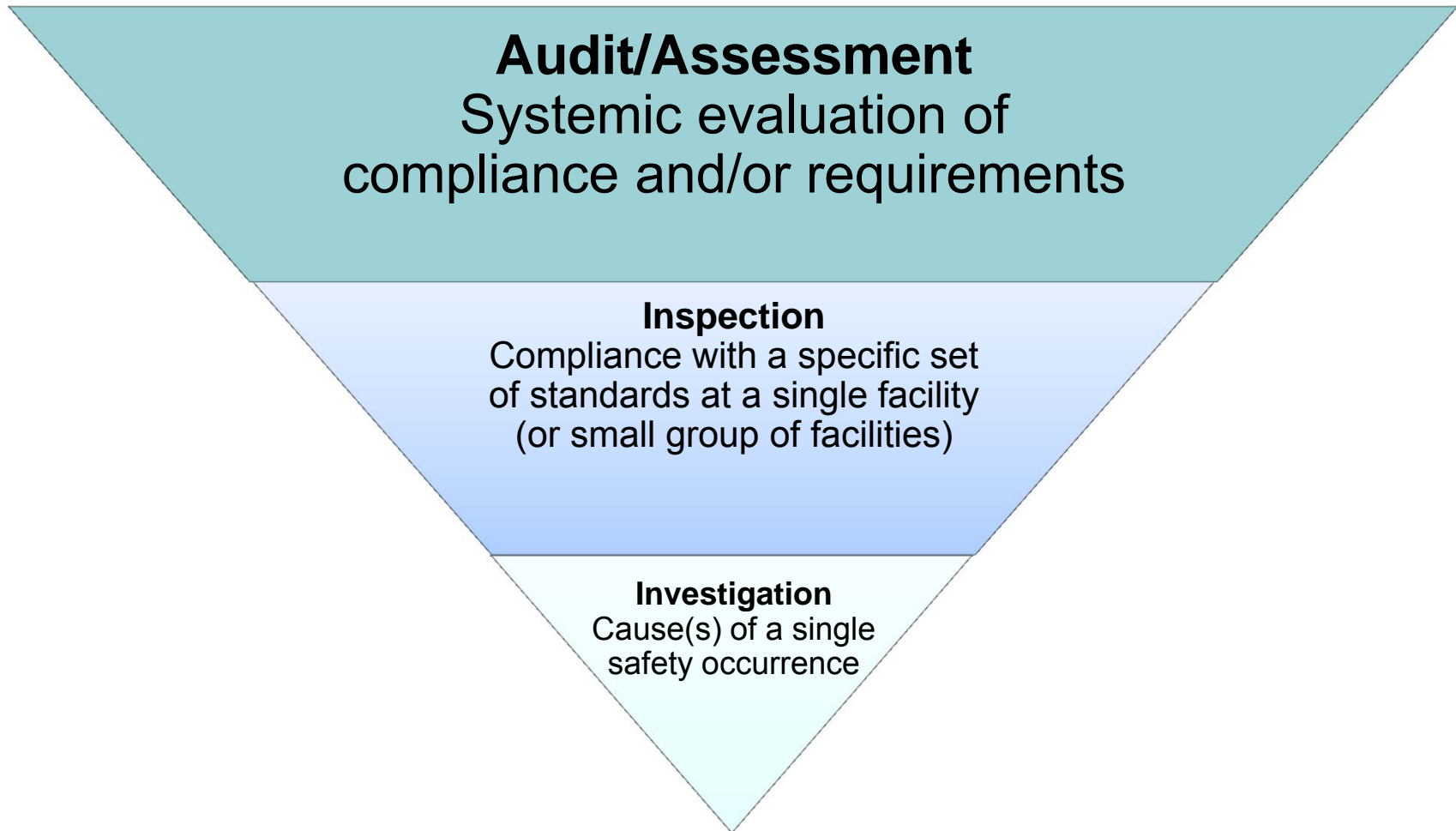
Safety Risk
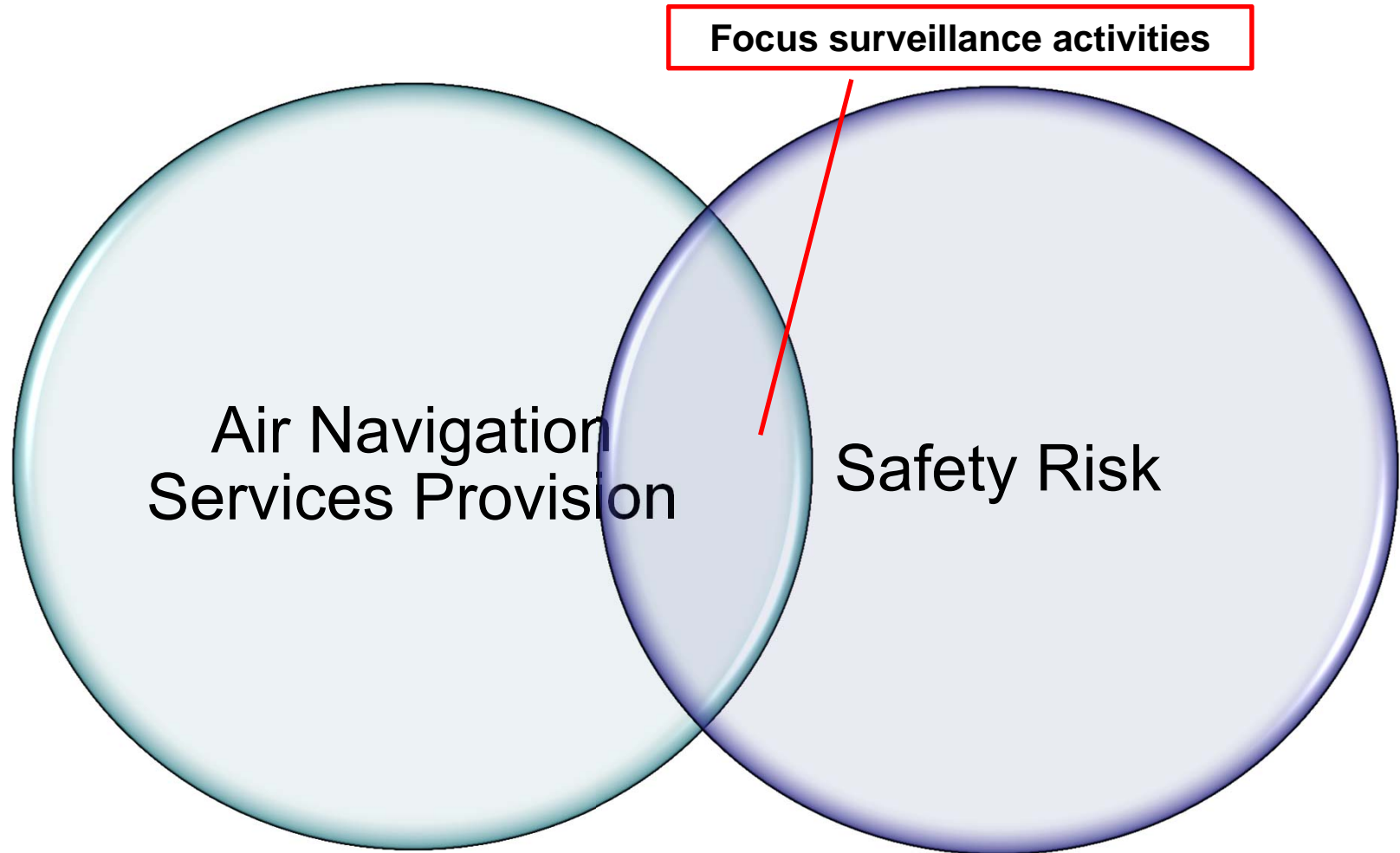
Surveillance Techniques

- **Common safety oversight surveillance techniques include:**
  - Audits
  - Inspections
  - Assessments
  - Investigations

Surveillance Techniques

Audit/Assessment
Systemic evaluation of
compliance and/or requirements

Inspection
Compliance with a specific set
of standards at a single facility
(or small group of facilities)

Investigation
Cause(s) of a single
safety occurrence

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Surveillance Techniques

- **Audits** are conducted in order to assess the degree of compliance with applicable safety regulatory requirements and with procedural provisions of a Safety Management System[1]
  - Audits are systematic, critical evaluations based on obtaining and analyzing objective evidence
- **Assessments** judge the significance, worth, or quality of a standard, process, practice or procedure
  - Assessments take into account inadequate requirements

[1]SKYbrary: Safety Audits (http://www.skybrary.aero/index.php/Safety_Audits)

Surveillance Techniques

- **Investigations** may be conducted to determine the cause(s) of a safety occurrence
  - The objective of an investigation is to prevent future occurrences
  - Investigations may:
    - Help to understand the events leading up to an occurrence
    - Be used to make safety recommendations[1]

- **Inspections** are conducted to evaluate compliance with a specific set of standards
  - Inspections may be shorter and less formal than audits

[1]SKYbrary: Safety Occurrence Investigation (http://www.skybrary.aero/index.php/Safety_Occurrence_Investigation)

FAA Example: Surveillance Techniques

- **The Air Traffic Safety Oversight Service uses the following surveillance techniques:**
  - Targeted Inspections
  - Investigations
  - Risk-focused system Audits and Assessments
  - Continuous Monitoring*

FAA Example: Inspections & Investigations

- **Targeted Inspections** are tailored to a particular topic or facility
  - Generally planned in response to an event (accident, incident, etc.)
  - May be scheduled or "no-notice" (unscheduled)
  - Useful in determining whether compliance issues identified during continuous monitoring activities are likely to be isolated or system-wide

- **Investigations** are conducted to evaluate possible non-compliance issues identified outside of an audit or assessment

FAA Example: Prioritization Model

- The Air Traffic Safety Oversight Service **Safety Risk Prioritization (SRP)** process establishes a standardized method to prioritize safety issues and allocate resources
  - The **Risk Analysis Valuation (RAV)** is not a direct assessment of operational risk (i.e. accident/incident or collision prediction) but is valuable in comparing similar surveillance activities
  - SRP includes five steps:

| Determine Severity | Determine Likelihood | Determine RAV | Apply to Surveillance Activities |

FAA Risk Analysis Valuation

- The RAV is a numerical rating framework used for oversight prioritization and resource allocation (distribution of time, personnel, cost, or other assets)

Severity / Likelihood	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
Frequent A	Low	Medium	High	High	High
Probable B	Low	Medium	High	High	High
Remote C	Low	Medium	Medium	High	High
Extremely Remote D	Low	Low	Medium	Medium	High
Extremely Improbable E	Low	Low	Low	Medium	High* / Medium

0.8	1.6	2.4	3.2	4.0
0.7	1.5	2.3	3.0	3.8
0.6	1.3	2.0	2.7	3.3
0.5	1.0	1.5*	2.0	2.5
0.0	0.0	0.0	0.0	2.5 / 2.0

FAA Example: Using the RAV

- **The Air Traffic Safety Oversight Service uses the RAV in:**
  - Developing audit proposals
  - Evaluating audit findings
  - Reviewing proposed system changes for approval, acceptance, or concurrence

Monitor Compliance

- **A surveillance program ensures consistency in the application of requirements by means of:**

  - Monitoring ANSP operations to determine compliance with established standards, rules, and directives

  - Safety audits, inspections, and assessments of ANSP operations and system processes

   - This includes follow-up surveillance to ensure resolution of identified safety issues

FAA Example: Continuous Monitoring

- **Continuous monitoring** is performed by field inspectors
- **Continuous monitoring activities include:**
  - Maintaining an in-depth knowledge of facility procedures, requirements, and operations
  - Developing professional relationships with counterparts in the field
  - Interacting with other Air Traffic Safety Oversight Service specialists to collaboratively discuss issues or concerns
  - Conducting safety oversight at the field-facility level
    - Reviewing and analyzing data from assigned facilities
    - Identifying facility-specific risks
    - Monitoring equipment and maintenance procedures
    - Monitoring trends and indicators

FAA Example: SOOP Model

Safety Operations Oversight Program
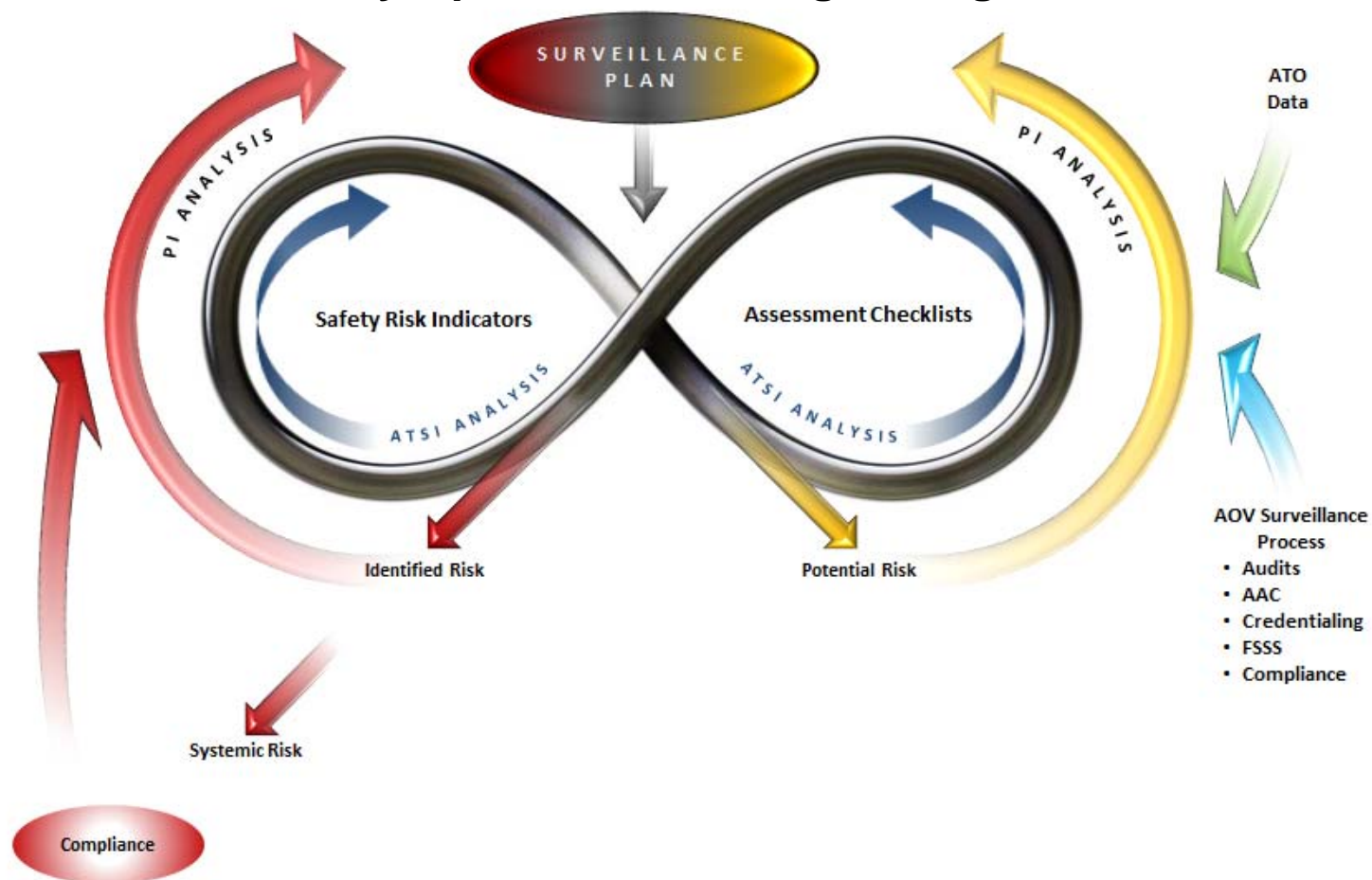
Risk Indicators

- **High consequence**
  - Related to high consequence occurrences, such as accidents and serious incidents
  - Reactive indicators

- **Lower consequence**
  - Related to lower consequence occurrences, such as incidents and deviations
  - Proactive/predictive indicators

FAA Example: Risk Indicators

- **Developed based on facility assessment checklists**
  - Linked to requirements documents
  - Periodic assessments by field inspectors
  - Captured in database

	Personnel	
PER-01	Fatigue from Overtime	Beta Testing
PER-02	Rapid Downsizing or Understaffed Facility (StaffControllers)	Beta Testing
PER-03	On The Job Training Ratio – (Staffing Ratio-CPC to Developmental)	Beta Testing
PER-04	Employee/Controller Morale	Not Usable for Beta-Test
PER-00	Safety Culture - SMS	TBD
	Equipment	
EQI-01	Availability and Reliability of Facility Equipment	Beta Testing
EQI-02	Equipment Capability and Limitations	Not Usable for Beta-Test
	Procedures	
PRO-01	Airspace or Procedural Changes	Beta Testing
PRO-02	Airport and/or Airspace Complexity/Configuration	Beta Testing
PRO-03	Midnight Operations	Beta Testing
PRO-04	Traffic Mix	Beta Testing
PRO-05	Flight Schools (and Parachute Operations)	Beta Testing
PRO-06	Uncommon Operations – Seasonal Traffic, Military Exercises	Beta Testing
PRO-07	Traffic Decreases or Increases	Beta Testing
PRO-08	Construction Within the Airport Environment	Beta Testing
PRO-09	Facility Construction	Not Usable for Beta-Test
	Event Reporting, Compliance and Accountability	
ECA-01	Compliance Issues (C1, C2, or C3) - (Corrective Action Plans *CAP*)	Beta Testing
ECA-02	Risk Analysis Events (RAEs)	Beta Testing
ECA-03	Frequency of visits for Audits/Inspections	Beta Testing
ECA-04	POI - Assessment Checklist Ratings (Need validated facility assessment data in order to fill out this RI)	Not Usable for Beta-Test

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FAA Example: Risk Indicators

Risk Analysis Event – A loss of standard separation occurrence that has a MOC with less than 66% required separation maintained

Risk Score	Inspector Considerations
1–2	• The facility has had no medium risk RAEs in the last 12 months. • The facility has decreased the number of RAEs, or has increased by 10% or less when comparing last quarter's RAEs with the same quarter of the previous year.
3–5	Concern exists due to considerations such as: • The facility has had medium risk RAEs, yet they do not occur more frequently than once per 100,000 operations or three months (whichever occurs first). • The facilities number of RAEs has increased by greater than 10% but less 25% when comparing last quarter's RAE with the same quarter of the previous year.
6–7	Concern exists due to considerations such as: • The facility has had a high risk RAE in the last three years. • The facility has had medium risk RAEs occur more frequently than once per 100,000 operations or three months (whichever occurs first). • The facilities number of RAEs has increased by more than 25% when comparing last quarter's RAE with the same quarter of the previous year.

FAA Example: SDPr

Service Delivery Point repository

References

- **FAA Order JO 7210.632, Air Traffic Organization Occurrence Reporting**
- **ICAO Safety Oversight Manual, Doc 9734**
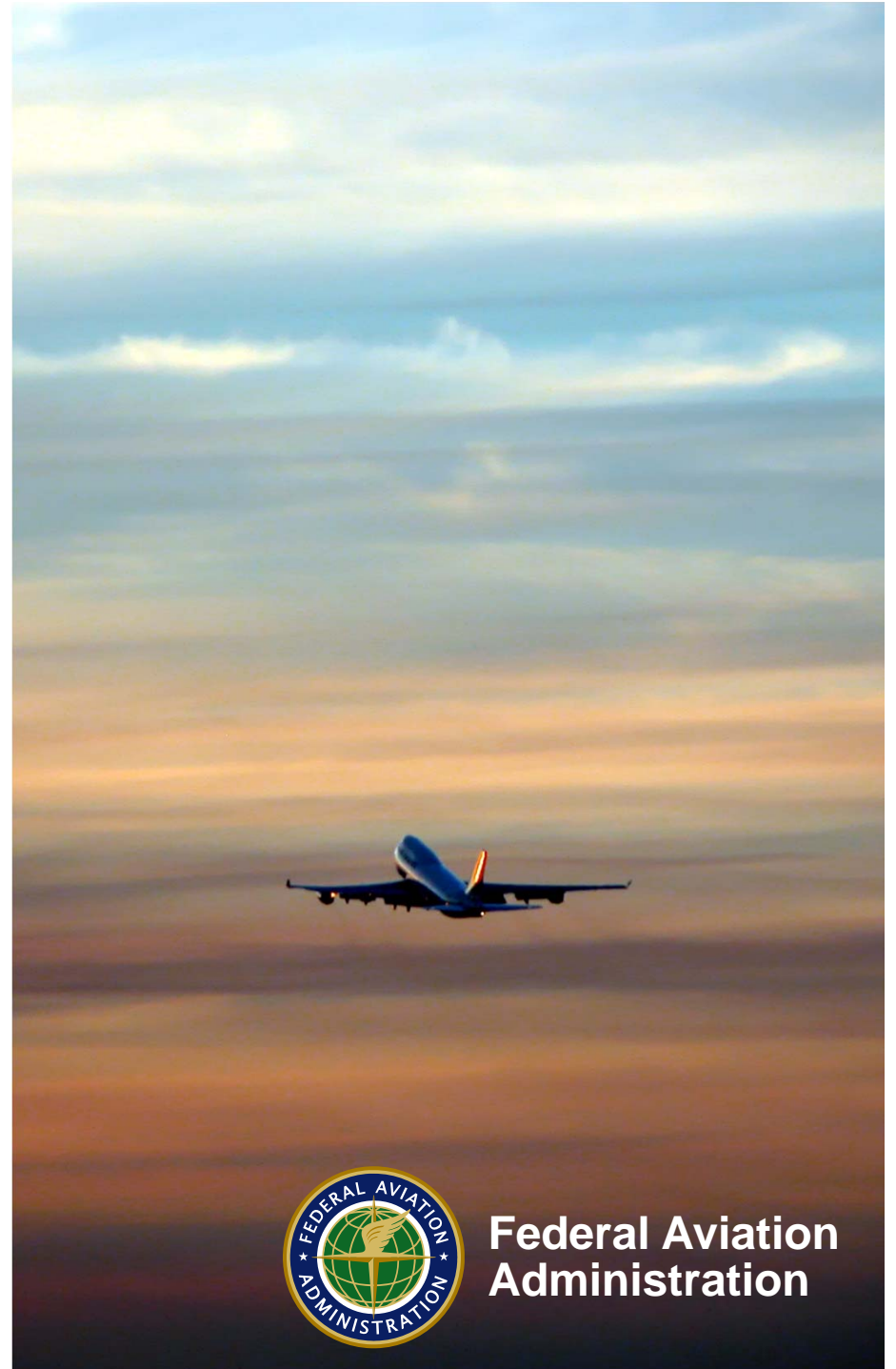- **ICAO Safety Management Manual, Doc 9859**

Developing a Risk-Based Air Traffic Safety Audit

Presented to: ICAO NACC Region

By: Federal Aviation Administration

Date: February 20-24, 2017

Federal Aviation Administration

What Is An Audit?

- A **systematic**, **independent,** and **documented** process for obtaining objective evidence and analyzing it to determine the extent to which certain criteria are met

  - Gather information, compare information, and present facts

  - Focus on those functions or changes that pose the greatest risk to safety

- Audits should be **well documented** so that an individual audit could be replicated and produce the same results

Types of Audits

- **Methods of Conducting Audits**
  - Onsite
    - Can be scheduled or unscheduled
  - Desk (virtual)
- **Audit Types**
  - New audit
  - Follow-up audit
    - Used to check progress in completing a Corrective Action Plan after a previous audit, or after a significant safety finding
  - Replication audit
    - Re-creates a previous audit

Roles and Responsibilities

- **The regulator is responsible for:**
  - Developing a meaningful, targeted audit topic and focus areas
  - Identifying data and information required from the service provider(s)
  - Notifying the service provider of the upcoming audit
- **The service provider is responsible for:**
  - Providing safety inspectors access to requested facilities and information
 - Taking action to correct safety concerns

Regulating as Problem-Solving

Stages (adapted from **Malcolm Sparrow**)	AOV Solution
1. Nominate potential problem for attention	Audit topic initiation
2. Define the problem precisely	Audit plan
3. Determine how to measure impact	Audit checklist
4. Develop solutions/interventions	Audit report
5. Implement the plan/periodic monitoring/review/adjustment	Compliance and Follow-up Audits
6. Project closure and long term monitoring/maintenance	

The Audit Process

Initiate Audit → Pre-Audit Activities → Conduct Audit → Post-Audit Activities → Recordkeeping
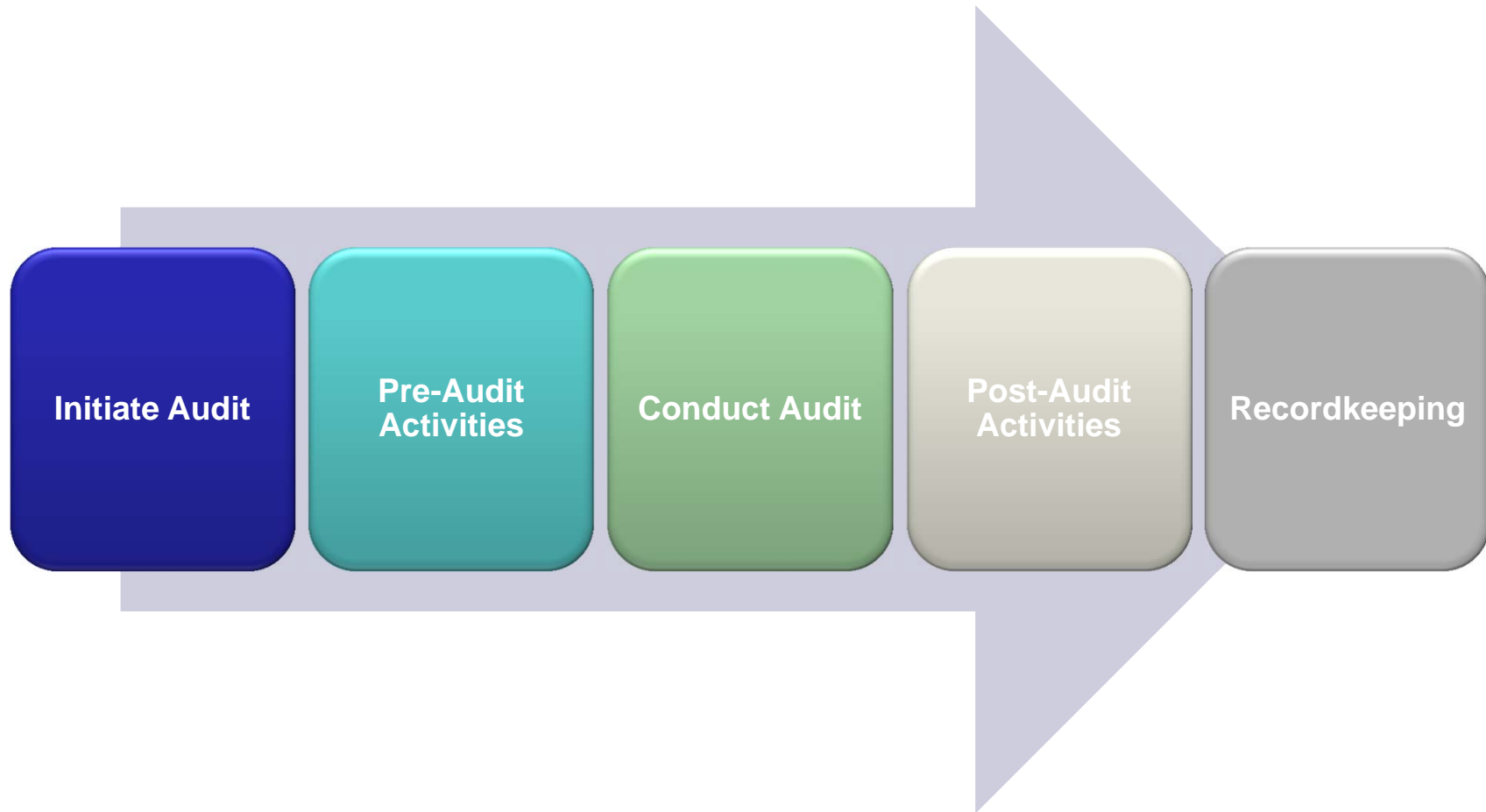
Phase 1: Initiate Audit

- Identify/select topic

- Assign audit team personnel

- Confirm audit timeline

Phase 2: Pre-Audit Activities

- Conduct topic research
  - Collect, review and analyze information
- Develop objective and scope, audit plan, notification to ANSP, checklists, and datasheet(s)
- Select facilities/sectors to audit
- Confirm target dates in audit timeline
- Train audit teams
- Conduct pre-audit briefing for audit teams and management

Phase 3: Conduct the Audit

- Collect and verify data
- Conduct opening and closing meetings with facility management to:
  - Communicate audit objective and scope
  - Discuss how the audit will be conducted
  - Discuss the audit results for each location

Phase 4: Post-Audit Activities

- Analyze consolidated data

- Validate findings with oversight team

- Prepare Audit Report and send to ANSP

- Track and follow-up on responses and corrective actions

Phase 5: Recordkeeping

- Audit records are established and maintained in each phase of the audit process

- Final records should be archived systematically

Important Audit Documents

- **Audit Plan**
  - Describes what will be audited and which facilities will be visited
- **Audit Notification**
  - Memo or letter advising service provider(s) of the audit dates and location(s)
- **Audit Report**
  - Shared with service provider safety organization and audited facilities
- **Corrective Action Plan**
  - To be completed by service provider(s) in response to compliance issues identified during the audit

Audit Timeline

- **The audit timeline:**
  - Ensures accountability
  - May be adjusted as the audit develops

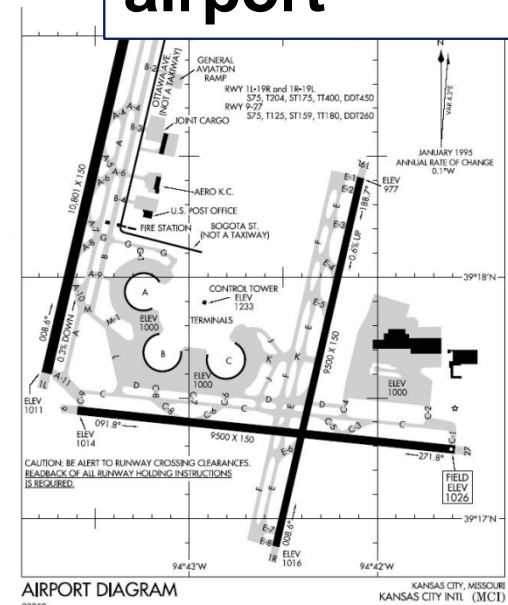| Audit Timeline				
Notify ANSP	Start Date	End Date	Conclusions and Draft Report	Report Due to ANSP
At least 10 days prior to audit start	Audits generally last 5 business days		Typically 5 business days following audit End Date	Within 15 business days from validation of observations

Initiate Audit: Developing a Topic

- **Ongoing effort**
- **Triggered by events, such as:**
  - Routine surveillance of service provider(s)
  - Management request
  - Changes to requirements documents or publications
  - High-profile accident, incident, or other occurrence

TRIGGERS

Flight skids off runway at Metro Airport

Travel News on NBCNEWS.com

Experts concerned with g... ...nning airliners

'Are you kidding?' controller asks pilot that landed at wrong airport

Boeing 747 mistakenly lands at wrong airport

AIRPORT DIAGRAM
03359

KANSAS CITY, MISSOURI
KANSAS CITY INTL (MCI)

Pre-Audit Activities: Research

- Collect, review, and analyze information
- Evaluate risk indicators
- Develop audit objective, scope, and focus areas
- Identify facilities/locations to audit

Audit Research

- **Key questions to consider:**
  - What prompted the audit?
  - What are the results of any past audits on the topic?
  - Were there any investigations pertaining to this topic?
  - Are there enforcement actions against the ANSP? Responses from the ANSP?
  - What is the current state of the system related to this topic?
  - Which requirements are applicable to this topic?

Audit Objective and Scope

- **Objective**
  - The purpose of the audit

- **Scope**
  - Limits the audit and is directly tied to the objective
  - Defines what will and will *not* be audited

Example: Objective and Scope

- **Objective**
  - To determine ANSP compliance with requirements relating to providing current approach information

- **Scope**
  - The audit will examine requirements for approach controllers to provide current approach information and visual approach clearances

Source: http://blog.cryptographyengineering.com/2013/10/lets-audit-truecrypt.html

Pitfalls to Avoid

- **Scope too broad**

- **Hearsay**

- **Preconceived ideas**

Focus Areas

- **Subset of specific areas to be audited (checklist items) within the audit scope**

- **Tied to methodology**
  - Examples:
    - Observation of ATC operations
    - Interviews with ANSP personnel
    - Review of local directives
    - Review of training requirements

Example: Focus Areas

- **Objective**
  - To determine ANSP compliance with requirements relating to providing current approach information

- **Scope**
  - The audit will examine requirements for approach controllers to provide current approach information and visual approach clearances

- **Focus Areas**
  - Availability of current approach information
  - Airports in close proximity

Selecting Facilities

- **Key questions to consider in choosing facilities to audit:**

  - Do the selected facilities use or maintain the system or procedure in question?

  - What is the likelihood and severity of accidents or incidents associated with the system or procedure?

  - How many incidents have been reported that are related to the system or procedures?

Pre-Audit: Prepare the Audit Plan

- The **audit plan** summarizes essential information about the audit, including:
  - Objective and Scope
  - Focus Areas
  - Facilities to be visited
  - Timeline
  - Resources

Pre-Audit: Notification

- The **audit notification** is a memorandum or letter transmitted to the service provider containing the audit dates, topic, and facilities to be visited

  - Notifications request ANSP to provide points of contact at each facility
    - May also request data from the ANSP
  - Must be sent to the ANSP at least 10 business days prior to the audit start date

- **Unscheduled** audits do <u>not</u> require notification

Pre-Audit: Develop Checklists

- ## What is a checklist?
  - A checklist is a listing of critical process activities needed to complete the process or operation successfully
  - It is used as a real-time verification that the critical process step has been completed

> **Checklists can be an effective control tool when designed, used, and supported properly.**

Developing Audit Checklists

- **Why create checklists?**
- **Checklists:**
  - Ensure we accomplish the critical elements of an activity
  - Help reduce inadvertent errors
  - Help standardize results when the "human factor" is a significant source of variation
  - Are useful when observing/reviewing processes that are complex or involve repetitive tasks
- **Checklists should reference applicable requirements**

Developing Audit Checklists

- **How to create a checklist:**
    - Locate the requirement
        - Regulation, Directive, Order, etc.
    - Copy the requirement into the checklist
    - Turn the requirement into a question
        - Address one issue per question
            - Break requirements into separate questions if needed
        - Questions should be answerable in "YES/NO" format

Example: Requirements (Doc 4444)

- **8.9.5.1** The controller may initiate vectoring of an aircraft for visual approach provided the reported ceiling is above the minimum altitude applicable to vectoring and meteorological conditions are such that, with reasonable assurance, a visual approach and landing can be completed.

- **8.9.5.2** Clearance for visual approach shall be issued only after the pilot has reported the aerodrome or the preceding aircraft in sight, at which time vectoring would normally be terminated.

Sample Checklist

Requirement:		
Insert specific requirement (e.g., FAA Order 7110.65, Air Traffic Control, paragraph X-X)		
Checklist Questions	**Compliance verified? (yes or no)**	**Evidence and/or Observations**
1.		
2.		
3.		
4.		
5.		
Audit Sampling Methods (where to look and how many to look at, find, discuss or interview)		
Additional Comments (use additional pages as needed)		

Example: Doc 4444 Checklist

Requirement:		
8.9.5.1 The controller may initiate vectoring of an aircraft for visual approach provided the reported ceiling is above the minimum altitude applicable to vectoring and meteorological conditions are such that, with reasonable assurance, a visual approach and landing can be completed.		
Checklist Questions	**Compliance verified? (yes or no)**	**Evidence and/or Observations**
1. Did the controller initiate vectoring?		
2. Was the reported ceiling above the MVA?		
3.		
4.		
5.		
Audit Sampling Methods (where to look and how many to look at, find, discuss or interview)		
Additional Comments (use additional pages as needed)		

Pre-Audit: Create Datasheets

- **Datasheets** are informal worksheets designed by the audit team to ensure enough information is collected during the audit to answer checklist questions

- **Tips for developing datasheets:**
  - Consider each checklist question individually
    - What do you need to ask/observe/read/review to answer the question?
  - Count something!
    - Example: number of ATC operations observed
  - Review samples of the data you will be collecting, if possible
    - Review datasheets from previous audits

Sample Data Sheet

Requirement:

8.9.5.1 The controller may initiate vectoring of an aircraft for visual approach provided the reported ceiling is above the minimum altitude applicable to vectoring and meteorological conditions are such that, with reasonable assurance, a visual approach and landing can be completed.

Aircraft	Did the controller initiate vectoring of an aircraft for visual approach?		Was the reported ceiling above the MVA?	
	Yes	No	Yes	No
N327	√		√	
UA479	√		√	
AA123	√			√

Pre-Audit Team Meetings

- **Audit teams should meet regularly to complete Pre-Audit activities**
- **Hold a team briefing at least one day prior to the start of an onsite audit**
  - All team members should be present
  - Pre-Audit Team Briefing Objectives
    - Exchange information relative to the audit
    - Ensure common understanding of audit scope
    - Confirm audit locations
    - Review audit methodology
    - Confirm time frame for conducting Opening and Closing meetings at facilities

Conduct Audit

- **At each facility/location to be visited during the audit:**

  – Conduct opening meeting with facility management

  – Complete data collection

    • Observe operations, conduct interviews, and review documentation

  – Conduct closing meeting

Opening Meeting

- **Introductions**
- **Review audit objective, scope, and focus areas**
- **Inform facility management about how the audit will be conducted**
  - What will you observe? For how long?
  - What documents will you need to review?
- **Review logistics**
- **Checklists** – sharing optional

Data Collection

- **Observations**
- **Interviews**
- **Records review**

Observation

- **The act of noting and recording something**

- **Detailed examination of phenomena prior to analysis, diagnosis, or interpretation**

- **Regarding attentively or watching carefully**

Interviews

- **Use to gather anecdotal information**
- **Not objective evidence**

Records Review

- **Protect facility materials and documents**
  - Maintain sensitive materials in a secure area and never leave them unattended
  - Do not remove original documents from a facility

Audit Observations

- **Meet with Team Lead to review data collected during the audit**
  - Is the data sufficient to answer all datasheet and checklist questions?

Closing Meeting

- **Review audit objective, scope, and focus areas**

- **Summarize audit results**

- **Opening and closing meetings are conducted by the Team Lead**
  - All team members must be present

Post-Audit: Analyze Data

- **Compile data from across all audit locations**
  - Provide a representation of the airspace system
- **Compute percentages, where appropriate**
- **Key questions to consider:**
  - Does the data reveal system-wide issues or concerns?
  - Will you recommend observations of non-compliance? Why or why not?

Validation Meeting

- **Should be convened as soon as possible after the audit end date**
  - Recommend within one week after all data is collected and analyzed

- **Present and discuss audit observations with management**

Post-Audit: Writing the Report

- **Clearly communicate audit results**
- **Adhere to audit timeline**

Components of an Audit Report

- **Executive Summary**
- **Overview**
  - Background
  - Objective & Scope
    - Describe the focus areas
  - Requirements
  - Methodology
    - Describe how you verified compliance/non-compliance
    - Make your argument!
- **Audit Results**
  - Focus Areas (Observations)
- **Comments**
  - Recognize compliance, best practices
  - Practices observed that are outside scope of audit

Strategies for Successful Reports

- **Report writing tips:**
  - Risk-based
    - Why is the report relevant?
    - How do the audit topic and results relate to system safety?
  - Present audit observations effectively
    - Convey important information up front in an executive summary
    - Include details in the body of the report
    - Use objective evidence to support conclusions
    - Be accurate & consistent

Final Audit Activities

- **Discuss lessons learned**
- **Records retention**

Recordkeeping: Document Retention

- **Maintain permanent copies of:**
  - Audit Plan
  - Audit Notification
  - Checklists
  - Audit Report

Strategies for Successful Audits

- **Ask Questions**
- **Think Critically**
  - Analyze information and data with an approach that seeks the most appropriate solution
- **Communicate Effectively**
- **Build Cohesive Teams**
  - Regular team meetings
  - Standardize team materials
- **Be Professional**
- **Adhere to timeline**

FAA Example: Team Folders

- **All Team Members should have a standardized team folder containing documentation needed to conduct an audit**
  - Audit Plan
  - Logistical arrangements
  - Facility details (e.g., directions)
  - Checklists
  - Datasheets
- **The Team Lead is responsible for ensuring the folders are standardized**
  - Team Members each prepare individual folders

Professionalism

- **Dress appropriately**
- **Act professionally**
  - Leave any issues or team conflicts outside the facilities
- **Avoid being drawn into confrontations with facility staff**
  - Do not disturb staff or distract from duties
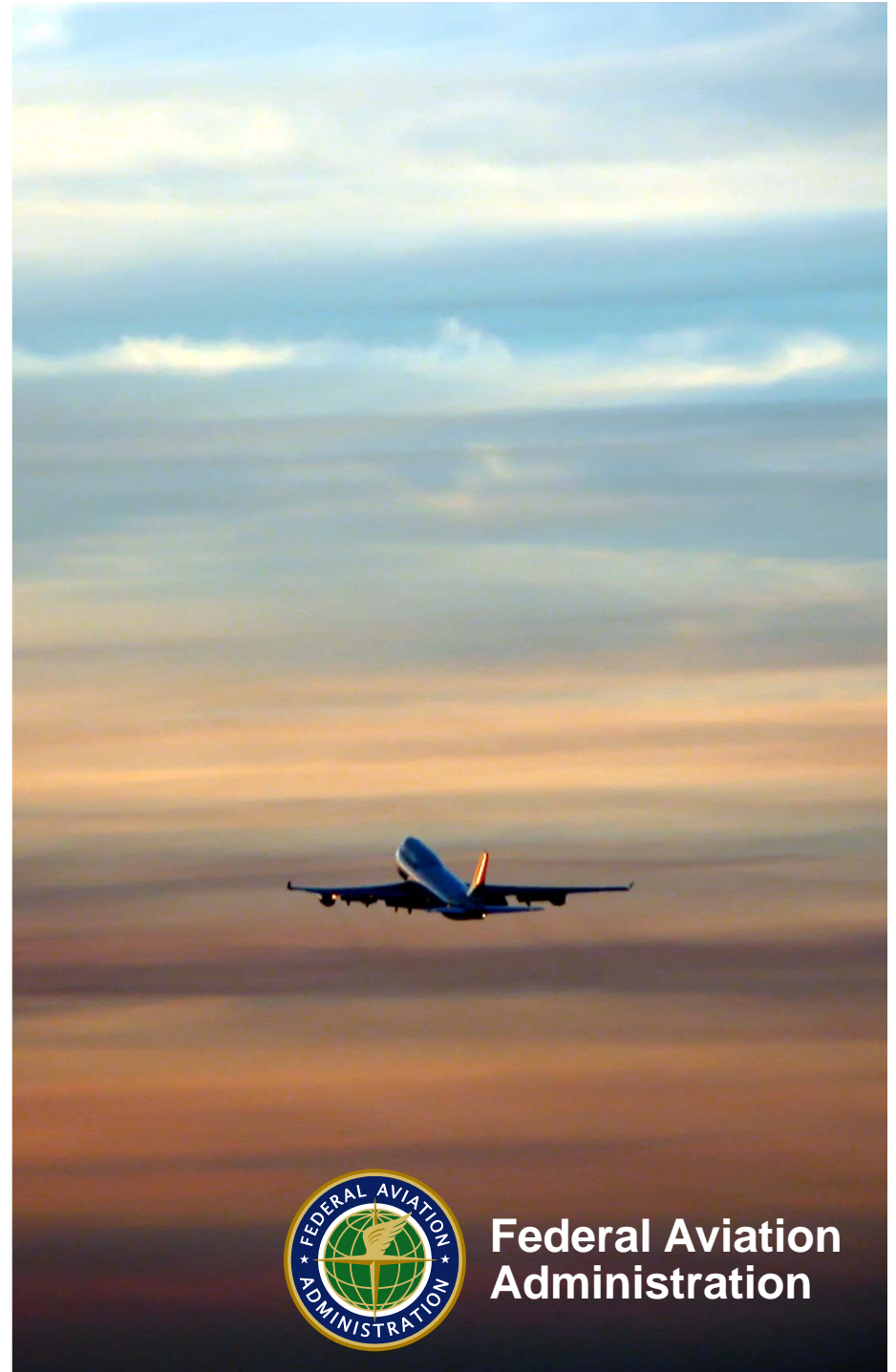 - If facility personnel become uncooperative, contact management

Workshop: Developing a Risk-Based Air Traffic Safety Audit

Presented to: ICAO NACC Region

By: Federal Aviation Administration

Date: February 20-24, 2017

Federal Aviation Administration

Activity

MOCK AIR TRAFFIC SAFETY AUDIT…

Objectives

- **Review your knowledge of performing a risk-based air traffic safety audit**

- **Practice using the processes and tools discussed in this workshop**

- **Develop strategies for successful audits**

Audit Team Roles

- **Team Member**
- **Team Lead**

Team Member Responsibilities

- Follow direction of the Team Lead

- Carry out assigned tasks

- Participate in audit briefings and meetings

- Make logistical arrangements as requested

- Adhere to the audit timetable and scope

- Collect and verify data

- Document and report all observations to the Team Lead

- Safeguard all audit documents

- Maintain confidentiality

- Keep the Team Lead informed of progress

Team Lead Responsibilities

- Lead audit team
- Act as the primary point of contact with ANSP and facilities
- Confirm logistical arrangements with audit facilities
- Ensure Team Members make logistical arrangements as required
- Resolve conflicts
- Keep Team Members, management, and ANSP facility personnel informed of audit progress
- Conduct opening and closing meetings with ANSP/facilities
- Analyze and organize evidence to support observations
- Document and/or report all observations
- Report audit results

Part I: Activity Instructions

- **Assemble in small groups**
- **Note your team role and responsibilities**
  - Team Lead or Team Member
- **Review audit prompt material**
- **Work in teams to develop an audit objective, scope, and focus areas**
- **Access the Audit Plan and Status Briefing files**
- **Complete an Audit Plan**
- **Prepare and present a Status Briefing**

Part II: Activity Instructions

- **Access the Audit Checklist file**
- **Work in teams to develop checklist(s) for the audit**
- **Access the Pre-Audit Briefing file**
- **Prepare and present a Pre-Audit Briefing**