Federal Aviation Administration

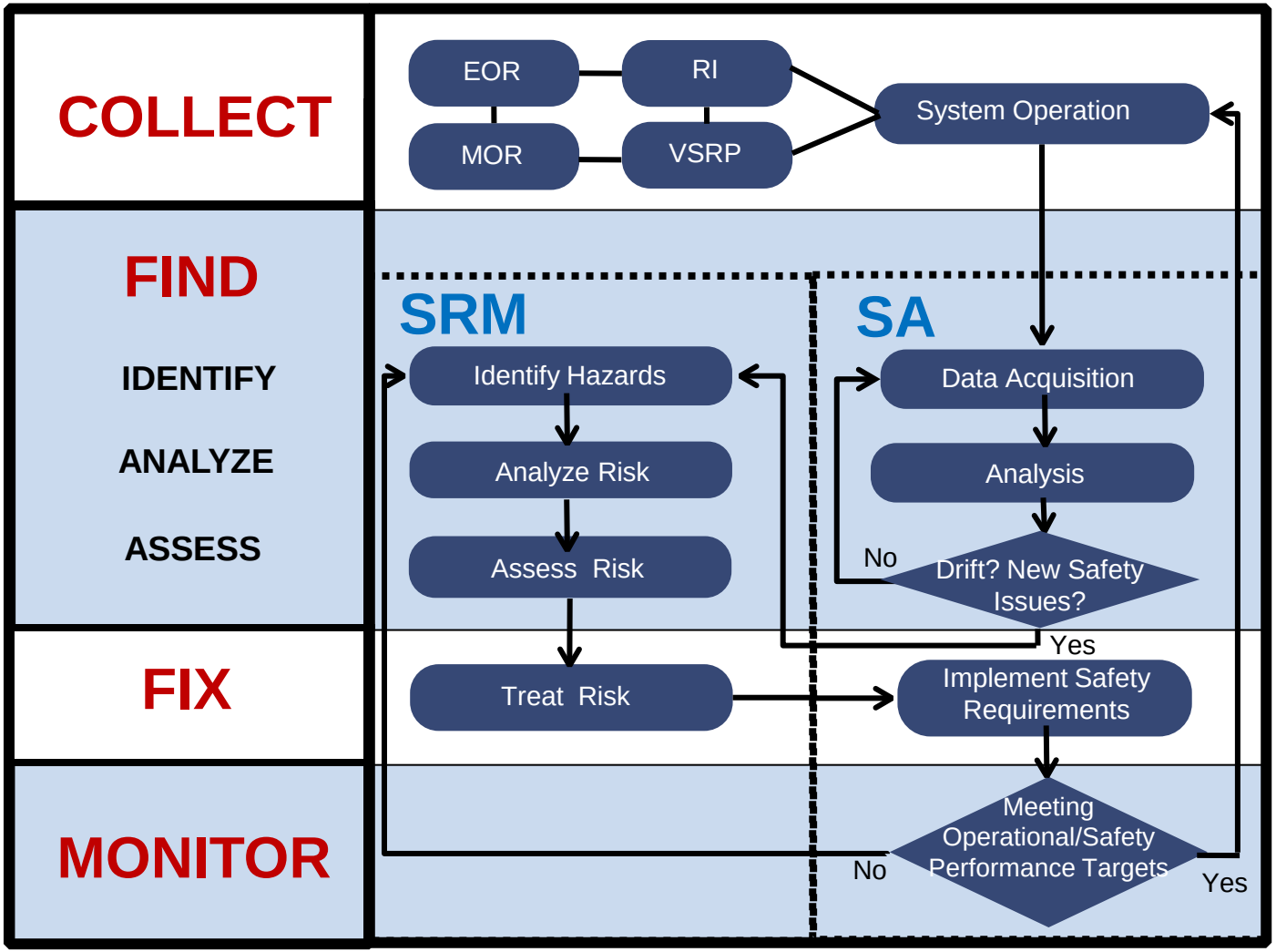
The ATO's Approach to Safety Performance Monitoring Today and Tomorrow

Collect – Find – Fix – Monitor

- **“Collect, Find, Fix, Monitor” is the Air Traffic Organization’s (ATO’s) slogan for the Safety Management System (SMS)**

- **Employees understand:**
  - Where their job functions fit within the SMS.
  - The importance of reporting.
  - That the focus of reporting is placed on identifying safety issues versus placing blame.
  - The importance of mitigating risk in the NAS.
  - How to monitor safety performance.

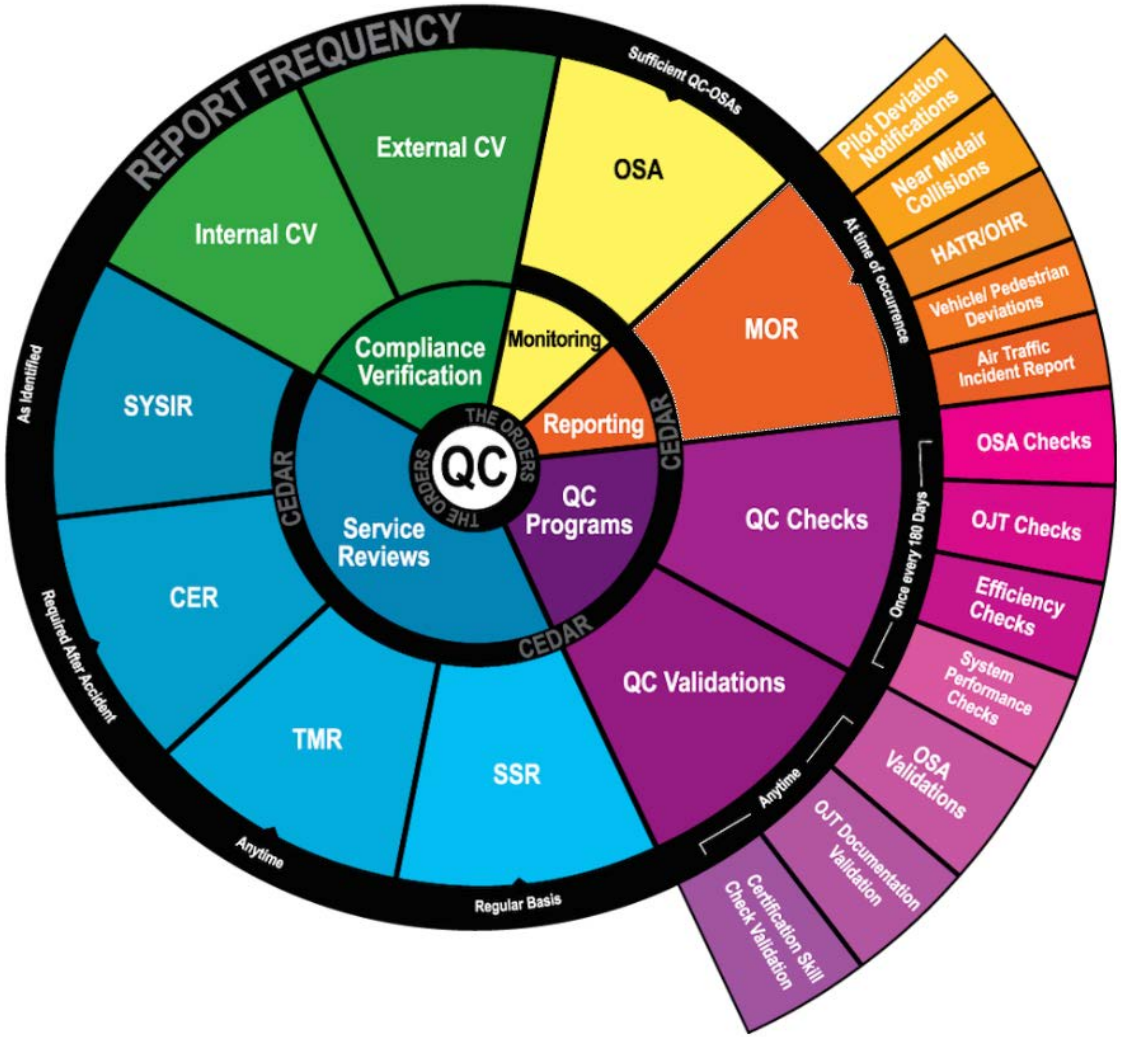
Collect – Find – Fix – Monitor



Collect – Find – Fix – Monitor

- **The ATO collects data through the following programs:**
  - Quality Control (QC)
  - Quality Assurance (QA)
    - Mandatory Occurrence Reporting (MOR)
    - Electronic Occurrence Reporting (EOR)
  - Voluntary Safety Reporting Programs (VSRPs)
  - Audits and Assessments

Collect – Quality Control



Collect – Quality Assurance

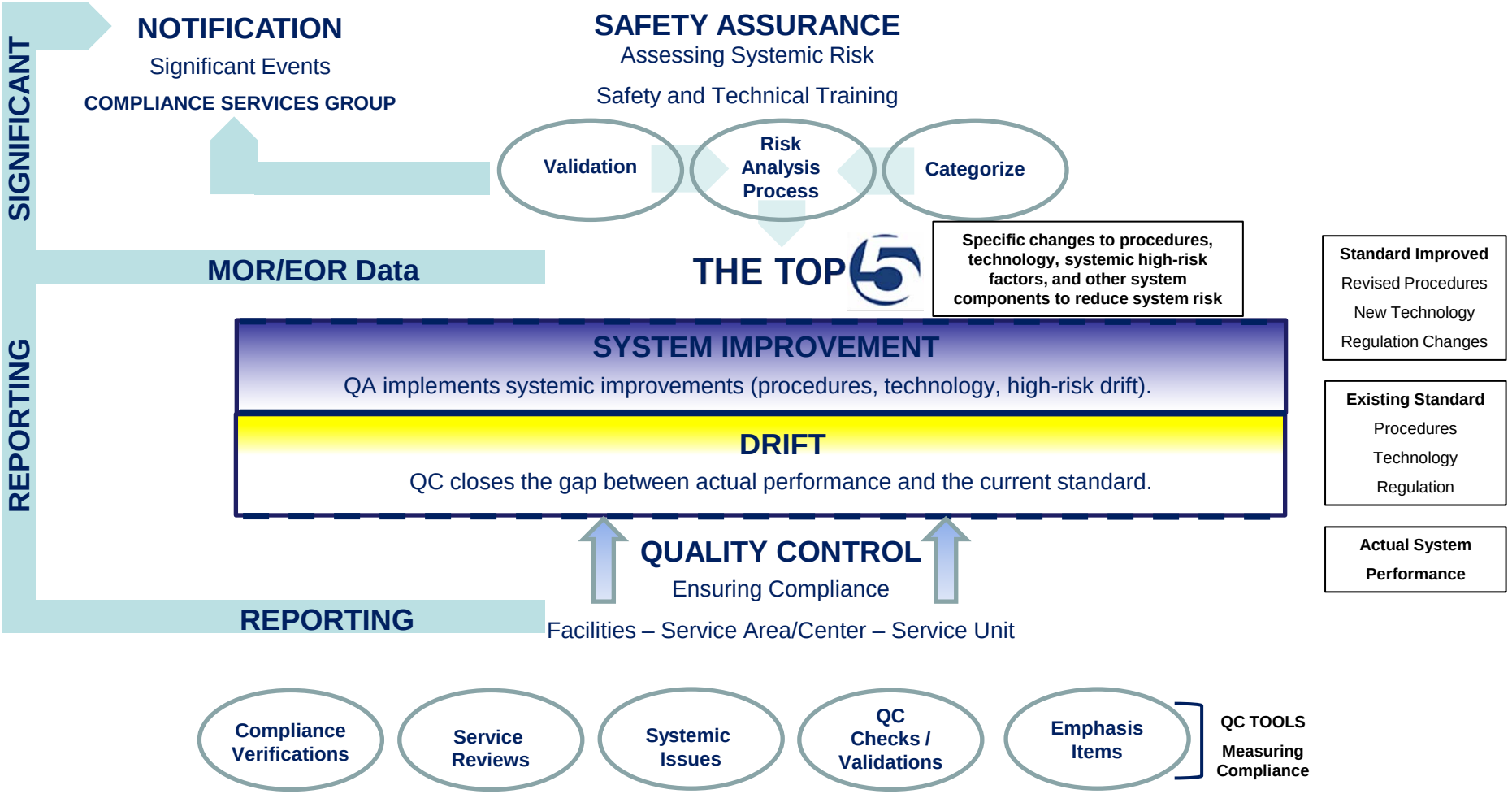
- **QA focuses on:**
  - Safety-related trends, not single occurrences.
  - Finding system-wide safety risk.

- **QA processes, reviews, and validates all MORs and EORs when required separation is at less than 66 percent.**
  - Traffic Analysis and Review Program (TARP)

Collect – Voluntary Safety Reporting Program

- **VSRPs provide:**
  - Additional information regarding adverse occurrences.
  - Information on changes within an environment that may cause unintended consequences.
  - A safe and confidential, non-punitive mechanism for reporting.

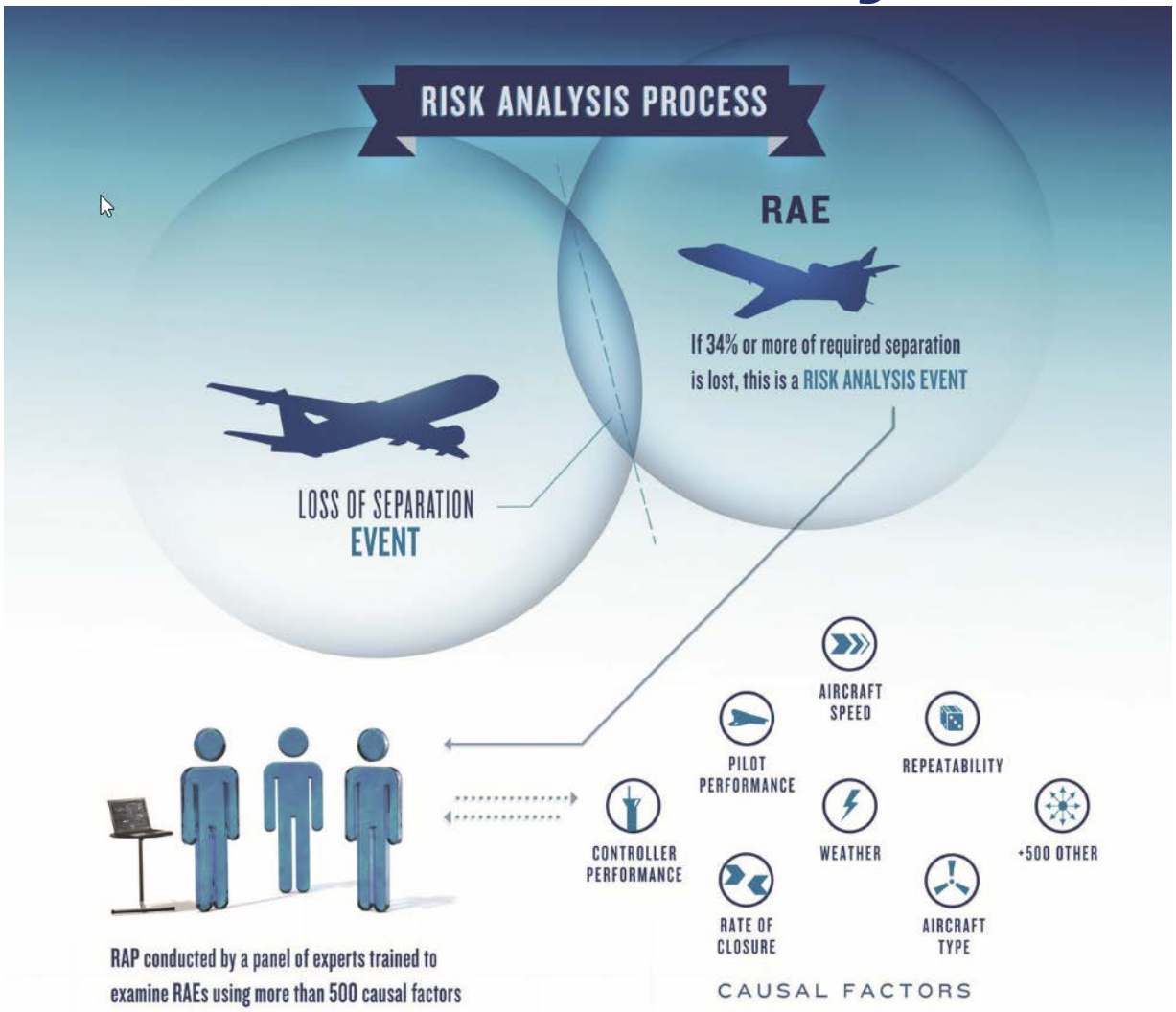
Collect – Data Collection Working Together



Collect – Find – Fix – Monitor

- **The ATO develops analytics for identifying risk from the collected data. Hazards are identified through:**
  - The Risk Analysis Process
    - Airborne
    - Surface
    - System (hardware/software)
  - Safety Risk Management (SRM)
  - VSRP data analysis and review
  - QC
  - Audits and Assessments

Find – Risk Analysis Process



Find – Risk Analysis Process

2017

ZSU (ZSU)

Max of 300 rows returned

Select a row then click "View Item" to see CEDAR record -------> View Item

Date UTC	Facility	MOR EOR #	NAS Risk
5/17/2017	ZSU	ZSU-M-2017/05/17-0004	1/2
5/12/2017	ZSU	ZSU-M-2017/05/17-0002	3/2
5/12/2017	ZSU	ZSU-M-2017/05/12-0001	3/2
4/4/2017	ZSU	ZSU-M-2017/04/04-0002	2/2
1/28/2017	ZSU	ZSU-M-2017/01/28-0002	2/2

Select from below:

	1	2	3	4	5
5					
4					
3					
2	1	2	2		
1					

Total # of RAEs: 5

PWD755 was east bound at 7000 feet. WAF6910 was east bound descending into SJU. The ATCS instructed PWD755 to fly heading 360 and descend to 6000 feet. PWD755 read back heading 360 descend to 3000 feet and the ATCS missed the incorrect altitude read back. The ATCS recognized the conflict as PWD755 descended thru 4400 feet. The ATCS instructed PWD755 to fly heading 060 and maintain 6000 feet. The ATCS attempted to stop WAF6910 at 4000 feet and PWD755 at 3000 feet however both aircraft had gone thru those altitudes losing separation.

Non-Systemic Factors

Factor Code	Factor Name	Factor Group	Total RAE
1.4.9.1.5.1	ATC turned aircraft towards each other	CAUSAL	2
1.4.9.1.4.15	Pilot climbed above/descended below assigned altitude	CAUSAL	2
1.5.1.12	Distraction by other aircraft	CONTRIBUTORY	1
1.5.3.5.5	Vectors were inadequate to maintain separation	CONTRIBUTORY	1

Recovery Factors

Factor Code	Factor Name	Total RAE
1.4.9.1.13.8	Inadequate Recovery - ATC attempted vectors instead of altitude or vice-versa	1
1.4.9.1.5.2	Recovery made situation worse - ATC turned aircraft towards each other	1
1.4.9.3.3	Inadequate Recovery - Untimely or ineffective response	1
1.4.9.1.2.13	Inadequate Recovery - ATC did not ensure correct readback	1

Collect – Find – Fix – Monitor

- **The ATO uses the data collected to identify risk and mitigate (i.e., "Fix") it.**
- **Mitigation of risk is achieved through various methods, including:**
  - Conducting SRM
  - Developing Corrective Action Plans (CAPs)
    - Local
    - National Top 5 Program. (This program identifies the highest systemic risks in the National Airspace System (NAS) and fixes them by developing a CAP. SRM is applied.)

*CAPs may solely be compliance based (i.e., focused on compliance issues) if a CAP is developed in response to QC findings.

Fix – SRM

- **SRM requires:**
  - Causal information to be defined.
  - Risk analysis and assessment to be conducted.
  - Mitigations (or the “Fix”) to be defined.
  - Predicted residual risk (i.e., risk present after mitigation) to be assessed.
  - Safety performance targets to be defined based on the predicted residual risk.
  - A monitoring plan to be developed.

Fix – CAP Development

- **CAPs are developed when safety issues related to risk or compliance are identified. They contain:**
  - Activities to be completed.
  - Mitigations to be implemented.
  - Due dates for activities/mitigations.
  - Effectiveness criteria.
  - Monitoring requirements.

Collect – Find – Fix – Monitor

- **The ATO monitors safety risk and the effectiveness and implementation of mitigations through:**
  - The National Safety Performance Monitoring Program
  - Top 5 Program monitoring
  - CAP implementation tracking
  - CAP effectiveness tracking

*** The Monitor phase uses the same data under the Collect and Find phases**

Monitor – National Safety Performance Monitoring Program

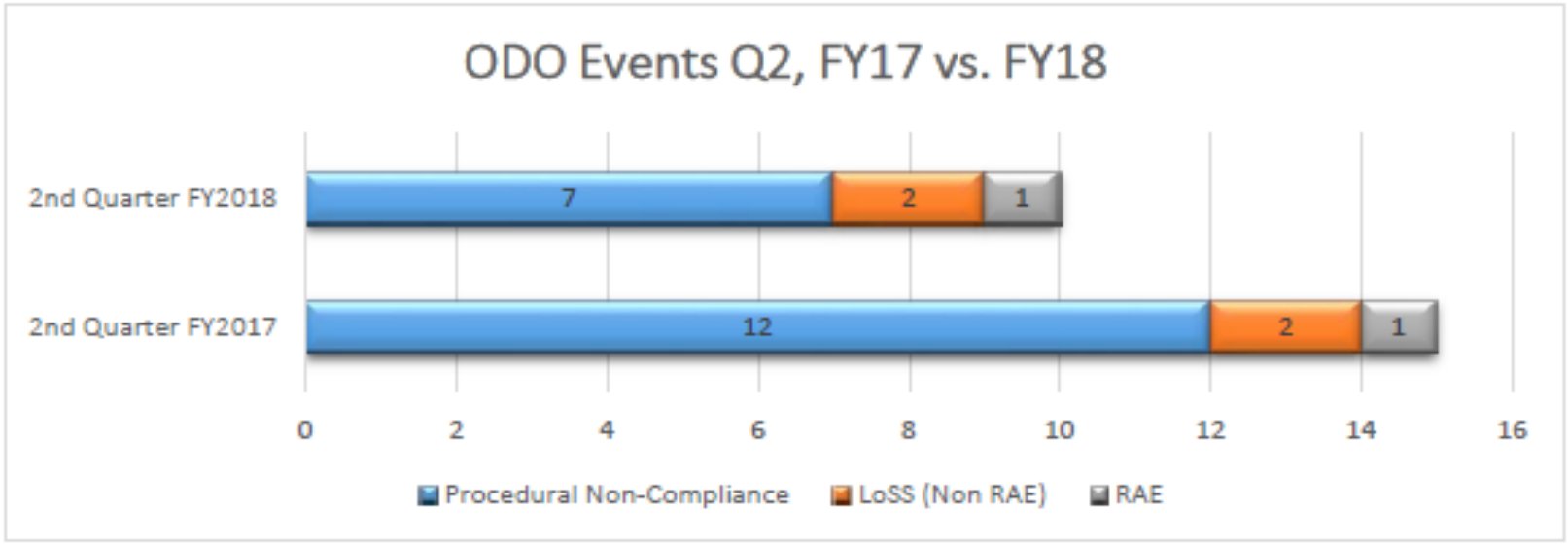
- **The National Safety Performance Monitoring Program monitors the risk within the NAS specific to SRM efforts.**
  - The program measures the risk against an SRM effort's defined safety performance targets.

- **Monitoring performance against defined safety performance targets allows the ATO to manage the risk accordingly.**

Monitor – National Safety Performance Monitoring Program

Opposite Direction Operations

Safety Performance Target	Status	Observed Risk	Predicted Residual Risk
No more than one high RAE per three years related to ODO for the same runway (or less than 1 per 10,000,000 operations)	On Target	None	MEDIUM (2D)
Less than six medium RAEs per one year related to ODO for the same runway	On Target	None	MEDIUM (2D)
No more than one RAE of any severity per three years related to ODO for the parallel runways	On Target	None	LOW (4D)



Monitor – CAPs

- **Monitoring of CAPs differ greatly based on whether the CAP was developed to address issues found:**
  - Locally
  - Nationally
  - Compliance based
  - Risk based, or
  - Originated based on VSRP information

- **Monitoring may include:**
  - Measuring the effectiveness of the a specific activity or mitigation (training, change in procedure)
  - Verifying Compliance

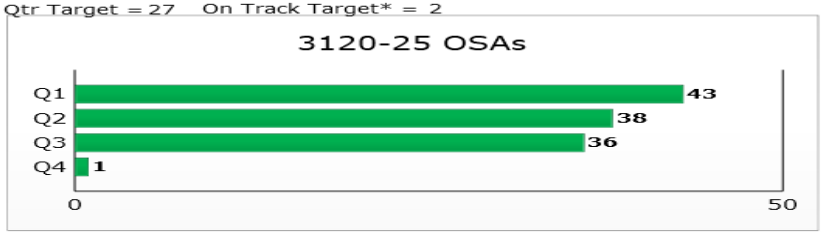
Monitor – CAP Local/Compliance-Based Example

Operational Skills Assessments

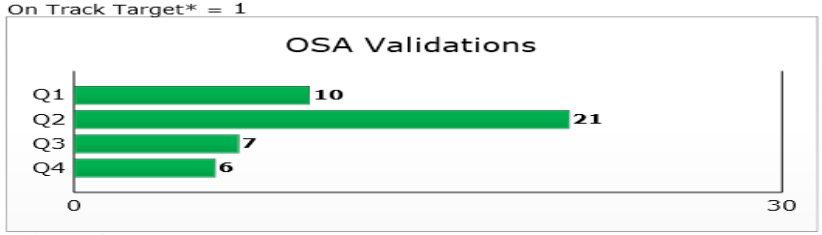
2018

ZSU (ZSU)

Qtr Target = 27 On Track Target* = 2



On Track Target* = 1



* On track target = number of OSAs or Validations a facility should have completed by **today** to remain on target.

Validation Detail

Quarter	Exemplary	Meets Requirements	Needs Improvement	Total
Q1	1	9	0	**10**
Q2	8	12	1	**21**
Q3	1	4	2	**7**
Q4	0	5	1	**6**

Select for National Emphasis Items and Subtasks: (●) All ( ) Q1 ( ) Q2 ( ) Q3 ( ) Q4

National Emphasis Items

Item	% Total	% Compliant
IFR-VFR - Issuance of safety alerts	0.15%	37.50%
Weather - PIREP solicitation and dissemination	0.35%	78.95%
IFR-VFR - Issuance of control instructions that prevent a collision	0.55%	86.67%
Weather - Issuance of observed/reported weather areas	0.83%	86.67%
IFR-VFR - Application of merging target procedures	0.46%	88.00%

Subtask

Subtask	Needs Improvement	% Compliant
24. Relief briefings are complete and accurate.	20	81.82%
02. Safety alerts are provided.	2	85.71%
20. Communication is clear and concise.	12	94.06%
09. Aircraft identity is maintained.	10	95.19%
11. Clearance delivery is complete/correct and timely.	8	96.23%

Communicating Monitoring Results

- **The ATO shares critical safety performance data across the organization through:**
  - The Facility Manager's Safety Dashboard
  - Other safety dashboards
  - CEDAR
  - Incident reports

Facility Manager's Safety Dashboard

HOME

OSAs

Airborne

SSRs
SYSIR

CVs

CAPs

OJT

CERT

CURRENCY

3120-25 QC OSAs
Quarterly Status
1 of 27 Completed
Validation Status
6 of 1 Completed

QC OSA Issues

- NEI. IFR-VFR - Issuance of safety alerts
- NEI. IFR-VFR - Issuance of control instructions that prevent a collision

Airborne RAE
Common Causal Factors

- ATC climbed or descended one aircraft through the altitude of the other

Surface RAE
Common Causal Factors

- No Data Available

SSRs
Issues Most Identified

- Performance
- Weather
- Airspace / Airports

ICVs
5 Low Mitigations
0 High Mitigations

ECV
Last Completed on May. 23, 2017

Status of ICV Ratings
83 of 101 Rated

CAPs
No Data Available

RSTS
No Data Available

On-the-Job Training

Average Hours of OJT per Dev and CPC - IT

Last Month's Average:	**11.78**
Monthly Average over previous 6 Months:	**14.09**

Certification-Current On-Board Staffing

PP201814

20 Total DEV-CPCIT
13 DEV-CPCIT Received OJT

37 Total OJTIs
17 Active OJTIs

Currency

Last Month

63 | 5

Current Month
25 Days remaining in July 2018

6 | 63

Last Updated 07/06/2018 05:10 Central Time

ATO Safety Performance Monitoring Tomorrow

The Evolution

Safety Performance Monitoring Evolution

- **ATO safety performance monitoring relies heavily on compliance data today.**
  - But does compliant mean safe?

- **Compliance is important but <u>safety is essential.</u>**
  - The key to improving safety is not compliance.

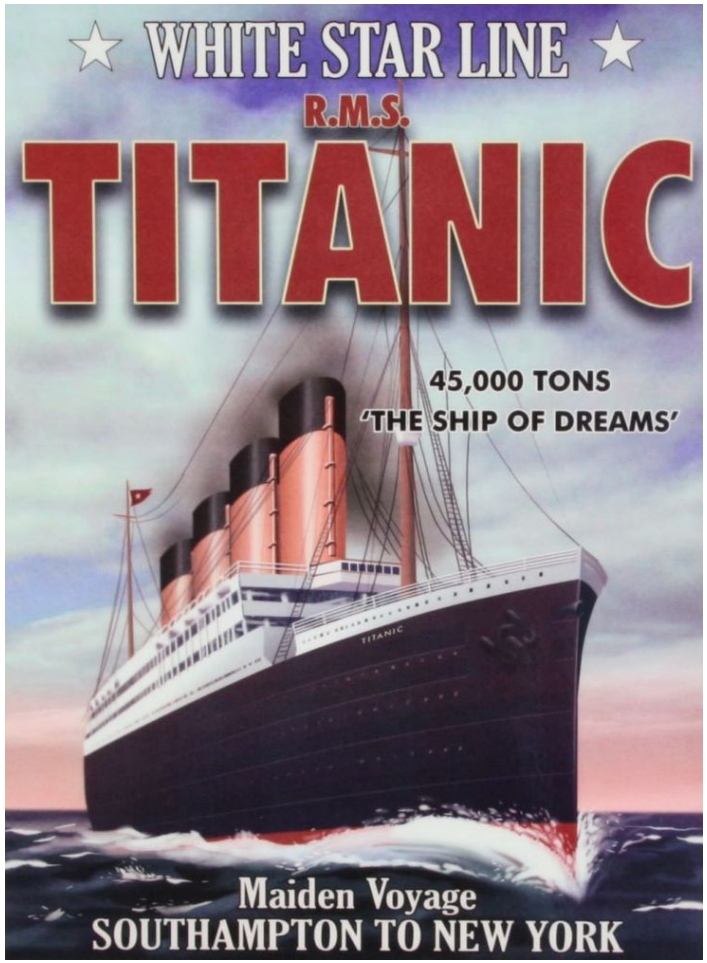
Safety Performance Monitoring – Definitions

- **Let's review important definitions:**
  - **Compliance:** The act or process of doing what you have been asked or ordered to do
  - **Risk:** The possibility that something bad will happen (accident)
  - **Safety:** The art of actively preventing bad outcomes through a mix of risk identification, mitigation, and prevention

- **What motivates Air Navigation Service Providers to implement an SMS?**
  - Improve safety or compliance?

Compliant?

A Titanic case study



- In 1912, UK lifeboat requirements were based on tonnage rather than passenger load. And since White Star's leaders were focused on legal compliance rather than mitigation of risk, they simply bought enough boats to keep the authorities at bay and went to sea.
- White Star's engineers and advisors reinforced a faulty perception that there was zero probability of the ship sinking; therefore, the company based their mitigation decisions on inaccurate data. Decision makers did not believe a risk existed.
- **2,224 passengers and crew**
- **20 lifeboats – capacity: 1,178**

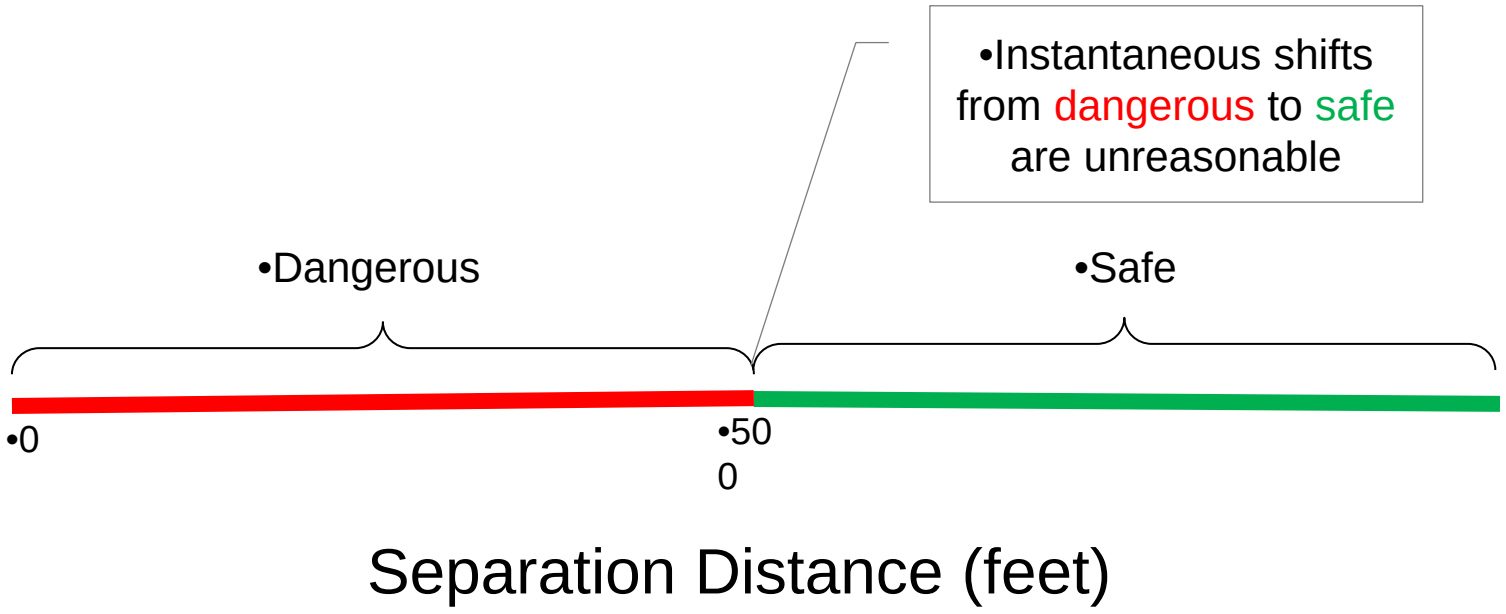
Safety Performance Monitoring – Compliance

Instrument Flight Rules (IFR) / Visual Flight Rules (VFR) operations can be compliant but still have considerable risk.

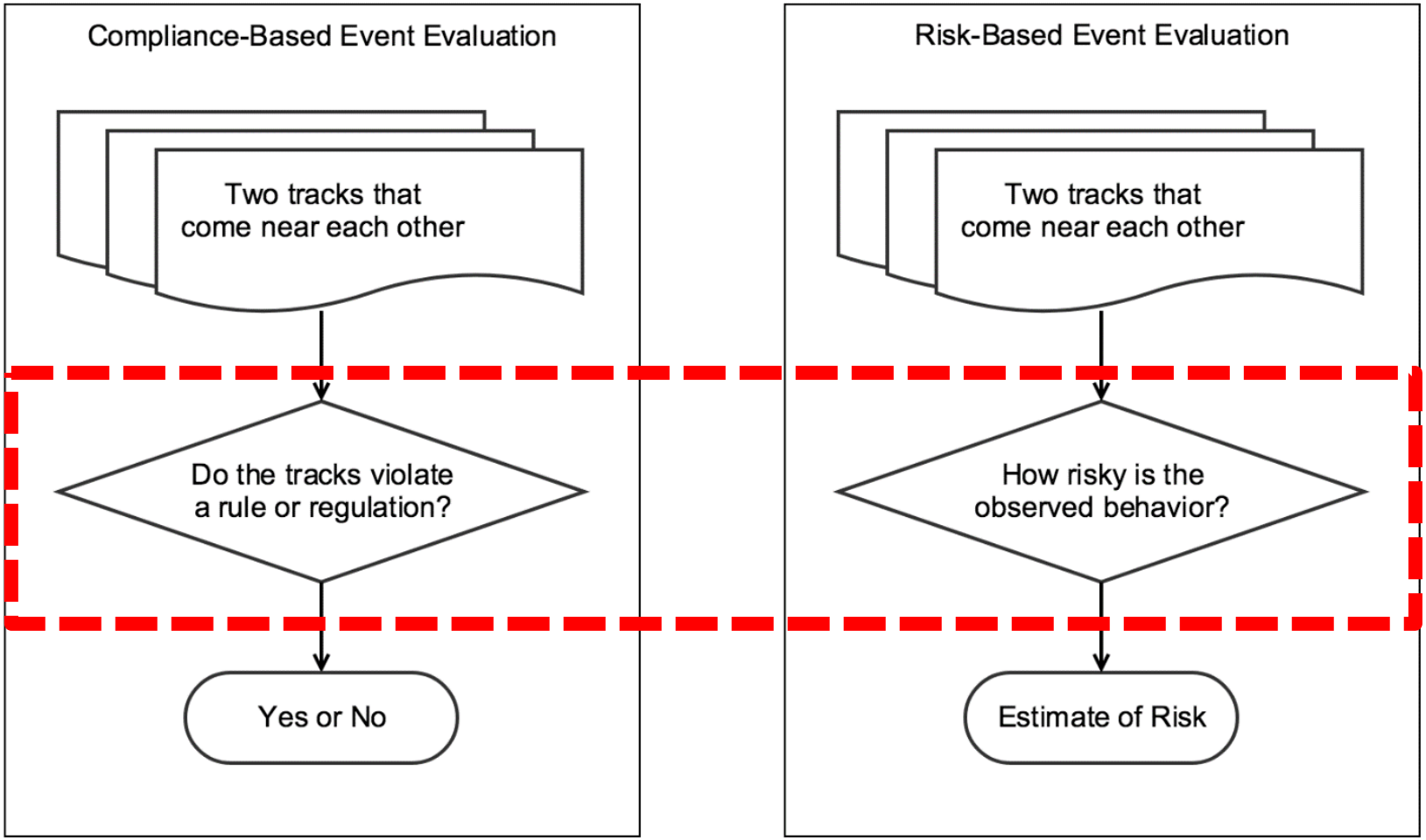
- **Compliance-based safety performance monitoring does not provide a solid picture of risk.**

IFR or VFR?... Does it matter?

The Risk Dilemma



Compliance-Based versus Risk-Based Approach to Safety Performance Monitoring



Safety Performance Monitoring Evolution

- **The focus of safety performance monitoring will shift from compliance to compliance *and* risk.**

- **Risk-based information will be collected in addition to compliance-based information.**
  - The highest risk events will be reviewed and addressed first.

- **Safety will be improved by reducing risk.**

Risk-Based Data Collection

- **To evolve ATO safety performance monitoring, risk-based data must be collected.**
- **Data to be collected electronically includes:**
  - National Offload Program (NOP) and Airport Surface Detection Equipment data.
    - Incoming data includes:
      - NAS-wide NOP data stream
      - 40,000 files per hour
      - 2.4 gigabytes per hour
      - 300 million radar hits per day

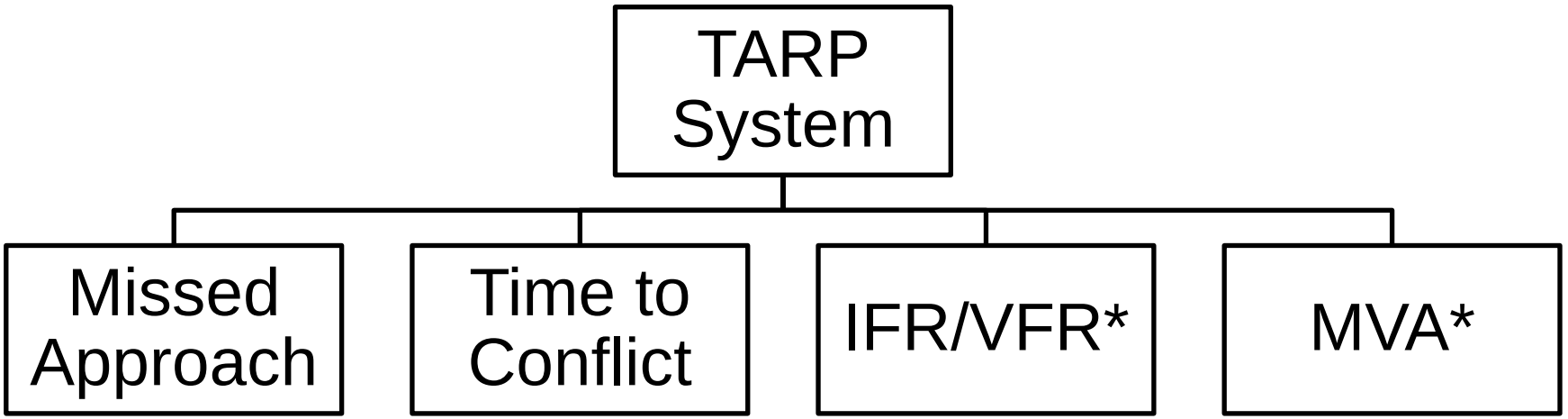
Risk-Based Data Collection Criteria

- **What is the most important event to review?**

- **How does the ATO determine what the most important event for review is?**
  - Current distance between aircraft
  - Projected future distance between aircraft
  - Slant range
  - Rate of closure
  - Time to closure
  - Projected minimal separation distance

Collect – Find – Fix – Monitor

The evolution begins with risk-based data collection.



* In future module

Questions?