SAFETY MATTERS

Insight and Resources for the ATO Safety Professional

Volume 4 Issue 1

How Operational Employees Can Lead Change in the NAS through QA

Admiral Rickover's Seven Rules of Leadership: Part 1: Raising the Bar

Weather Dissemination: Complete the Picture

WINTER 2016

Federal Aviation Administration

"I call on everyone involved to participate fully in Recurrent Training."

Teri Bristol, *ATO Chief Operating Officer*

JANUARY 2016 TOPICS

Instructor-Led:

1. ATSAP
2. Human Factors
3. Performance-Based Navigation and Stable Approaches
4. Wake Turbulence

Web-Based:

1. Climb Via/Descend Via
2. Holding Instructions
3. Line Up and Wait
4. PBN/RNAV Procedures—Arrivals and Departures
5. Runway Incursions—Hot Spots
6. Similar Sounding Call Signs

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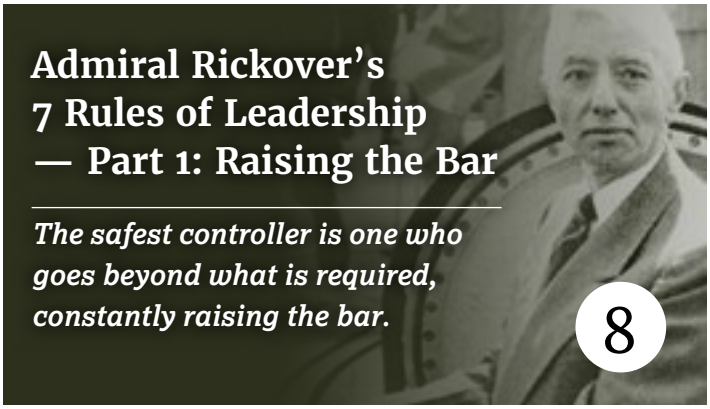

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Correction: In the article from our Fall 2015 issue, "A Winter Excursion of Another Kind," item 10 on page 6 should read as follows: "Comply with operational flight requirements (ensure aircraft are not above the glide slope when cleared)."

Message from the Vice President: Relationships Matter

What we do each day helps more than 770 million passengers reach their destinations safely each year. In a complex organization such as ours, it is important to remember that we are all on the same team and our working relationships can ultimately affect the safety of the flying public.

Over the next few months, I'd like to share some principles that can help us build and sustain strong relationships within the ATO and with our stakeholders. Known as the Shepherdstown Principles, they were developed collaboratively by FAA executives for FAA executives, but are applicable at all levels of the organization. Here are the first two:

Assume Positive Intent and Set the Tone—Consider that all employees are working to serve stakeholders; resist negativity and assumptions.

This involves keeping an open mind when something outside of the norm comes up. Take for example, a facility that asks for a training waiver. Rather than making assumptions, or relying on your default answer, take the time to fully understand the true need. This helps to keep conversations focused on a positive outcome. After all, we all have the same mission—to provide safe and efficient air traffic services.

Collaborate and Build Connections—Keep attuned to the needs and issues of other FAA organizations and stakeholders; foster relationships.

Finding and working toward common goals and interests are the foundation for effective collaboration and for building connections that produce effective results. For instance, the Air Traffic Safety Oversight Service, or AOV, has concerns around Opposite Direction Operations, but for some facilities like Aspen, Colorado, due to its configuration, ODO is a way of life. Both AOV and ATO Safety and Technical Training have the common goal of keeping the national airspace system safe. Cultivating good relationships enables us to have productive conversations around tough issues like this, and work toward sustainable solutions.

Whether you are working with individuals or groups; within your facility or with other facilities; with the airport authority or across lines of business, these principles can be applied in just about any setting. None of us can carry out this awesome responsibility alone. Positive working relationships are at the core of providing excellent service.

Terry Biggio
Vice President of ATO Safety and Technical Training

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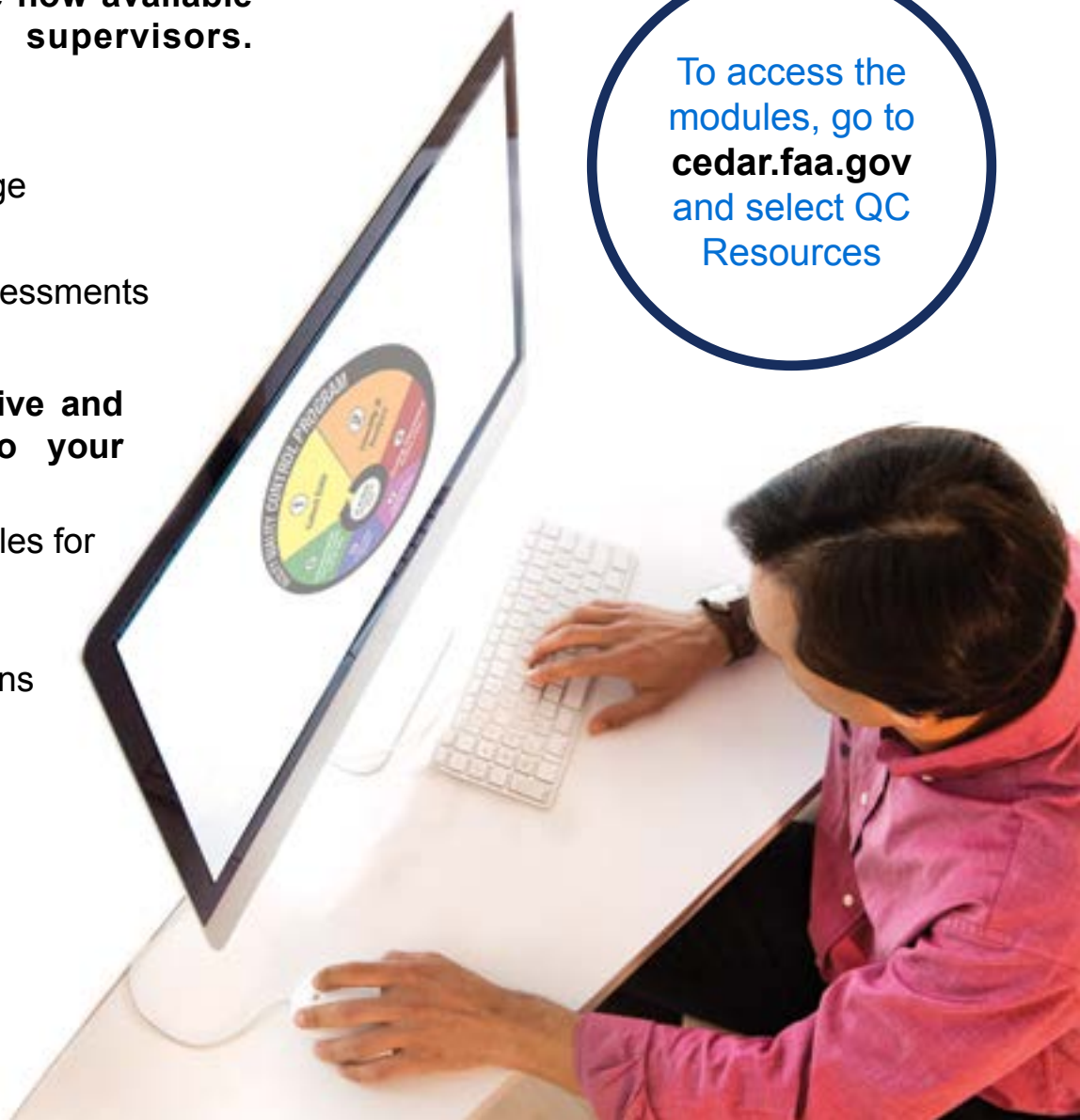


Quality Assurance: How Your Input Can Lead Change in the NAS

By Nancy Dorr, Safety Promotion

Quality Assurance, or QA, is a national-level data collection and analysis process performed by the Quality Assurance Group at FAA headquarters and in the Service Centers. The group collects data and then analyzes it to identify hazards at the national airspace system, or NAS, level. In contrast to Quality Control, or QC, which focuses on safety at the facility level, the QA process focuses on risk throughout the system."Once hazards are identified, changes may be implemented to mitigate risk through national directives and procedures," said Mike Balder, acting director for Safety.

Data from the field is vital to this process. Operational employees provide the QA Group with important system safety events in the form of reports, which include Mandatory Occurrence Reports and Electronic Occurrence Reports, as well as other data collected through the Comprehensive Electronic Data Analysis and Reporting program, or CEDAR, Internal Compliance Verifications and External Compliance Verifications.

When QA Group members conduct the Risk Analysis Process, known as RAP, for high-risk events, they review data from the above reports and tools along with data from the Air Traffic Safety Action Program, the Traffic Analysis Review Program, and other sources, to identify systemic trends. Hazards identified through the RAP are often selected by the Safety Roundtable for national mitigation efforts as one of the Top 5 safety hazards.

How Can Employees Lead Change in the NAS?

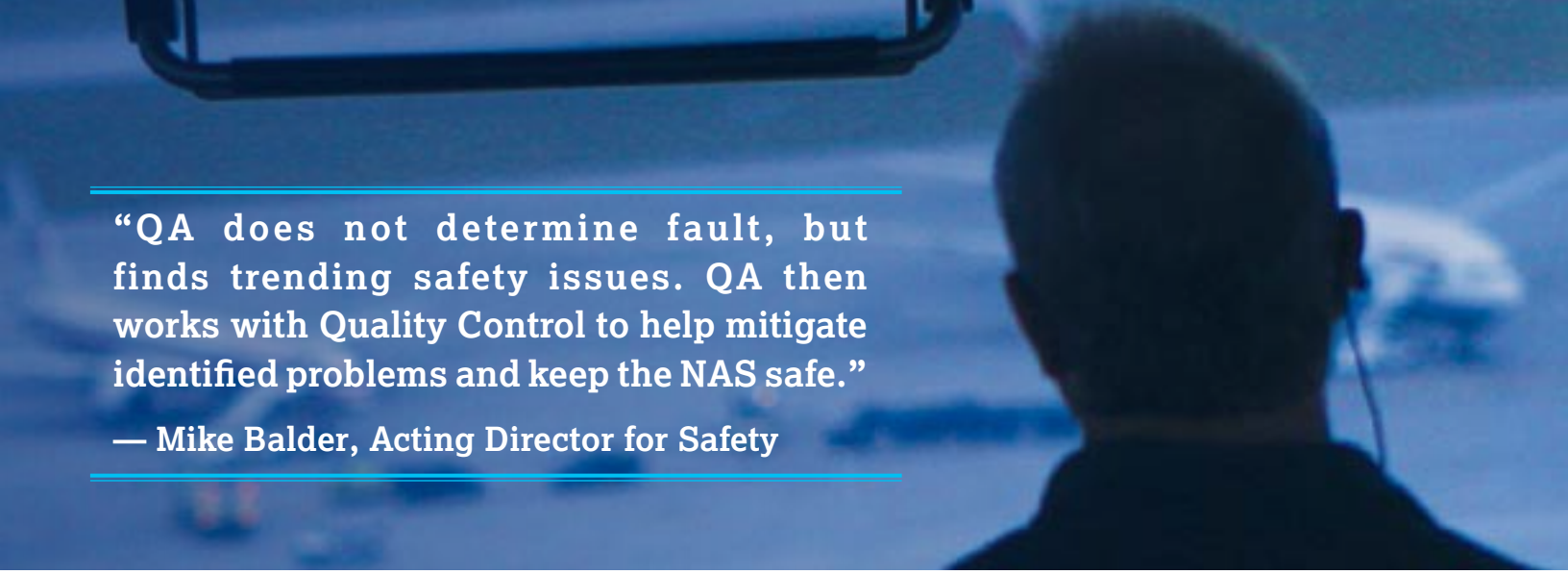
Complete and accurate safety event information from employees enables the ATO to develop more effective risk mitigations. Therefore, be as complete, timely, and informative as possible.

When reporting an event, include the following:

- A detailed description
- What positions and/or facilities were working the aircraft when the event occurred
- An accurate time the event occurred (specify local or UTC)
- If a potentially significant event, ensure it is marked as one
- If the Brasher Notification was issued, and if not, why it was not issued (for example, unable to communicate with pilot)
- If a pilot called, include a summary of the call and pertinent information

Note: If you are in doubt, report and QA will sort it out. If QA contacts you for more information, be sure to respond in a timely manner.

The information provided in the various reports can ultimately influence how the ATO develops and implements safety mitigations. Here is one example of how ATO operational employee data led to change throughout the system:



"QA does not determine fault, but finds trending safety issues. QA then works with Quality Control to help mitigate identified problems and keep the NAS safe."

— Mike Balder, Acting Director for Safety

During the investigation of go-around events between 2011 and 2013, safety analysts identified a systemic hazard associated with Converging Runway Operations, or CRO. A Converging Runway Operation occurs when the flight paths of two aircraft intersect, but the runways themselves do not. In the event of a go-around or rejected landing, the aircraft may unexpectedly be in the proximity of another aircraft departing from a nonintersecting runway, potentially compromising the established safety margins. The result of the intersecting flight paths created an airborne risk of collision.

In response to this hazard, a CRO task force developed the Arrival Departure Window tool to prevent possible conflicts between departures and arrivals by requiring the departure aircraft to be rolling for takeoff before the arrival aircraft enters the specific window. The tool creates a display on the controller's radar screen that provides a "go/no go" marker and virtual intersections, allowing a controller to make safer decisions. National policy was also implemented that addressed safety concerns on the use of nonintersecting converging runways whose flight paths intersected within one nautical mile.

These changes would not exist had it not been for the important data provided by ATO operational employees.

"QA is part of the ATO's proactive safety strategy of Collect, Find, and Fix. QA does not determine fault, but finds trending safety issues. QA then works with Quality Control to help mitigate identified problems and keep the NAS safe," Balder said.

This is one example of how the FAA is moving away from a culture of blame to a culture of learning, enabling the ATO to correct risk, locally and across the NAS.

For more information about QA and QC, be sure to visit the CEDAR page and click on the QC Resources link, or look for the Spring 2016 Safety Matters article on QC and the Summer 2016 Safety Matters continuing the series, to learn how these safety tools work together in maintaining the safety of the NAS.

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Staying on Top of the Top 5

By Stephanie Austin, Safety Promotion

The Top 5 list of hazards published each year by the ATO sets annual priorities that enable us to focus on the most prevalent areas of risk in the national airspace system, or NAS. It is the measurable output of field operational reporting and the culmination of our national Quality Assurance, or QA, process and proactive safety management efforts.

What It Is

"A good way for field or operational personnel to view the 2016 Top 5 list may be as a 'coming attraction,'" said Dave Boone, former deputy vice president for ATO Safety and Technical Training. The announcement of the list of Top 5 hazards each year is merely the beginning of the ATO's collaborative efforts in developing appropriate mitigations to address these hazards.

In effect, the Top 5 serves as our "to do" list for the next 12 months for developing corrective actions that address systemic risk across the NAS. Many of the resulting procedural or technological changes may not materialize in the year the Top 5 list is announced. Mitigating the Top 5 hazards is a priority for all operational personnel at all affected facilities. When we address known sources of risk, we effectively raise the bar on safety by implementing the corrective actions as directed and performing effective quality control.

What It's Not

The annual Top 5 list is sometimes confused with the National Quality Control Emphasis Items, which are Weather Dissemination and Instrument Flight Rules/Visual Flight Rules Conflicts, including parachute operations. These focus areas have been targeted for performance improvement within Air Traffic. While safety problems in these areas are rare, the data tells us that when problems do happen, they may lead to collision and loss of life. In these cases, controllers must have clear, unambiguous guidance on what can and can't be done to safely affect the situation; and adhere to the safety standards to keep the system safe. Weather Dissemination also became a Top 5 items for fiscal 2015 because safety data showed it was a factor in many high-risk events, and mitigations were developed and implemented. As the ATO continues to monitor the effectiveness of the mitigations, tracking and improving controller compliance is also necessary in this two-pronged approach to this persistent and sometimes fatal hazard.

Why Do We Do It?

The purpose of the Top 5 list is to help the FAA proactively manage risk in the NAS and raise the level of safety on a national level. In the past, we focused on significant events and took action to correct problems after they occurred. This was a reactive approach. The Top 5 list helps the FAA to focus on the most prevalent hazards and manage the associated issues before they become problematic. With this in mind, all of us play a key role in the development of the list.

In the daily operation, facility performance may vary from its standard (depicted as the solid horizontal line in the illustration below); this is known as "drift."

The ATO Safety Management System, or SMS, has significantly improved the way we gather and analyze data, and mitigate risks. With this approach, we now proactively identify drift, and work to reduce gaps between the standard and performance to ensure compliance with safety standards.

In addition to the SMS there are other tools available to close potential gaps and eliminate drift:

- **Operational Skills Assessment** – This tool gathers a sampling of individual technical performance to assess facility performance.
- **Compliance Verification** – It's used to conduct an operational audit.
- **Service Reviews** – They give a 360-degree look at a particular event, procedure, or policy. There is a question tree here to help get the relevant data you need.
- **Systemic Issue** – This process looks at perceived weaknesses. It helps to gather data that can be used to evaluate people, systems, or process.
- **Quality Control Checks** – They provide a method to ensure integrity. Remember, data must be "good," so this tool helps you ensure the integrity of QA data.
- **Emphasis Items** – This process focuses on one particular facility item to help gather data for further analysis.

How Do Operational or Field Employees Contribute to the Top 5?

Facility Quality Control, or QC, managers should use the tools outlined above on a regular basis to assess the collective performance of their team and understand if policies, procedures, and safety standards are being implemented and adhered to. Performing QC on a regular basis ensures compliance with the standards and provides valuable data for the QA process. QC reporting yields thousands of data points that are then analyzed to ensure data integrity, validity, and meaningfulness.

All the reporting done as a result of QC allows the ATO to identify systemic trends in the operation. Through the Risk Analysis Process, the ATO assigns a level of risk associated with information the data is showing. Additional safety data from the Air Traffic Safety Action Program, or ATSAP, and other sources are also included. This results in a set of verified safety priorities. These priorities are formalized as the Top 5 hazards in the NAS.

Corrective actions formulated to address the Top 5 are continually monitored to ensure related risks are adequately mitigated. This is a key component of the SMS feedback loop. Mitigations are readdressed when and where needed if the desired outcome is not achieved. Click here for additional information on the 2016 Top 5 listing and the Top 5 Archives.

1. WAKE SEPARATION

Difficulty of pilots and controllers to separate for wake, leading to loss of wake separation.

2. LARGE OR HEAVY AIRCRAFT WAKE TURBULENCE

Large or heavy aircraft wake turbulence encounters despite maintaining separation.

3. HELICOPTER OPERATIONS

Close–proximity helicopter operations in the vicinity of an airport.

4. TOWER VISUAL SCANNING

Air Traffic Control scanning technique did not provide situational awareness.

5. WEATHER ACCESS

Lack of radar–derived weather information displayed on controller scope.

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ADMIRAL RICKOVER'S SEVEN RULES OF LEADERSHIP PART 1

RAISING THE BAR

By Dianna Johnston, National Communications Coordinator, Air Traffic SUPCOM

SEVEN RULES

Rule 1: You must have a rising standard of quality over time, and well beyond what is required by any minimum standard.

Rule 2: People running complex systems should be highly capable.

Rule 3: Supervisors have to face bad news when it comes, and take problems to a level high enough to fix those problems.

Rule 4: You must have a healthy respect for the dangers and risks of your particular job.

Rule 5: Training must be constant and rigorous.

Rule 6: All the functions of repair, quality control, and technical support must fit together.

Rule 7: The organization and members thereof must have the ability and willingness to learn from mistakes of the past.

Admiral Hyman Rickover, nicknamed "Father of the Nuclear Navy," was widely recognized for being one of the most influential leaders of the 20th century. Both respected and controversial, Admiral Rickover was known for his emphasis on high standards, ownership of work, development and training of employees, and clear purpose in completing objectives. He consistently dealt with highly complex and highly risky operations while maintaining a phenomenal safety record. His Seven Rules of Leadership apply to all types of work situations, including air traffic control.

Rule 1: You must have a rising standard of quality over time, and well beyond what is required by any minimum standard.

As controllers, the greatest sigh of relief we experience is our first "check-out." Training seems to last forever, the culmination of many years of college, military, Academy, and facility training in one large, stressful period. The emotional ups and downs of the entire process can often leave us feeling drained, worthless, frustrated, or even humiliated. Yet, once we pass this proverbial hump in our training, and start seeing that downhill roll toward certification, our spirits are lifted and ultimately our egos return.

Certification is a dream come true for some, a huge weight off of the shoulders for others. Many throw massive parties as a symbol of success and initiation into an exclusive band of brothers and sisters. Celebrating the end of a very stressful time in our lives, we shake the weight off our shoulders and finally begin to relax.

Training Continues beyond Certification

Young controllers may often feel that once certification is achieved, they are done training. However, the truth is that we never stop training. Certification merely means we are safe enough to talk to airplanes by ourselves and make decisions that do not threaten the safety and integrity of the national airspace system, or NAS. Thinking we do not need to continue growing, learning, and improving is a mistake too many of us tend to make. The truth is that most newly certified controllers regress a bit, losing some of the edge that facility training created.

As we grow older and become more mature in our controlling abilities, we begin to season, and experience takes our instincts to new levels. Having a sense of what will work and what won't seems second nature, a skill we envied when we were new. Most of us have a mentor, the facility-seasoned controller with so much charisma that even the most difficult situations seem like a piece of cake. We put these people on a pedestal and aspire to be like them. But, what we sometimes fail to realize is that our mentors did not magically become amazing overnight. They were once like us, but knew early on to be vigilant, stay sharp and focused through repetitive training and critiques, and consistently set high standards for themselves.

Imagine your most precious family members flying through the NAS. What kind of service do you want them to receive? Are you comfortable with the minimalist mentality, or would you want the highest degree of safety? Now, imagine that the person controlling the plane with your family on board is the most complacent controller you can imagine. How would that make you feel?

They are most likely those who take great pride in their jobs, not in an egotistical sense, but from wanting to provide the safest, most efficient service, often without acknowledgment for their good work. The work ethic of the safest controllers certainly does not mirror that of a minimalist, but rather one who consistently goes beyond what is required, constantly growing and raising the bar. Granted, having a bit of an "ego" is an important aspect of our job, as with any job where necessary risk is part of the picture, but the safest controller is able to put his or her ego aside when the time comes to do so.

Yes, There Are Real People on Those Planes

Ensuring that everybody in the NAS, whether as an operator or passenger, arrives at their destinations free from harm, is our most basic requirement. People's lives are in our very capable hands every time we key our mics. Imagine your most precious family members flying through the NAS. What kind of service do you want them to receive? Are you comfortable with the minimalist mentality, or would you want the highest degree of safety? Now, imagine that the person controlling the plane with your family on board is the most complacent controller you can imagine. How would that make you feel?

It doesn't matter if you work at the busiest airport in the world, or the slowest and smallest. We all should have the same, high standards of safety, and reflect greatness in each other. Be on guard not to allow complacency to creep in, or the thought that "we aren't busy, so it isn't necessary" to take hold. Instead, raise the standard and make it a point to remain vigilant during these times. Issue the proper clearances and use proper phraseology at all times, even when it is easier not to.

Drifting into Danger

It is easy for any controller to gradually drift away from the procedures that lie within our Orders and Notices. One slip of phraseology here, one bend in the rules there. Eventually, the standards of safety slip completely, and what was once considered a great service and safe operation becomes an eye-opening, ATSAP-filing performance. Being constantly aware of how drift erodes the safety of the operation, and seeking to raise the bar every time we take control of a position, should be the norm.

Periods of light traffic are most often the times when controllers make mistakes, typically because we tend to let our guard down. Even if you speak to only one airplane pilot in a month, your standard should be to provide the safest, most efficient service you can – all the time. It doesn't matter if you work at the busiest airport in the world, or the slowest and smallest. We all should have the same, high standards of safety, and reflect greatness in each other. Be on guard not to allow complacency to creep in, or the thought that "we aren't busy, so it isn't necessary" to take hold. Instead, raise the standard and make it a point to remain vigilant during these times. Issue the proper clearances and use proper phraseology at all times, even when it is easier not to.

Self-Evaluation is Vital

Raising the bar requires honest self-evaluation. Take time to reflect on your control abilities and ask yourself: How safe am I, really? Do I consistently provide great service? Am I reactive and argumentative when receiving performance critiques? By evaluating ourselves and maximizing each opportunity to improve, we raise our own personal standard of safety to its absolute peak. Never settle for the mindset of "I'm good enough." Strive for the mindset of "I want to be great" and keep pushing yourself to make our NAS the safest it can be.

"The greater danger for most of us lies not in setting our aim too high and falling short; but in setting our aim too low, and achieving our mark." – Michelangelo

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ATC Observations from the Cockpit

By Captain Dan Watkins (US Airways, Retired)

In 43 years of flying – 35 years as an airline pilot – I have, literally, observed air traffic control, or ATC, around the world. I've been impressed how professionally, safely, and efficiently controllers facilitate aircraft movement.

It's my observation that because of air traffic controllers, the U.S. national airspace system, or NAS, has such a high volume of air traffic moving efficiently and safely.

I know, it takes as much knowledge and experience for controllers to do their jobs as it does for pilots. Need confirmation? Look no further than the ever-changing 744 pages of the ATO Order 7110.65 Air Traffic Control. This does not include the myriad number of ancillary ATC orders and standard operating procedures employed by facilities across the NAS. Like pilots, controllers require substantial training and considerable experience over long periods to be proficient and accomplished.

Flight Deck Training, Good News for Controllers and Pilots

The ATO's new emphasis on the Flight Deck Training program, better known as FDT, is good news. Getting controllers back in the cockpit will be very beneficial for the entire system. A shuttle leg from Reagan Washington National Airport, or DCA, New York's LaGuardia Airport, or LGA, or Boston's Logan International Airport, or BOS, in an Airbus cockpit will allow controllers to see the demands required on a short leg into a busy terminal. Observing the required cockpit coordination, crew resource management, and requirements controlling the aircraft responding to ATC changes will be enlightening.

I think it will compare to the day I visited Indianapolis Air Route Traffic Control Center, or ARTCC, sat down beside the controller, observed the display, and listened to instructions being issued. I left knowing the controller's job was more challenging than I first assumed. I suspect the same may occur with FDT trips. Controllers will observe firsthand the work pace required of pilots.

Inconsistencies, Uncertainties, and Unnecessary Programming

I consulted an airline pilot colleague for his ATC observations. He immediately brought up OPDs, also known as Optimized Profile Descents, and confirmed some of my own thoughts. Captain Michael Low, an Airbus captain for a major U.S. airline, flies almost exclusively the DCA/BOS Shuttle – usually two round trips a day, three days a week. He talked about inconsistencies, uncertainties, and unnecessary programming.

He used the ROBUC ONE Area Navigation, or RNAV, arrival as an example. The ROBUC ONE Standard Terminal Arrival, or STAR, provides lateral and vertical guidance for traffic to all arrival runways into BOS. In practice the flight crew programs the Flight Management System, better known as FMS, with the arrival well prior to descent and arrival into the BOS area. Captain Low discussed inconsistencies: "We find we are requested to fly a modified arrival about half the time. Modifications range from 'after PROVI, fly heading 070°, vectors to ILS 27' to 'Cleared direct PROVI, resume the arrival, maintain 250 knots till PROVI, resume arrival airspeeds at PROVI.' Sometimes, the controller is getting slammed and appears to be sequencing aircraft to the arrival runway. Other times it appears the controller is simply clearing us direct as a personal preference." In any case, changes demand modifications to the FMS and introduce opportunities for potential crew errors.

Concerning uncertainties, Captain Low stated: "Occasionally, we'll be cleared from the vicinity of FEXXX to cross PROVI at 10 [10,000 feet altitude] and 250 [250 knots indicated airspeed]. The arrival depicts 'above 11,000 feet at PROVI' and no speed restriction. Uncertain whether or not to conform to crossing restrictions between FEXXX and PROVI, we ask and are sometimes told to conform to the crossing restrictions and other times to disregard the restrictions. Controller instructions are not always clear. Another time, inside PROVI, we were told to 'descend to 6,000 feet for the ILS Runway 4R approach.' As it turned out, we were expected to comply with the crossing altitudes on the arrival."

Discussing unnecessary programming, Captain Low said: "Once the FMS is programmed with a STAR containing vertical guidance, the aircraft will maintain cruise altitude until the last possible point where a normal idle descent meeting the vertical profile's crossing restrictions can be accomplished. Changes in that profile are usually doable, but add another 'opportunity for the crew to make an error programing the box.' The biggest example on the ROBUC ONE is at PROVI. About 25 percent of the time, the controller's clearance will modify the crossing at PROVI to a hard altitude of 10,000 feet and a hard speed of 250 knots. That's fine, until someone overlooks changing the FMS or the FMS deletes another restriction along the route that is not detected by the crew and the aircraft is high at PROVI."

FMS-managed descents are governed by a predetermined speed based on a cost index defined by the dispatcher. Airline aircraft usually descend in the 290 knot range. Once the aircraft begins the descent at the preplanned speed and the controller issues a speed restriction below the planned speed, the aircraft will immediately be high on profile. Occasionally, even with speed brakes, it is physically impossible to make crossing altitude restrictions at the slower speed.

Unstable Approaches

This led to another observation — speed control. Captain Low talked about the ILS Runway 4R at BOS. "I have several experiences where the controller requests 'maintain XXX knots until a 5 mile final.' Add a tailwind and it is tough getting down at the higher indicated speed."

The pilot should decline if the requested speed is too fast and will hamper a proper stabilized approach. Occasionally, a pilot will attempt to maintain the higher speed honoring the controller's request. This situation can create a risky situation – an unstable approach. If the approach is unstable, determined by safe performance criteria, it is a mandatory go-around for airline crews and unplanned pop-up traffic for controllers.

Can a controller tell if an aircraft is on a normal glidepath? Yes. Multiply the distance on final by 300. A normal glideslope is 3° – normally a loss of 300 feet per nautical mile. It is simple math to determine an appropriate altitude for a normal descent. For example, at 10 miles on final, the aircraft should be roughly 3,000 feet and decelerating; at 5 miles, 1,500 feet and roughly 130 knots; at 3 miles, approximately 900 feet, etc. If an airplane is not close to those numbers while on final approach, a controller should expect and be prepared for a go-around due to an unstable approach.

Complex ATC Instructions Given During Touchdown and Rollout

In November 2015 the Air Traffic Safety Action Program, or ATSAP, Committee published a briefing sheet discussing controller instructions to crews completing landing rollout. The document cites "pilot reports shared to ATSAP through the Confidential Information Share Program."

Landing roll is a busy time. The typical airliner landing roll involves ensuring the aircraft is tracking down the centerline; speed brakes are deployed; thrust reversers are deployed; wheel brakes are engaged; and the aircraft is decelerating at an adequate rate for the remaining runway. On landing, pilot physical activity wanes as speed decreases, but mental focus is heightened. Concentration may preclude pilots from comprehending amended control instructions. Don't be surprised if you are queried about amended instructions you gave during the landing roll. If possible, I suggest waiting to amend an instruction.

Photo from DCA Tower.

Many times, I experienced during the rollout on Runway 23 at Charlotte/Douglas International Airport, with its 7,502-foot length and 0.5 percent downslope, the controller asking if we could make Taxiway Foxtrot. At the same time, I remember wondering: "Will we stop by the end?" Late in the landing roll, after we had finally slowed, we'd acknowledge the question and commit to a turnoff taxiway. We'll control the aircraft first, then talk on the radio.

Based at DCA many years, I observed controllers there doing a great job. They moved lots of traffic at a busy airport with restricted airspace, crossing runways, and only one long, 7,000-foot primary runway. I especially liked the way controllers used key phrases to inform pilots exactly what they needed. For example, the local controller's "Line Up and Wait" clearance would also include "Be ready" if an aircraft was closing in on final. My interpretation for "Be ready" meant "have both engines above idle. I need you to start the takeoff roll immediately when cleared, spacing is getting tight."

The controllers had observed that modern high-bypass fan engines on today's airliners require a significant acceleration period from idle to full takeoff power – CFM-56 engines on Boeing 737s and narrow-body Airbus aircraft can take between 10 and 17 seconds to accelerate to takeoff thrust.

I've observed that if you, as controllers, will communicate your plan for the aircraft, then pilots will attempt to fly in a manner to satisfy your requirements. Tell me you want me to turn in tight or I'm number one for arrival, and I'll start slowing so I can configure the aircraft for a tight turn, or rapid descent, and be ready for your clearance. Incidentally, it can take up to 10 miles in level flight for an aircraft to decelerate from above 300 knots to 210 knots, where flaps can be extended and further slowing takes place.

General Aviation View from the Cockpit

It's not all about turbojets and airliners. I fly a Cessna 182 from my home base in North Carolina. Personally, I prefer filing instrument flight rules, or IFR, when traveling for several reasons. If I encounter clouds and weather along the way, I'm not worried about "maintaining VFR," or visual flight rules. After 35 years as an airline pilot, frankly, I find it easier being within the "system" on an IFR flight plan. I have another set of eyes watching, someone else helping, and another source of valuable information if I need assistance. A prime example occurred on a recent trip to Wyoming.

Between Gillette and Cody, Wyoming, cruising at 12,000 feet, we listened to an aircraft relaying messages while circling above the site of a very recent crash. The orbiting aircraft was transmitting to high-altitude aircraft en route that were relaying messages to the Salt Lake ARTCC controller. The Salt Lake controller was communicating with the local sheriff's department, which was launching ground rescue efforts. It was an excellent example of the knowledge, capability, and teamwork controllers bring to the pilot community and the NAS. It hit home just how important controllers were to me in my 182. As a general aviation pilot, I don't have a dispatcher to help me with in-flight issues. This practical example demonstrated how controllers are a valuable resource where I can turn when I need assistance.

On a different trip, I had another interesting situation. Arriving at a fuel stop in the Midwest, the Automatic Terminal Information Service, or ATIS, was read and recorded by a controller. It sounded like a contest to determine how quickly the weather information could be read. The controller was speaking so quickly, it took listening to the ATIS transmission three times to get all the information. While not a crisis, the time listening to the number two radio was time taken away from really monitoring radio number one – the ATC control frequency. Aviation is not a game to make pilots or controllers expend extra effort.

On a recent trip to Texas, our destination was Houston's David Wayne Hooks Airport, which has a very high rate of runway incursions. Since the last time I was there, the controllers had instituted new procedures. For landing Runway 17R or 35L, pilots were informed via the ATIS to exit and stop. Aircraft were not to continue movement until they contacted ground control, and were issued specific taxi instructions. The same information was given again by the local controller, when aircraft checked in with tower. I acknowledged the controller's instructions to exit and stop, but I did not read the instructions back verbatim with the landing clearance as I was requested to do so. I thought the whole procedure, while cumbersome, certainly made pilots aware of their responsibilities for runway incursions, and was actually a good idea. Maybe we need more controllers demanding pilots read clearances back correctly.

My observations are limited because of space. I appreciate and salute the excellent job controllers do, and I recognize the vital controller function in the aviation safety equation.

Captain Dan Watkins *retired from US Airways in 2013, accumulating more than 25,000 hours of airline, military, and general aviation, or GA, pilot time. His military pilot experience includes the T-38, T-29, and C-130. As an airline pilot, Captain Watkins has flown the Convair 580, Boeing 727, three models of the 737, along with the Airbus 320 family of aircraft. He continues to actively fly GA in a Cessna 182. Since 2007, Captain Watkins has provided contract support, in various capacities, to ATO Safety and Technical Training.*

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New Training for a New Era

By Nancy Dorr, Safety Promotion

The application of NextGen technology and procedures is rapidly modernizing our national airspace system, or NAS. Along with this modernization comes the task of training those who operate in it.

"The onset of NextGen will bring significant changes to the specialized skills required to use and maintain systems in the NAS," said Administrator Michael Huerta. "To prepare for these modern systems, the FAA must modernize the way it develops, maintains, and administers training in proportion to the systems themselves."

Over 130 members from academia, industry, and the federal government met to discuss the future of Technical Training and Human Performance through the establishment of a new FAA Center of Excellence, or COE. The COE will conduct research and development on technical training for air traffic controllers, aviation safety inspectors, engineers, pilots, and technicians.

In a public meeting held in October, the FAA presented programmatic details of its COEs, and outlined the technical areas on which the proposing teams should focus. The focal technical areas include: curriculum architecture, content management and delivery, simulation and part-task training, human factors research, analytics, and safety. The FAA expects the COE to perform long-term basic and applied research, education, and training tasks through a variety of analyses, development, and prototyping activities.

"As the FAA installs and implements new equipment, capabilities, concepts, and techniques to achieve the NextGen vision, we have to retrain our workforce, in addition to most users of the NAS, to really be able to use this new technology," said Randy Smith, acting director for Technical Training.

FAA Center of Excellence event.

Randy Smith, acting director for Technical Training, provides an overview of the air transportation environment.

Patricia Watts, Ph.D., national program director, FAA Center of Excellence, provides a program overview of the FAA Center of Excellence for Technical Training and Human Performance.

The FAA wants to take advantage of advancements in teaching, such as part-task training, modeling, immersive human-in-the-loop simulation, and adaptive learning technologies that are standard in other technical workforces.

Human factors will also be examined, such as changes in learner expectations and academic best practices for training a new generation of learners. Additionally, the COE will research innovative training methods, new technologies such as mobile learning, and new ways of collecting and managing training data.

"The COE program provides a structured mechanism for the FAA to team with institutions of higher learning and industry partners in a cost-sharing and collaborative manner. Through this new COE, we will uncover industry's best practices, tap into the minds of bright researchers and innovate together. We will collectively study, test, and implement progressive improvements and solve some of the long-standing training challenges for the aviation workforce – for about half the cost to the government," said Karen Callihan, the COE program manager for Technical Training and Human Performance.

The FAA COE Program Office, ANG-E4, led by Dr. Patricia Watts, currently hosts eight successful Centers of Excellence; the Center of Excellence for Technical Training and Human Performance will be the FAA's ninth active center.

To select a Center of Excellence, the FAA seeks out institutions of higher education to conduct research and other activities, which will allow the institution to recommend innovative solutions, centered on training and human performance throughout the aviation community. The competitive process has engaged U.S. colleges and universities since 1990 when Public Law 101-508 (49 USC Section 44513) directed the FAA Administrator to establish the Air Transportation Centers of Excellence program. The program is grant-based, and the selected COE members and affiliates must match FAA funds dollar-for-dollar.

To date, the FAA program has had over 70 institutes of higher education as named Centers of Excellence, consisting of more than 200 industry and government affiliates. Over the years, the collective efforts have contributed to significant advancements in aviation technology, as well as research critical to the FAA and the flying public.

The selection for the Center of Excellence for Technical Training and Human Performance will be announced in summer 2016.

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Weather DISSEMINATION

By Matt Cabak, SUPCOM Safety Focal

More lives are lost to weather encounters than any other hazard in aviation. As spring approaches, it is important once again to begin the conversation of what controllers can do to help our users safely arrive at their destinations.

The best preflight planning can mean little when weather systems change quickly or unexpectedly. Like a new car that loses value when you drive it off the lot, weather information obtained in a preflight briefing may be inaccurate as soon as the aircraft lifts off the runway.

Spring will soon be upon us, and that means that the national airspace system, or NAS, will see an uptick in traffic as passengers head for a much-needed break from the grips of winter. It also means that pilots stroll out to their hangar, many for the first time in months. Unfortunately, as spring brings us an increase in system volume, it also brings the threat of weather hazards. This article ran in an earlier edition of Safety Matters, but we feel that the information is just as important now as it was then. We offer this reprint as a refresher on the hazards of spring and summer weather. Weather continues to be the largest threat to the safety of aircraft in our system, and it is incumbent upon us to be as familiar with the changing conditions as possible and provide the highest level of service regarding weather to our users.

More lives are lost to weather encounters than any other hazard in aviation. As spring approaches, it is important once again to begin the conversation of what controllers can do to help our users safely arrive at their destinations. That conversation must begin with an understanding of the importance of the weather information we can provide, and continue with the manner and methods by which we can provide it.

Let's begin with the importance of information. Any pilot who is planning a flight is required by 14 CFR Part 91.103 to become familiar with the current and forecasted weather conditions along the route of flight. That familiarization can be as simple as getting a printout from a dispatcher or as complex as calling Flight Service for a briefing, doing homework on AviationWeather.gov, or downloading weather information to a mobile device.

It's important to recognize that weather on this planet is constantly changing. While weather forecasts are more accurate than they have ever been, they are not perfect. Weather hazards can develop and diminish quickly, and sometimes conditions change so quickly that forecasting is in constant flux. Because of this, weather information obtained in a preflight briefing may not be accurate when the aircraft lifts off the runway. This is why pilots rely on air traffic control, or ATC, to provide up-to-the-minute weather information along their route of flight. We know that pilots have the option of contacting Flight Service for further weather information while airborne, but during periods of increased cockpit workload, this may not be possible. Additionally, we know how the weather has affected other pilots, and we see the weather trends on our scopes or out the window of the tower. We also hear valuable information from pilots that we can pass on to others.

Take a Hint

By discussing current weather conditions early and often, we have the unique ability to help a pilot make a well-informed decision on how to avoid hazardous weather. Often times, pilots are subtly asking for this information by how they check in with ATC. When pilots check in on frequency by talking about the weather, such as ride conditions or previously issued deviation instructions, they are interested in what lies ahead. If we do not answer this subtle hint, the pilots are likely to ask directly very soon after. Initial contact is an excellent time to deliver what we know of the conditions in their path. This can give them the opportunity to begin planning their next moves as early as possible, and can often make our jobs easier at the same time by eliminating the need to have a conversation later with a pilot who ventures too close to severe weather.

ATC Can Fill Important Gaps in Weather Information

Weather dissemination was a key topic of discussion during the National Safety Initiative webinars in 2014. Most of that discussion focused on depicted precipitation. Keep in mind, most general aviation aircraft have little to no onboard weather information. If they do have weather information on board, some of the information can be 10 to 20 minutes old, depending on the source.

Larger aircraft likely have onboard weather radar systems, but those systems have limitations. The average antenna on an aircraft is 18 inches in diameter, compared to ground-based systems with an average diameter of 18 feet. Rather than rotating in a complete circle, as ground-based systems do, these systems scan side to side. The crew can manually adjust the tilt angle to gather vertical information, but this information is still limited by the antenna size and power output of the system. As the aircraft gets closer to the storm, the dimensions of the precipitation area can exceed the radar beam and scan pattern dimensions, and therefore present an incomplete picture. These radar systems are also susceptible to radar attenuation, in which the radar beam is wholly absorbed or reflected back to the antenna by extremely intense precipitation, leaving a "radar shadow" in which there is no information on what lies behind the reflected precipitation. This shadow may hide far more severe precipitation that may indicate hail or wind shear in the vicinity. More intense storms often require the flight crew to keep farther away from the area.

Controllers can fill the gaps in those radar shadows by providing pertinent information to pilots in a timely manner. What looks like a viable route to a pilot may look completely different on a controller's radar screen. As stated earlier, airborne systems have limitations as to what image will be painted on-screen for the pilot. The amount of information can be rather limited, and the system itself can be cumbersome or labor intensive to a pilot who may be less familiar with the system. Controllers have a radar mosaic, whereas the pilots can only see in front of the aircraft and typically look 40 to 80 miles ahead but may be able to change their settings to see up to 150 nautical miles ahead. Controllers can provide more accurate information that allows pilots to make a good decision about their course of action.

Airborne weather radar systems cannot detect icing or turbulence. For this reason, it is crucial to collect and disseminate Pilot Report, better known as PIREP, information. Turbulence can quickly go from a mild annoyance to a severity that causes injuries to passengers and crew or structural failure of the airframe. With enough notice from a properly disseminated PIREP, the flight crew can ensure that passengers and cabin crew are seated prior to entering the turbulent area, and the crew can slow to the appropriate turbulence penetration speed to prevent structural damage.

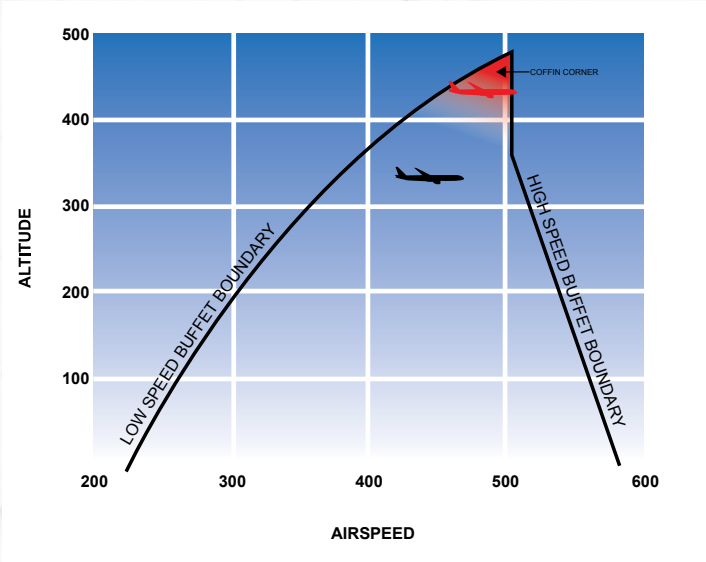
Beware of the 'Coffin Corner'

Turbulence PIREPs provide other benefits as well. During the cruise phase of flight, when a controller offers a higher altitude, the pilot often asks if the ride is smooth there. This question, while partially for passenger and crew comfort, is actually an important concern regarding the abilities of the aircraft to safely remain airborne. Near the top of the aircraft's operating altitude there is a very slim margin of usable airspeed to keep the aircraft aloft based on aerodynamics and weight. As the aircraft approaches the upper altitude limits of its performance, the margin between the aircraft stall speed and its critical Mach number narrows; this is sometimes referred to as the "coffin corner" because operation in this envelope can be dangerous. If the critical Mach number is exceeded, shock waves may develop along the aircraft surfaces, which can cause a stall or loss of control. Conversely, if the aircraft slows too much, the risk of stalling increases. Flight in the coffin corner means any change in speed may result in the aircraft exceeding either of its performance limitations. For this reason, pilots generally are only able to accept flight in this part of the performance envelope if the air is smooth. This is also the reason why an aircraft near the top of its operating limitations may need a lower altitude the moment it reaches turbulent air.

The best preflight planning can mean little when weather systems change quickly or unexpectedly. Over long flights, existing conditions can often be dramatically different than the forecasts predicted prior to takeoff. The ATO has the tools to help users safely navigate the NAS, and has the responsibility to help them safely and efficiently reach their destinations.

As inclement weather develops, air traffic personnel need to ensure the appropriate use of all the tools available to provide the best level of service possible. Air traffic system users need to be kept informed of changing weather conditions so that they can adjust their plans as necessary. The best preflight planning can mean little when weather systems change quickly or unexpectedly. Over long flights, existing conditions can often be dramatically different than the forecasts predicted prior to takeoff. The ATO has the tools to help users safely navigate the NAS, and has the responsibility to help them safely and efficiently reach their destinations.

Coffin Corner



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Human Performance in the ATO

By Jason Demagalski, Human Performance Team

A large part of the success of the ATO is due to the hard work and talent of the people that work in it. While we have technology that supports air traffic controllers and technicians in accomplishing their work, the bulk of the effort in the delivery of air traffic services comes from the experts, that is, the human talent. As a result, human performance is directly linked to our organizational performance, whether it is measured in terms of safety, capacity, efficiency, training effectiveness, or any other relevant metric.

The Winter 2015 edition of Safety Matters featured an article that discussed the role of human factors in air traffic control. Since then, the ATO has created the Human Performance Team, which encompasses Human Factors as well as other elements, and provides operational support at the facility level. The team uses scientific expertise in the fields of human factors, fatigue, and health and wellness to provide real-world solutions. The team works in collaboration with NATCA, the National Air Traffic Controllers Association, and a NATCA Human Performance liaison works directly as part of the team. So, what is human performance, how does it relate to human factors and where is it used to support the ATO?

Human Performance

The team supports the agency in four ways:

- Working directly with those in the operation to help them identify human performance issues and generate implementable solutions
- Providing human performance guidance and support to the ATO and its leadership to prioritize and plan the best human performance activities in the ATO
- Providing education and training materials for the ATO for use in areas such as Partnership for Safety and Recurrent Training
- Working across lines of business in the FAA, especially with existing human factors professionals in the Office of NextGen and Aviation Safety to harmonize our research activities and mission, as well as working with international Air Navigation Service Providers and air traffic groups such as CANSO to make the FAA a world leader in human performance in the air traffic control community.

Defining Human Performance

Human Performance is about scientific human factors knowledge directly and consultatively to support and contribute to the needs of the ATO and its users.

ATO Business Goals

Enables
Level of effectiveness achieved by ATO employees in their work

Supports
Influences that underlie the work of ATO employees and the discipline that optimizes these influences

Human Factors Element

The Human Factors Element focuses on traditional areas of human factors such as selection, placement, training, organizational culture, change management, leadership, performance measurement and management, as well as system design. This element examines how these areas function in the operation, and where issues are identified, works to address them.

To address human factors components of human performance, the team is building on operational work already performed, such as:

- Human factors investigations at Southern California TRACON and Honolulu Control Facility CERAP in response to safety incidents that led to human factors recommendations to address identified issues
- Development of training standards and on-the-job instructor workshops at New York TRACON to improve the on-the-job training pass rates
- Supporting a facility with skill enhancement training at the request of the Event Review Committee
- Ensuring that the human factors elements are addressed in corrective action plans to support the Top 5 and Runway Safety Call to Action

This initial support to the operation is being used as a template for how to approach safety, training, and human performance challenges across the national airspace system, or NAS.

Whether the issue is identified with individuals, across a facility, or as the result of a specific incident or is identified as systemic across the NAS, the Human Performance Team is ready to assist with an assessment and recommendations, and more importantly, to provide continuous and ongoing support to ensure successful resolution of the issue.

The team becomes a stakeholder along with the facility, working together to address the problem at hand. Be on the watch for human factors as part of the upcoming recurrent training. If you think there are human factor issues in your workplace, you can reach out to the Human Performance Team.

Fatigue Risk Management Element

Established in 2009, the Fatigue Risk Management Element is the most mature component of the Human Performance Team. Originally its own team, it became part of the Human Performance Team as an essential element that needs to be addressed and considered in the ATO. Also known as FRM, this element provides operational fatigue risk expertise, guidance, and program management support to the ATO.

Following development of fatigue-mitigation safety policy, guidance, and training material in previous years, the FRM element focused on fatigue safety promotion this past year by publishing articles in Safety Matters and bulletins to educate the workforce on fatigue science, fatigue-related operational risks, and personal mitigation strategies and tactics.

In 2013, a collaborative FAA and NATCA Fatigue Risk Management Workgroup defined a number of shift permutations associated with increased fatigue hazards. This resulted in changes to Order 7210.2, paragraph 2-6-7, Basic Watch Schedule that went into effect in January 2015 to reduce or eliminate some of these schedules to help controllers remain more alert on the job.

As a follow-on to the 2010 NASA Controller Fatigue study, in 2016 the team will perform facility-specific sampling to understand the extent to which recent fatigue policy and guidance implemented since 2010 has reduced fatigue risk.

We also are interested in revealing any latent fatigue-causing factors and emerging threats such as our addiction to electronic devices when we are in bed and should be sleeping! That said, we are developing a Fatigue App for our workforce – not that they should be on it when they should be sleeping, of course.

Health and Wellness Element

The last element of human performance is the Health and Wellness Element. It focuses on personal life issues and characteristics that can impact human performance, many of which people don't want to think about or don't understand how they influence performance. This element focuses on:

- Social – The impact of human relationships within and outside the work environment that can influence employee performance and overall wellness
- Physical – The impact on our ability to meet fitness for duty and our overall health
- Emotional – How employees cope with life challenges such as feelings of sadness, stress, depression, and loss
- Intellectual – How employees can improve their overall intellectual wellness
- Career – Opportunities to contribute to the organization, advancement opportunities, and the sense of fulfillment employees receive from their work
- Financial – The impact on employees of providing for themselves and their families now and in the future
- Nutrition – Keeping our bodies and minds healthy

This element brings an exciting set of additional activities to the team. It allows us to support human performance by encouraging people to take ownership and responsibility for things that affect us at work, but that are things that we don't often want or like to talk about. This element is in its infancy within the Human Performance Team, and will initially focus on some educational elements.

Our goal is to bring human performance support to every aspect of the operation. A highly trained, healthy, and aware workforce will continue to preserve our safety record and push it to new heights. We look forward to working with you across the ATO to support our human performance.

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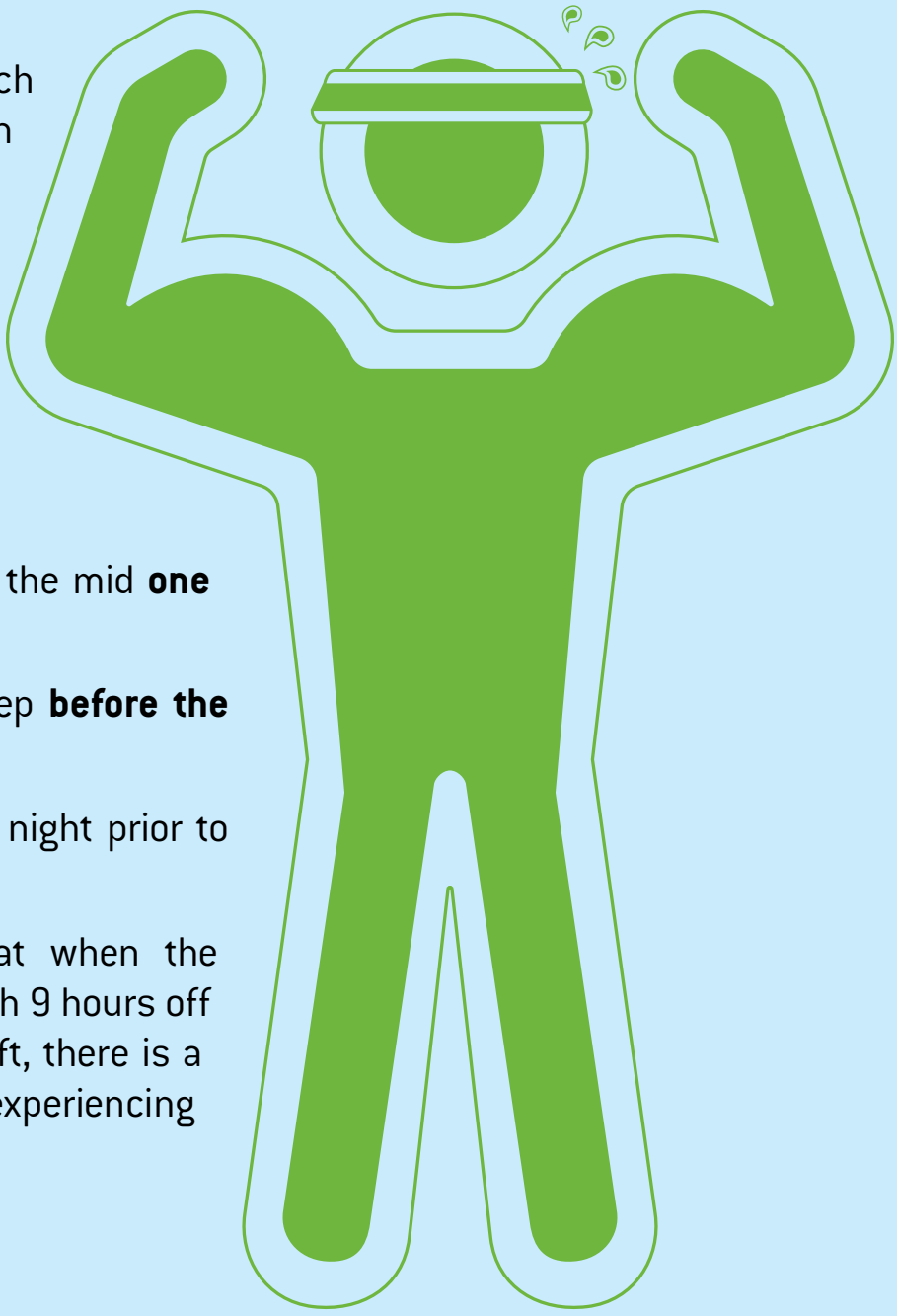
HOW DO YOU FATIGUE FLEX?



Fatigue Flex is a 2-2-1 basic watch schedule modification where an employee is provided an **extra hour of nighttime sleep** when it is most needed.

Fatigue Flex is designed to:

- Reduce the day shift preceding the mid from **8 to 7 hours**
- Begin the day shift preceding the mid **one hour later** than normal
- Give you an extra hour of sleep **before the day shift**
- **Increase nighttime sleep** the night prior to the second day shift

Biometric modeling shows that when the 7-hour day shift is combined with 9 hours off between the swing and day shift, there is a **34% reduction** in time spent experiencing fatigue risk.

my.faa.gov/go/fullycharged

passmember.org

natcamembers.org

FULLY CHARGED

We Turn Off and Tune In Across the NAS

Do you?


Seattle Center


Atlanta Center


Lincoln, NE Tower


St. Louis Downtown Tower


Van Nuys Tower


Kansas City Center


Denver Center