Investigations into ATC matter

Twelve National Air Traffic Controller Association (NATCA) Air Safety Investigators cover the United States of America. We are current Air Traffic Controllers from the Enroute, TRACON (Terminal Radar Approach Controls), and Tower specialties. The NATCA Air Safety Investigator’s primary task is to provide an objective controller based perspective to NTSB investigations of aircraft accidents or incidents that involve air traffic control services. The NATCA ASI works as part of the team of investigators to determine the probable cause of an aircraft accident and formulate recommendations to prevent future occurrences. (Insert ASI Investigation map here)

Our investigations into this highly complex and ever changing world of Air Traffic Control truly matter and are an integral part of a safety system that function to create the most safe and efficient Air Traffic Control system in the world. Without investigations, solutions will lack the needed depth and fail to prevent reoccurrence. The outcome of a good investigation results in real world applicable changes whether through training or procedural modifications.

On June 5, 2015 at 1434 CDT a loss of Instrument Flight Rules (IFR) separation (3 miles or 1000 feet) occurred when a Gulfstream, descending on a standard terminal RNAV arrival route (STAR) entered TRACON airspace without a radar handoff (method of transferring identification of aircraft from one controller to the next) and came in close proximity to Bonanza at 10,000 feet. The closest proximity was 1.24 lateral miles and 100 feet vertical with a high closure rate on a collision course. Simply calling the event human error does little to peel back the many layers of the onion that the investigatory process reveals.

This investigation is an example of an air traffic control related investigations of increasingly automated systems of Next-Gen (the FAA’s modernization efforts of Air Traffic Control). Through this process we are able to uncover unintentional consequences of a complex system design and implementation process involving hundreds of controllers, automation specialists, engineers and pilots. Investigations such as this uncover our weak spots and when corrected lead to a safer operation.

RNAV (Area Navigation) procedures are designed under two different sets of rules and design offices; Metroplex or non Metroplex or formerly known as OAPM (Optimization of Airspace and Procedures in the Metroplex) / Non OAPM or PBN (Performance Based Navigation). Pilots, controllers, and investigators are seldom aware of the design differences between the two. But through investigations such as this, we are able to discover how these nuances can lead to potential losses of separation between aircraft. This is especially important to aircraft flying in airspace such as Houston Center that controls aircraft on RNAV procedures designed in both a Metroplex and non Metroplex (PBN) structure. Here arriving aircraft are descending on procedures designed under different rules. Some problems are created by:

* Design rules from the program office,
* Lead carrier differences in type aircraft and avionics
* Fleet mix/Avionics
* Pilot and controller training and expectations
* Design evaluation
* Charting change timelines
* Facility education
* Post implementation procedural analysis

Continually evolving and changing rules and procedures can actually create barriers to uncovering problems that need more than an easy solution. It is through the process of an investigation that these things can be brought out into the open, evaluated, discussed and corrected. Controllers, pilots and investigators seldom have awareness to these differences. But by highlighting them, we can create a safer system through corrective action.

Take for example the lead carrier differences just mentioned. Airlines often spear head design of RNAV procedures for airports that they service frequently. DFW’s design under Metroplex was test flown by American Airlines. American’s input is different when compared to Austin which was test flown and designed by Southwest Airlines. Neither the Gulfstream, the Bonanza, nor the Controllers involved in this loss of separation have awareness to these differences and how they affect expectations of all involved. It is up to the investigation to uncover nuances that can then be addressed and trained so all can benefit.

Another problem listed is training. The investigation found that during the enroute training of the RNAV STARS (standard terminal arrival), the controllers were given an expectation that aircraft would be “descending via” on the arrival into the TRACON. Yet the same training provided to the receiving terminal controller included the expectation that Center would stop the aircraft’s descent within the Center controller’s airspace if a handoff had not yet occurred. Neither workforce developed training to cover not accomplishing a handoff nor did training cover conflictions in simulation along with recovery techniques. These factors are not readily apparent without an investigation.

The investigation also uncovered a delay in equipment procurement that may have contributed to the Gulfstream descending into the Bonanza. The terminal facility was scheduled to install fusion radar prior to implementation of descend via procedures. Fusion, which pulls in data from multiple Radars as opposed to one, would have allowed the receiving controller to take the hand-off from the center at a greater distance from the airspace boundary. Center controllers were advised to expect that the TRACON controllers would take handoffs sooner and not wait until the boundary. This would provide the time needed to correct the handoff problem and also allow for the aircraft to switch from the center controllers frequency to the TRACON controllers frequency. Pushing back the installation of Fusion Radar until after the implementation of “descend via” RNAV STARS created a procedural risk. Controllers were operating with the new STAR but under single sensor Radar mode instead of Fusion. The Investigation can highlight issues such as this and allow us to prevent future occurrences as we move forward with Next-Gen technologies deployment.

The Investigation also considered the period of time it takes to get changes made to faulty procedures. Even if a proper post implementation review is conducted and changes need to be made we still need time to fix the problem. Long lead times required to make changes to published procedures can cause a facility to use a flawed procedure for months or years until it is corrected. Case in point, Southern California TRACON had a known issue with a SID (Standard Instrument Departure procedure) penetrating an often used parachute jump area, but the facility could not immediately fix the problem because they were scheduled for a redesign under Metroplex. While waiting for a change to be made, the facility had a B739 suffer a near midair collision with a jump aircraft. Investigations can highlight details such as this and help provide pressure to shift priorities and more quickly obtain results.

In conclusion, as we bring more automated and advanced systems on line, investigations continue to matter. Investigations of the design, implementation processes, equipage, training and post implementation review with timely modifications provide us all with a better understanding. They enable us to discover and correct new and often hidden issues that are brought to light. NATCA’s investigation with the NTSB is a viable method for affecting change. The influence of the NTSB and their ability to garner attention with in the FAA often leads to change that may not otherwise happened. Once corrective action gains a foothold in this manner, NATCA can then employ it’s many internal collaborative groups in an effort to reach far and wide across the organization. Our investigations do their part in maintaining the most safe and efficient ATC system.

By Curt Fischer. Curt is a 26 year FAA/NATCA Air Traffic Controller living in Merrimack NH. He is the Boston TRACON NATCA President, NATCA ASI. He earned his Bachelor Degree from Florida Institute of Technology in Aircraft Systems Management, is a Commercial Multi-Engine Pilot and simply “Dad” to 6 amazing kids.