

CALLBACK

From NASA's Aviation Safety Reporting System



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Tools of the Trade

A safe and efficient flight is a testimony to the combined talents of air traffic controllers, maintenance personnel, flight attendants, and pilots, and to their use of all the "tools" available to them. Having the right tools is essential, but knowing how to use them is the key to professional results.

"To do good work, one must first have good tools." – Chinese proverb

The ASRS database holds more than 1,600 Reports related to TCAS Traffic Alerts and Resolution Advisories. A recent report shows how one flight crew made good use of this important safety tool prior to takeoff.

■ *We taxied to the approach end of Runway 22 and were cleared by the Tower to taxi into position and hold... I stopped on the runway at a 45-degree angle to provide a view of the final approach to Runway 22 for the First Officer. I noticed an aircraft on TCAS which appeared to be on base [leg] at 1000 ft. AGL. I asked the First Officer to spot the aircraft. He said that the aircraft was turning Final... When the TCAS was indicating 700 and 500 [feet] for the aircraft on Final, I asked the First Officer if the aircraft was landing. He stated that it was still landing. I initiated a turn off the runway and advised the Tower that we were clearing the runway. Tower asked if we needed assistance. I stated, "No. I just didn't want to sit on the runway with that aircraft on short final." As I turned the aircraft around towards the runway, the other aircraft, a Learjet, landed on the runway exactly where we had been in position.*

"An Extra Pair of Eyes"

The pilot who submitted the next report shows how TCAS can be an extra "pair of eyes" in the cockpit – eyes not distracted by communications, checklists, FMC programming, weather, or...windscreen obstructions.

■ *ATC asked us to turn 15 degrees to the right for traffic. Shortly thereafter, a yellow TA symbol appeared in the upper right portion of the TCAS II (approximately six mile range). TCAS II then went red and ordered a descent...I promptly [complied], disconnecting the autopilot to do so... The target was acquired visually off the left wingtip (approximately 5 miles distance using TCAS II). I climbed back to FL330 and re-engaged the autopilot. ATC was immediately notified of our actions...*

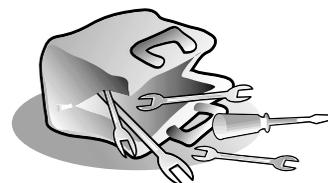
TCAS is a very good tool since we did not visually acquire the target right away at our same altitude. The windscreen post was in my way and I didn't see [the traffic] until he moved past us laterally.

Using Tools the Right Way

The Flight Management Computer (FMC) is a valuable tool which, when used properly, substantially reduces a flight crew's workload. When not programmed correctly, particularly for the approach phase of a flight, it adds to the workload at a time when distractions can be critical.

■ *Prior to [top of descent], we were cleared direct ALPHA intersection. [Our] flight plan indicated direct [destination] after ALPHA. The expected arrival was entered in the FMC for an ALPHA Arrival with the BRAVO Transition... During descent after ALPHA, the aircraft turned for BRAVO VOR instead of direct [Destination]... There was much confusion with ATC regarding the reason for the turn. He thought it was for weather. [We were then] cleared direct to [destination] and proceeded on descent to landing. Placing an expected Arrival in the FMC helps reduce workload during descent, but if the route becomes activated before you are cleared by ATC, the workload you were trying to reduce becomes greater and the resulting confusion takes you away from "flying the aircraft."*

A Maintenance Misplacement



No job is complete until all the tools have been put away. As this B737 crew found, a set of misplaced tools could have "thrown a wrench in the works" when it came time for gear retraction.

■ *The outbound aircraft had an open logbook item stating, "Nosewheel continues to spin excessively after retraction." Maintenance was to repair the item. Spacers were added to the nosewheel snubbers and the airplane was released from maintenance... The First Officer accomplished his walk around and reported finding a bag of tools in the nosewheel well. I inspected the tool bag which contained several wrenches, etc. It was located just below the scissor extension arm, a handy location to lay tools. ▲*

A Note to Our Readers

This is a combined August/September issue of CALLBACK. The next issue will be published in October 2002.

ASRS Recently Issued Alerts On...

ASR-9 false radar targets
EMB145 false APU fire warnings
An approach chart frequency error
B757 wake turbulence separation incident
Missing taxiway signs at an international airport

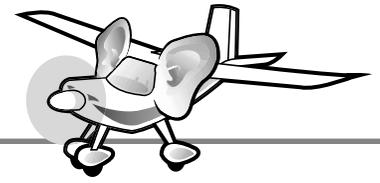
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June-July 2002 Report Intake

Air Carrier / Air Taxi Pilots	4310
General Aviation Pilots	1702
Controllers	135
Cabin/Mechanics/Military/Other	235
TOTAL	6382



Cooperative Communication

Two-way communication is one of the most important aspects of air traffic control. But, as the controller who submitted this ASRS report found, a radio is like the old two-man crosscut saw...you need somebody on each end.

■ *The Skylane was maneuvering in the Class C outer area, receiving traffic advisories on my frequency. He had been at 5000 feet west of the arrival corridor where the jet arrivals transition at 5000 feet. [Then] I noticed that the Skylane had turned eastbound, putting him on a converging course with a B737. I asked the Skylane if he was continuing in that direction. He replied that he was. I instructed the pilot to either reverse course, or climb to 5,500 feet for traffic. There was no response. I issued the traffic to the B737 (approximately four miles away). The [B737] pilot replied that he was looking. I called traffic to the Skylane and instructed the pilot to climb. There was no response. I issued traffic to the B737 again, and advised him that the other aircraft was not listening. The pilot of the B737 did not see the aircraft. As my airspace lower limit is 5000 feet, I quickly coordinated with the adjacent sector, issued the B737 a traffic alert, and descended him to 4000 feet. The aircraft passed within 1/2 mile laterally and approximately 300 feet vertically. When I finally regained radio communication with the Skylane, he apologized for not hearing my calls.*

A controller's only tool is a frequency. If [pilots] are not listening to their radios, it is impossible for us to do our jobs.

Wrong Number

Even if everyone on the radio frequency is listening, they may not be hearing the same things. Similar call signs can add another dimension to the problem. The conversation in this ASRS report approaches the comic confusion of the "Who's on First" routine, but the consequences could have been serious.

■ *Taxiing to runway 7L, prior to the hold short line, Tower cleared our flight for takeoff. The First Officer responded that we needed two minutes...Tower then told us to hold short. We read back the clearance and held short of the runway. When we told Tower that we were ready for takeoff, we heard Tower say, "Aircraft X23 cleared for takeoff." The First Officer responded, "Roger, Aircraft X23 cleared for takeoff." Tower then said, "Aircraft Y23, cancel takeoff clearance." Aircraft Y23 said, "The other aircraft thinks he has takeoff clearance." Tower then said, "Aircraft X23, you are cleared for takeoff." Aircraft Y23 said, "Who's cleared for takeoff?" Tower had apparently cleared Aircraft Y23 for takeoff previously. I had heard, "Aircraft X23*

cleared for takeoff." The First Officer read the clearance back...The problem of similar call signs remains a constant source of confusion.

Listening versus Hearing – It's a Matter of Degree

The Cessna 172 pilot who submitted this report was departing from an airport where terrain clearance was a consideration. With less visibility and a slower reaction to the heading/intercept disparity, this pilot might have heard a more angelic "harping" than the controller's down-to-earth admonition.

■ *My takeoff instructions from Tower were, "Fly runway heading." Tower handed me off to Departure. On calling Departure, I was given a heading and told to intercept [the airway]. I wrote down a heading and confirmed it on the radio. I was not corrected. The heading I thought I heard was 260 degrees. Apparently ATC said 360 degrees. As I turned towards 260 degrees (from an initial heading of +/- 50 degrees), I realized I wouldn't be able to intercept [the airway], so I called ATC and asked him to repeat the heading. He said, "360," which I repeated, and began my turn back toward 360 degrees. ATC said, "Say your heading," and I gave my current heading. Then ATC said, "Say your heading before you asked me to repeat." I said, "I'm not sure. It was in the 200's." He said, "In the 200's could be very dangerous one mile from the airport." I said, "Roger." In the future I will listen closer and ask quicker.*

In another incident, a busy air carrier crew conducting a missed approach apparently failed to read back an ATC clearance correctly, and ATC didn't catch the readback error. From the First Officer's report:

■ *On arrival a missed approach was required to resolve an abnormal cockpit indication. While executing the missed approach, Tower instructed us to climb to 3,000 feet MSL. Apparently they also instructed us to fly runway heading. However, we flew the published missed approach procedure which diverges from runway heading. Neither the Captain nor I...recall hearing it [runway heading clearance]. What we believe happened was that the runway heading clearance was issued and we acknowledged it. However, in a very busy two-pilot cockpit while executing a missed approach in IMC weather with windshear advisories and...an abnormal cockpit indication to deal with, we failed to actually "listen to" the whole clearance ("fly runway heading, climb to 3,000 feet"). Tower later advised us over the telephone that there had been a potential conflict with another aircraft. ▲*