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Readback *Hearback*

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Problems

"What's going on up there?" puzzle ATC controllers in their reports to the ASRS involving numerous pilot errors in clearance readbacks. "What's going on down there?" query airmen reporters who dutifully read back ATC instructions only to be subsequently informed that they have "busted" their altitudes, turned to wrong headings, lined up with wrong parallel runways or have descended below minimum safe altitudes.

"What's going on"--as indicated in ASRS data--is that all too frequently airmen are reading back wrong numbers and the ATC controllers are failing to catch the pilots' errors in the readbacks. We call this the hearback problem.

The ASRS has published several studies on pilot/controller communications breakdowns. The FAA and the industry have actively campaigned for improvement in these areas. Yet, ASRS submissions confirm that hearback problems in pilot/controller communications continue to be acute.

Causes of Communications Breakdown

Why aren't pilots "getting it straight?" We examined a sample set of ASRS reports from airmen and controllers, and identified four major patterns of causal sources for pilot errors in their readbacks.

Readback Problems

1. **Similar aircraft call signs.** Airlines, with their hub operations, have set a major trap for their airmen. Trips 401, 402, 403 .... Flight ABC1 and XYZ1, GYC and GYE-all operating on the same frequency, at the same time and in the same airspace. "Good for marketing," protested a reporter, "no good for us."
2. **Only one pilot listening on ATC frequency.** "Picking up the ATIS" and "talking to the company" represented a time-critical gap in backup monitoring during two-pilot operations.
3. **Slips of mind and tongue.** The typical human errors in this category included: Being advised of traffic at another flight level and accepting the information as clearance to that

flight level; the classic "one zero" and "one one thousand" mix-up; the L/R confusion in parallel runways; the interpretation of "maintain two five zero" as an altitude rather than an airspeed limitation.

4. **Mind-set, pre-programmed for..., and expectancy factors.** The airmen who request "higher" or "lower" tend to be spring-loaded to "hear what we wanted to hear" upon receipt of a blurred call sign transmission.

The incident set included traffic conflicts, altitude busts, crossing restrictions not made, heading/track deviations, active runway transgressions, and mix-ups of takeoff clearances and parallel runways. Two reports of controlled flight toward terrain were reported.

Hearback Problems

"Why didn't the controller catch the pilot error?" was the questioning theme in the data set. While the sources for pilot readback failures were clearly delineated in the narratives, hearback deficiencies diffused into a tangle of erratic, randomly overlapping causal circumstances. But the underlying problem seems to be the sheer volume of traffic: the 9 a.m. - 5 p.m. rush of departures/arrivals; the behind-the-scenes tasks of land-lines, phones and hand-offs; the congested frequencies with "stepped on" transmissions; the working of several discrete frequencies; and, at times, the time and attention-consuming repeats of call-ups or clearances to individual aircraft. These activities, together with human fallibilities of inexperience, distractions and fatigue set the stage for hearback failures. Indeed, a series of pilot narratives recognized controller "overload," "working too many aircraft," "overwork" and frequency saturation.

These facility conditions provide strong motivations for airmen to drop any "how-the-system-is-supposed-to-work" idealism and adopt a more realistic approach to cockpit communication practices. As a working premise, airmen should assume that during congested traffic conditions, the controller may be unable to hear, or is not listening to their readbacks.

Digging Deeper

The report set included a number of aggressively optimistic assumptions on the part of pilots regarding ATC performance. Reluctantly, but more and more frequently, airmen are accepting silence as a confirmation that readbacks are correct. Pilots respond to doubtful or partially heard clearances with perfunctory readbacks expecting controllers to catch any and all errors.

Airmen hold to the illusion that ATC radar controllers are continuously observing their aircraft as they progress through the airway structure. The reality is that controllers continually scan the entire scope; they generally do not focus on individual targets. Descent clearances that "seem a little early" or to altitudes that "seem too low" or turns in the wrong direction may well be intended for another aircraft.

Finally, airmen who fail to brief upon minimum safe altitudes within or near a terminal area or during the approach phase are vulnerable to readback/hearback errors leading to "controlled flight toward terrain." Such an event is described in an ASRS report from a shaken pilot who admitted to not checking the charts prior to a night time descent:

- "The dim shape of the mountain came into view...seconds before the 'WHOOP ... WHOOP ... PULL UP' sounded. We both pulled back abruptly on the controls and climbed..."

The ATC controller's report added further details: "The tapes revealed that I had told the pilot to descend to 7,000 feet (6500 is the MEA) but he had read back 5,000. He got down to 5,700 feet, about 2 miles from a 5,687 foot mountain before I saw him."

Summarized the airman:

- "I don't know how much we missed by, but it certainly emphasizes the importance of good communications between controller and the pilots."

"Reading the tape" was the final administrative step that identified the readback/hearback sequence in a recent NTSB assisted international accident investigation:

Time - 06:32
CONTROLLER :

"Air Carrier ABC, descend [to/two] four zero zero. Cleared for the NDB approach..."

PILOT :

"Okay, four zero zero."

TAPE READOUT :

"WHOOP . WHOOP . PULL UP"
"WHOOP . WHOOP . PULL UP"

Time - 06:34
SOUND OF IMPACT

Summary and Recommendations

When pilots read back ATC clearances, they are asking a question: "Did we get it right?" Unfortunately, ASRS reports reveal that ATC is not always listening. Contrary to many pilots' assumptions, controller silence is not confirmation of a readback's correctness, especially during peak traffic periods.

Pilots can take several precautions to reduce the likelihood of readback/hearback failures:

- Ask for verification of any ATC instruction about which there is doubt. Don't read back a "best guess" at a clearance, expecting ATC to catch any mistakes.
- Be aware that being off ATC frequency while picking up the ATIS or while talking to the company is a potential communications trap for a two man crew.
- Use standard communications procedures in reading back clearances. "Okays," "roger's," and mike clicks are poor substitutes for readbacks.
- Controllers can also take steps to safeguard against readback/hearback failures:
- Be aware that an altitude mentioned for purposes other than a clearance, such as a traffic pointout, may occasionally be interpreted by pilots as an instruction to go to that altitude.

- Deliver cautionary messages such as "similar call signs on frequency" to help reduce call sign confusion.

The consequeces of readback/hearback failures vary, but when they occur in the context of high rate of climb/descent operations, ASRS reports frequently conclude: "It was too late to intervene- the aircraft had already passed through an occupied altitude."

The Future

Reflecting a major trend in ASRS data, the report set poses troublesome questions concerning the ATC-pilot communications procedures. Are traffic growth and congested frequencies compressing the traditional to-from-to exchanges into a one-way transmission? Are airline managements aware of the similar call sign problem? Are airmen placing full-time confidence upon a confirmation procedure that works only part of the time? Can data link help solve some of these problems? Postulated a pilot reporter: "If, in truth, controllers are unable to listen, then we should change the system."