Attachment 6

to Operations Group Factual Report

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COMAIR BULLETIN 05-010 dated 09/05/05

Runway assignments/changes associated with SIDs and STARs: The single largest issue during the implementation of RNAV SIDs in ATL was that of proper runway selection. In the "old days," navigation was from "airport to airport." With the performance capabilities of FMS/RNAV systems (and RNP systems), navigation is increasingly "runway to runway." This is vitally important to understand because future navigation will increasingly move away from vectors in the terminal environment (air traffic control) to the use of procedures which controllers will implement to cause the aircraft to fly themselves to a given runway (air traffic management). The success of this system depends on pilots knowing the procedure for which they've been cleared and then properly programming that procedure, including any runway transitions. In ATL, each SID could have been flown from any of the eight runway ends, with lateral navigation beginning virtually on that particular runway (they are Type B SIDs which have a lateral navigation engagement height of NO HIGHER than 500 feet agl). If the runway was changed by ATC and not reprogrammed by the crew (or the crew guessed wrong and didn't correct the programming), the aircraft would turn toward the fix for the incorrect runway, which in the case of ATL was toward the adjacent runway complex. This resulted in nearly two dozen incidents where separation was lost. The original issue ATL STARs also had multiple runway transitions which needed to be specifically programmed for a specific runway. Due to the experience gained during the SID implementation, the STARs had those transitions dropped because of pilot performance on the SIDS. Not programming a runway or programming the incorrect runway will cause loss of separation and potential traffic collisions. SID and STAR runway transitions will be re-introduced in the future when more pilots understand and consider the requirements and risks associated with such procedures.

Perform a runway update: Runway updates are also important. In GPS equipped aircraft, assuming that the GPS is working and there are no messages (NO GPS RAIM; GPS NOT AVAIL) which would place doubt on the position solution, the GPS will always know where it is. Even in the case of the GPS equipped aircraft, runway updates are good procedure. Ensuring that the aircraft is actually on the end of the programmed runway when the update is performed will ensure the best, quickest most accurate runway update with GPS equipment.

Runway updates are more important in the non-GPS aircraft, since most of those airplanes will be in "DR" mode during ground operations. Performing a runway update will cause the aircraft to know where it is at the moment the update is performed. For Comair's non-GPS fleet, which do not have the capability to fly Type B SIDs because DME-DME navigation capability cannot be guaranteed from the surface to 500 feet agl, this position update causes the FMS to go out of DR mode. The theory is that before the aircraft goes back into DR mode, the airplane will have climbed high enough to acquire enough DME signals to maintain accurate navigation. This is the reason that the non-GPS aircraft can fly a Type A SID, since the engagement altitude is high enough (2000 agl) to allow the FMS to have acquired those signals and to have an accurate, stable position solution. Unfortunately, none of Comair's DME-DME only aircraft yet have the required documentation regarding DME accuracy specified by AC 90-100 and as a result will not be able to fly even Type A SIDs/STARs until that documentation is received.

In either type of aircraft (GPS or non-GPS), the best type of runway update is pressing the TOGA buttons to display the command bars. Pressing the TOGA buttons performs an automatic runway update. Should both buttons be inoperative or deferred, pressing the CDU "RUNWAY UPDATE" (LSK L6) will perform a manual update.

Intersection takeoffs have special issues. With the GPS equipped aircraft, pressing the TOGA buttons (or performing a manual update with LSK L6) will initially slew the position from the intersection to the end of the runway, momentarily making the position inaccurate. The GPS should shortly correct the position back to the actual location (intersection). The takeoff roll should not begin until the FMS corrects the position back to the actual location. This is best seen by having one of the MFDs at the 5 mile range.

Determine cross track error or deviation: Comair pilots have for years, visited the CDU page that displays this information. This particular page (PROGRESS 2/2) also has within it, the SAT and ISA DEV. To determine cross track error, press PROG and NEXT PAGE. The cross track error is adjacent to LSK L3.

Insert and delete a route discontinuity: Any time you add an approach and select "VECTORS," the FMS will insert a discontinuity between the last arrival fix and the first approach fix. Depending on whether or not you actually receive vectors, will determine how to delete the discontinuity. In most cases, as soon as vectors to the approach are received, the discontinuity can be deleted in the normal fashion. In cases where you are cleared to an initial fix that is also part of the arrival, you can simply paste that fix in the discontinuity box, Once executed, the aircraft will fly to that fix and begin to turn onto the approach as it appears in white data. You will still have to go to 'green' data and tune and identify the approach in the CRJ40/50. In the CRJ70, however, if the approach is a non-precision approach retrieved from the database, the FMS will manage the aircraft's lateral path. The crew must still manage the aircraft's vertical path manually according to the guidance contained in the *CRJ70 Flight Standards Manual*.

Remove and reselect navigation sensor input: There are occasions where a crew will want to deselect a navigation sensor. The most common reason is receiving a CHK POS message that is due to an FMS-DME DISAGREE. What these messages are telling you is that there are DME signals that the FMS does not 'trust' for some reason. The most common reason for this distrust is a problem with the identifier. Where such messages are intermittent or continuous, pressing the INDEX button, followed by VOR CTL (LSK L3) and then pressing LSK L5 to deselect VOR and DME USAGE will eliminate the message. In this condition, however, there is no redundancy since the FMS is navigating via GPS only. Should the NO GPS RAIM message appear, this is a case where the FMS doubts the accuracy of the GPS solution. To deselect the GPS, press INDEX, followed by GPS CTL. On the GPS CONTROL page, deselect disable the GPS sensor by pressing the corresponding LSK. Since both of these are 'toggles,' (press the LSK once to disable and again to enable), returning to the respective page and pressing the respective LSK will re-enable that particular sensor.