AERONAUTICAL CHARTING FORUM
Charting Group
Meeting 10-02 October 27-28, 2010

RECOMMENDATION DOCUMENT

FAA Control # (10-02-233)

Subject:

Remove the requirement to annotate Air Traffic Control crossing restrictions (ATC) from Standard Terminal Arrivals (STARs). Establish an alternate annotation to depict TERPS driven restrictions.

Background/Discussion:

Prior to adopting the (ATC) annotation requirement, pilots were trained that altitudes on a published instrument procedure were mandatory and aircraft are required to comply with the associated restriction. Some special annotations (X, MCA, etc) were available but, especially on departures, the pilot may not know if the restriction was for obstruction clearance requirements. Thus, when a pilot was assigned an altitude below a depicted altitude prior to an en route segment it could cause flight crew concern.

This issue was brought before the Departure Working Group of the Aeronautical Charting Forum. As a result of a recommendation from this group, FAA Order 8260.46D, Departure Procedures was modified to establish an (ATC) annotation requirement, and IACC Requirements Document (RD 677) established that in order to clarify to the pilot whether a crossing altitude on either a SID or STAR has been established for obstacle clearance or for air traffic control (ATC) purposes by convention all crossing altitudes without annotation will be assumed to be for obstacle clearance, NAVAID reception, airspace containment, etc.

This requirement is unnecessary on STAR procedures. Order 7100.9 requires that an MEA is charted for each segment of the arrival. For terminal RNAV procedures all operations are radar monitored. Any ATC issued changes on a procedure places the responsibility for obstacle clearance on the air traffic controller. Similarly, once a controller vectors an aircraft off of a procedure, and then returns the aircraft to the procedure, he retains responsibility for obstacle clearance until the aircraft is re-established within the lateral and vertical confines of the IFP.

This charting requirement would create chart clutter, especially on NextGen procedures incorporating an Optimized Vertical Profile. The specification has caused confusion and concern among the ATC workforce. There are approximately 1,100 STARs in the NAS. Many of them have altitude restrictions and NONE of them currently has the (ATC) annotation. None of the procedures reviewed had a TERPS driven altitude restriction. Contrary to the intent of the charting specification, on STARs obstacle driven altitude restrictions appear to be virtually non-existent and are the exception not the rule. Regardless, each case a depicted MEA would alert an aircrew should they be descending to an unsafe altitude. Additionally, ATC automation Minimum Safe Altitude Warning (MSAW) settings alert ATC prior to an aircraft reaching an unsafe altitude; ATC procedures require issuance of a low-altitude alert in such cases.

Recommendations:

The Performance Based Navigation Integration Group recommends that the charting specification for (ATC) altitudes be cancelled. Charting of the Minimum En Route Altitude (MEA) for each STAR segment is already required and depicts the lowest published altitude between fixes that assures acceptable navigation signal coverage and meets obstacle clearance criteria and communications requirements. Recommend establish a charting specification for SIDs and STARs that requires a (T) annotation next to TERPS driven altitude restrictions.

Comments:

Recommend that no RNAV STAR procedures use the (ATC) notation at a crossing restriction. Only TERPS driven restrictions should have a special annotation to highlight the cause of the restriction. Any STAR that may be charted with the (ATC) annotation prior to implementing this recommendation should be processed for charting revision.

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Date: October 27, 2010

MEETING 10-02: Mr. Jim Arrighi, FAA/AJV-14, briefed the issue citing examples provided in the attachment.

This issue had been brought before the Departure Working Group of the Aeronautical Charting Forum, purportedly resolved, but is now resurrected. As a result of a recommendation from this group, FAA Order 8260.46D, Departure Procedures was modified to establish an (ATC) annotation requirement. The application to Arrivals was vetted through the RNAV/RNP Group and received concurrence from Mr. Arrighi. IACC Requirement Document 677 required that a crossing altitude on a SID or STAR that has been established for Air Traffic Control (ATC) purposes will have '(ATC)' annotated adjacent to the altitude. By convention, all crossing altitudes without an annotation will be assumed to be for obstacle clearance, NAVAID reception, airspace containment, etc. and would represent the altitude below which Air traffic could not clear an aircraft.

Mr. Arrighi now states that this requirement is unnecessary on STAR procedures. Order 7100.9 requires that an MEA is charted for each segment of the arrival. For terminal RNAV procedures all operations are radar monitored. Any ATC issued changes on a procedure places the responsibility for obstacle clearance on the air traffic controller. Similarly, once a controller vectors an aircraft off of a procedure, and then returns the aircraft to the procedure, he retains responsibility for obstacle clearance until the aircraft is re-established within the lateral and vertical confines of the IFP.

Mr. Arrighi asserts that this charting requirement would create chart clutter, especially on NextGen procedures incorporating an Optimized Vertical Profile. The specification has caused confusion and concern among the ATC workforce. There are approximately 1,100 STARs in the NAS. Many of them have altitude restrictions and NONE of them currently has the (ATC)

annotation. None of the procedures reviewed had a TERPS driven altitude restriction. Contrary to the intent of the charting specification, on STARs obstacle driven altitude restrictions appear to be virtually non-existent and are the exception, not the rule. Regardless, each case a depicted MEA would alert an aircrew should they be descending to an unsafe altitude. Additionally, ATC automation Minimum Safe Altitude Warning (MSAW) settings alert ATC prior to an aircraft reaching an unsafe altitude; ATC procedures require issuance of a low-altitude alert in such cases.

Mr. Arrighi further stated that his office, The Performance Based Navigation Integration Group (formerly known as the RNAV/RNP Group), recommends that the charting specification for (ATC) altitudes be cancelled. Charting of the Minimum En Route Altitude (MEA) for each STAR segment is already required and depicts the lowest published altitude between fixes that assures acceptable navigation signal coverage and meets obstacle clearance criteria and communications requirements. Recommend establish a charting specification for SIDs and STARs that requires a (T) annotation next to TERPS driven altitude restrictions and that no RNAV STAR procedures use the (ATC) notation at a crossing restriction. Only TERPS driven restrictions should have a special annotation to highlight the cause of the restriction. Any STAR that may be charted with the (ATC) annotation prior to implementing this recommendation should be processed for charting revision.

Mr. Arrighi said that ATC has been advised to disregard the (ATC) annotation for STAR's and not to publish any more. Ms. Valerie Watson, FAA/AJV-3B, asked why no one else was informed that ATC was disregarding the procedure.

Mr. Bill Hammett, FAA/AFS-420 (ISI), commented that he felt Mr. Arrighi's presentation was biased and stated that the policy and charting standard for depicting ATC altitude restrictions were not developed in isolation, but through consensus of the ACF Departure Working Group, chaired by Tom Schneider, AFS-420. This group had representatives from many lines of business, including: FAA Flight Standards, FAA Air Traffic (Terminal, En Route, and the RNAV Group), DOD, ALPA, NBAA, Jeppesen, Air Canada, Delta, and Volpe. The issue was vetted thoroughly over 4 meetings and the currently used charting solution agreed to by all, including the RNAV/RNP Group (Mr. Arrighi's office). Mr. Hammett emphasized that the goal of the Departure WG was to provide the pilot with a minimum safe altitude for obstacle clearance when ATC has intervened with the charted procedure and then clears the aircraft to re-join it while simultaneously canceling charted altitude restrictions. It was with the RNAV/RNP Group's agreement that the departure charting standard was also accepted for STARs. Mr. Hammett stated that all departure procedure policy falls under Flight Standards. STARs are still under the purview of Air Traffic under Order 7100.9 and Air Traffic is free to dictate what needs to be charted.

Mr. Ted Thompson, Jeppesen, commented that this was not a charting issue but is a procedure design issue. The fact that ARINC coding for SID and STAR procedure types can only accommodate a single altitude and its description (such as "AT", "AT OR ABOVE", or "AT OR BELOW") at a given airspace fix further complicates matters because the designation of multiple altitudes at a fix will inherently result in differences between the single altitude that is coded in the electronic navigation database (FMS) vs. the multiple altitudes the pilot will see on the corresponding SID or STAR chart. This issue is less about the inclusion of labels on the chart or the style used to depict altitudes. The problem is the practice of defining multiple altitudes at a single fix on SID and STAR procedures. If multiple altitudes are a necessity, the only possible ARINC solution would be to (re)design the procedures to accommodate the use of the ARINC "Block" or "Window" altitude concept at applicable fixes. This could be easily

accommodated in the ARINC coding as "BETWEEN" altitudes - and also charted as such. This (re)design solution might serve the desired outcome and it would improve chart and database compatibility.

Mr. John Moore, FAA/AJV-3B, summarized and noted that there are two issues, (1) Coding, (2) Chart differences between SIDs and STARs. He recommended that a Working Group be established to revisit the issue. This working group should include all those involved in the previous effort to insure that their concerns are met.

SID/STAR (ATC) ALTITUDE WORKING GROUP

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ACTION: Mr. Jim Arrighi, has agreed to be the Chair of the new WG and will report back at the next ACF.

MEETING 11-01: Mr. Jim Arrighi, FAA/AJV-14, briefed the issue. Mr. Arrighi presented a PowerPoint and noted that a special meeting of the ATC Annotation working group was held on January 2011 at ALPA, involving 30 participants. The working group concluded that the problem was only to do with SIDs. The consensus (not unanimous) was to return to a single altitude/block altitude specification with greater focus on providing lost communications and clarifying ATC responsibilities. Mr. Arrighi provided the group's official statement:

> "The single altitude which meets ATC needs and also incorporates the obstruction clearance requirement. The single altitude would be coded in the navigation database."

Mr. Arrighi went on to provide details pertaining to two internal FAA meetings that followed after the subcommittee meeting. Mr. Arrighi stated that it was found that additional development work remains in order to resolve the issue (procedure design, procedure source, charting and related guidance documents).

Any changes would impact approximately 50 RNAV SID procedures.

Mr. Rick Dunham, FAA/AFS-420, briefed that the issue was discussed extensively within AFS-400 and the following actions decided: 1) Flight Standards will issue an immediate directive to stop the practice of charting dual minimum altitudes at a given fix; 2) Only one altitude that will meet ATC and TERPS procedure design requirements will be specified at a fix unless ATC requires an "at or below" altitude. In these cases a second minimum altitude will be provided and charted as a block altitude; 3) Altitude restrictions intended for ATC purposes will no longer be identified by "(ATC); 4) AFS-420 will take immediate action to revise FAA Order 8260.46D to formalize this policy.

Mr. Bob Lamond, NBAA, expressed support for the change to a single, or block altitude but expressed concern over other operational aspects associated with the changes, namely lost communications and ATC instructions/clearances.

Mr. Brad Rush, FAA/AJV-3B, commented that the affected SID procedures would not be changed until the FAA procedure source documents (FAA Form 8260) are amended and reissued.

ACTION: FAA/AFS-420 will initiate a Stop Action Plan (GENOT or similar action).

ACTION: FAA/AFS-420 will immediately begin processing a change to FAA Order 8260.46D.

ACTION: Mr. Arrighi, AJV-14, to coordinate with NBAA to address their concerns over lost communications and climb gradients.

ACTION: Mr. Arrighi to reconvene the work group to review and address the various issues with the RD that remain to be resolved (ATC and AIM).

ACTION: Mr. Arrighi to provide a status report at the next ACF.

MEETING 11-02: Mr. Jim Arrighi, FAA/AJV-14, was not able to attend the ACF, so Mr. John Moore, FAA/AJV-3B, and Mr. Tom Schneider, FAA/AFS-420, summarized actions taken since last ACF. Mr. Schneider briefed that AFS 420 had issued a Stop Action Plan Memo (not a GENOT). AFS 420 has updated FAA Order 8260-46D with new guidance for ATC altitudes as previously agreed in the special working group.

It was noted that Mr. Arrighi was to have reconvened the Work Group between ACFs. This never occurred.

Mr. Kevin Allen, US Airways, conveyed on behalf of Mr. Arrighi his recommendation that the RD be closed. Mr. Rich Boll, NBAA, objected because NBAA's concerns with Lost Comm had not yet been discussed or addressed.

ACTION: Mr. Bruce McGray, FAA/AFS-410, will follow up regarding changes to the AIM.

ACTION: Ms. Valerie Watson, FAA/AJV-3B, to coordinate with Mr. Brad Rush, FAA/AJV-3B, concerning changes to AeroNav Products' affected charting specification(s) after all of the affected procedures have been revised.

ACTION: Mr. Jim Arrighi, FAA/AJV-14, to coordinate with NBAA.

MEETING 12-01: Mr. Jim Arrighi, FAA/AJV-14, was not in attendance at the ACF.

Ms. Valerie Watson, FAA/AJV-3B, summarized the actions taken place since last ACF. Ms. Watson reported that there no existing ATC crossing altitudes (at least not annotated on the charts as "(ATC)" – the existing charted altitudes may exist to serve ATC purposes, but are not published on the plates as such) on STARS, but 33 Departures do still have ATC crossing altitudes annotated as "(ATC)". Mr. Brad Rush, FAA/AJV-3B, stated that the Terminal offices are in possession of the listing of the 33 subject Departures and the ATC altitudes will be removed when the procedures are next modified.

Mr. Rich Boll, NBAA, commented that Mr. Arrighi has not been in touch with his organization to address the NBAA's concerns regarding Lost Communication.

The issue will remain open until the remaining 33 procedures have been amended to remove the ATC crossing restrictions, and Mr. Boll's concern regarding Lost Comm has been satisfactorily resolved.

STATUS: OPEN

ACTION: Mr. Brad Rush, FAA/AJV-3B, to report on status of 33 remaining Departures with ATC crossing altitudes.

ACTION: Ms. Valerie Watson, FAA/AJV-3B, to coordinate changes to AeroNav Products' affected charting specification(s) after all of the affected procedures have been revised.

ACTION: Mr. Jim Arrighi, FAA/AJV-14, to address the Lost Communications aspect of the original concern.

MEETING 12-02:

Valerie Watson, FAA/AJV-3B, summarized the issue and reviewed from last ACF that there no ATC crossing altitudes on STARS and briefed that there are still 28 Departures with ATC crossing altitudes.

Brad Rush, FAA/AJV-3B, briefed the schedule for the removal of the ATC crossing altitudes on the remaining Departure procedures. The ATC altitudes are steadily being removed as Departures are amended and they should be all deleted within the next year or so.

Still of concern to NBAA was Lost Communications (Lost Comm) information.

Gary McMullin, Southwest Airlines, made a presentation to the ACF, providing a review of the history of the original ACF issue and the actions taken. Gary, though satisfied

with the removal of “(ATC)” crossing altitudes, expressed his problem with the concept of “block altitudes”. The 8260.46 specifies that when an “at or below” altitude is specified at a fix, that a minimum “at or above” altitude also be published – this results in either a mandatory altitude or a block altitude. Gary states that Southwest and other industry partners find block altitudes problematic.

Gary brought up a side issue associated with the (ATC) altitudes regarding “ownership of aircraft”, namely whether the pilot or the controller has ownership and therefore responsibility for the aircraft. With the removal of ATC altitudes, the ownership of the aircraft reverts back to the controller as the controller is giving information the different from the written/published procedure. This point was expanded upon with a discussion of “Block Altitudes”

Gary, in his presentation of block altitudes on SIDS and STARS, made several specific discussion points:

- Block altitudes on SIDS present climb rate and aircraft performance issues. When a block altitude is on a Chart, a pilot has to calculate whether his/her aircraft can meet that block altitude. This adds more demand on a pilot during the departure phase of flight, especially in and around airports with terrain and high volumes of aircraft traffic.

- Block altitudes in current instrumentation do not have a climb path indicator. Many FMS’ will try to fly through the center of the window.

Jim Arrighi, FAA/AJV-141, agreed in principle with Gary’s position. Jim provided a report on progress made on addressing NBAA’s Lost Communication concerns. Jim stated he has had several meetings recently and that there seems to be strong agreement not to chart a minimum crossing altitude, but rather to look at segment MEAs on SIDs. Minimum segment altitudes could provide the minimum altitudes needed during lost communications, but would not cause the confusion experienced when block altitudes are published.

Rick Dunham, FAA/AFS-420, raised the concerns regarding the use of a single climb gradient. For instance, what if ATC wants “At or Above Altitudes” at certain points? Jim stated that planned block altitudes were acceptable if required by ATC. Gary agreed that in some cases, block altitudes may be warranted.
Bill Hammett, Contractor, FAA/AFS-420, asked why, if the block altitudes were able to be handled if they were planned to support ATC operational needs, were they not always acceptable.

Ron Renk, United Airlines, commented that pilots consider block altitudes “safe altitudes” and that they could fly anywhere between the two block altitudes and think “I am safe”. This is true and will guarantee obstacle protection.
At this point the discussion shifted to what block altitudes are intended for versus actual use and derived meaning with the user (pilot) community, in conjunction with lost communication procedures.

Lev Prichard, APA - American Airlines, commented that there is more at stake here than just lost communications, but information the pilot needs when something goes wrong. A pilot needs to know “what is a safe altitude to fly when things go wrong?”. MEAs are easy to use. However, when flying fix to fix with the safe altitude given only at the fix, the pilot has to calculate the climb grade between fixes/waypoints to maintain safety. He mentioned that it is often SOP to brief a safe altitude for each departure.

Gary proposed the removal of the mandate for publishing block altitudes, but to not rule out the use of block altitudes.

Rick stated that the FAA is not in a position to customize procedures and charts to the needs of one section of industry. The FAA has to serve a broader audience and must provide obstacle clearance protection, meet ATC requirements and serve all NAS user needs.

Jim reiterated that the issue around the handling of lost comm on SIDs is an on-going collaborative effort and that different opinions exist as to how it should be handled. Valerie commented that the only way for lost comm to be resolved is by addressing the procedures themselves by either adding the required altitudes (MEAs or minimum obstacle clearance crossing altitudes) or publishing specific lost comm procedures. For this reason, she stated that this expansion of the original issue is not a Charting Group item and needs to be moved to the IPG portion of the Forum.

Lev requested a clarification on how the rules in the criteria impact charting, namely, are things written (criteria) so that things are charted? If so and if an item is specified to be charted, he asked how that relates to this (Charting Group) audience.

Valerie responded that yes, sometimes items are written into criteria partly so that they will be charted. She explained that AeroNav Products is required to chart what is published on the source documents, which in turn are created in adherence with criteria. She further clarified that all published altitudes on a Departure or Arrival Procedure source document must be depicted on the chart. The only way to remove those altitudes from the chart is to remove them from the procedure source document.

Tom Schneider, FAA/AFS-420, stated Flight Standards would discuss and consider removing the "at or above" altitude requirement whenever an "at or below altitude" restriction was requested by ATC.

STATUS: OPEN

ACTION: Brad Rush, FAA/AJV-3B, to report on status of 28 remaining Departures with ATC crossing altitudes.

ACTION: Tom Schneider, FAA/AFS-420, to report Flight Standards action on block altitude charting.