

GOVERNMENT/INDUSTRY AERONAUTICAL CHARTING FORUM 04-01

April 28-29, 2004

Recommendation Document

Subject: Charting of Altitude Constraints on SIDs and STARs

Background/Discussion: Current charts for SIDs and STARs do not depict altitude constraints in a consistent manner. Some charts depict mandatory altitude constraints in a similar format as is used on approach charts i.e., with lines above and/or below the altitude. Other procedures use the textual format to depict mandatory constraints e.g., Cross at 8000. Both formats have been combined on a few charts.

Recommendations: Establish a standard charting format for mandatory altitude constraints. Consideration should be given to maintaining consistency throughout different phases of flight: Departure, Enroute, Arrival and Approach. The format should allow for ease of recognition.
Choices:

1. Use format of lines above and/or below the constraint.

Mandatory altitude of 12,000	<u>12000</u>
Mandatory altitude of 12,000, speed 250	<u>12000/250K</u>
Cross at/or above 12,000	<u>12000</u>
Cross at/or below 12,000	<u>12000</u>
Cross above 12,000 and below 15,000	15000 <u>12000</u>

2. Use similar format to approach chart to depict vertical profile. Advantages: allows for quick recognition of required constraints, less chart clutter, and potential use of vertical path angles in the future. Disadvantages: difficult to chart with multiple transitions and requires more chart space.
3. Use tabular format (see below) on textual description page of procedures to highlight speed and altitude constraints. Advantage: allows for quick error checking on RNAV systems and use of vertical path angles in the future (with the addition of another column). Disadvantage: requires more chart space.

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MEETING 04-01: Mr. Mark Steinbicker, AFS-410, submitted this issue. Current charts for SIDs and STARs do not depict altitude constraints in a consistent manner. AFS-410 recommended establishing a standard charting format for mandatory altitude constraints. Consideration should be given to maintaining consistency throughout 13 the different phases of flight: Departure, Enroute, Arrival and Approach. The format should allow for ease of recognition. Mr. Frank Flood, Air Canada stated that Canada uses a box around altitude and airspeed on Canadian SIDs. **ACTION:** AFS-410, NACO AVN-503.

MEETING 04-02: Mr. Mark Steinbicker, AFS-410, provided the following briefing. Currently SIDs and STARs do not depict altitude constraints in a consistent manner. Recommendation was made to establish a standard charting format for altitude constraints. Mr. Steinbicker stated that the depiction of altitude constraints should be standardized for all procedure types. Mr. Eric Secretan, NACO, stated that ICAO approved the change to Annex 4, which contained Charting Symbolology for SIDs and STARs using lines above and/or lines below the altitude to depict mandatory altitude constraints. Mr. Secretan stated that NACO would submit a requirement document to modify the IACC specifications at the next MPOC meeting. Mr. Steinbicker requested that hard altitude maximum/minimum or maintain altitudes be published for the procedure beyond the fix, possibly using a boxed note format. ACF discussion led to the consensus of the ACF that the hard altitude requirement should be a separate issue. Mr. Steinbicker concurred and he will submit a recommendation document at the next ACF. ACF members discussed future charting requirements. Mr. Steinbicker stated that in the future we will need a process for charting climb via altitude and descent via altitude constraints. **ACTION:** FAA/NACO AVN-503 and AFS-410.

MEETING 05-01: Mr. Mark Steinbicker, AFS-410, stated that at the 04-02 Aeronautical Chart Forum a recommendation was made to establish a standard charting format for altitude constraints. Mr. Eric Secretan, NACO, stated that ICAO Annex 4 is being changed to use over and underlines for minimum, maximum, mandatory and recommended altitudes on SIDs and STARs. The intent is to standardize the charting format. NACO provided a draft requirement document and the proposed TPP, STAR and DP Legend changes for ACF discussion. The TPP Legend page is attached to these minutes. Mr. Tom Schneider, AFS-420, questioned if the proposed changes apply to all procedure types. Mr. Eric Secretan, NACO, responded that the proposed changes are only for the STAR and DP procedures. ACF Members concurred that the RD should be modified to include IAPs. Mr. Steinbicker recommended the following changes to the legend page. Change the altitude example to include an example of flight level. Change the mandatory altitude example to a block altitude example. Change the title AIRSPEED to read INDICATED AIRSPEED (IAS). Mr. Ted Thompson, Jeppesen, stated that approximately ten years ago Jeppesen standardized the depiction of speed and altitude. Jeppesen uses a text description for MIN, MAX, and MANDATORY. **ACTION:** FAA/NACO and IACC MPOCs.

MEETING 05-02: Ms. Val Watson, Cartographic Standards, reported that the IACC MPOC is currently staffing the issue of using over and underline bars to depict minimum/maximum altitudes and airspeeds on SIDs, STARs and Instrument Approach Procedure (IAP) Charts. Mr. Eric Secretan, NACO, stated that ICAO endorses the use of over and underline bars. **ACTION:** IACC MPOCs.

MEETING 06-01: Ms. Val Watson, Cartographic Standards, reported that the IACC is currently coordinating RD 616 for IACC signature. The RD will establish the requirement for using over line and underline bars to depict maximum/minimum altitudes and airspeeds on SIDs, STARs and Instrument Approach Procedure (IAP) Charts. **ACTION:** IACC MPOCs.

MEETING 06-02: Mr. John Moore, NACG, provided a brief history of the issue. Requirement Document (RD) 616 was submitted to the IACC for approval. The RD established the requirement for using over line and underline bars to depict maximum/minimum altitudes and airspeeds on SIDs, STARs and Instrument Approach Procedure (IAP) Charts. Ms. Val Watson, Cartographic Standards, reported the RD was signed by the IACC on 5/23/06. Mr. Moore reported that the NACG could not determine an implementation date due to unresolved issues with verbiage on the source documentation and the 7100.9 Star Order. Mr. Moore explained that the 8260 Order is specific in regard to the language used for describing altitudes, constraints and criteria. However, the 7100.9 Star Order does not provide clear guidance for mandatory and recommended altitudes on STARs and Charted Visual Flight Procedures. Mr. Paul Ewing, ATO-R commented that it was his understanding that recommended altitudes have been eliminated from the 7100.9. Mr. Ewing suggested that NACG confirm this with the point of contact for the Star Order, Mr. Jim Arrighi. Ms. Janet Myers, NACG, stated that the STAR forms still have recommended altitudes; these forms will need to be updated. Mr. Ted Thompson, Jeppesen, informed the group that Jeppesen uses text labels and 'information boxes.' Jeppesen occasionally receives queries whether or not it will adopt the overline/underline application for existing pre-composed charts. For the present time, Jeppesen intends to remain with text labels. However, overlines/underlines will be considered in Jeppesen's future data-drive charting specifications. Mr. Thompson requested a copy of RD 616. He also suggested that the issue be taken to the SAE G-10 meeting. **ACTION:** NACG.

MEETING 07-01: Mr. John Moore, NACO, provided a brief history of the issue. Requirement Document (RD) 616, signed by the IACC in May 2006, established the requirement for using over line and underline bars to depict maximum/minimum altitudes and airspeeds on SIDs, STARs and Instrument Approach Procedure (IAP) Charts. NACO could not determine an implementation date due to unresolved issues with verbiage on the source documentation and the 7100.9 Star Order. The 8260 Order is specific in regard to the language used for describing altitudes, constraints and criteria; however, the 7100.9 Star Order does not provide clear guidance for mandatory and recommended altitudes on STARs and Charted Visual Flight Procedures. Mr. Paul Ewing, ATO-R commented that 'expect' altitudes have not been eliminated from the STAR Order. Val Watson, NFDC, asked if there would ever be a recommended altitude. Mr. Ewing responded that there is no reference to recommended altitude in the STAR Order, only expect altitudes. Brad Rush concurred and added that all altitudes are Minimum unless otherwise stated. All altitudes are at or above.

ACTION: IACC to write an EC to remove the word "recommended" on the SID/STAR legend.