AERONAUTICAL CHARTING MEETING
Instrument Procedures Group
Meeting – October 23, 2018

RECOMMENDATION DOCUMENT

FAA Control #18-02-339

Subject: Revision of Take-Off Obstacle Notes

Background/Discussion:

The FAA currently publishes Take-Off Obstacle Notes in the Terminal Procedures Publications in textual form. They describe the location and vertical extent of low close-in obstacles by stating the distance of the obstacle from DER and lateral distance from it.

Example (Source: dTPP) KBFI TAKEOFF OBSTACLE NOTES:

SEATTLE, WA

BOEING FIELD/KING COUNTY INTL (BFI)

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

AMDT 8 17257

TAKEOFF MINIMUMS: **Rwy 14L,** 500-2¾ with minimum climb of 270' per NM to 700 or standard with minimum climb of 708' per NM to 500 or 1000-2½ for VCOA. **Rwy 14R,** 500-2 with minimum climb of 315' per NM to 700 or standard with minimum climb of 500' per NM to 600 or 1000-2½ for VCOA. **Rwy 32L,** 400-1⅞ with minimum climb of 235' per NM to 800 or standard with minimum climb of 425' per NM to 500 or 1000-2½ for VCOA. **Rwy 32R,** 400-2 with minimum climb of 230' per NM to 800 or standard with minimum climb of 345' per NM to 500 or 1000-2½ for VCOA.

DEPARTURE PROCEDURE: **Rwy 14L,** climbing right turn thence... **Rwy 14R,** climbing right turn thence... **Rwy 32L,** climbing left turn thence... **Rwy 32R,** climbing left turn thence...

...all aircraft climb direct to SEA VORTAC, continue climb in SEA VORTAC holding pattern (hold e, left turns, 290° inbound) to cross SEA VORTAC at or above 3000 before proceeding on course.

VCOA: **All Runways,** obtain ATC approval for VCOA when requesting IFR clearance. Climb in visual conditions to cross Boeing Field/King County Intl airport at or above 900, then climb to 3000 via SEA R-344 to SEA VORTAC, continue climb in SEA VORTAC holding pattern (hold E, left turns, 290° inbound) to cross SEA VORTAC at or above 3000 before proceeding on course.

TAKEOFF OBSTACLE NOTES: **Rwy 14L,** sign 76' from DER, 135' left of centerline, 3' AGL/20' MSL. Building 403' from DER, 411' left of centerline, 14' AGL/32' MSL. Building 403' from DER, 491' left of centerline, 35' MSL. Building 622' from DER, 526' left of centerline, 34' AGL/51' MSL. Buildings beginning 647' from DER, 473' left of centerline, up to 54' MSL. Tree 1052' from DER, 688' left of centerline, 56' MSL. Transmission towers and buildings beginning 1147' from DER, 426' left of centerline, up to 63' MSL. Tower and transmission tower beginning 1545' from DER, 658' left of centerline, up to 50' AGL/72' MSL. Poles, tower and trees beginning 1784' from DER, 714' left of centerline, up to 103' MSL. Tree 2591' from DER, 1156' left of centerline, 141' MSL. Tree 2701' from DER, 1134' left of centerline, 143' MSL. Tree 2730' from DER, 1030' left of centerline, 157' MSL. Trees beginning 2820' from DER, 646' left of centerline, up to 192' MSL. Tree 2931' from DER, 1162' left of centerline, 201' MSL. Trees beginning 2967' from DER, 619' left of centerline, up to 226' MSL. Trees beginning 3060' from DER, 914' left of centerline, up to 235' MSL. Trees beginning 3100' from DER, 553' left of centerline, up to 266' MSL. Trees beginning 3259' from DER, 906' left of centerline, up to 277' MSL. Trees beginning 3332' from DER, 732' left of centerline, up to 302' MSL. Trees, transmission towers and buildings beginning 3675' from DER, 384' left of centerline, up to 116' AGL/342' MSL. Trees, transmission towers and buildings beginning 4032' from DER, 296' left of centerline, up to 103' AGL/356' MSL. Trees, buildings, transmission towers, ground and roads beginning 4538' from DER, 380' left of centerline, up to 110' AGL/365' MSL. Transmission tower and trees beginning 1.6 NM from DER, 1787' left of centerline, up to 135' AGL/382' MSL. Trees, towers, electric transmission lines and buildings beginning 1.7 NM from DER, 936' left of centerline, up to 438' MSL. Trees, transmission towers, buildings, electric transmission line, roads and ground beginning 1.9 NM from DER, 888' left of centerline, up to 478' MSL. Trees, buildings, towers, fences, roads, ground, parking lots, electric transmission lines and poles beginning 2 NM from DER, 638' left of centerline, up to 531' MSL.

SEATTLE, WA (CON'T)

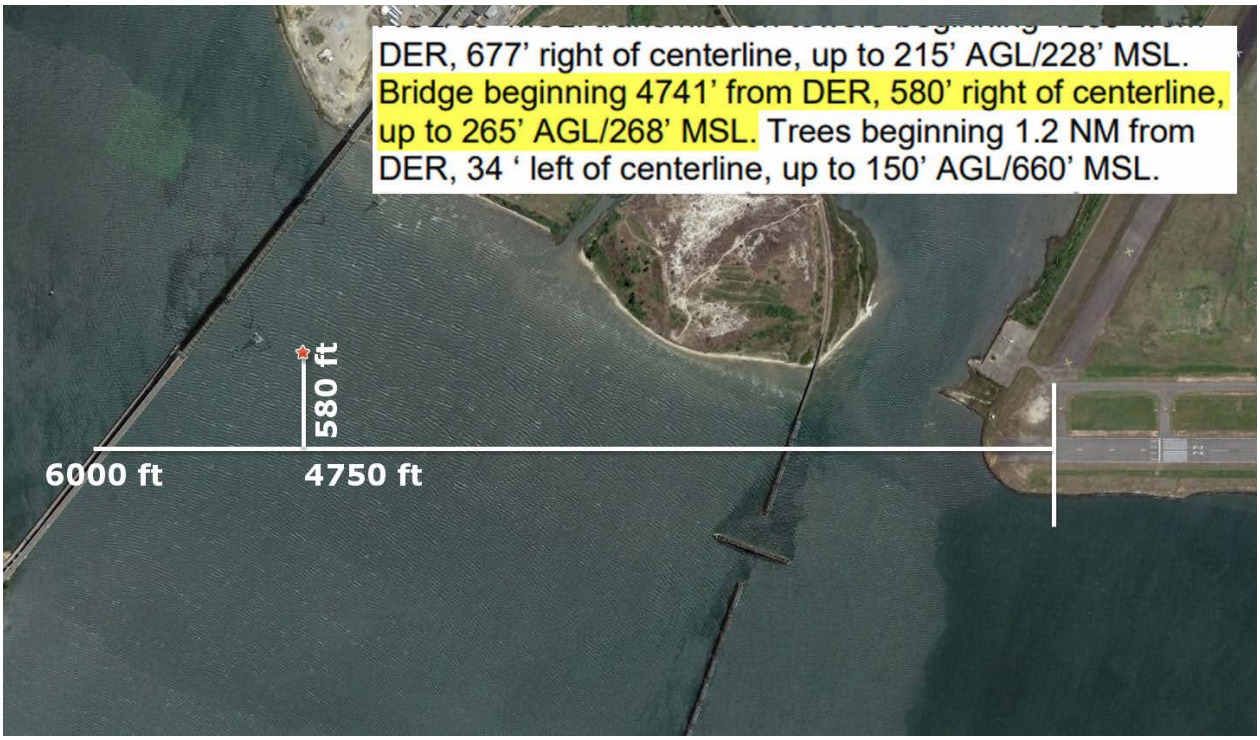
BOEING FIELD/KING COUNTY INTL (BFI) (CON'T)

Rwy 14R, railroad 50' from DER, 453' left of centerline, 46' MSL. Railroad, tree and road beginning 128' from DER, 277' left of centerline, up to 47' MSL. Lt pole 202' from DER, 539' right of centerline, 64' MSL. Signs, railroads, roads and trees beginning 263' from DER, 280' left of centerline, up to 98' MSL. Poles, OL DME, NAVAID and trees beginning 411' from DER, 283' right of centerline, up to 66' MSL. Trees, railroads and road beginning 793' from DER, 240' left of centerline, up to 61' AGL/116' MSL. Trees, roads, railroads, poles, sign, electric system, towers and electric transmission lines beginning 891' from DER, 142' left of centerline, up to 113' AGL/129' MSL. Trees, building and poles beginning 1123' from DER, 2' right of centerline, up to 87' MSL. Transmission towers beginning 2880' from DER, 90' right of centerline, up to 74' AGL/94' MSL. Transmission tower 3138' from DER, 1305' right of centerline, 100' MSL. Trees beginning 3181' from DER, 344' right of centerline, up to 91' AGL/106' MSL. Pole 3278' from DER, 1292' right of centerline, 111' MSL. Electric transmission line 3363' from DER, 1389' right of centerline, 121' MSL. Electric transmission lines and trees beginning 3373' from DER, 597' right of centerline, up to 124' MSL. Electric transmission line and trees beginning 3511' from DER, 278' right of centerline, up to 125' MSL. Trees beginning 3574' from DER, 710' right of centerline, up to 132' MSL. Tree 3658' from DER, 486' right of centerline, 139' MSL. Trees beginning 3680' from DER, 724' right of centerline, up to 146' MSL. Trees and transmission tower beginning 3710' from DER, 270' right of centerline, up to 155' MSL. Trees and poles beginning 3894' from DER, 773' right of centerline, up to 183' MSL. Trees, electric transmission lines, antenna and towers beginning 4017' from DER, 16' right of centerline, up to 88' AGL/195' MSL. Trees beginning 4142' from DER, 11' left of centerline, up to 137' MSL. Trees beginning 4429' from DER, 4' left of centerline, up to 130' AGL/149' MSL. Tree 4671' from DER, 31' left of centerline, 130' AGL/153' MSL. Trees beginning 4694' from DER, 1172' left of centerline, up to 167' MSL. Trees beginning 4807' from DER, 1051' left of centerline, up to 193' MSL. Trees beginning 4978' from DER, 828' left of centerline, up to 202' MSL. Trees beginning 5257' from DER, 825' left of centerline, up to 212' MSL. Trees beginning 5405' from DER, 773' left of centerline, up to 221' MSL. Trees beginning 5519' from DER, 684' left of centerline, up to 229' MSL. Trees and electric transmission line beginning 5636' from DER, 75' left of centerline, up to 234' MSL. Trees, towers and electric transmission lines beginning 5685' from DER, 168' left of centerline, up to 247' MSL. Trees beginning 5697' from DER, 477' right of centerline, up to 95' AGL/217' MSL. Electric transmission lines, trees and towers beginning 5832' from DER, 421' left of centerline, up to 360' MSL. Trees and transmission tower beginning 1 NM from DER, 719' left of centerline, up to 399' MSL. Trees, ground, buildings, electric transmission line, transmission towers, roads and fence beginning 1.1 NM from DER, 970' left of centerline, up to 437' MSL. Trees, transmission towers, roads, buildings, fences, ground, parking lots, electric transmission line, poles and antenna beginning 1.3 NM from DER, 948' left of centerline, up to 116' AGL/506' MSL. Trees beginning 2 NM from DER, 2647' left of centerline, up to 523' MSL. Trees beginning 2.1 NM from DER, 2225' left of centerline, up to 543' MSL. Trees beginning 2.3 NM from DER, 2603' left of centerline, up to 553' MSL.

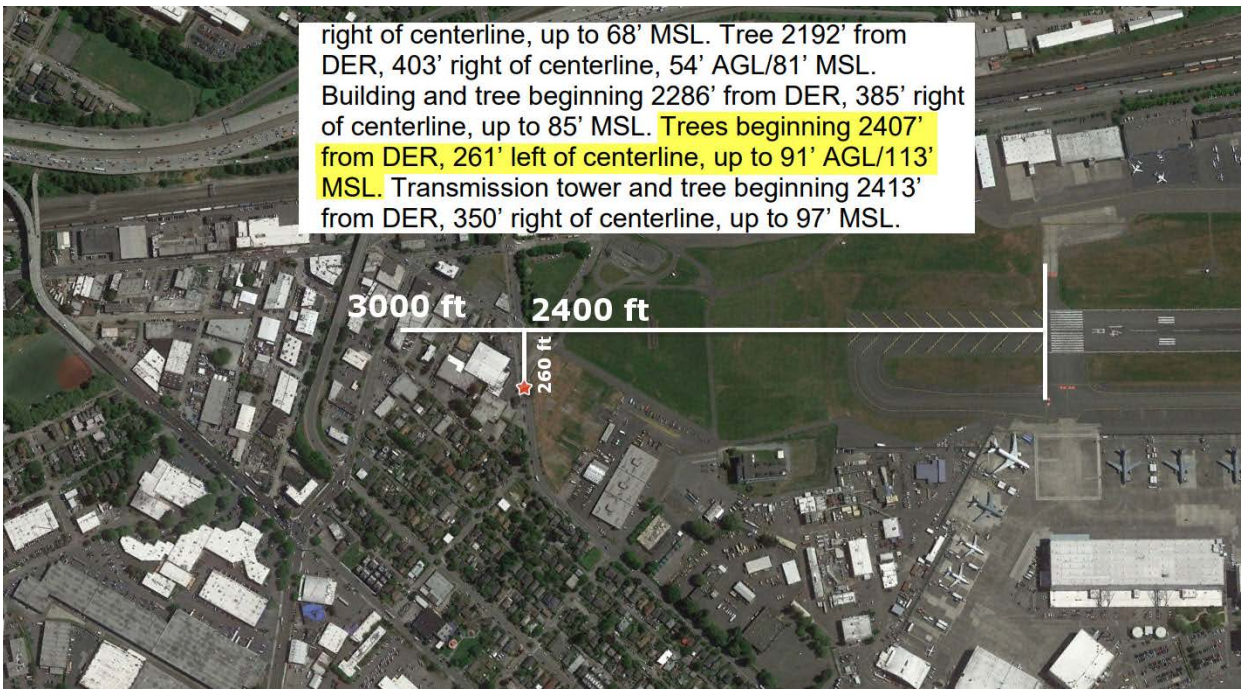
A) This form of representation is of limited usefulness, especially if many obstacles are provided, as the textual description is too convoluted and cumbersome to interpret.

B) The accuracy of these obstacles is known to be rather poor given the way they are currently referenced. Coding the obstacles and representing them on charts based on the current publications may not represent the actual obstacles in a sufficiently accurate manner due to difficulties in geo-referencing the described obstacle locations.

Example 1) KOTH airport, with marked asterisk corresponding to obstacle location description:



Example 2) KBFI airport with marked asterisk corresponding to obstacle location description:

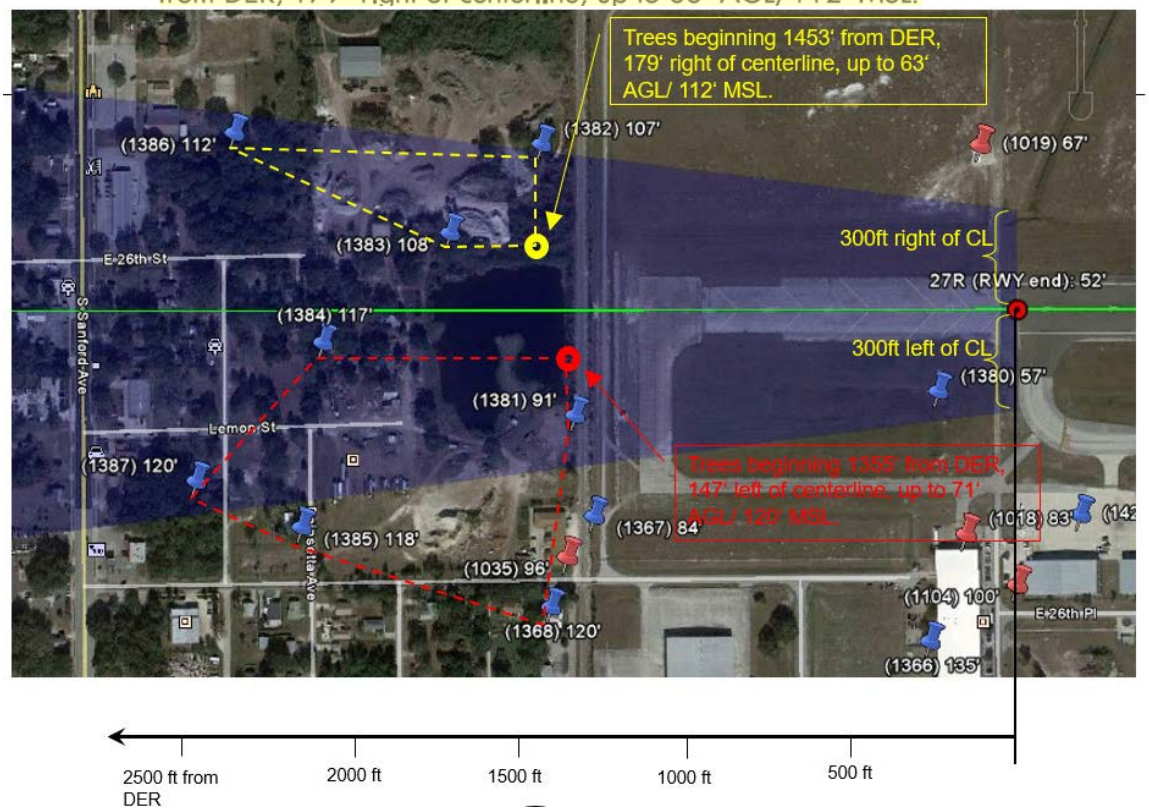


The vague nature of descriptions regarding grouped obstacles further leads to problems with takeoff calculations. These obstacles have been observed to not be located where they are described to be, leading to overly restrictive calculations.

Example 3) KSFB Orlando Sanford Intl RWY 27R

Extract TKOF Obstacle Notes

Rwy 27R: Tower 3,434′ from DER, 1,332′ left of centerline, 115′ AGL/171′ MSL. Pole 1,378′ from DER, 790′ left of centerline, 37′ AGL/96′ MSL. Trees beginning 1,355′ from DER, 147′ left of centerline, up to 71′ AGL/120′ MSL. Antenna on building 130′ from DER, 440′ right of centerline, 18′ AGL/67′ MSL. Trees beginning 1,453′ from DER, 179′ right of centerline, up to 63′ AGL/112′ MSL.



AVNIS (D)DOF OC/UDDF

Since the obstacles published in the Takeoff Obstacles notes can have a significant impact on flight safety and processes, but are not always covered by different sources (e.g., DOF), it is important to convey the information about them in an efficient manner to the pilot, which the current solution does not manage to accomplish sufficiently.

Recommendations:

We suggest the following points to improve the quality of Takeoff Obstacle Notes:

Presently Take-off Obstacles Notes provide a running text description of take-off obstacles starting with the nearest obstacle in relation to the DER continuing with the others simply ordered by their longitudinal distance from DER.

We would like to suggest following improvement possibilities to be discussed:

1. The accuracy of these obstacles could be improved by providing them with proper coordinates (e.g., in WGS-84 reference system)

   a) Instead of, or

   b) In addition to the current description.

2. Instead of the running textual description, a tabular and/or line separated representation would improve readability significantly.
3. The list provides obstacles penetrating the 40:1 Obstacle identification surface (OIS) corresponding to a climb gradient of 152ft/NM starting normally with the obstacle(s) located closest to the DER.

   a) A clear distinction between low close in obstacles* and those others located outside of this area.

   b) A tabular listing based on a criticality assessment starting with the most critical obstacle(s) penetrating this OIS most could provide a better safety advice to choose a proper climb gradient to pilots analyzing this obstacle listing.

   c) The publication of a recommended climb gradient to clear this obstacle with sufficient obstacle clearance could improve pilots handling considerably.

4. Additional publication of these obstacles in electronic format (eTOD) would allow an efficient way to process them for the datahouses and charting agencies.

***Extract AIM**:
Low close-in obstacles are those obstacles that are located within 1 NM of the DER and penetrate the 40:1 OCS are referred to as “low, close-in obstacles.” The standard required obstacle clearance (ROC) of 48 feet per NM to clear these obstacles would require a climb gradient greater than 200 feet per NM for a very short distance, only until the aircraft was 200 feet above the DER.

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Initial Discussion – Meeting 18-02: Juergen Kuhnhenn (LIDO) introduced a new recommendation to improve the accuracy usefulness of takeoff obstacle information. Juergen began by stating many obstacles appear to be charted inaccurately. He displayed some examples whereby it appears the longitudinal and lateral distances provided by the FAA do not appear to be representative of the actual environment, particularly when obstacles are grouped within the textual description. The net result can in some cases also result in payload issues when calculating takeoff performance. Juergen suggested it would be helpful to have more accurate obstacle data and believes the depiction/charting of obstacles can be improved. Specifically, he recommends having WGS-84 coordinates of takeoff obstacles instead of, or in addition to, the current location information that is currently being provided. In addition, instead of a running textual list of takeoff obstacles, he recommended a line-separated list of obstacles as well as a clear distinction between low-close-in obstacles and other takeoff obstacles. Additional recommendations included the charting of a recommended climb gradient to clear obstacles and the publication obstacles in an electronic format. John Bordy (Flight Procedures and Airspace Group) stated these recommendations appear to be largely charting recommendations. Valerie Watson (AJV-553) stated that charting takes obstacle information directly from 8260-series FAA forms. Discussion followed regarding the usefulness of coordinates with some believing would be useful to pilots and others stating it would not be useful. Rich Boll (NBAA) discussed grouped obstacle representation, and added it is impossible use this obstacle data for performance engineering use and suggested all obstacles intended to be described within the grouping process should be contained somewhere else and available for planning usage since there is a regulatory requirement to consider these obstacles. Rich stated open access to Airports GIS is needed immediately. Jose Alfonso (AJV-53) indicated his office owns the Digital Obstacle File (DOF), and that he will bring the topic of access to the Airports GIS up at his monthly meeting with the Office of Airports to determine if increased access to GIS data is feasible. Lengthy discussion followed including some initiatives currently being discussed within the US-IFPP Departure Working Group. Valerie mentioned this issue is similar to the existing issue, 15-02-323, Depiction of Low, Close-In Obstacles; John Bordy agreed and said he will introduce Juergen's specific suggestions to the Departure Working Group. John Moore (Jeppesen) suggested greater emphasis perhaps should be made to amending procedure design as opposed to charting. More discussion followed related to what obstacles are relevant for departure calculations. John Bordy reiterated that the additional recommendations from LIDO will be referred to the Departure Working Group.

Action Item:

- Jose, Alfonso (AJV-53) will engage with Office of Airports to determine if increased access to Airports GIS data is possible.
- John Bordy will bring these suggestions to the DWG and report back.

Status: Item open.

Meeting 19-01: John Bordy, Flight Procedures and Airspace Group, briefed the issue directly from the slide: discussing a summary and current status. This will involve significant policy changes related to low, close-in obstacle notes. This issue was not referred to the US-IFPP due to its cancellation in January, but will be referred to in June for discussion within the DWG. In the interim, significant policy changes are under consideration related to the new concept discussed as part of issue 15-02-323, Depiction of Low, Close-In Obstacles on SIDs and ODPs (see above). Jose Alfonso was not present to discuss Airports GIS data availability.

Action Items:

- John Bordy will provide a status of Airport GIS data availability.
- John Bordy will brief this at the US-IFPP 19-02.

Status: Item open.

Meeting 19-02: John Bordy, FAA Flight Procedures and Airspace Group, briefed the issue summary and current status from the slide. There are significant ongoing considerations for changes to low close-in obstacle notes. With the focus on the effort and the associated safety risk assessment, this issue has been delayed. A final direction for this issue will be determined once the safety risk assessment proposal is finalized. As a result from a previous action item, Airport GIS will be open to all registered users, to include government and non-government users, effective November 15.

Action Items:

- FAA Flight Procedures and Airspace Group will report status of the issue

Status: Item open

Meeting 20-02: Jeff Rawdon, FAA Flight Procedures and Airspace Group (FPAG), briefed the issue summary and current status from the slide. Dan Wacker, FPAG, added the Departure Working Group (DWG) is working on this, and inquired if this should be combined with 15-02-323, adding the idea is to not add coordinates to the obstacles. Rich Boll, NBAA, briefed slides from the original issue, and explained the interest was to produce obstacle data in the Terminal Procedures Publication to identify the obstacles in the takeoff obstacle notes for performance planning purposes. Jeurgen Kuhnhenn, LIDO, agreed with Rich on his presentation. Dan will brief LIDO on the DWG activities to get their input. Bill Tuccio, Garmin, would like to see some use case examples on this data, since it appears to be more of an engineering issue than a pilot operational issue. Dan brought up combining issues, and John Moore, Jeppesen, pointed out these are two separate needs and should be kept separate. Rich thinks this could be closed and combined with the previous item. Jeff decided to keep both issues open.

Action Items:

- Flight Procedures and Airspace Group will report DWG status.

Status: Item open