A Test of the Proposed Inputs
To the Integrated Noise Model
For The Ohio State University Airport
Part 150 Noise Compatibility Study

Originally submitted March 26, 2008
Revised April 7, 2008

Submitted by
Scott Whitlock and Kimberly Nixon-Bell

Introduction

Although we are not members of the Technical Advisory Committee for the Part 150 study, we have long advocated that study be done.[1] As members of the public we observed the first meeting of the Technical Advisory Committee on January 17, 2008. Although the proposed inputs for the integrated noise model were withdrawn at the beginning of that meeting and new inputs were presented, we were able to identify and present[2] three empirical[3] concerns with the data:

1. On their face the proposed inputs were incorrect using fractions of operations such as suggesting that there had been only one-third of a night-time landing by a Gulf Stream II jet (a stage 2 jet) during the year-long period used as the base period.
2. The proposed inputs understated the number of night-time Gulfstream II stage 2 jet operations which were known to have taken place based upon radar data furnished to the Overnight Flight Subcommittee.
3. The night-time operations of the LabCorp planes (PA31) were materially understated based upon data from both www.flightaware.com ("FlightAware") and data from The OSU Airport's flight information system www.webscene.info/WebScene/KOSU/console.html ("WebScene") a concern which was supported by Mr. Chris Lenfest, a member of the Technical Committee who reported that the Port Columbus Tower had furnished the consulting team with information showing six operations per night five nights a week which was

[1] Scott Whitlock has served as the City of Worthington representative on the Airport Advisory Board since its inception. Kimberly Nixon-Bell is a member of WOOSE and served as the WOOSE representative on the Airport Noise Committee from its inception. Upon its merger into the Airport Advisory Board she became an alternate to that board. Both the City of Worthington and WOOSE have asked for years that a Part 150 Study be done.

[2] The Technical Memorandum to the Technical Subcommittee of The Ohio State University Airport Part 150 Committee from David Full - RS&H Project Manager dated March 18, 2008 (the "Technical Memorandum") attributes the suggestions to "various Technical Subcommittee members" (p. 7) which is not correct.

[3] The Technical Memorandum (p.6) refers to the radar data, FlightAware data and WebScene data as "anecdotal sources" which is not correct.

substantially more than the less than one-half operation per night used in the proposed inputs.

The Technical Memorandum has now addressed these concerns:

1. All annual operations are shown as whole numbers.
2. The number of Gulfstream II stage 2 jet operations during the night-time hours has been increased at least to the number supported by the analysis of the radar data – GLF2 from .37 operations per year to 2 operations per year.
3. The number of PA31 night-time operations has been increased from 160 per year to 1,521.

Overall, the night-time operations have now been increased from 4,099 to 8,064. Unfortunately, the new inputs are the result of a number of assumptions and adjustments. The consultant team states[4] that the "total number of actual operations (both IFR and VFR) at the Airport for FY2007 was 87,156." Unfortunately no source is offered for that data point. The consultant team then obtained 55,312 records of operations from the Columbus Regional Airport Authority (CRAA) Noise Office.[5] No explanation for the discrepancy between the 55,312 records and the 87,156 actual operations is offered. Since the arrivals did not match the departures in the database from the CRAA Noise Office, the lower number was adjusted upward to the higher number at the Model Combination level[6] resulting in 61,486 operations.[7] No explanation is offered as to why this adjustment was not made at the individual aircraft type. The 61,486 operations were then adjusted upward by 25,670 operations based apparently entirely on undocumented anecdotal sources.[8]

Because the final inputs were not based entirely upon empirical data, we felt that it would be important to test the accuracy of at least some of the inputs using empirical data.[9] We have served on various subcommittees of the Don Scott Airport Advisory Board and Noise Committee including the 050 Turn Subcommittee, Overnight Flight Subcommittee and the Historic Data Analysis Subcommittee. As members of those subcommittees we emphasized and advocated the use of empirical data and strongly believe that the Part 150 Study should utilize empirical data to the greatest extent possible.

[4] Technical Memorandum p. 7
[5] Technical Memorandum p. 7 and Table B-1 pp. 23-29
[6] Technical Memorandum p. 22
[7] Technical Memorandum p.22 and Table B-3 pp 36-57
[8] The sources appear to have been "interviews with operators, Ohio Highway Patrol, OSU Flight School and OSUA air traffic control." Technical Memorandum p. 22. No documentation of these interviews or explanation of the methodology by which interviews were converted into data has been provided.
[9] Although one might expect that the consultants would perform some tests to check on the accuracy and reasonableness of the final results, there is no indication in the Technical Memorandum that any tests were performed.

Methodology

Because of very limited time before the meeting of the Technical Committee,[10] we chose to focus on night time (10:00 PM to 6:59 AM) operations since those operations have a significant impact on the model output. We chose the month of June because it was the last full month in the annual period of July 24, 2006 through July 23, 2007 used to develop the initial aircraft fleet mix.[11] The volume of data for just night time operations quickly dictated that the verification had to be limited to a single week and we used the first week in June beginning at 10:00 PM on May 31, 2007. Because data was apparently not recorded by WebScene for one night during that week, we had to substitute Tuesday-Wednesday night June 12-13 for Tuesday-Wednesday night June 5-6. We recognized that the Memorial Tournament would affect the first several nights of data, although the busiest two nights occurred after the tournament was over.

We utilized both WebScene and the data from FlightAware to identify all of the night-time operations during our test week. From WebScene we identified 177 total night-time operations during the test week[12]; from FlightAware we identified 46 total night-time operations only 5 of which we could not find in WebScene. The 182 total night time operations is more than suggested by the proposed inputs to the INM (9,490 on an annualized basis compared to the 8,064 night-time operations proposed in the Technical Memorandum, approximately 17% more), but we do not believe that the test week is necessarily representative of total night-time operations.

The percentage of arrivals (59%) during the test week is a little higher than the percentage of arrivals (53%) proposed in the Technical Memorandum[13] but we cannot draw any conclusion from the difference.

We were able to identify aircraft types for 74 of the 182 operations Using WebScene we were also able to observe flight tracks and identify local operations. Based upon the data we were able to draw three conclusions.

---

[10] Although we had been the primary critics of the inputs at the first Technical Committee meeting, we were not furnished the Technical Memorandum or the c.d. which accompanied it. We were able to obtain copies from a member of the Technical Committee and had approximately four days in which to do our analysis. Additional information was furnished to us in a memorandum dated April 4, 2008, from David Full – RS&H Project Manager to Douglas Hammon, Airport Director on the subject of Whitlock/Nixon-Bell Paper (the "Supplemental Memorandum").

[11] Technical Memorandum p. 7

[12] We only included operations in which the aircraft was coded by WebScene as arriving (blue) or departing (red) the Airport. On two occasions aircraft suddenly popped up on WebScene on what appeared to be departure tracks. However they were coded as in transit and were not counted as night-time operations.

[13] Technical Memorandum p. 45

Conclusions

1. Night-time Fleet Mix. We were able to identify aircraft types operating at the Airport during the night-time hours which are not included in the proposed inputs. Specifically, we observed the following aircraft types operating at night for which there does not seem to be input proposed:

    Airbus A320[14]
    Boeing 737-300[15]
    Boeing BBJ2 or 737-800[16]
    Canadair Bombardier Regional Jet CRJ-2000[17]
    Embraer EMB135 and EMB 145[18]
    McDonnell-Douglas DC9[19]

    Although we found 16 night-time operations during the test week in which it appears that zero night-time operations for the year are proposed as inputs into the INM, we were only able to identify aircraft type in 74 operations. The 16 night operations not included in the inputs represent an understatement of at least 18%. Because we were comparing one week of test data against the total inputs for a year and demonstrating that the actual operations in that week were greater than the inputs proposed for the year, it is likely that if additional test weeks are done the errors will grow.[20]

[14] We suspect that WebScene may have incorrectly identified this aircraft. We found two arrivals during the test week.
[15] WebScene showed four night-time arrivals by Boeing 737-300 jets. There is no input proposed for the B737.
[16] WebScene showed one night-time arrival by a B738 which could be either a Boeing BBJ2 or a 737-800. There is no input proposed for this operation.
[17] We found two arrivals during the night-time hours during the test week. The proposed input for night-time operations for the year is zero arrivals, one departure. Technical Memorandum p. 44
[18] These two aircraft types are combined as model types. Technical Memorandum p. 32. We found 2 EMB135 arrivals, 3 EMB145 arrivals, and 1 EMB145 departures. The proposed input for the combined model types is 0 arrivals and 1 departure. Technical Memorandum p.44.
[19] On WebScene we found three DC9 arrivals at night during the test week. The Technical Memorandum does not propose to input any DC9 operations. Technical Memorandum p.44.
[20] For example, the Technical Memorandum proposes to input only one departure for the Falcon 50. We found one departure during the test week. If any additional arrivals or departures are found for the Falcon 50, it will be clear that the proposed inputs are to low for that aircraft type. As another example, the Technical Memorandum proposes only 21 night-time operations for the BAe125(800), we found 4 night-time operations in just the test week. Either that is an unusual concentration of BAe125(800) operations into a single week, or the proposed inputs are too low. If additional test weeks are done, it seems likely that errors in the proposed BAe125(800) inputs will be established. However, we did not treat this as an error in this memorandum. As a third example, we noted in the FlightAware data was that during the test week there were regular night time operations of a BE58 Beech Baron. It may be that the category in which the BE58 is grouped - Multiple Aircraft (1) - is too low. There should be further verification of this issue.

2. Local Operations. The Technical Memorandum proposes that Local Operations at night are zero.[21] This seems to be contradicted by the fact that the Airport has received complaints about Local Operations at night from Worthington residents. Observing the flight tracks available through WebScene we identified six departures and six arrivals with flight tracks affecting Worthington residents north of the Airport and three departures and three arrivals with flight tracks south of the Airport. That would be 18 Local Operations in one week. The proposed inputs are clearly wrong and will cause the model to understate the noise impacts on Worthington residents.

2. Total Night-time Jet Operations. In the one test week we observed 40 jet operations. On an annualized basis that would be 2085 jet operations at night. The proposed night-time inputs show 479 total jet operations for a year.[22] We recognize that the Memorial Tournament may have inflated that numbers somewhat. However, coupled with the findings in paragraph 1 above, it would seem that total night-time jet operations may be substantially understated. Because these are generally the noisiest operations drawing the largest number of complaints and having the biggest impact on the output of the Integrated Noise Model, these proposed inputs should be scrutinized carefully and should be subject to verification. Our test did not verify either the accuracy or reasonableness of the proposed night-time inputs for jet operations.

Recommendation

On the basis of these findings, we believe that the Technical Committee should not accept the proposed night-time inputs without further verification.

[21] The Supplemental Memorandum proposes to use 0.5 operations per night. The Supplemental Memorandum is based upon observation ending at 11:00 p.m. The Supplemental Memorandum argues that there are zero local operations after 11:00 p.m. because of Airport "prohibits" them. Supplimental Memorandum, p.3. Actually the Airport merely "requests" that pilots follow its "Recommended noise abatement guidelines" The Ohio State University Airport Noise Abatement Guidelines). We found 18 Local Operations during the test week, or more than 5 times as many as the input now proposed in the Supplemental Memorandium. Six of those Local Operations occurred after midnight.

[22] The number of night-time jet operations proposed is 5.9% of total night-time operations; the number of day-time jet operations proposed is 9.1% of total day-time operations. Technical Memorandum pp. 44-45