APPENDIX G REQUESTS TO FAA REGARDING NON-STANDARD AIRCRAFT TYPE MODELING SUBSTITUTIONS

The INM database does not include data for every aircraft type. The database includes a lookup table that identifies approved "substitutes" for many types. However, that lookup table does not include some aircraft types modeled at VNY. For those aircraft types, recommendations for INM substitute aircraft were forwarded to the FAA for approval or identification of an alternate approved substitution. The following pages present copies of the LAWA request to FAA for guidance.

Appendix H presents the FAA response. The noise contours presented in this document followed the FAA guidance.

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Los Angeles
World Airports

October 19, 2010

Victor Globa
Environmental Protection Specialist
Federal Aviation Administration
Western-Pacific Region
Los Angeles Airports District Office
P.O. 92007
Los Angeles, CA 90009-2007

Subject: Request for Approval of Integrated Noise Model Non-Standard Aircraft Substitutions in Support of the Noise Exposure Map Update at Van Nuys Airport

Dear Mr. Globa:

Los Angeles World Airports (LAWA) requests the Federal Aviation Administration's (FAA) approval of non-standard aircraft substitutions in the FAA Integrated Noise Model (INM) for updating the Noise Exposure Maps (NEMs) for Van Nuys Airport (VNY).
Based on aircraft fleet data derived from the Van Nuys Data System and Airport Noise and Operations Monitoring System (ANOMS), LAWA has identified a list of aircraft types that operate at VNY but are not included in the INM Version 7.0b database. For each of these aircraft types a recommended INM substitution has been identified to use in the NEMs Update modeling process. Consistent with FAA policies and procedures, we are submitting this listing and recommended aircraft types for review and approval by FAA/AAE.

LAWA requests that the FAA approve the use of these "non-standard" aircraft substitutions in INM 7.0b for the VNY NEM Update. If you have any specific comments or questions related to this request, please feel free to contact Robert Behr of Harris Miller Miller & Hanson (HMMH) at (916) 368-0707, ext 2226 or me at (424) 646-6499.

Thank you for your assistance on this matter.

Sincerely yours,

Scott Tatro
Environmental Affairs Officer

Attachment:: INM Aircraft Substitution Requests and Suggestions

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Appendix A

INM Aircraft Substitution Requests and Suggestions

We have identified the following 32 aircraft types included in the VNY Part 150 Noise Exposure Map fleet mixes for which FAA approved substitutes are required. In each case, we have proposed a substitute from the INM 7.0b database. The bases for our proposals are discussed following the table. The bases for some recommendations refer to recent guidance FAA provided HMMH for the VNY Part 161 study[1], and for recent noise studies at Naples Municipal Airport (APF)[2], Jackson-Evers International Airport (JAN)[3], Louisville International Airport (SDF)[4], Martin County Airport/Witham Field (SUA)[5].

Table A1 Aircraft Types and Recommended INM Substitutions

#	Group	Aircraft Code	Represented Aircraft Models	Recommended INM Substitution
1	Jet	C56X	Cessna 560XL Citation Excel	CNA55B
2	Jet	GALX	1126 Galaxy, Gulfstream 200	CL601
3	Jet	GLEX	Bombardier Global Express BD-700	GV
4	Jet	H25C	Raytheon Hawker BAe HS 125-1000	LEAR35
5	Jet	L39	Aero L-39 Albatros	T-38A
6	Jet	PRM1	Premier 1, 390	CNA500
7	Piston	AC68, AC6L	Aero Commander 680	BEC58P
8	Piston	B25	North American B-25 Mitchell	DC3
9	Piston	B26	Boeing (Douglas) B-26 Marauder/Invader	DC3
10	Piston	C46	Curtiss C-46 Commando	DC3
11	Piston	C82	Fairchild C-82 Jet Packet	DC3
12	Piston	U16	Grumman HU-16 Albatross	DC3
13	Piston	C411	Cessna 411	BEC58P
14	Piston	CE25	Hydroplane Che-25	BEC58P
15	Piston	P68	Partenavia P.68	BEC58P
16	Piston	TCOU	Helio H-580 Twin Courier	BEC58P
17	Turboprop	B350	Beechcraft King Air 350	DHC6
18	Turboprop	C10T	Cessna P210 (turbine)	CNA208
19	Turboprop	C2	Grumman Greyhound	HS748A
20	Turboprop	CVLT	Convair 580	CVR580
21	Turboprop	P46T	Piper Malibu Meridian	SD330
22	Turboprop	P68T	Partenavia P.68 (turbine)	CNA441
23	Turboprop	P180	Piaggio P-180 Avanti	DHC6
24	Turboprop	PC12	Pilatus PC-12, Eagle	1900D
25	Turboprop	TBM7	Socata TBM-700	1900D
26	Rotor	BK117C	Eurocopter BK117C.1C	B222
27	Rotor	B412	Bell 412/412EP	BO105
28	Rotor	EC20	Eurocopter EC120 Colibri	SA341G
29	Rotor	EXPL	MD 900 Exporer	EC130
30	Rotor	B47G/H	Bell 47-G/H	R44
31	Rotor	B430	Bell 430	S76
32	Rotor	S58T	Sikorsky S-58	S76

[1] Van Nuys Airport Part 161 Study, HMMH Project No. 300701.000, FAA approval issued November 21, 2006.
[2] Naples Municipal Airport Part 150 Study, HMMH Project No. 302720.001, FAA approval issued September 16, 2009.
[3] Jackson-Evers International Airport Part 150 Study, HMMH Project No. 304140, FAA approval issued May 13, 2010.
[4] Louisville International Airport Part 150 Noise Exposure Map Update, HMMH Project No. 304060.000, FAA approval issued July 13, 2010.
[5] Martin County Airport/Witham Field Part 150 Noise Exposure Map Update, HMMH Project No. 303880.003, FAA approval issued June 11, 2010.

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1. Cessna 560XL Citation Excel C56X

We propose to model the C56X operations with INM type CNA55B as recommended for JAN.

In the JAN Part 150 the FAA approved the Cessna Citation Bravo (CNA55B) as the substitution aircraft for the Cessna Citation Excel (Cessna model 560XL). Both aircraft have the PW500 series power plants with similar certification noise levels shown in Table A2.

Table A2 Noise Certification Data from Cessna 560XL and Cessna 550 Bravo

MANUFACTURER	TYPE DESIGNATION	MTOW (lb)	MLW (lb)	ENGINE MANUFACTURE / TYPE DESIGNATOR	NOISE LEVEL (EPNdB)		
					FLY OVER	LATERAL	APPROACH
Cessna	Cessna 560XL	20,000	18,700	PW545A	72.4	85.3	93.1
Cessna	Cessna 550 Bravo	14,800	13,500	PW530A	73.7	85.2	91.2
Source: FAA AC 36-1H, as posted on http://www.faa.gov/about/office_org/headquarters_offices/AEP/noise_levels/media/uscert_appendix_01_030210.xls							

2. 1126 Galaxy Gulfstream 200 – GALX

We propose to model GALX operations with INM type CL601 as recommended for JAN.

The Israel Aircraft Industries (IAI) 1126 Galaxy was renamed the Gulfstream G200 shortly after Gulfstream's parent company, General Dynamics, purchased Galaxy Aerospace in 2001. The aircraft has a MTOW of 34,850 lb. a MLW of 28,000 lb. and powered by two Pratt & Whitney Canada PW306A turbofan engines rated at 6,040 lb. each.[6] This is comparable to the INM type CL600 (MTOW 36,000 lb., MLW of 33,000 lb. and max. static thrust 7,500 lb. according to INM 7.0b). Table A3 compares certification data for these three aircraft types. The CL601 matches slightly better than the CL600, especially on the lateral measurement.

Table A3 Noise Certification Data from IAI 1126 Galaxy/Gulfstream G200, Bombardier CL-601, and Bombardier CL-600

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Takeoff	Sideline	Approach
Gulfstream	G200	34,850	28,000	PW306A	81.40	85.80	92.70
Israel Aircraft	IAI 1126 Galaxy	34,850	28,000	PW306A	81.40	85.80	92.70
Gulfstream	G200	34,850	28,000	PW306A	81.40	85.80	90.90
Bombardier	CL-601-3R	43,100	36,000	CF-34-3A1	79.80	85.70	90.10
Bombardier	CL-600	36,000	33,000	ALF-502	81.60	89.30	91.20
Source: FAA AC 36-1H, Appendix 1, 030210 http://www.faa.gov/about/office_org/headquarters_offices/AEP/noise_levels/media/uscert_appendix_01_030210.xls							

3. Bombardier BD-700 Global Express/Global 5000 – GLEX

We propose to model GLEX operations with INM type GV as recommended for SDF.

The GLEX, Bombardier BD-700 Global Express, is similar to the Gulfstream V (INM 7.0a type GV). Both aircraft use variants of the Rolls-Royce BR710 engine and both have similar maximum take-off weights, landing weights and noise levels. Table A4 provides a comparison of the noise certification data for these aircraft.

[6] Data for this aircraft is from AC36-1H, Appendix 1 (March 2, 2010).

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Table A4 Noise Certification Data from Bombardier Global Express and Gulfstream GV

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPN dB)		
					Takeoff	Sideline	Approach
Bombardier	BD-700-1A10 (Global Express)	96,000	78,500	BR700-710-A2-20	82.7	88.6	89.8
Bombardier	BD-700-1A10 (Global Express)	93,500	78,500	BR700-710-A2-20	82.1	88.7	89.8
Bombardier	BD-700-1A10 (Global Express) (Learjet STC: SA8184nm-D)	75,000	75,000	Rolls Royce/ BR700-710-A2-20	75.6	89.3	89.7
Gulfstream	G-V	90,500	75,300	BR700-710-A1-10	80.3	98.1	90.8
Source: FAA AC 36-1H, at http://www.faa.gov/about/office_org/headquarters_offices/AEP/noise_levels/media/uscert_appendix_01_030210.xls							

4. Raytheon Hawker-125-1000 – H25C

We propose to model H25C operations with INM type LEAR35 as recommended for SDF.

We compared the Hawker 125-1000 with the Hawker 800 and LEAR35 aircraft shown in Table A5. Based on the comparison, the LEAR35 appears to be a good match.

Table A5 Noise Certification Data from BAe-125-1000 and -800 and LEAR35

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPN dB)		
					Takeoff	Sideline	Approach
Raytheon	Hawker 125-1000	31,000	25,000	PW305	81.8	85.9	91.6
Raytheon	Hawker 125-800	27,400	23,350	TFE731-5R-1H	80.9	87.2	96.5
Learjet	LEAR 35 A	18,000	14,300	TFE731-2-2B	83.6	87.4	91.3
Source: FAA AC 36-1H, at http://www.faa.gov/about/office_org/headquarters_offices/AEP/noise_levels/media/uscert_appendix_01_030210.xls							

5. Aero L-39 Albatros – L39

We propose to model L39 operations with INM type T-38A as recommended for VNY Part 161.

The L-39 Albatros is somewhat unique with no parallel aircraft having the same engine type. For the VNY Part 161, the T-38A was recommended.

6. Premier 1 390 - PRM1

We propose to model the Beechcraft 390 Premier I (PRM1) with INM type CNA500 as recommended for JAN and SDF.

The PRM1 is a relatively new light twin-engine corporate jet. The maximum take-off weight is 12,500 lb. and maximum landing weight is 11,600 lb. The aircraft is powered by two William FJ44-2A turbofans, each rated at 2,300 lb.[7] The PRM1 is similar in weight and engines as the Cessna 525A (max take-off weight of 12,375 lb., max landing weight of 11,500 lb., powered by William FJ44-2C

[7] Data presented here regarding the Beech 390 Premier 1 is from ""Jane's All the World's Aircraft 2005-2006" pp 578-579.

turbofans with max thrust of 2,400 lb.)[8], which has an INM standard substitution of CNA525 and is mapped to the CNA500. In addition, the Cessna 525A and the PRM1 have similar noise certification data as summarized in Table A6.

Table A6 Noise Certification Data from Cessna 525A and Bombardier Beechcraft 390 Premier I

Manufacturer	Model	Max. Takeoff Weight (lb.)	Max. Landing Weight (lb.)	Powerplant	Noise Level (EPNdB)		
					Takeoff	Sideline	Approach
Cessna	525A Citation Jet II (CJ-2)	12,370	11,500	FJ44-2C	74.5	88.8	91.4
Raytheon	390 Premier	12,500	11,600	FJ44-2A	76.6	87.9	92.0
Source: FAA AC 36-1H, as posted on http://www.faa.gov/about/office_org/headquarters_offices/AEP/noise_levels/media/uscert_appendix_01_030210.xls							

7. Aero Commander 680 – AC68, AC6L

We propose to model these aircraft types as INM type BEC58P.

The AC68/AC6L Aero Commander is a twin-engine propeller aircraft that also has a turboprop variant. It is assumed that the piston propeller aircraft variant is more prevalent and thus the twin-engine Baron was selected as the substitute.

8. North American B-25 Mitchell – B25

9. Boeing (Douglas B-26 Marauder/Invader – B26

10. Curtiss C-46 Commando – C46

11. Fairchild C-82 Jet Packet – C82

12. Grumman HU-16 Albatross – U16

We propose to model these aircraft types as INM type DC3 as recommended for the VNY Part 161.

These aircraft all have twin-piston radial engines of variable sizes. The DC3 is the only INM aircraft type with twin radial engines and therefore determined to be the best aircraft to represent all of these aircraft types.

13. Cessna 411 – C411

We propose to model the Cessna 411 as INM type BEC58P.

The C411 is a twin-engine aircraft powered by two Continental TSIO-520 piston engines. Two derivatives of this aircraft type are the C401 and C402 which have the Beech Baron, BEC58P INM aircraft, identified as the appropriate substitute aircraft. A pressurized version, C421, is also linked to the BEC58P. Therefore, the BEC58P appears to be the appropriate aircraft type for the C411.

14. Hydroplane Che-25 – CE25

We propose to model the CE25 as INM type BEC58P.

The CE25 is a twin-piston engine aircraft developed in Russia. Not much other information is readily available; therefore, the INM twin-piston engine aircraft, BEC58P, was selected as a viable substitute.

15. Partenavia P.68 – P68

We propose to model the P68 as INM type BEC58P as recommended for APF.

[8] Data presented here regarding the Cessna 525A are from "Jane's All the World's Aircraft 2005-2006" pp 646-647.

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The P68 is a twin-engine piston aircraft most similar in size and engine type to the Beech Baron INM standard aircraft type (BEC58P).

16. Helio H-580 Twin Courier – TCOU

We propose to model the TCOU as INM type BEC58P.

The TCOU is a twin-engine piston aircraft most similar in size and engine type to the Beech Baron INM standard aircraft type (BEC58P).

17. Beechcraft King Air 350 – B350

We propose to model the B350 as INM type DHC6.

The B350 is another variant of the King Air aircraft with two P&W PT6A turboprop engines. There are several King Air models that are modeled with the DHC6 INM aircraft type; thus, it is appropriate to also use the DHC6 for this model.

18. Cessna P210 (turbine) – C10T

We propose to model the C10T as INM type CNA208 as recommended for SUA.

The C10T is a single-engine aircraft with a turbocharged piston.

19. Grumman Greyhound – C2

We propose to model the C2 as INM type HS748A.

The C2 is a twin-engine turboprop aircraft powered by two Allison T56-A turboprops. The HS748A appears to be the closest match as the INM substitute aircraft.

20. Convair 580 –CVLT

We propose to model the CVLT as INM type CVR580.

The CVLT designation represents the various Convair models 580, 600, and 640. The Convair 580 type was selected as it is an INM standard aircraft type, CVR580.

21. Piper Malibu Meridian – P46T

We propose to model the P46T as INM type SD330 as recommended for APF.

The SD330 INM type was recommended by the FAA for the Piper Malibu Meridian for the Van Nuys Airport Part 161 study and approved for the APF Part 150 study.

22. Partenavia P.68 (turbine) – P68T

We propose to model the P68T as INM type CNA441.

The P68T is a twin-engine turboprop aircraft most similar in size and engine type to the Cessna Conquest INM standard aircraft type (CNA441).

23. Piaggio P-180 Avanti – P180

We propose to model the P180 as INM type DHC6 as recommended for APF.

The Piaggio P-180 Avanti has two PT6A-66 turboprops which appear to be similar to the DHC6 turboprops, PT6A-27.

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24. Pilatus PC-12 – PC12

25. Socata TBM-700 – TBM7

We propose to model these aircraft types as INM type 1900D as recommended for APF.

The FAA approved the INM aircraft type 1900D for these single-engine turboprop aircraft in the APF study.

26. Eurocopter BK 117C.1C – BK117

We propose to model the BK117 as INM type B222.

The BK117 has a similar Lycoming LTS101 turboshaft comparable to the INM standard aircraft, Bell 222.

27. Bell 412/412EP – B412

We propose to model the B412 as INM type BO105.

28. Eurocopter EC120 Colibri – E20

We propose to model the EC120 as INM type SA341G.

The E20 has a similar Turbomeca turboshaft comparable to the INM standard aircraft, SA341G, Gazelle.

29. MD900 Explorer – EXPL

We propose to model the EXPL as INM type EC130.

The EXPL has one or two turboshafts along with NOTAR technology to reduce the noise signature. The EC130 has the fenstrom tail rotor which has also bee n shown to reduce noise generation. Therefore, the EC130 is the appropriate substitute aircraft for the EXPL.

30. Bell 47-G/H – B47G *(30)*

We propose to model the B47G as INM type R44.

The B47G has a similar piston or reciprocating engine as the INM standard aircraft, R44, Robinson 44.

31. Bell 430 – B430

We propose to model the B430 as INM type S76 as recommended for APF.

The B430 is a twin-engine light to medium helicopter comparable to the INM standard aircraft, S76, Sikorsky S-76 Spirit.

32. Sikorsky S-58 – S58T

We propose to model the S58T as INM type S76.

The S58T is similar in size, weight, and power plant to the INM standard aircraft, S76, Sikorsky S-76 Spirit.

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