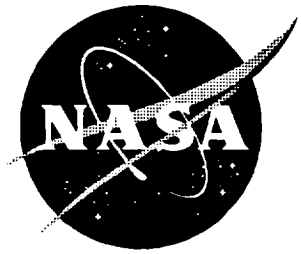

NASA Contractor Report 4719

High-Speed Civil Transport Forecast: Simulated Airlines Scenarios for Mach 1.6, Mach 2.0, and Mach 2.4 Configurations for Year 2015

Munir Metwally

Contract NAS1-19345
Prepared for Langley Research Center

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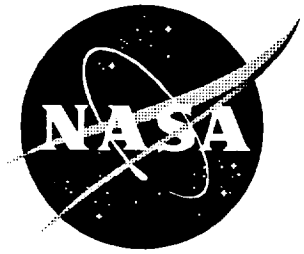

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High-Speed Civil Transport Forecast: Simulated Airlines Scenarios for Mach 1.6, Mach 2.0, and Mach 2.4 Configurations for Year 2015

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EXECUTIVE SUMMARY

McDonnell Douglas Corporation's (MDC) current participation in the National Aeronautics and Space Administration's (NASA) High-Speed Research Program Atmospheric Effects of Stratospheric Aircraft (AESA) investigation has focused on development of forecast High Speed Civil Transport (HSCT) engine exhaust emissions databases for the year 2015.

The report describes the development of a database of fuel burn and emissions from projected HSCT fleet that reflect actual airlines' network, operational requirement, and traffic flow as operated by simulated world wide airlines for Mach 1.6, 2.0, and 2.4 HSCT configurations.

For the year 2015, MDC created two supersonic commercial air traffic networks consisting of origin-destination city pair routes and associated traffic levels. The first scenario represented a manufacturing upper limit producible HSCT fleet availability by year 2015. The fleet projection of the Mach 2.4 configuration for this scenario was 1059 units with a traffic capture of 70 percent. The second scenario focused on the number of units that can minimally be produced by the year 2015. Using realistic production rates, the HSCT fleet projection amounts to 565 units. The traffic capture associated with this fleet was estimated at 40 percent. The airlines network was extracted form the actual networks of 21 major world airlines. All the routes were screened for suitability for HSCT operations. The route selection criteria included great circle distance, difference between flight path distance and great circle distance to avoid overland operations, and potential flight frequency.

Although 345 routes have qualified for the simulated airlines network to represent 100% of traffic capture in a mature HSCT fleet, only 294 were used in the first scenario representing 70% traffic capture for an upper limit producible 2015 HSCT fleet, and 219 routes were used in the second representing a 40% traffic capture with a 2015 producible HSCT fleet.

MDC modeled global HSCT aircraft operations on a commercial scheduled airline network to estimate fuel burn and engine exhaust emission levels in the year 2015. These databases, will contribute to assessing the environmental impact of introducing a fleet of HSCT aircraft into global commercial airline operations. A producible fleet will consume from 62 (Mach 1.6) to 73 (Mach 2.4) billion kilograms of fuel. Operation of this fleet in year 2015 will deposit from 60 (Mach 1.6) to 249 (Mach 2.4) million kilograms of NOX at altitudes above 16 kilometers.

ACKNOWLEDGMENT

The work described in this technical report was funded under the National Aeronautics and Space Administration High-speed Systems Research Studies contract NAS1-19345.

Many people at McDonnell Douglas participated in the successful completion of this effort, and they deserve recognition for their contributions. They include, Z. Harry Landau, and Richard Van Alstyne, from Advanced Program Engineering Support; and Alan Mortlock of the High Speed Civil Transport Program Office; John Morgenstern from Advanced Aircraft Aerodynamics; Andy Grothues from Aircraft Performance; and William Regnier from Propulsion.

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ACRONYMS

AESA	Atmospheric Effects of Stratospheric Aircraft
ASK	Available seat kilometers
ASM	Available seat miles
BCAG	Boeing Commercial Aircraft Group
CO	Carbon monoxide
EI	Emission index
HC	Unburned hydrocarbons
HSCT	High speed civil transport
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
MDC	McDonnell Douglas Corporation
NASA	National Aeronautics and Space Administration
NO_x	Nitrogen oxides
OAG	Official Airline Guide
RPK	Revenue passenger kilometers
US	United States

1.0 INTRODUCTION

The National Aeronautics and Space Administration's (NASA) High-Speed Research Program Atmospheric Effects of Stratospheric Aircraft (AESA) investigation is an on-going, joint government-academia-industry research effort with multinational contributors. Started in 1990, the program attempts to erase some of the uncertainties surrounding the effects of future supersonic aircraft operations in the stratosphere on stratospheric ozone levels. Aircraft manufactures, in particular, are interested because of the potential market for high speed civil transport (HSCT) and the ensuing goal to produce aircraft that are economically viable and satisfy all regulatory requirements.

McDonnell Douglas Corporation's (MDC) participation in the AESA investigation has included developing several jet aircraft engine exhaust emissions databases for year a 1990 scenario and a forecast year 2015 scenario. These databases represents one component of jet aircraft operations or services and consists of a global, three-dimensional grid, one degree latitude by one degree longitude by one kilometer altitude. The grid's cells contain aggregate estimates of the annualized fuel burn and levels of engine exhaust emission constituents, specifically NO_X emission index (EI) from $EI(NO_X)=5$ to $EI(NO_X)=15$.

The simulated airlines scenario presented in this report is designed to develop emission scenarios for HSCT operation as flown by airlines. One objective is to identify if the HSCT network that simulates actual airlines operations may be different than the previous network of one global airline. An evaluation of the differences among airlines, in terms of, scheduling windows, home-base, airport curfews, and route structures was also considered.

Efforts were made to use previous ground rules, assumptions, traffic growth rates, and HSCT configurations rates to be able to compare the current scenario to the previous 1993 global airline scenario on the same basis. The new elements that were introduced to make the simulated airline scenario as realistic as possible, are as follows:

1. Each airline was represented indiviually with its unique scheduling and operational requirement.
2. A new HSCT route system that is based on passenger preferences.
3. Airlines utilization.
4. Seasonal traffic trends.

2.0 SIMULATED AIRLINES NETWORK

2.1 Airlines

To develop an HSCT emissions scenario that is based on actual airlines operations, the top 21 of world airlines, ranked by traffic volume, were considered in the simulated airlines network. The selected top 21 airlines were as follows:

Carriers Of The Simulated Airline Supersonic Network

AA American Airlines, Inc.	LH Lufthansa German Airlines
AF Air France	NW Northwest Airlines, Inc
AZ Alitalia	QF Qantas Airways Ltd.
BA British Airways	RG Varig Airlines
CX Cathay Pacific Airways Ltd.	SK Sas-Scandinavian Airlines
CP Canadian Pacific	SQ Singapore Airlines
DL Delta Air Lines, Inc.	SR Swissair
IB Iberia	TG Thai Airlines
KE Korean Airlines	TW Trans World Airlines, Inc
JL Japan Airlines	UA United Air Lines, Inc.
KL Klm-Royal Dutch Airlines	

2.2 Airlines Supersonic Network

2.2.1 Route Selection Criteria

By screening the data for international wide-body service with ranges greater than 2000 nm, 567 airport-pair combinations with potential for HSCT service were identified. These airport-pair combinations are listed alphabetically in Appendix A. To qualify these airport-pairs for HSCT service, they were subjected to route diversion analysis per the following ground rules:

1. No more than 20% increase in diverted route range over the great circle distance
2. Achieve supersonic cruise speed over more than 50% of the route
3. Traffic on the route must support at least one HSCT round trip per day per airline
4. 6 Hours curfew, and minimum interval between operation 5 minutes per runway

2.2.2 Route Diversion

The Official Airline Guide (OAG)(OAG, 1990, Reference 1, and MDC, 1990, Reference 2) assigns a globally accepted unique 3-letter code to each active terminal

the great circle ground track and shortest distance traversed by the traffic over it. By deviating slightly from the great circle to minimize the overland segment of a route many more routes can become candidates for HSCT service. The diversion analysis identified for each route the amount and location of the overland segments, and the total diverted distance. This was accomplished by assigning navigational waypoints with their proper geographical coordinates to define the segments of the diverted ground track.

An arbitrary example of route diversion for the Amsterdam routes is shown in Figure 1. Table 1 displays in tabular form the 3 of the 12 routes from Amsterdam and their waypoints in alphabetical order of airport-pair codes for convenient reference. The remaining routes from Amsterdam are provided in Appendix B. Please note that the geographical coordinates convention used is: decimal degrees, Longitudes range from 0 to 360 degrees (i.e. 180°<=West Longitudes<=360°), and South Latitudes are negative. The table identifies for each route the great circle distance, the individual segment distances, the segment's overland flag (when overland is set to 1), the route cumulative distance and overland cumulative distance. Each route is labeled with the ratio of diverted to great circle distance, and the route's percent overland distance. These statistics are indicators of HSCT service potentials as used by the screening criteria. The format of this table formed the foundation upon which the HSCT performance group developed the algorithm for the 3-dimensional flight profile block time and fuel burned computations.

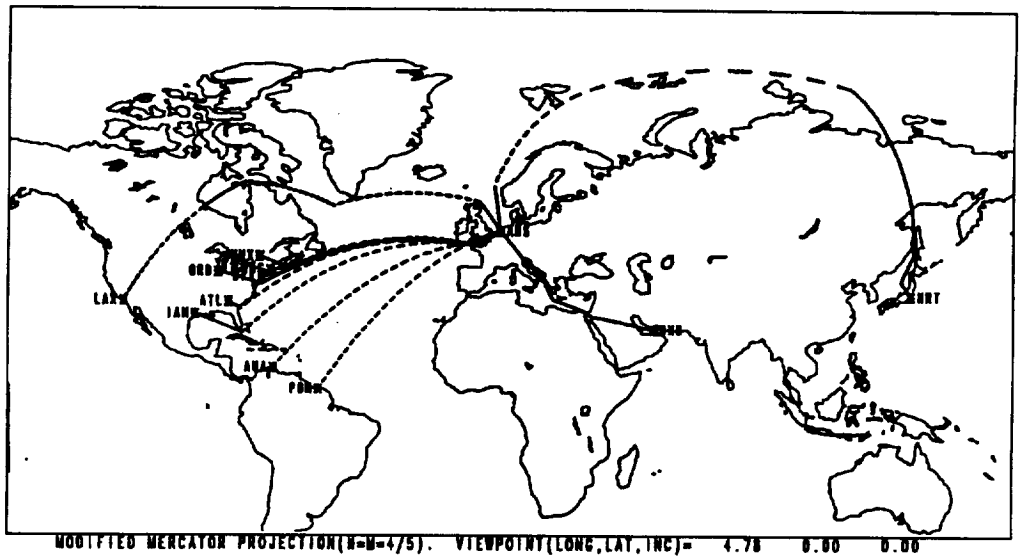


Figure 1. High Speed Civil Transport 12 Diverted Routes from Amsterdam.

HSCT High Density Network

WayPoint	Latitude	Longitude	Great Circle	WayPoint Dist	Ovrlnd Flag	Route Cum NM	Ovrlnd Cum NM
AMS	52.32	4.78					
1	50.00	359.00		258	0	258	0
2	49.00	354.00		204	0	462	0
3	31.50	279.50		3423	0	3885	0
ATL	33.65	275.57		237	1	4122	237
AMS	52.32	4.78	3812			**1.08**	**5.70%**
AMS	52.32	4.78					
1	50.00	359.00		258	0	258	0
2	49.50	354.00		196	0	454	0
AUA	12.50	289.98		3825	0	4279	0
AMS	52.32	4.78	4252			**1.01**	**0.00%**
DXB	25.25	55.33					
1	26.50	50.00		297	0	297	0
2	29.50	35.00		814	1	1111	814
3	31.00	33.00		137	1	1249	951
4	34.50	22.00		593	0	1842	951
5	40.50	18.75		392	0	2234	951
6	45.50	12.33		411	0	2645	951
AMS	52.32	4.78		505	1	3150	1457
DXB	25.25	55.33	2787			**1.13**	**46.20%**

Table 1. High Speed Civil Transport 12 Diverted Routes from Amsterdam, Netherlands.

2.2.3 Regional Airlines

By adhering to these ground rules, 499 out of the 570 potential routes qualified for HSCT service and involved 124 airports. Grouping the 21 airlines by their international region of domicile created 4 global regions: European, Far-East, Americas-East, and Americas-West. The summary of city paiir screening results for each of these sub-models are presented in Figures 2, 4, 6, and 8, and maps of the sub-models network structure are shown in Figures 3, 5, 7, and 9. For efficiency in the process of global fuel burned and exhaust emissions distribution analysis, a network structure of unduplicated routes is needed. Aggregation of qualified routes' traffic served by more than one airline from the sub-models, and including the qualified single airline routes, created a global network of 345 unduplicated routes. These 345 routes are listed in the Appendix C. A numerical entry in this table's column headed by "A/L Code" indicates the number of airlines competing on the route. A two letter code indicates the single airline operating on this non-competitive route.

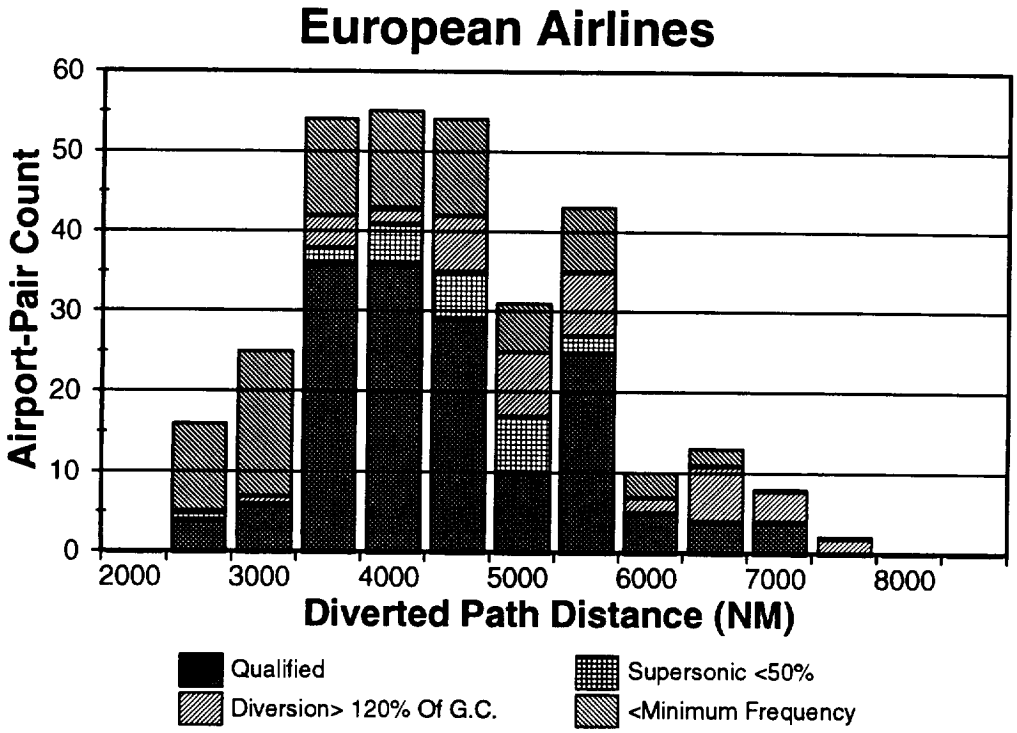


Figure 2. City Pair screening results for European Airlines.

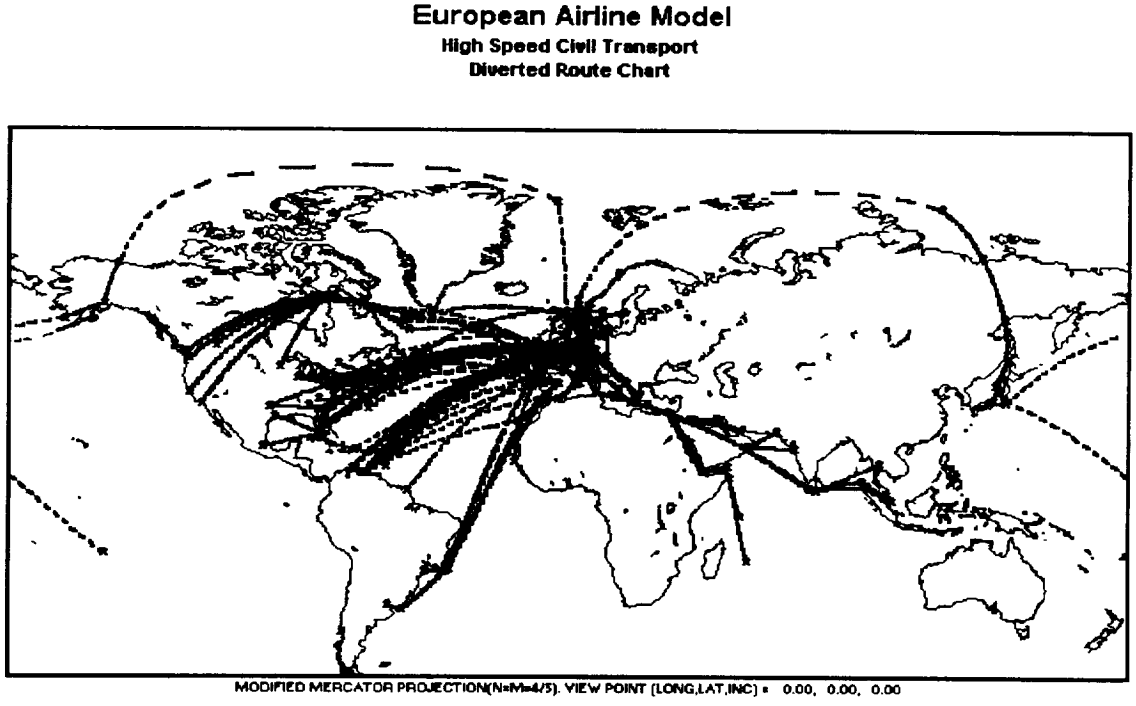


Figure 3. Network map for European Airlines route structures.

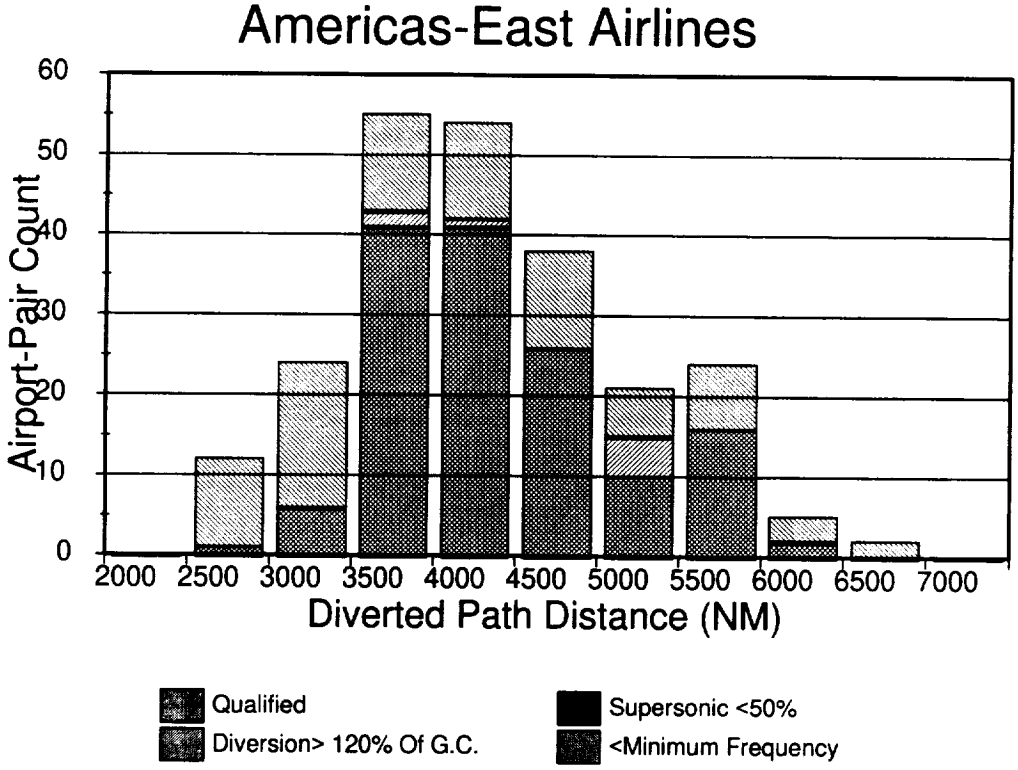


Figure 4. City Pair screening results for Americas-East Airlines.

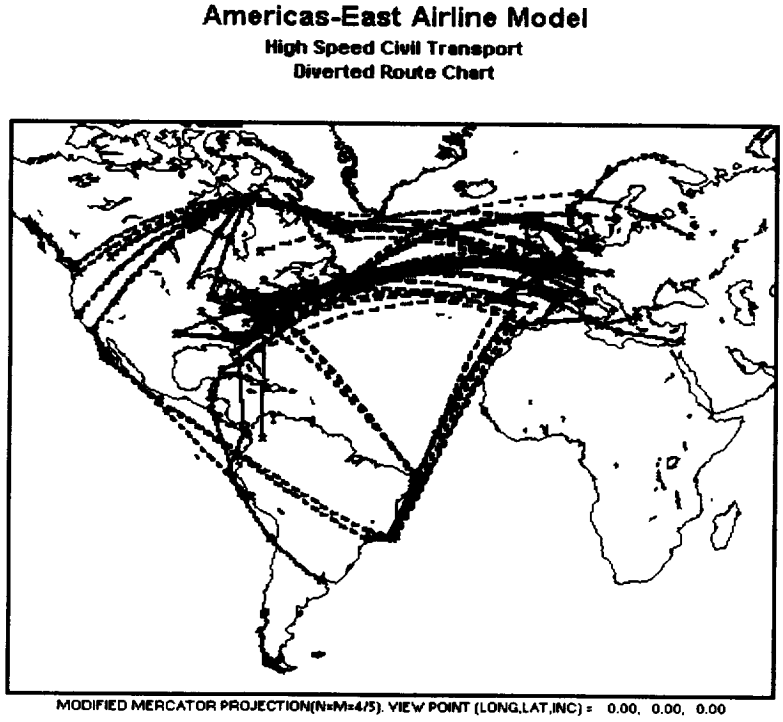


Figure 5. Network map for Americas-East Airlines route structures.

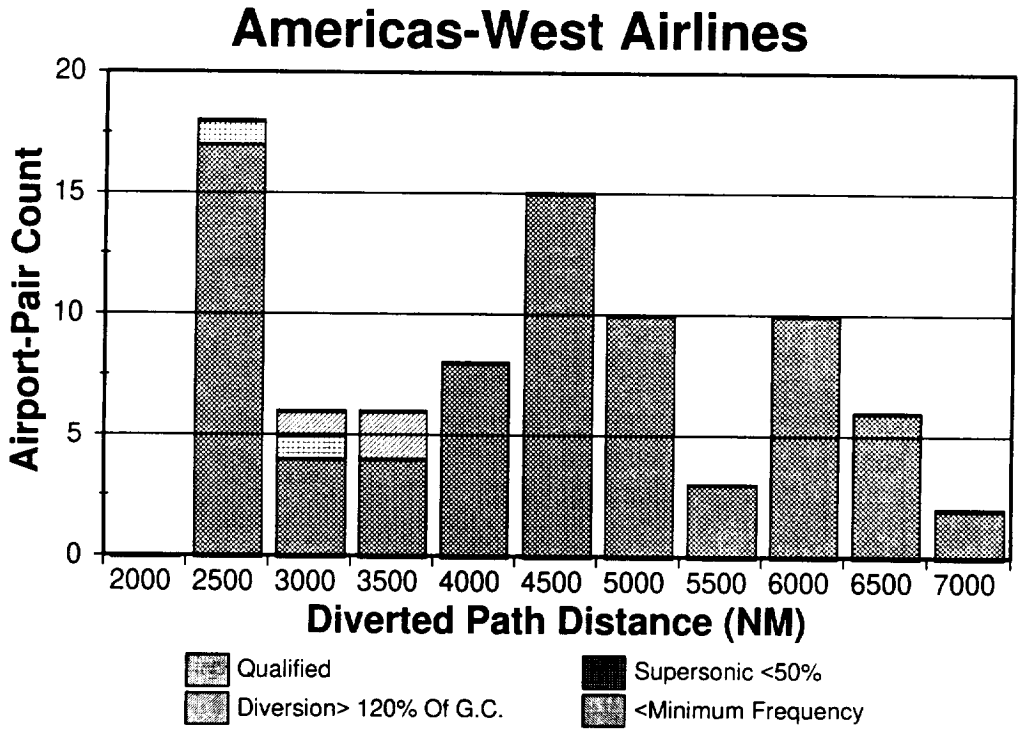


Figure 6. City Pair screening results for Americas-West Airlines.

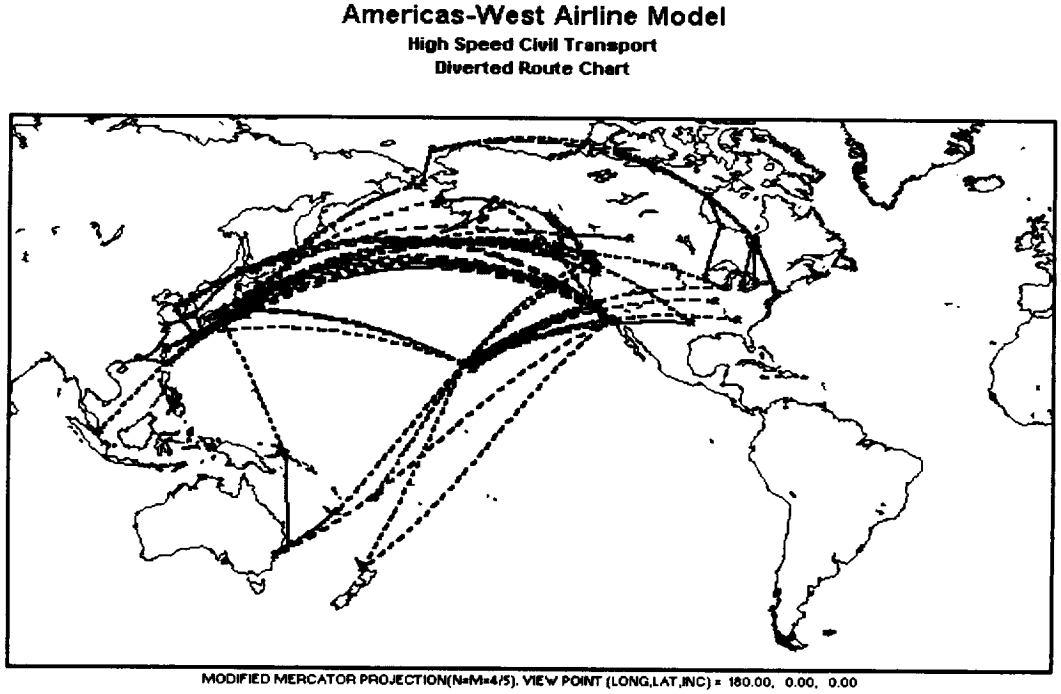


Figure 7. Network map for Americas-West Airlines route structures.

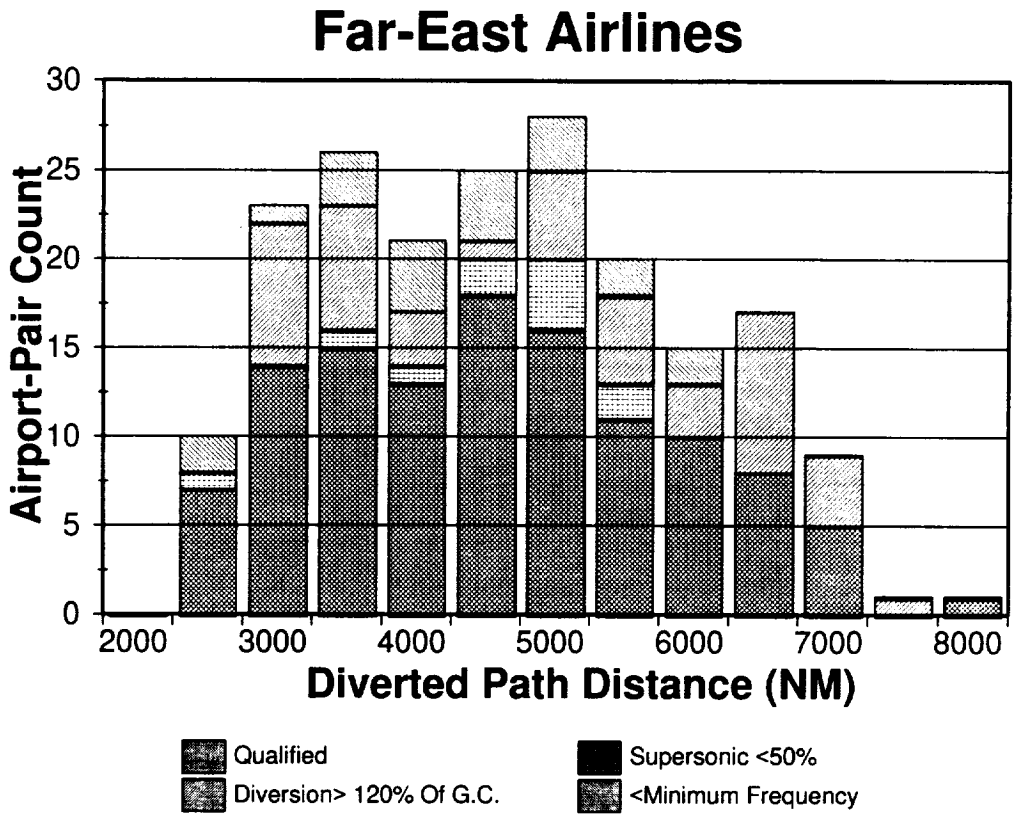


Figure 8. City Pair screening results for Far East Airlines.

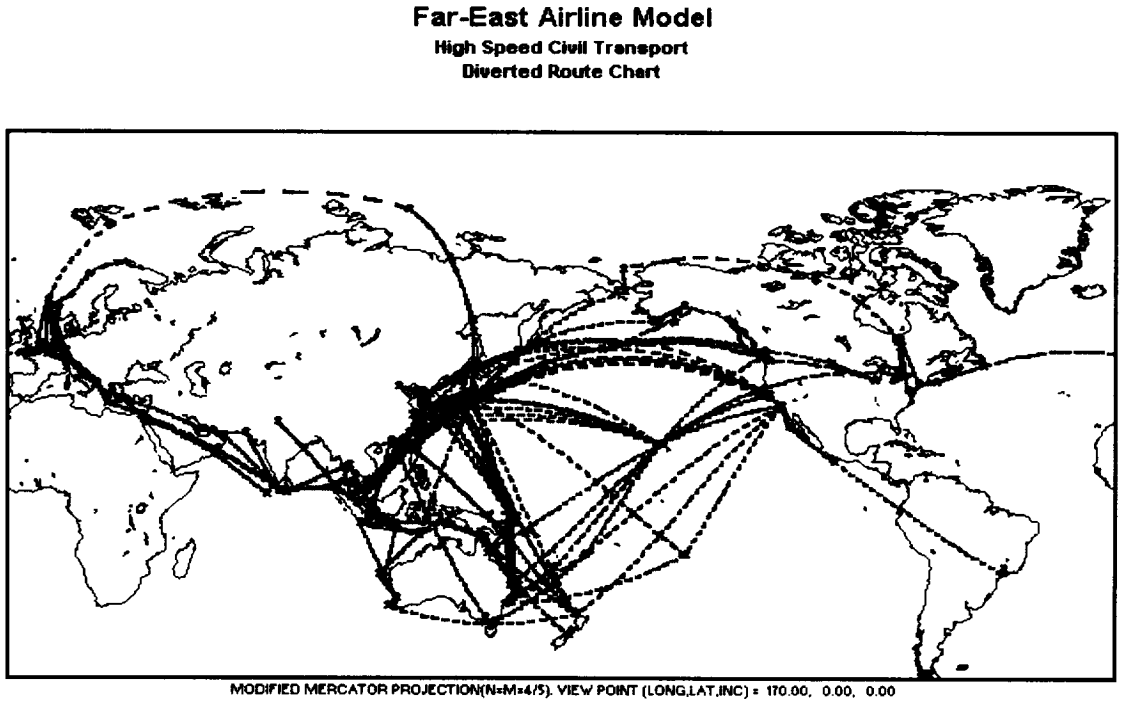


Figure 9. Network map for Far East Airlines route structures.

2.3 *Traffic Demand Forecast*

Each route in the network operates within an IATA international traffic region. The regional traffic forecast, previously developed jointly by MDC (MDC, 1991, Reference 3) and BACG, established the growth rate for total scheduled air traffic for each one of the defined regions.

Table 2. Growth Rates in Scheduled Passenger Demand Determined by Boeing and McDonnell Douglas

Emission Study Scheduled Passenger Demand Growth Rates

	Passenger Demand Growth Rate Percentage									
	McDonnell-Douglas			Boeing			"Common" Rates*			
From (Year)	1990	2000	2005	1990	2000	2005	1990	2000	2005	2010
To (Year)	2000	2005	2010	2000	2005	2010	2000	2005	2010	2015
Region:										
North America - Europe	5.00	4.10	4.00	5.10	4.30	4.20	5.00	4.20	4.10	4.00
North America - Asia	11.70	10.20	10.00	8.50	7.40	7.20	10.10	8.80	8.60	8.00
North America - Latin America	6.60	5.20	5.20	6.50	5.00	5.00	6.60	5.10	5.10	5.00
Europe - Asia	8.40	7.40	6.90	8.80	7.80	7.30	8.60	7.60	7.10	7.00
Intra Asia	10.70	9.60	9.20	8.10	7.20	7.00	9.40	8.40	8.10	8.00

*Common rates refer to the commonly agreed upon passenger demand developed jointly by Boein McDonnell Douglas.

Table 2 shows growth rates of scheduled passenger demand as determined by Boeing and McDonnell Douglas. In the previous 1993 AESA HSCT emission database study data regarding growth rate forecasts were exchanged between the two companies and a single growth scenario was devised which resulted in a common forecast for passenger demand. Using the same growth rates will assure consistency with the previous study and will allow comparable analysis of the current and the previous database.

2.4 *Supersonic And Subsonic Fleets.*

Because of the HSCT operational constraints and higher operating costs, ticket prices higher than subsonic's service may be needed to offer an attractive investment to the airlines. There is however, a practical limit as potential passengers will weigh supersonic merits in terms of time savings against ticket cost. McDonnell Douglas has developed a proprietary supersonic market capture model to identify these limits. Passenger value of time, fare premiums, and blocktime differences between the HSCT and the competing subsonic airplane interact with market share. The resulting output shows the fraction of the forecast traffic that is expected to be captured by the HSCT. The complementary traffic is carved by the subsonic fleet. The assumptions underlying market share calculations are as follows:

- Trip time savings reflect, HSCT specifications, route characteristics, operational constraints, and non-stop, one stop preferences.
- A traveler will be an HSCT passenger if the monetary value of the time savings exceed the fare premium.

These assumptions are applied to all city pairs in the simulated airlines traffic model with the fare premiums varying from zero to fifty percent.

The supersonic market capture model has the capability to examine the modal split parametrically. Network size, fleet size, and other related operational statistics can be examined as a function of traffic modal split. A supersonic traffic capture-ratio, which can vary from 100% supersonic down to 0% for all subsonic, is the modal split data entry to the model. Subsonic fleets and supersonic fleets for HSCT configurations of Mach 1.6, 2.0, and 2.4 were parametrically evaluated over the full spectrum of possible traffic capture ratios. For 100% capture-ratio, the HSCT Airline Network can support fleet sizes of 1553 of Mach 2.4 units, 1723 Mach 2.0 units and 1889 Mach 1.6 units. Results of the parametric approach are summarized in Figure 10 and Table 3.

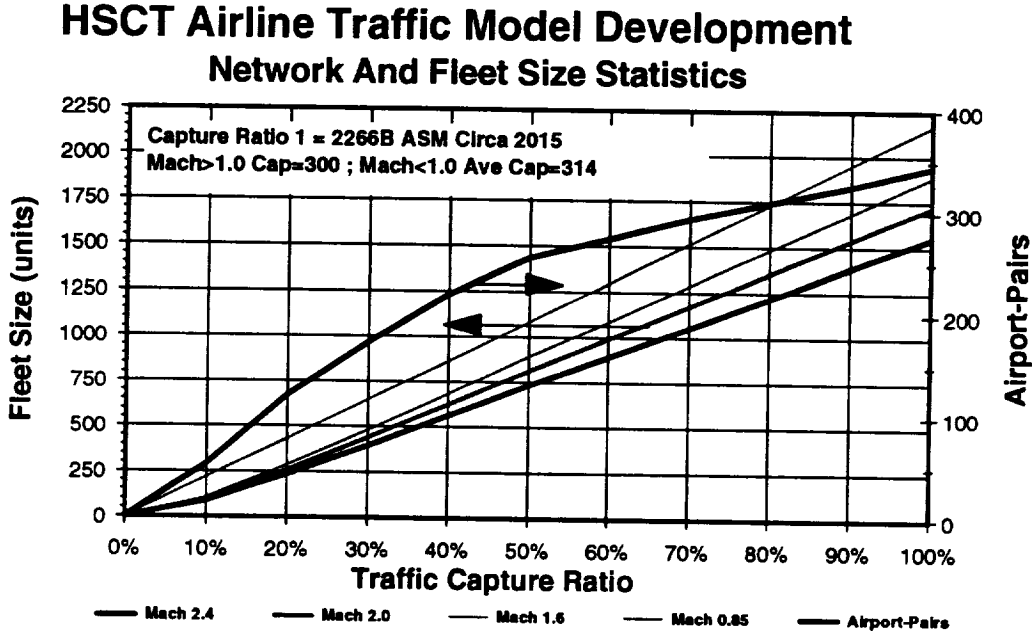


Figure 10. HSCT Network - Network and Fleet Size Statistics

		Number Of		Mach 2.4 Required A/C Units		Mach2.0 Required A/C Units		Mach 1.6 Required A/C Units		Mach 0.85 Required Units
Capture Ratio	Annual ASM(9)	Airports	Airport Pairs	GC	DVRTO	GC	DVRTO	GC	DVRTO	GC
0%	0	0	0	0	0	0	0	0	0	0
10%	130094	32	52	96	86	105	96	111	106	217
20%	349013	58	120	263	236	287	262	304	288	434
30%	581501	76	172	442	396	482	396	509	482	651
40%	827308	91	219	631	565	689	565	726	687	868
50%	1072834	98	255	821	734	896	734	944	893	1085
60%	1308003	103	274	1002	895	1093	895	1151	1088	1302
70%	1548015	106	294	1187	1059	1295	1059	1363	1288	1518
80%	1783192	113	310	1369	1221	1493	1221	1571	1485	1735
90%	2022190	119	326	1555	1386	1695	1386	1783	1685	1952
100%	2265611	124	345	1743	1553	1900	1553	1999	1889	2169

Table 3. HSCT Airline Traffic Model Development circa 2015

The results of applying the supersonic market capture model on the four regional airlines produced an averaged market capture of 70% for HSCT by year 2015. By referring to Table 3, we can identify the following fleet requirements:

Mach 2.4	1059 units
Mach 2.0	1175 units
Mach 1.6	1288 units

The distributions of traffic among the regional airlines in the 100% and 40% capture HSCT networks are shown in Figure 11.

2.5 HSCT Production Rate

Previous fleet projections were based on forecasted level of traffic by the year 2015. This raises some doubts about the ability of aircraft manufacturers to produce over a thousand HSCT units within such time frame. In previous NASA studies on engine selection, both Boeing and McDonnell Douglas have reached consensus on the HSCT production schedule that depicted in Table 4.

	"Low Scenario"		"High Scenario"	
Year	Units per Year	Cum Units	"Unit per Year	Cum Units
1	12	12	12	12
2	24	36	36	48
3	36	72	60	108
4	36	108	96	204
5	36	144	96	300
6	36	180	96	396
7	36	216	96	492
8	36	252	96	588
9	36	288	96	684
10	36	324	96	780
11	24	348	96	876
12	24	372	96	972
13	24	396	96	1068
14	24	420	96	1164
15	24	444	96	1260
16	24	468	96	1356
17	24	492	96	1452
18	24	516	96	1548
19	24	540	96	1644
20	24	564	96	1740
21	24	588	96	1836
22	24	612	96	1932
23	24	636	96	2028
24	24	660	96	2124
25	24	684	96	2220

Table 4 HSCT Production Schedule Scenarios

The table shows a low scenario that would represent an HSCT program that is marginally able to sustain itself, and a high scenario that would reflect an optimistic market for HSCT. Using the same production schedules, assuming that MDC took the average of the low and high scenarios for the tenth year of production to be the realistic fleet size that the aircraft manufacturers may be able to produce by year 2015. This average amounted to 552 units. By referring to Table 3 we can identify the nearest HSCT market capture

associated with approximate fleet size to be 40 percent. At this level of market capture, HSCT fleet requirement that are based on production schedules are as follows.

Mach 2.4	565
Mach 2.0	627
Mach 1.6	687

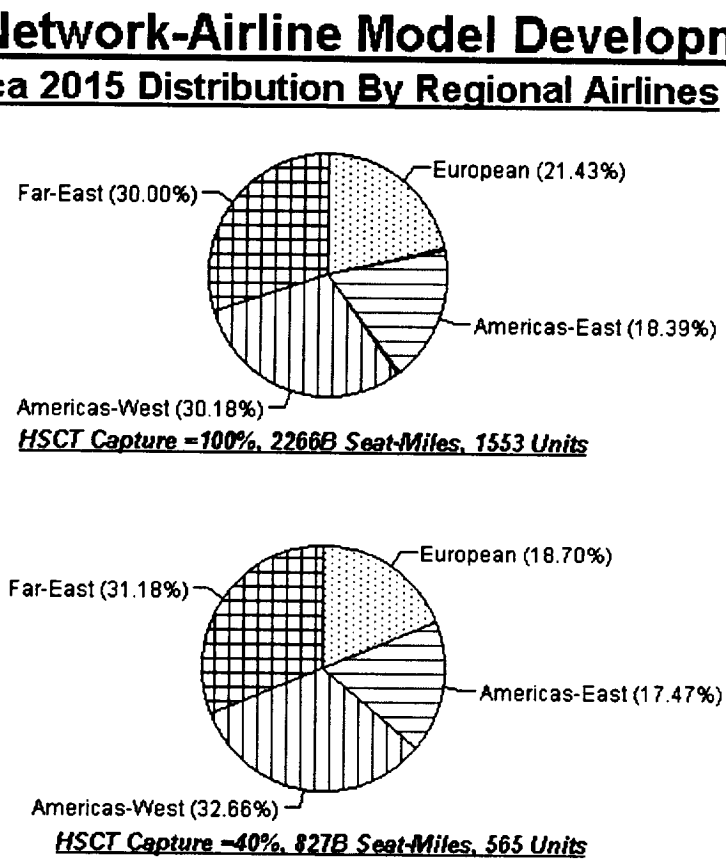


Figure 11. HSCT Network - Circa 2015 Distribution by Regional Airline

As shown in Figure 12, based on curfew and minimum interval between operations per runway, the 10 top ranked airports by operations, are tagged as marginal by the 100% HSCT Network, and only 3 by the 40% HSCT Network. However, with the exception of Singapore, all other 9 airports have more than one runway. Any problems of this nature can be resolved by detailed scheduling and selective rerouting of routes with technical stops to alternate less congested stop points.

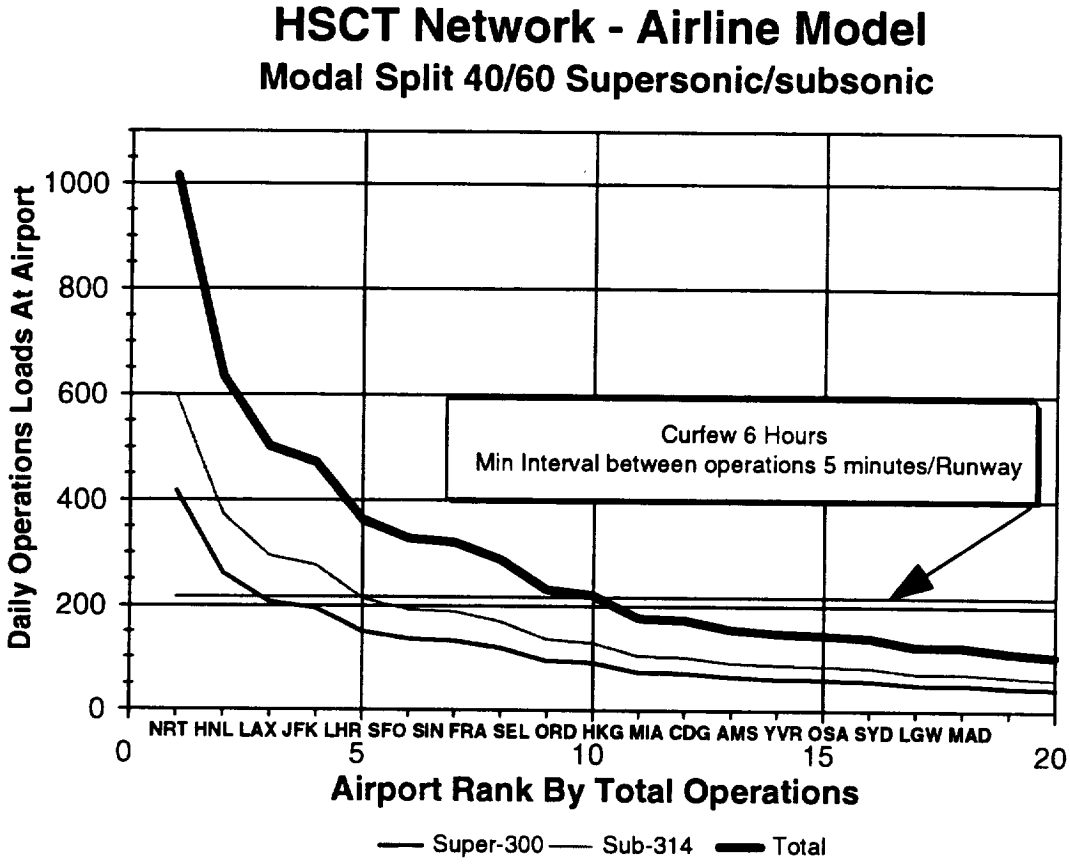


Figure 12. HSCT Network - Modal Split 40/60 Supersonic/subsonic

3.0 HSCT AIR TRAFFIC COMPONENT EMISSIONS USING THE CONCEPTUAL AIRCRAFT

The development of global, three dimensional grid fuel burn and engine exhaust emissions levels estimates representing three conceptual HSCT designs (Mach 1.6, Mach 2.0 and Mach 2.4) operating on a year 2015 supersonic commercial scheduled air traffic networks are described in this section.

3.1 Aircraft Definition and Engine Exhaust Emission Indices

Previous HSCT design optimization studies developed the Mach 1.6 and Mach 2.4 aircraft configurations shown in Figure 14 and Figure 15 respectively (Mach 2.0 having the same configuration as the Mach 2.4 (Boeing, 1995, Reference 4). Table 5 presents HSCT aircraft characteristics for these study aircraft. The 300 seat aircraft has a design range of 9260 km (5000 nm) when flown a maximum of 15% over land at subsonic speeds. Both Pratt & Whitney and General Electric provided performance and emissions data for each Mach configuration (United Technologies, 1992, Reference 5, and Baughcum, 1993, Reference 6). Predicted engine and airframe performance, adjusted for engine installation and operational effects, were integrated with the airframe design to determine the final HSCT performance predictions. Table 6 provides the individual Emission Indices (EI) per altitude band that were used for each of these configurations.

	Mach 1.6	Mach 2.0	Mach 2.4
Model Number	1.6-6	1080-924	1080-938
Engine	PW ST1015	PW STJ989	PW STJ1016
Range (NM)	5000	5000	5000
Passengers	300	309	309
Design Payload (lbs)	61500	64,890	64,890
Max. Takeoff Weight (lbs)	785661	784,608	802,872
Wing Span (ft)	148	139	140
Wing Area (sq. ft.)	8670	8180	8260

Table 5 Summary of HSCT aircraft characteristics for Mach 1.6, 2.0, and 2.4.

3.2 HSCT Flight Profiles

The HSCT flight profile developed for each route depends on whether the flight path takes the aircraft over land. In the simplest case where the flight path is almost entirely over water (with the exception being a short distance from the airport to the coast as is the case from Los Angeles to Honolulu), the HSCT would take off, climb subsonically, then supersonically climb to its optimum supersonic cruise altitude. The optimum cruise

altitude is a function of the aircraft gross weight and increases over the flight route as fuel is consumed. At the destination end of the route, the HSCT may supersonically descend, then subsonically descend, approach, and land. Figure 13 depicts two somewhat more complex flight plans. The first flight plan, Honolulu to Chicago in which the HSCT would take off, climb subsonically and then supersonically climb to its optimum altitude prior to encountering the continental US. At that point a supersonic descent is begun to place it in subsonic flight at landfall. A subsonic cruise climb then would proceed until landing at Chicago.. The second route, San Francisco to Paris, provides the HSCT taking off, climbing out to initial subsonic cruise, then cruise climbing to an optimum subsonic cruise altitude until landfall is exited. A supersonic climb is then initiated until initial sonic cruise altitude is reached. The remaining sonic portion of the route is at cruise climb. A sonic descent, followed furthered by subsonic descent is initiated prior to encountering European landfall.

Altitude	NOX Emission Index (g NOX /Kg Fuel)			CO Emission Index (g CO/Kg Fuel)			THC Emission Index (g THC/Kg Fuel)		
Band (km)	Mach 1.6	Mach 2.0	Mach 2.4	Mach 1.6	Mach 2.0	Mach 2.4	Mach 1.6	Mach 2.0	Mach 2.4
0-1	3.4	7.3	7.0	2.9	11.8	12.1	0.3	1.2	1.2
1-2	3.4	7.9	8.0	2.9	3.5	4.0	0.3	0.6	0.6
2-3	3.4	7.4	8.1	2.9	3.5	4.0	0.3	0.6	0.5
3-4	3.4	7.4	8.1	2.9	3.5	4.0	0.3	0.6	0.5
4-5	4.0	7.4	8.1	2.9	3.5	4.0	0.3	0.6	0.5
5-6	4.0	7.4	8.1	2.9	3.5	4.0	0.3	0.6	0.5
6-7	3.4	7.4	8.1	2.9	3.5	4.0	0.3	0.6	0.5
7-8	3.4	7.4	8.1	2.9	3.5	4.0	0.3	0.6	0.5
8-9	3.4	7.4	8.1	2.9	3.5	4.0	0.3	0.6	0.5
9-10	3.4	7.1	8.2	2.9	3.1	3.2	0.3	0.4	0.4
10-11	3.7	7.3	8.2	2.9	2.6	2.0	0.3	0.4	0.3
11-12	3.8	7.4	8.2	2.9	2.2	2.0	0.3	0.4	0.3
12-13	3.8	7.4	8.2	2.9	2.2	2.0	0.3	0.4	0.3
13-14	3.8	8.1	8.2	2.9	0.6	2.0	0.3	0.3	0.3
14-15	3.8	8.1	8.3	2.9	0.6	0.8	0.3	0.3	0.3
15-16	5.0	5.7	8.3	2.9	2.5	0.8	0.3	0.3	0.3
16-17	5.0	5.7	8.3	2.9	2.5	0.8	0.3	0.3	0.3
17-18	5.0	5.3	8.3	2.9	2.9	0.8	0.3	0.3	0.3
18-19	5.0	5.3	5.7	2.9	2.9	2.1	0.3	0.3	0.3
19-20	5.0	5.3	5.0	2.9	2.9	2.5	0.3	0.3	0.2
20-21	5.0	5.3	5.0	2.9	2.9	2.1	0.3	0.3	0.2

Table 6 HSCT Simulated Airline EI Indices - Mach 1.6, Mach 2.0, and Mach 2.4

Assumed restrictions on supersonic flight over land required either the great circle route be diverted to fly a flight path exclusively over water, as above, or the HSCT fly subsonically while over land. Depending on the number and ordering of the over land flight segments, the HSCT could execute a series of climbs and descents to reach cruise altitudes. Because of the high fuel consumption rate during supersonic climb, the flight paths MDC developed for the HSCT network contain at most one subsonic over land

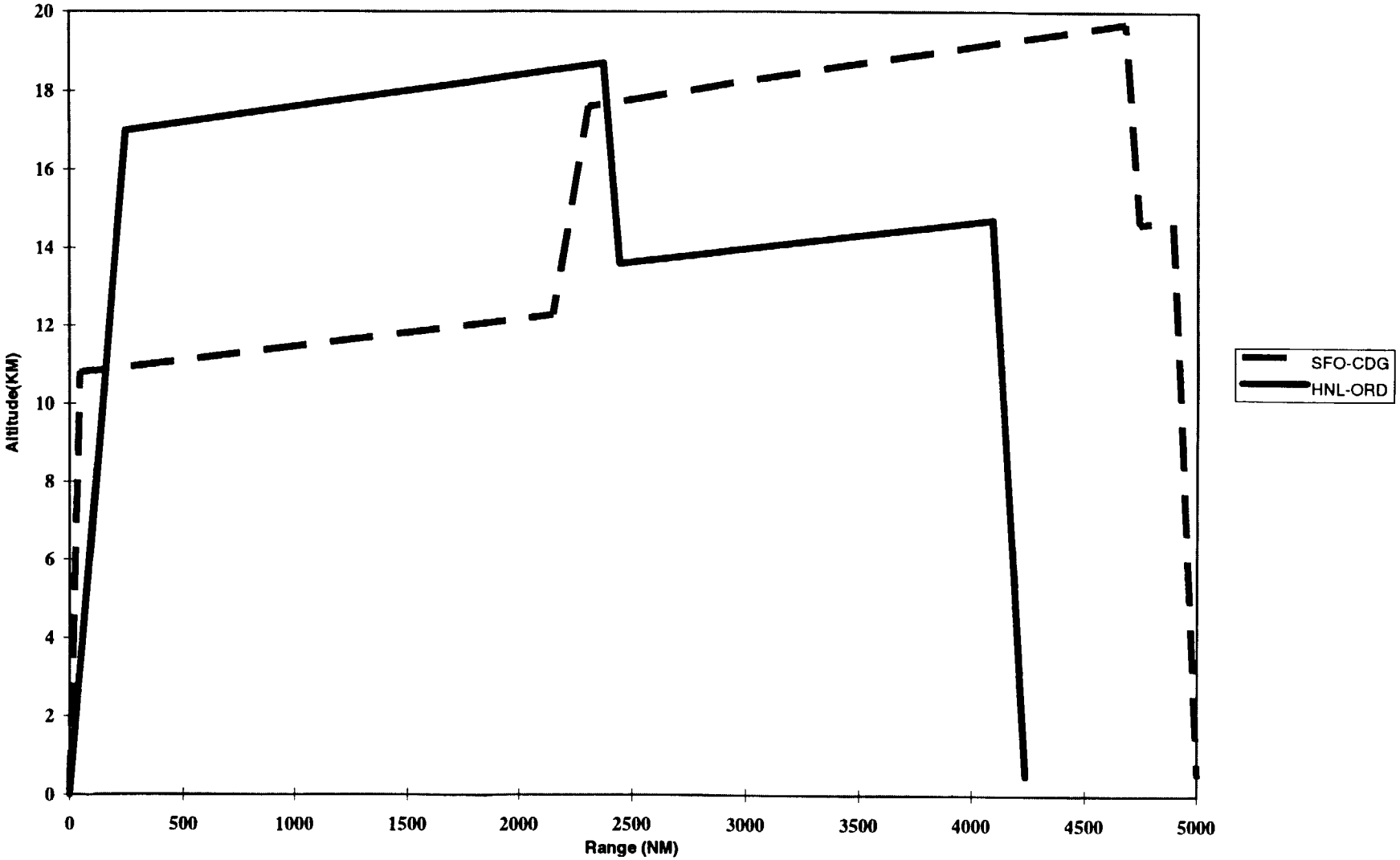


Figure 13 Representative HSCT Flight Profiles -Honolulu/Chicago and San Fransico/Paris

segment between the initial and final supersonic flight segments. In most cases, however, route diversion was able to avoid the situation where a route contained an intermediate over land segment. Corridors allowing supersonic flight over land were not considered in creating the flight paths.

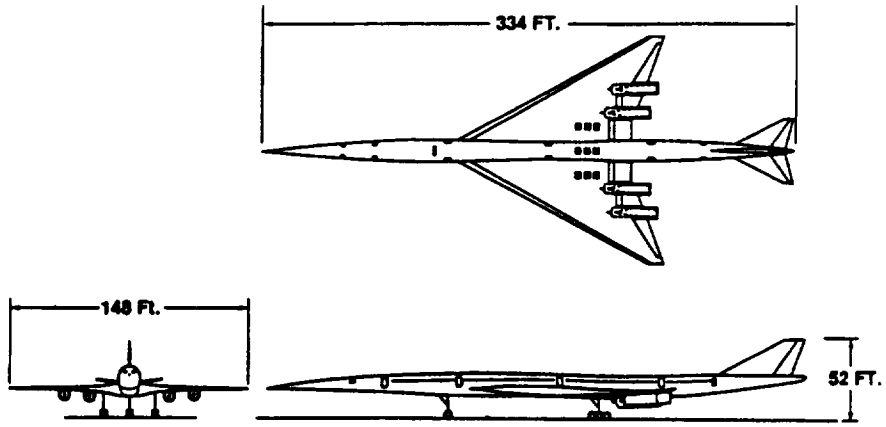


Figure 14. Configuration for a Mach 1.6 HSCT from design optimization studies at McDonnell Douglas.

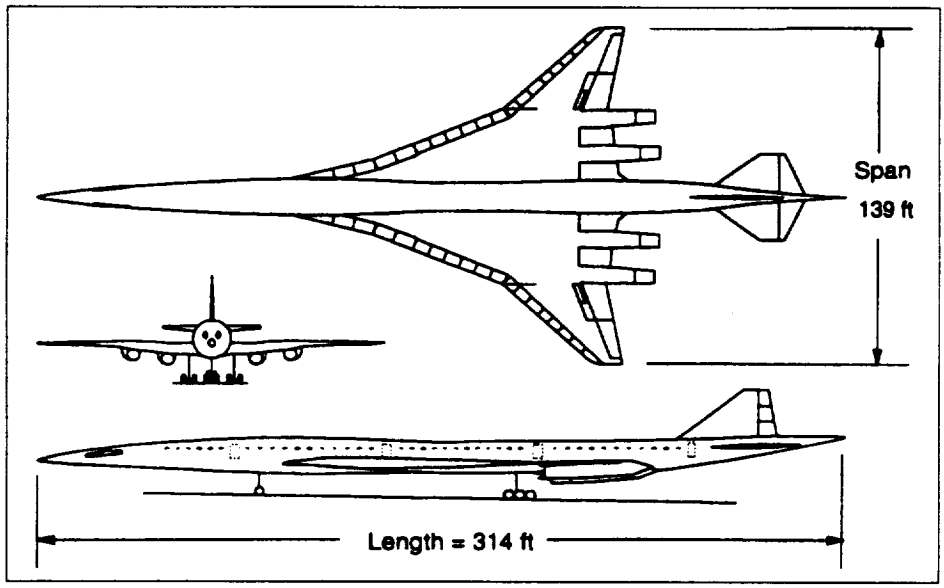


Figure 15. Configuration for a Mach 2.4 /Mach 2.0 HSCT from design optimization studies at Boeing Commercial Aircraft Group.

3.3 Grid Generation

Generating the grid is a two-step process that first allocates fuel consumption estimates to individual grid cells and subsequently multiplies the fuel burn estimate by the appropriate emission index.

Annual fuel consumption estimates are resolved into a global three-dimensional grid, one degree latitude by one degree longitude by one kilometer altitude, for each unique route/aircraft combination after summarizing the mission profile into a position, distance, time, fuel, and altitude data set. Each great circle flight segment traverses one or more grid cells. The fuel consumed on any flight segment is linearly allocated by distance, to the grid cells the segment traverses.

Next, each active grid cell's fuel burn estimate (a grid element is active if its fuel burn figure is positive) is supplemented with estimates of engine exhaust emissions levels by multiplying the fuel burn estimate by the appropriate constituent EI (Ward, 1993, Reference 7). The grid generation process occurs for each unique aircraft represented in the component. The resultant grids are then summed by cell to produce an aggregate grid. This aggregate grid is the component's emission database.

3.4 HSCT Simulated Airline Model Fuel Burn Profile Comparisons

Comparisons of fuel burn profiles for individual simulated airline supporting producible (40%) and upper limit (70%) fleet sizes, are provided in Table 7, Table 8 and Table 9 for each HSCT conceptual aircraft. Variations in cumulative percentage of fuel burn within an altitude band are not significant for a common Mach number. A significant observation is the combination of Far Eastern and America West airlines, both of which service the Pacific Rim, represent approximately 65% of the total fuel burn. Further comparisons of fuel burn as a function of both geographic and altitude are presented in Appendix D. Since variations among a common Mach number are not significant only the Mach 2.4 comparisons are provided.

3.4.1 Mach 1.6 Configuration. Fuel Burn and Exhaust Emission Estimates

Table 10 presents the Mach 1.6 HSCT scheduled air traffic component annualized fuel burn and engine exhaust emission estimates for the upper limit of HSCT producibility in the year 2015 (70% of candidate HSCT traffic capture, 1288 units). The NOX emission levels and effective EI(NOX) are for the case where the nominal EI(NOX)=5 during supersonic cruise flight conditions. The emission estimates and effective EI(NOX) for the cases where the nominal EI(NOX)=10 and EI(NOX)=15 at supersonic cruise can be derived by scaling-up the shown values by a factor of two or three, respectively. The minimum emission case, for fleet size parametric assessment, is provided in Table 11, and represents the projected producible HSCT fleet in 2015 (40% of candidate HSCT traffic capture, 687 units).

Altitude Band (km)	CUMULATIVE PERCENT OF TOTAL FUEL							
	America East		America West		European		Far Eastern	
	40 %	70 %	40 %	70 %	40 %	70 %	40 %	70 %
0-1	1.0	1.0	1.1	1.1	1.1	1.0	1.1	1.0
1-2	2.0	2.0	2.1	2.1	2.2	1.9	2.1	2.0
2-3	3.0	3.0	3.2	3.2	3.3	2.9	3.2	3.1
3-4	4.0	4.0	4.2	4.2	4.3	3.8	4.2	4.1
4-5	5.0	5.0	5.3	5.3	5.3	4.8	5.3	5.1
5-6	6.0	5.9	6.3	6.3	6.3	5.8	6.4	6.1
6-7	7.0	6.9	7.4	7.4	7.3	6.7	7.4	7.2
7-8	8.0	7.9	8.5	8.5	8.3	7.7	8.5	8.2
8-9	9.0	8.9	10.1	10.1	9.6	9.0	9.7	9.7
9-10	10.9	10.8	12.4	12.4	11.6	11.4	11.6	11.7
10-11	15.8	15.5	13.9	13.9	16.0	16.3	13.9	14.6
11-12	18.7	18.4	16.6	16.6	19.1	19.4	15.8	16.8
12-13	24.3	23.5	19.8	19.8	22.9	23.7	18.2	19.5
13-14	28.6	27.8	25.3	25.3	28.5	30.1	23.7	25.8
14-15	35.6	34.5	39.2	39.1	38.2	39.8	34.5	38.5
15-16	57.2	55.8	58.9	58.9	58.0	60.1	55.7	58.9
16-17	84.4	83.3	81.4	81.4	82.5	84.3	81.0	82.3
17-18	99.2	99.2	98.6	98.6	99.1	99.2	98.6	98.7
18-19	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Fuel (kg x 10E9)	9.7	23.0	26.9	47.1	8.3	28.9	17.2	46.4

Table 7. Mach 1.6 Simulated Airlines Fuel Burn Profile Comparisons

Altitude Band (km)	CUMULATIVE PERCENT OF TOTAL FUEL							
	America East		America West		European		Far Eastern	
	40 %	70 %	40 %	70 %	40 %	70 %	40 %	70 %
0-1	1.2	1.2	1.3	1.3	1.2	1.1	1.2	1.2
1-2	2.4	2.5	2.6	2.6	2.5	2.4	2.6	2.5
2-3	3.7	3.8	4.0	4.0	3.8	3.6	3.9	3.8
3-4	5.0	5.1	5.3	5.3	5.1	4.8	5.3	5.1
4-5	6.3	6.5	6.7	6.7	6.5	6.1	6.6	6.4
5-6	7.6	7.8	8.1	8.1	7.8	7.3	7.9	7.7
6-7	8.9	9.1	9.4	9.4	9.1	8.6	9.3	9.0
7-8	10.2	10.5	11.1	11.1	10.7	10.1	10.8	10.6
8-9	12.3	12.5	13.7	13.7	12.8	12.4	12.7	12.8
9-10	16.9	16.7	15.4	15.4	16.1	16.5	14.9	15.4
10-11	19.9	19.6	17.3	17.3	18.9	19.7	17.0	17.5
11-12	23.8	23.3	19.4	19.4	21.6	23.0	19.0	19.5
12-13	28.9	28.0	21.7	21.7	25.0	26.7	21.1	21.6
13-14	30.7	30.0	23.2	23.2	26.8	28.6	22.6	23.2
14-15	32.6	32.0	25.3	25.3	29.3	31.2	24.7	25.7
15-16	35.1	34.4	31.3	31.3	33.3	36.6	30.3	32.1
16-17	42.3	41.4	45.1	45.1	40.8	46.2	41.0	44.3
17-18	65.3	64.2	64.5	64.5	62.1	67.3	62.0	64.6
18-19	89.4	88.8	86.3	86.3	87.1	89.2	85.8	86.7
19-20	99.7	99.7	99.5	99.5	99.7	99.7	99.5	99.5
20-21	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Fuel (kg x 10E9)	10.5	23.3	27.0	47.2	11.5	28.9	17.7	46.8

Table 8 Mach 2. 0 Simulated Airlines Fuel Burn Profile Comparisons

	CUMULATIVE PERCENT OF TOTAL FUEL							
Altitude	America East		America West		European		Far Eastern	
Band (km)	40 %	70 %	40 %	70 %	40 %	70 %	40 %	70 %
0-1	1.6	1.6	1.9	1.9	1.5	1.5	1.8	1.8
1-2	3.3	3.4	3.9	3.9	3.1	3.1	3.8	3.7
2-3	5.1	5.2	5.9	5.9	4.8	4.6	5.7	5.6
3-4	6.8	7.0	8.0	7.9	6.4	6.2	7.6	7.5
4-5	8.5	8.7	10.0	9.9	8.0	7.8	9.6	9.4
5-6	10.3	10.5	12.0	11.9	9.6	9.4	11.5	11.3
6-7	12.0	12.0	14.0	13.9	11.3	11.1	13.5	13.2
7-8	13.7	13.7	16.4	16.3	13.2	12.9	15.7	15.5
8-9	16.6	16.6	19.6	19.5	15.9	15.8	18.1	18.4
9-10	21.2	21.2	22.0	21.9	19.7	20.3	20.9	21.5
10-11	23.4	24.7	24.6	24.5	23.3	24.3	23.6	24.4
11-12	26.7	28.2	27.4	27.3	26.5	28.0	26.1	27.0
12-13	31.8	33.2	30.3	30.3	30.4	32.2	28.9	29.7
13-14	33.8	35.3	32.5	32.4	32.4	34.3	31.0	31.9
14-15	35.9	37.4	34.6	34.5	34.5	36.5	33.1	34.0
15-16	37.9	39.5	36.8	36.7	37.1	39.0	35.3	36.6
16-17	40.1	41.7	40.1	40.0	40.6	43.3	39.2	40.9
17-18	49.7	47.2	49.8	49.6	47.5	51.0	47.3	49.7
18-19	71.4	66.6	65.9	65.6	63.7	66.8	62.5	65.3
19-20	91.6	89.9	85.7	85.6	87.4	88.5	84.8	86.0
20-21	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Fuel (kg x 10E9)	15.6	29.2	28.2	49.9	10.6	29.8	18.5	49.4

Table 9 Mach 2.4 Simulated Airlines Fuel Burn Profile Comparisons

Fuel burn and engine exhaust emission levels are concentrated between 15 km and 18 km altitude corresponding to the altitude bands where supersonic cruise occurs. Secondary peaks, roughly one order of magnitude less than the peak value, occur in the 11-13 km altitude band and 12-13 km altitude band, respectively. Figures 16 and 17 provide the fuel burn distribution as a function of latitude and altitude for the Mach 1.6 40% fleet and 70 % fleets respectively. Fuel burn is predominately concentrated in the higher altitudes of the northern latitudes. Figure 18 and Figure 19, provide total global Mach 1.6 fuel distributions on a geographic basis (Figures 18 and 19 representing the 40% and 70% fleet size case respectively) These figures indicate routing is predominately in the Northern Hemisphere, hence the concentrations in the higher altitudes

3.4.2 Mach 2.0 Configuration Fuel Burn and Exhaust Emission Estimates

Tables 12 and 13, representing a Mach 2.0 configuration, provide similar fuel burn and exhaust emission estimate data. Table 12 presents the Mach 2.0 HSCT scheduled air traffic component annualized fuel burn and engine exhaust emission estimates for the upper limit of HSCT producibility in the year 2015 (70% of candidate HSCT traffic capture, 1175 units). The NOX emission levels and effective EI(NOX) are for the case where the nominal EI(NOX)=5 during supersonic cruise flight conditions. The emission estimates and effective EI(NOX) for the cases where the nominal EI(NOX)=10 and EI(NOX)=15 at supersonic cruise can be derived by scaling-up the shown values by a factor of two or three, respectively. Table 13 provides similar engine exhaust emission data for the parametric assessment of fleet size impact. Table 13, the minimum emission case, represents the projected producible HSCT 2015 fleet (40% of candidate HSCT traffic capture, 627 units).

Fuel burn and engine exhaust emission levels are concentrated between 17 km and 19 km altitude corresponding to the altitude bands where supersonic cruise occurs. Secondary peaks, roughly one order of magnitude less than the peak value, occur in the 11-13 km altitude band. Figures 20 and 21 provide the fuel burn distribution as a function of latitude and altitude for the Mach 2.0 40% fleet and 70 % fleets respectively. Fuel burn is predominately concentrated in the higher altitudes of the northern latitudes. Figure 22 and Figure 23, provide total global Mach 2.0 fuel distributions on a geographic basis (Figures 22 and 23 representing the 40% and 70% fleet size case respectively) .

3.4.3 Mach 2.4 Configuration Fuel Burn and Exhaust Emission Estimates

Tables 14 and 15, representing a Mach 2.4 configuration, provide similar fuel burn and exhaust emission estimate data. Table 14 presents the Mach 2.4 HSCT scheduled air traffic component annualized fuel burn and engine exhaust emission estimates for the upper limit of HSCT producibility in the year 2015 (70% of candidate HSCT traffic capture, 1059 units). The NOX emission levels and effective EI(NOX) are for the case where the nominal EI(NOX)=5 during supersonic cruise flight conditions. The emission estimates and effective EI(NOX) for the cases where the nominal EI(NOX)=10 and

EI(NOX)=15 at supersonic cruise can be derived by scaling-up the shown values by a factor of two or three, respectively. Table 15 provide similar engine exhaust emission data for the parametric assessment of fleet size impact. The minimum emission is provided in Table 15, represents the producible HSCT 2015 fleet (40% of candidate HSCT traffic capture, 565 units).

Fuel burn and engine exhaust emission levels are concentrated between 18 km and 20 km altitude corresponding to the altitude bands where supersonic cruise occurs. Secondary peaks, roughly one order of magnitude less than the peak value, occur in the 11-13 km altitude band. Figures 24 and 25 provide the fuel burn distribution as a function of latitude and altitude for the Mach 2.0 40% fleet and 70 % fleets respectively. Fuel burn is predominately concentrated in the higher altitudes of the northern latitudes. Figure 26 and Figure 27, provide total global Mach 2.0 fuel distributions on a geographic basis (Figures 26 and 27 representing the 40% and 70% fleet size case respectively) .

Altitude Band (km)	Fuel ($kg \times 10^9$)	Cumulative Fuel	NO_X[a] ($g \times 10^9$)	Cumulative NO_X	CO ($g \times 10^9$)	Cumulative CO	HC ($g \times 10^9$)	Cumulative HC
0-1	1.47	1.0%	5.00	0.7%	4.27	1.0%	0.44	1.0%
1-2	1.47	2.0%	5.02	1.5%	4.28	2.0%	0.44	2.0%
2-3	1.48	3.1%	5.03	2.3%	4.29	3.0%	0.44	3.0%
3-4	1.48	4.1%	5.03	3.0%	4.29	4.0%	0.44	4.0%
4-5	1.48	5.1%	5.92	3.9%	4.29	5.0%	0.44	5.0%
5-6	1.48	6.1%	5.92	4.8%	4.29	6.1%	0.44	6.1%
6-7	1.48	7.1%	5.03	5.6%	4.29	7.1%	0.44	7.1%
7-8	1.49	8.1%	5.07	6.4%	4.33	8.1%	0.45	8.1%
8-9	2.08	9.6%	7.06	7.5%	6.02	9.5%	0.62	9.5%
9-10	3.12	11.7%	10.61	9.1%	9.05	11.7%	0.94	11.7%
10-11	4.53	14.8%	16.78	11.6%	13.15	14.8%	1.36	14.8%
11-12	3.89	17.5%	14.79	13.9%	11.29	17.5%	1.17	17.5%
12-13	5.18	21.1%	19.67	16.9%	15.01	21.0%	1.55	21.0%
13-14	8.30	26.8%	31.53	21.7%	24.06	26.7%	2.49	26.7%
14-15	16.76	38.3%	63.71	31.4%	48.61	38.3%	5.03	38.3%
15-16	29.58	58.7%	147.89	54.0%	85.78	58.6%	8.87	58.6%
16-17	34.79	82.6%	173.97	80.6%	100.90	82.5%	10.44	82.5%
17-18	23.63	98.8%	118.16	98.7%	68.54	98.8%	7.09	98.8%
18-19	1.69	100.0%	8.47	100.0%	4.91	100.0%	0.51	100.0%
Global Total	145.39		654.65		421.65		43.61	

[a] NO_X emission estimates and effective EI(NO_X) shown are for the case where the nominal EI(NO_X)=5 at supersonic cruise flight conditions. Emission levels and effective EI(NO_X) for nominal EI(NO_X)=10 and EI(NO_X)=15 can be derived by scaling-up the data by factors of 2 or 3, respectively.

Table 10. Mach 1.6 HSCT Simulated Airline Operations - Year 2015 Upper Limit Fleet Size Fuel Burn and Engine Exhaust Emission Estimates (1288 Units)

Altitude Band (km)	Fuel ($kg \times 10^9$)	Cumulative Fuel	NO_X[a] ($g \times 10^9$)	Cumulative NO_X	CO ($g \times 10^9$)	Cumulative CO	HC ($g \times 10^9$)	Cumulative HC
0-1	0.65	1.0%	2.21	0.7%	1.89	1.0%	0.20	1.0%
1-2	0.65	2.0%	2.22	1.5%	1.90	2.1%	0.20	2.0%
2-3	0.65	3.1%	2.22	2.3%	1.90	3.1%	0.20	3.0%
3-4	0.65	4.1%	2.21	3.0%	1.89	4.2%	0.20	4.0%
4-5	0.65	5.1%	2.58	3.9%	1.87	5.2%	0.19	5.0%
5-6	0.65	6.1%	2.58	4.8%	1.87	6.2%	0.19	6.1%
6-7	0.65	7.1%	2.20	5.6%	1.88	7.3%	0.19	7.1%
7-8	0.65	8.1%	2.20	6.4%	1.88	8.3%	0.19	8.1%
8-9	0.87	9.6%	2.95	7.5%	2.52	9.7%	0.26	9.5%
9-10	1.28	11.7%	4.36	9.1%	3.72	11.8%	0.38	11.7%
10-11	1.64	14.8%	6.05	11.6%	4.75	14.4%	0.49	14.8%
11-12	1.58	17.5%	6.00	13.9%	4.58	17.0%	0.47	17.5%
12-13	2.14	21.1%	8.12	16.9%	6.20	20.4%	0.64	21.0%
13-14	3.31	26.8%	12.59	21.7%	9.61	25.7%	0.99	26.7%
14-15	7.08	38.3%	26.89	31.4%	20.52	37.1%	2.12	38.3%
15-16	12.69	58.7%	63.46	54.0%	36.81	57.6%	3.81	58.6%
16-17	15.08	82.6%	75.42	80.6%	43.75	81.9%	4.52	82.5%
17-18	10.46	98.8%	52.30	98.7%	30.33	98.7%	3.14	98.8%
18-19	0.77	100.0%	3.87	100.0%	2.25	100.0%	0.23	100.0%
Global Total	62.10		280.43		180.03		18.62	

[a]NO_X emission estimates and effective EI(NO_X) shown are for the case where the nominal EI(NO_X)=5 at supersonic cruise flight conditions. Emission levels and effective EI(NO_X) for nominal EI(NO_X)=10 and EI(NO_X)=15 can be derived by scaling-up the data by factors of 2 or 3, respectively.

Table11. Mach 1.6 HSCT Simulated Airline Operations - Year 2015 Producible Fleet Size Fuel Burn and Engine Exhaust Emission Estimates (687 Units)

Altitude Band (km)	Fuel ($kg \times 10^9$)	Cumulative Fuel	NO_X[a] ($g \times 10^9$)	Cumulative NO_X	CO ($g \times 10^9$)	Cumulative CO	HC ($g \times 10^9$)	Cumulative HC
0-1	1.76	1.2%	12.88	1.4%	20.82	4.9%	2.11	4.0%
1-2	1.90	2.5%	15.03	3.2%	6.66	6.5%	1.14	6.2%
2-3	1.91	3.8%	14.10	4.8%	6.67	8.1%	1.14	8.4%
3-4	1.91	5.1%	14.12	6.4%	6.68	9.7%	1.14	10.6%
4-5	1.91	6.4%	14.13	8.0%	6.68	11.2%	1.15	12.8%
5-6	1.92	7.7%	14.17	9.6%	6.70	12.8%	1.15	15.0%
6-7	1.93	9.1%	14.30	11.3%	6.76	14.4%	1.16	17.2%
7-8	2.30	10.6%	17.04	13.2%	8.06	16.4%	1.38	19.9%
8-9	3.36	12.9%	24.88	16.1%	11.77	19.2%	2.02	23.7%
9-10	4.20	15.8%	29.83	19.5%	13.02	22.3%	1.68	27.0%
10-11	3.51	18.2%	25.63	22.4%	9.13	24.4%	1.40	29.7%
11-12	3.75	20.8%	27.81	25.6%	8.27	26.4%	1.50	32.5%
12-13	4.25	23.7%	31.43	29.2%	9.34	28.6%	1.70	35.8%
13-14	2.47	25.4%	19.98	31.5%	1.48	29.0%	0.74	37.2%
14-15	3.31	27.7%	26.83	34.6%	1.98	29.4%	0.99	39.1%
15-16	7.98	33.1%	45.47	39.8%	19.94	34.2%	2.39	43.7%
16-17	16.63	44.5%	94.81	50.7%	41.58	44.0%	4.99	53.3%
17-18	30.03	65.0%	159.91	68.9%	87.09	64.7%	9.01	70.6%
18-19	32.72	87.4%	173.42	88.8%	94.89	87.3%	9.82	89.4%
19-20	17.75	99.6%	9.41	99.6%	51.47	99.5%	5.32	99.6%
20-21	0.63	100.0%	0.33	100.0%	1.83	100.0%	0.19	100.0%
Global Total	146.14		872.42		420.85		52.14	

[a]NO_X emission estimates and effective EI(NO_X) shown are for the case where the nominal EI(NO_X)=5 at supersonic cruise flight conditions. Emission levels and effective EI(NO_X) for nominal EI(NO_X)=10 and EI(NO_X)=15 can be derived by scaling-up the data by factors of 2 or 3, respectively

Table 12. Mach 2.0 HSCT Simulated Airline Operations - Year 2015 Upper Limit Fleet Size Fuel Burn and Engine Exhaust Emission Estimates (1175 Units)

Altitude Band (km)	Fuel ($kg \times 10^9$)	Cumulative Fuel	NO_X[a] ($g \times 10^9$)	Cumulative NO_X	CO ($g \times 10^9$)	Cumulative CO	HC ($g \times 10^9$)	Cumulative HC
0-1	0.82	1.2%	6.00	1.5%	9.69	5.0%	0.98	4.1%
1-2	0.89	2.6%	6.99	3.2%	3.10	6.6%	0.53	6.3%
2-3	0.89	3.9%	6.56	4.9%	3.10	8.2%	0.53	8.6%
3-4	0.89	5.2%	6.57	6.5%	3.11	9.8%	0.53	10.8%
4-5	0.89	6.6%	6.58	8.2%	3.11	11.4%	0.53	13.0%
5-6	0.89	7.9%	6.60	9.9%	3.12	13.0%	0.53	15.3%
6-7	0.90	9.2%	6.64	11.5%	3.14	14.7%	0.54	17.6%
7-8	1.05	10.8%	7.79	13.5%	3.69	16.6%	0.63	20.2%
8-9	1.49	13.0%	11.01	16.3%	5.21	19.3%	0.89	24.0%
9-10	1.72	15.6%	12.20	19.3%	5.33	22.0%	0.69	26.9%
10-11	1.52	17.9%	11.11	22.1%	3.96	24.1%	0.61	29.4%
11-12	1.65	20.4%	12.21	25.2%	3.63	26.0%	0.66	32.2%
12-13	1.90	23.2%	14.10	28.8%	4.19	28.1%	0.76	35.4%
13-14	1.09	25.5%	8.83	31.0%	0.65	28.5%	0.33	36.8%
14-15	1.41	27.0%	11.39	33.9%	0.84	28.9%	0.42	38.5%
15-16	3.33	32.0%	18.99	38.6%	8.33	33.2%	1.00	42.7%
16-17	7.24	42.8%	41.25	49.0%	18.09	42.6%	2.17	51.9%
17-18	13.81	63.5%	73.19	67.5%	40.05	63.4%	4.14	69.3%
18-19	15.51	86.7%	82.20	88.2%	44.98	86.7%	4.65	88.8%
19-20	8.50	99.5%	45.03	99.5%	24.64	99.5%	2.55	99.6%
20-21	0.31	100.0%	1.64	100.0%	0.90	100.0%	0.09	100.0%
Global Total	66.68		396.87		192.84		23.78	

[a]NO_X emission estimates and effective EI(NO_X) shown are for the case where the nominal EI(NO_X)=5 at supersonic cruise flight conditions. Emission levels and effective EI(NO_X) for nominal EI(NO_X)=10 and EI(NO_X)=15 can be derived by scaling-up the data by factors of 2 or 3, respectively.

Table 13. Mach 2.0 HSCT Simulated Airline Operations - Year 2015 Producible Fleet Size Fuel Burn and Engine Exhaust Emission Estimates (627 Units)

Altitude Band (km)	Fuel ($kg \times 10^9$)	Cumulative Fuel	NO_X[(a)] ($g \times 10^9$)	Cumulative NO_X	CO ($g \times 10^9$)	Cumulative CO	HC ($g \times 10^9$)	Cumulative HC
0-1	2.76	1.8%	19.34	1.8%	33.45	8.3%	3.32	6.5%
1-2	2.91	3.6%	23.31	4.0%	11.66	11.2%	1.75	10.0%
2-3	2.92	5.4%	23.62	6.2%	11.67	14.1%	1.46	12.9%
3-4	2.92	7.3%	23.65	8.5%	11.68	17.0%	1.46	15.8%
4-5	2.92	9.1%	23.69	10.7%	11.70	19.9%	1.46	18.7%
5-6	2.93	11.0%	23.73	13.0%	11.72	22.8%	1.46	21.6%
6-7	2.98	12.9%	24.10	15.2%	11.90	25.7%	1.49	24.5%
7-8	3.37	15.0%	27.29	17.8%	13.48	29.1%	1.68	27.8%
8-9	4.65	17.9%	37.64	21.4%	18.59	33.7%	2.32	32.4%
9-10	5.45	21.4%	44.72	25.6%	17.45	38.0%	2.18	36.7%
10-11	4.88	24.5%	40.05	29.4%	9.77	40.4%	1.47	39.6%
11-12	4.80	27.5%	39.32	33.1%	9.59	42.8%	1.44	42.5%
12-13	5.54	31.0%	45.45	37.4%	11.09	45.6%	1.66	45.8%
13-14	3.37	33.1%	27.67	40.1%	6.75	47.3%	1.01	47.8%
14-15	3.39	35.3%	28.16	42.7%	2.71	47.9%	1.02	49.8%
15-16	3.70	37.6%	30.74	45.6%	2.96	48.7%	1.11	52.0%
16-17	5.66	41.2%	46.98	50.1%	4.53	49.8%	1.70	55.4%
17-18	13.06	49.4%	108.42	60.4%	10.45	52.4%	3.92	63.1%
18-19	26.09	65.9%	148.73	74.4%	54.80	66.0%	7.83	78.6%
19-20	33.43	87.1%	167.15	90.3%	83.58	86.7%	6.69	91.9%
20-21	20.47	100.0%	102.34	100.0%	53.22	100.0%	4.09	100.0%
Global Total	158.22		1056.12		402.73		50.52	

[(a)] NO_X emission estimates and effective EI(NO_X) shown are for the case where the nominal EI(NO_X)=5 at supersonic cruise flight conditions. Emission levels and effective EI(NO_X) for nominal EI(NO_X)=10 and EI(NO_X)=15 can be derived by scaling-up the data by factors of 2 or 3, respectively.

Table 14. Mach 2.4 HSCT Simulated Airline Operations - Year 2015 Upper Limit Fleet Size Fuel Burn and Engine Exhaust Emission Estimates (1059 Units)

Altitude Band (km)	Fuel ($kg \times 10^9$)	Cumulative Fuel	NO_X[a] ($g \times 10^9$)	Cumulative NO_X	CO ($g \times 10^9$)	Cumulative CO	HC ($g \times 10^9$)	Cumulative HC
0-1	1.29	1.8%	9.06	1.8%	15.65	8.4%	1.55	6.6%
1-2	1.36	3.6%	10.90	4.1%	5.45	11.3%	0.82	10.1%
2-3	1.36	5.5%	11.04	6.3%	5.45	14.3%	0.68	13.1%
3-4	1.36	7.4%	11.06	8.6%	5.46	17.2%	0.68	16.0%
4-5	1.37	9.3%	11.07	10.9%	5.47	20.2%	0.68	18.9%
5-6	1.37	11.1%	11.09	13.2%	5.48	23.1%	0.68	21.9%
6-7	1.38	13.0%	11.21	15.5%	5.54	26.1%	0.69	24.9%
7-8	1.55	15.2%	12.53	18.1%	6.19	29.5%	0.77	28.2%
8-9	2.02	17.9%	13.33	21.4%	8.06	33.8%	1.00	32.5%
9-10	2.25	21.0%	18.41	25.2%	7.19	37.7%	0.90	36.4%
10-11	2.09	23.9%	17.11	28.8%	4.17	39.9%	0.63	39.1%
11-12	2.12	26.8%	17.35	32.3%	4.23	42.2%	0.63	41.8%
12-13	2.55	30.3%	20.90	36.7%	5.10	45.0%	0.76	45.1%
13-14	1.52	32.4%	12.50	39.2%	3.05	46.6%	0.46	47.1%
14-15	1.53	34.5%	12.69	41.8%	1.22	47.3%	0.46	49.0%
15-16	1.61	36.7%	13.34	44.6%	1.29	48.0%	0.48	51.1%
16-17	2.38	39.9%	19.76	48.7%	1.90	49.0%	0.71	54.2%
17-18	6.46	48.8%	53.61	59.7%	5.17	51.8%	1.94	62.5%
18-19	12.46	65.9%	71.00	74.3%	26.16	65.9%	3.74	78.6%
19-20	15.38	87.0%	76.90	90.2%	38.45	86.7%	3.08	91.8%
20-21	9.48	100.0%	47.41	100.0%	24.66	100.0%	1.90	100.0%
Global Total	72.88		485.29		185.34		23.26	

[a] NO_X emission estimates and effective EI(NO_X) shown are for the case where the nominal EI(NO_X)=5 at supersonic cruise flight conditions. Emission levels and effective EI(NO_X) for nominal EI(NO_X)=10 and EI(NO_X)=15 can be derived by scaling-up the data by factors of 2 or 3, respectively.

Table 15. Mach 2.4 HSCT Simulated Airline Operations - Year 2015 Producible Fleet Size Fuel Burn and Engine Exhaust Emission Estimates (565 Units)

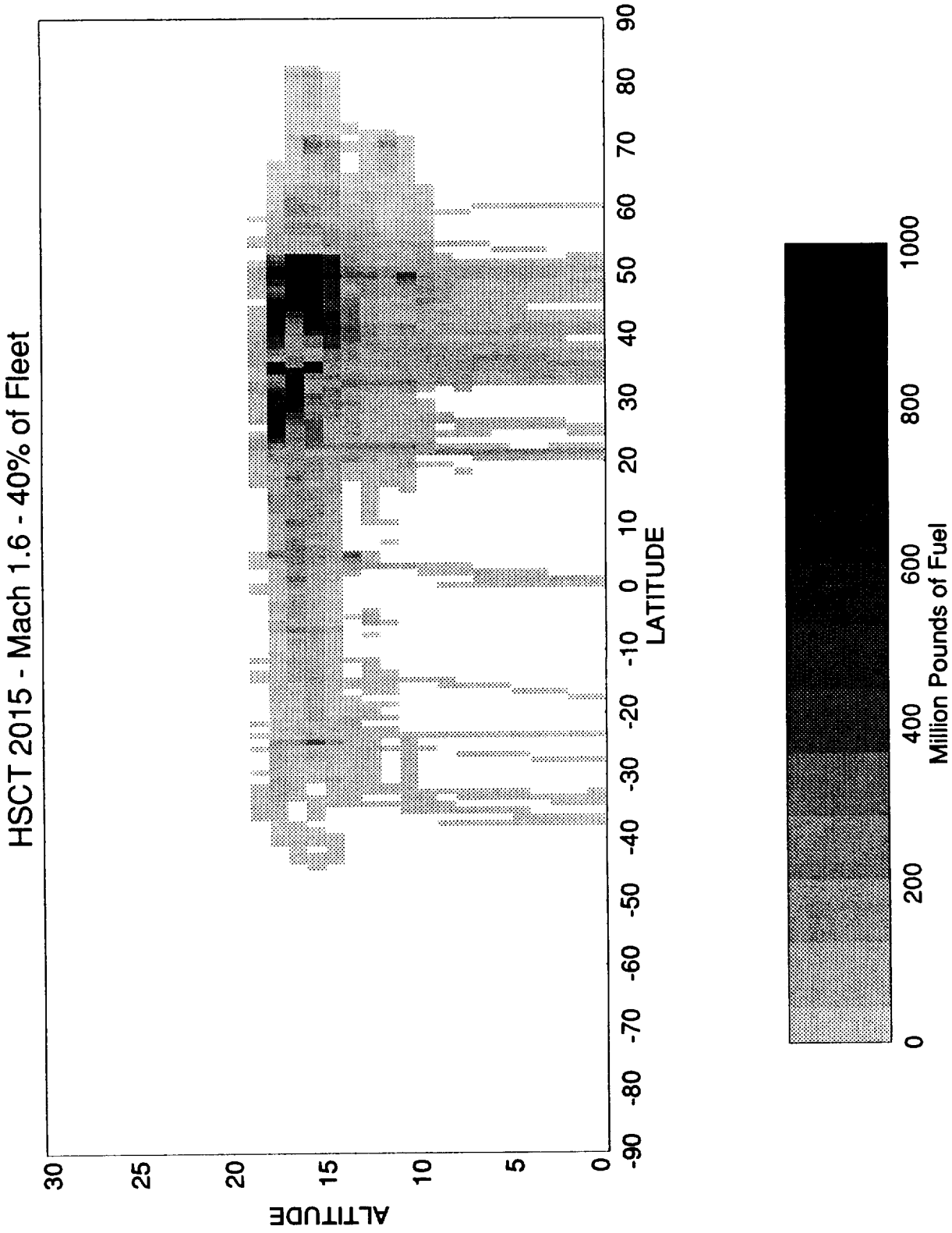


Figure 16 Mach 1.6 Altitude fuel distribution as a function of latitude (40% fleet, 687 units)

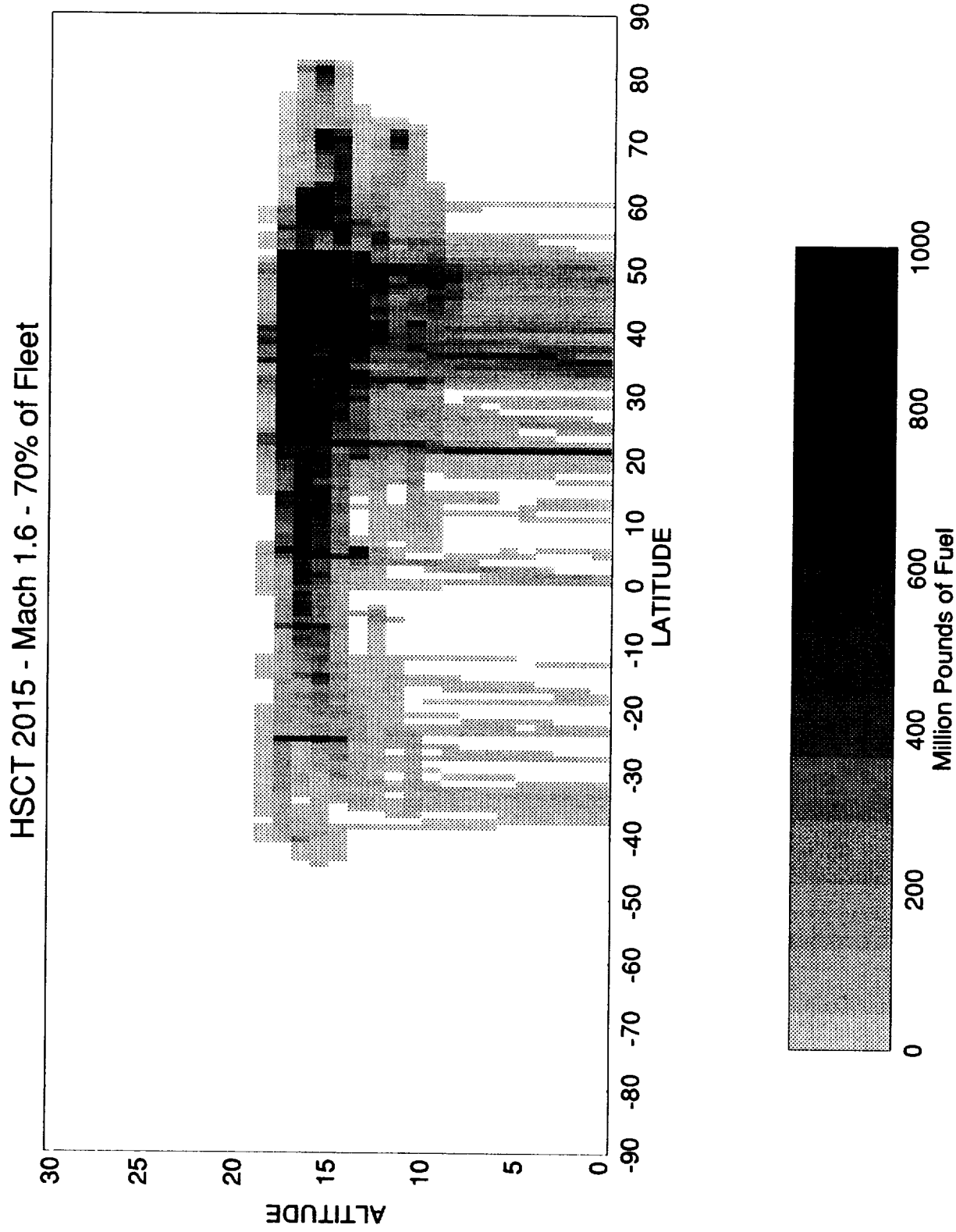


Figure 17 Mach 1.6 Altitude fuel distribution as a function of latitude (70% fleet, 1288 units)

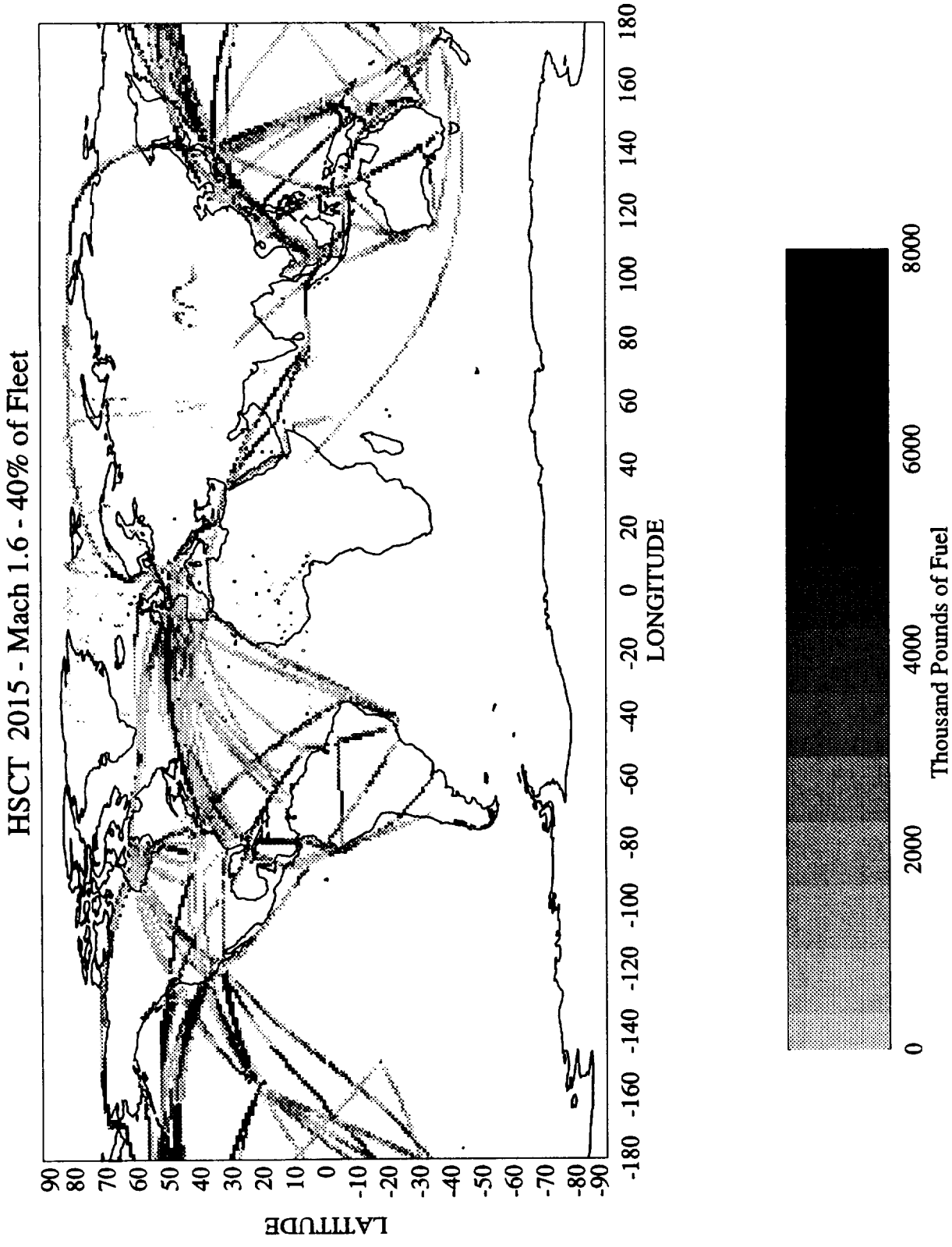


Figure 18 Mach 1.6 Geographic fuel distribution (40% fleet, 687 units)

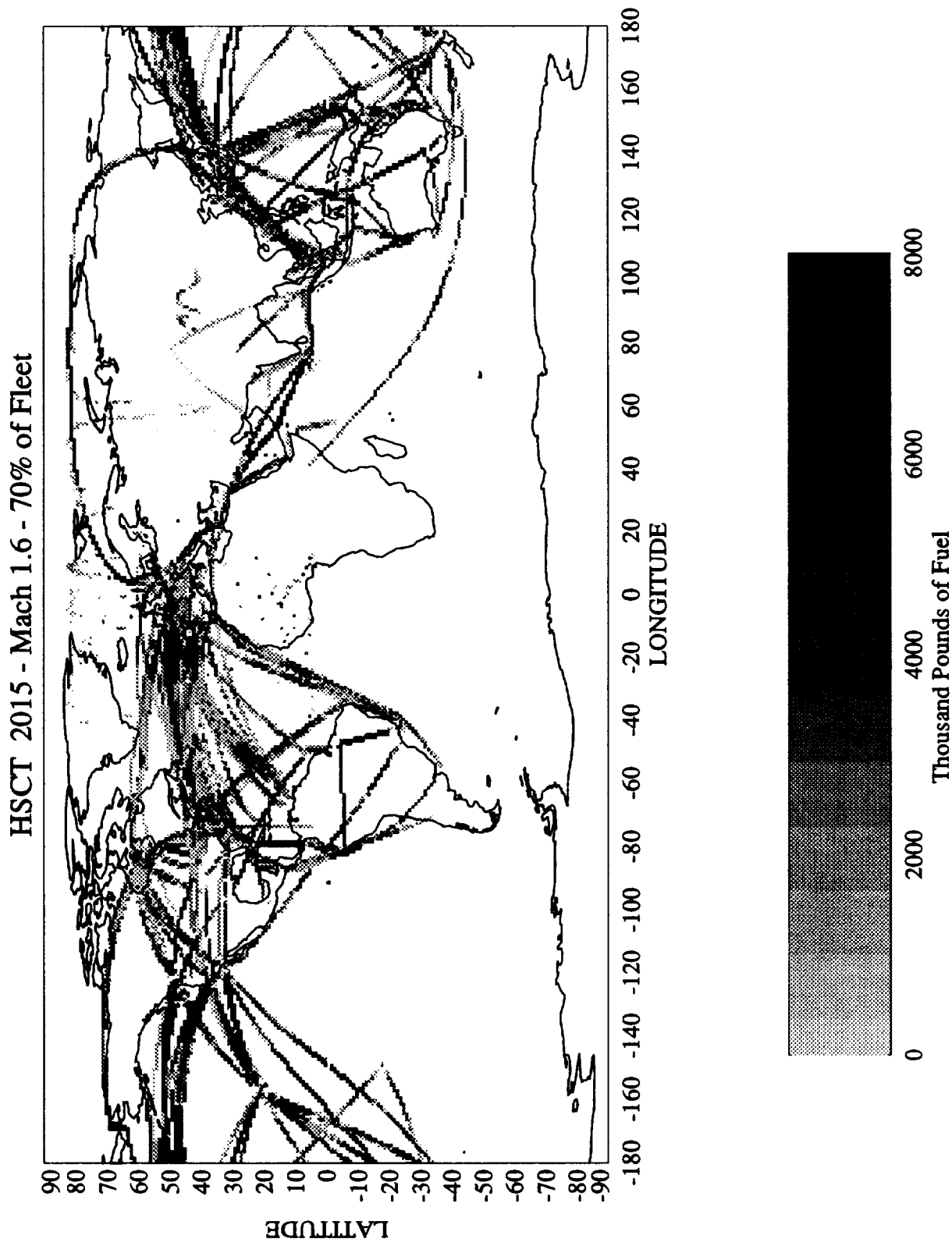


Figure 19 Mach 1.6 Geographic fuel distribution (70% fleet, 1288 units)

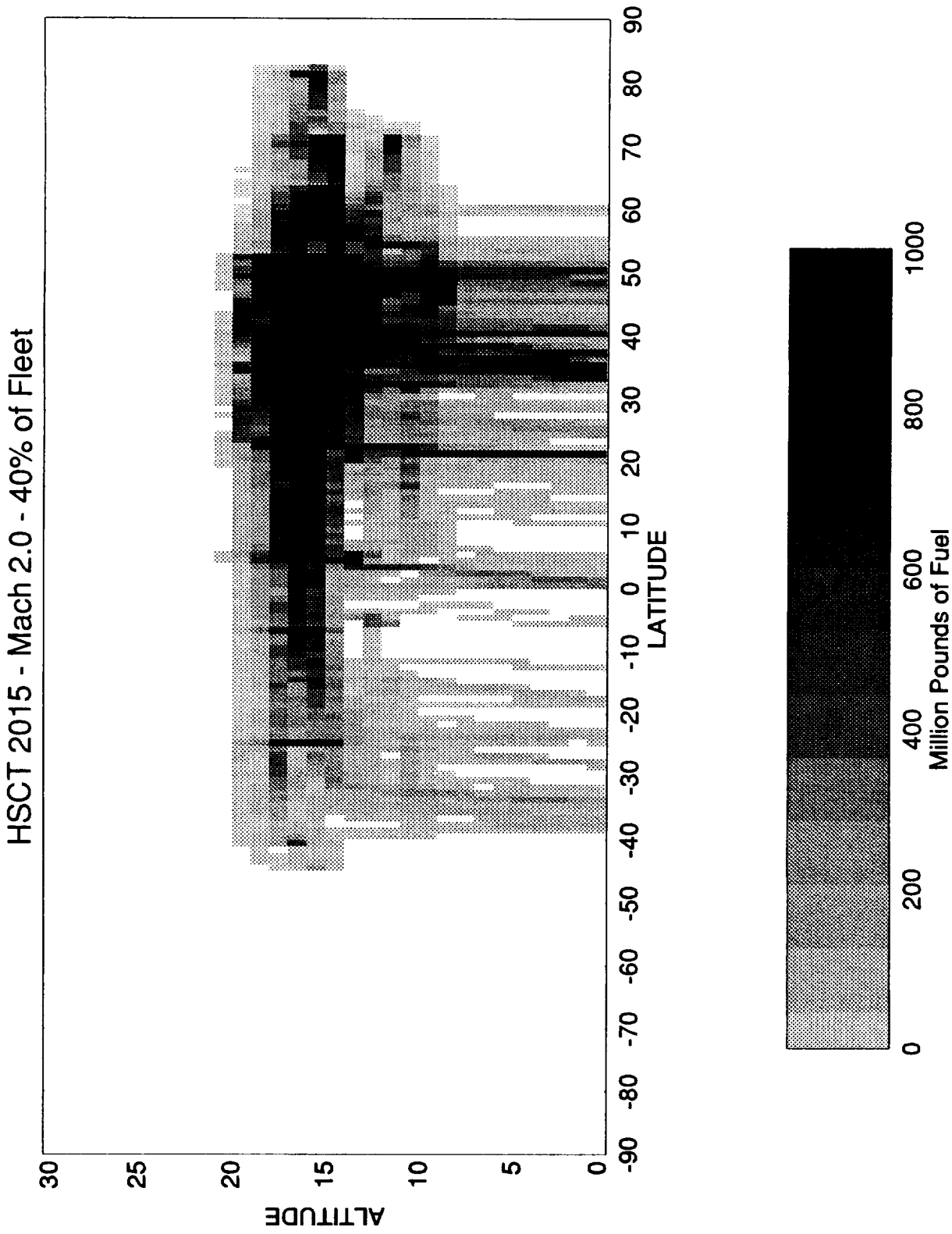


Figure 20 Mach 2.0 Altitude fuel distribution as a function of latitude (40% fleet, 627 units)

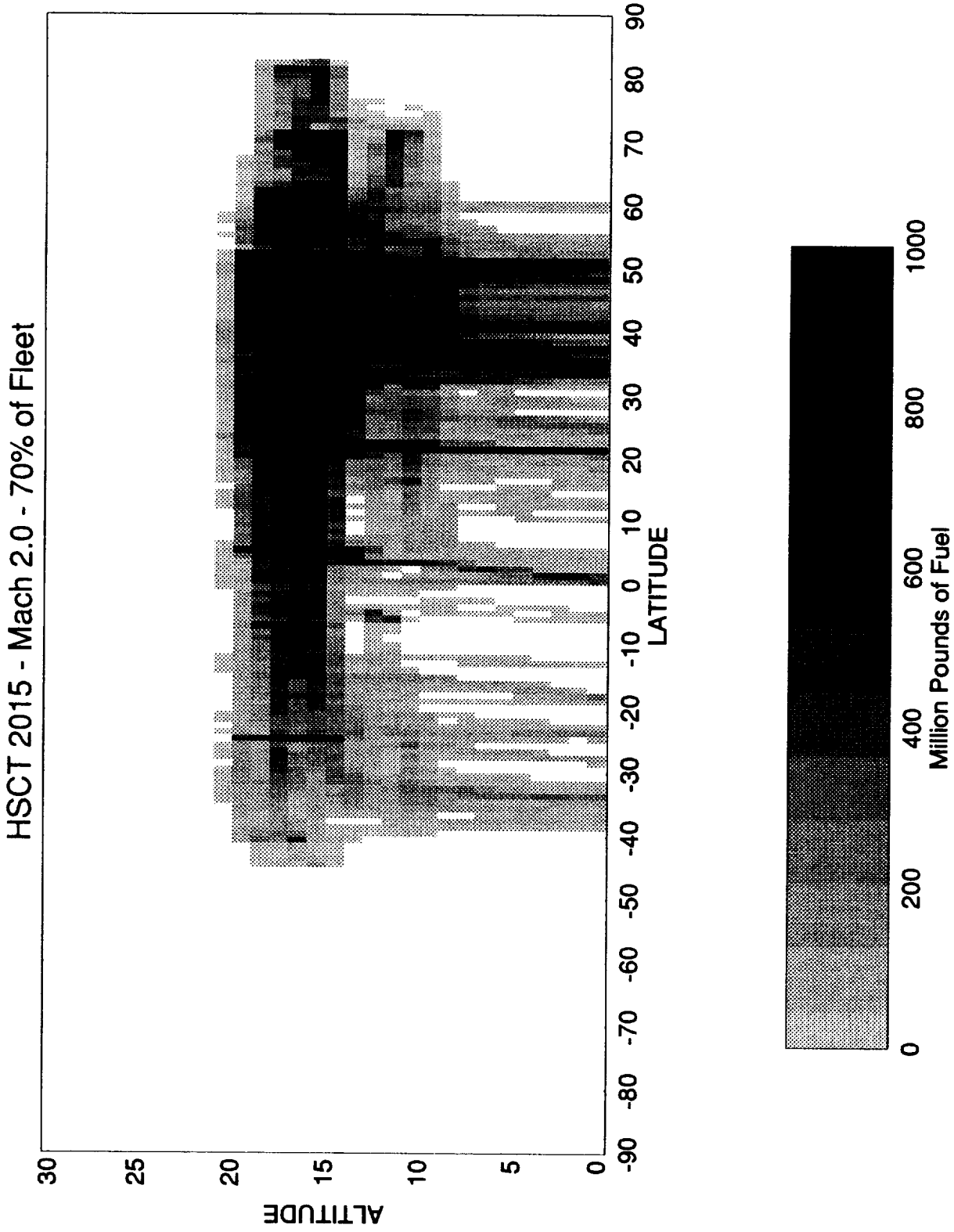


Figure 21 Mach 2.0 Altitude fuel distribution as a function of latitude (70% fleet, 1175 units)

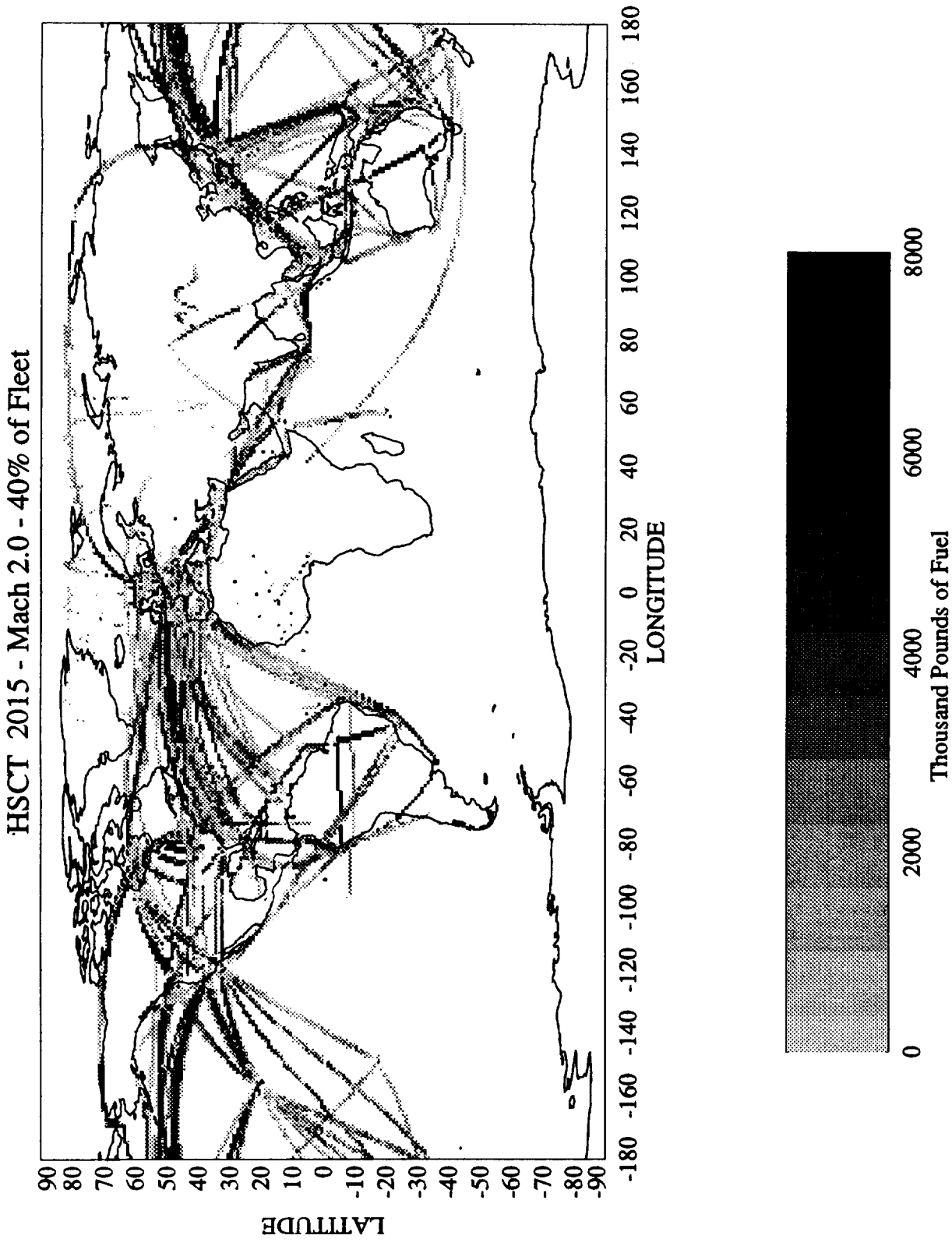


Figure 22 Mach 2.0 Geographic fuel distribution (40% fleet, 627 units)

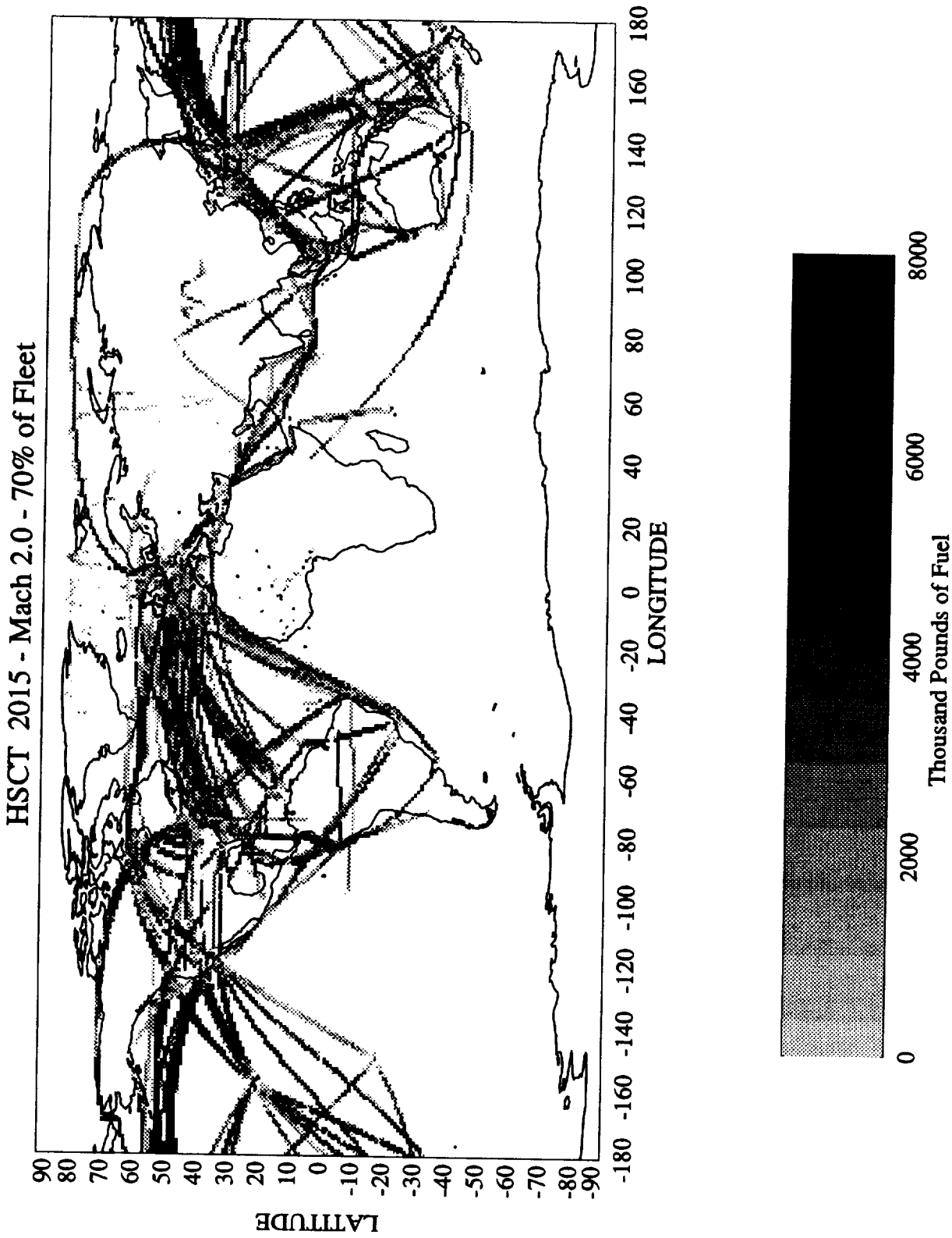


Figure 23 Mach 2.0 Geographic fuel distribution (70% fleet, 1175 units)

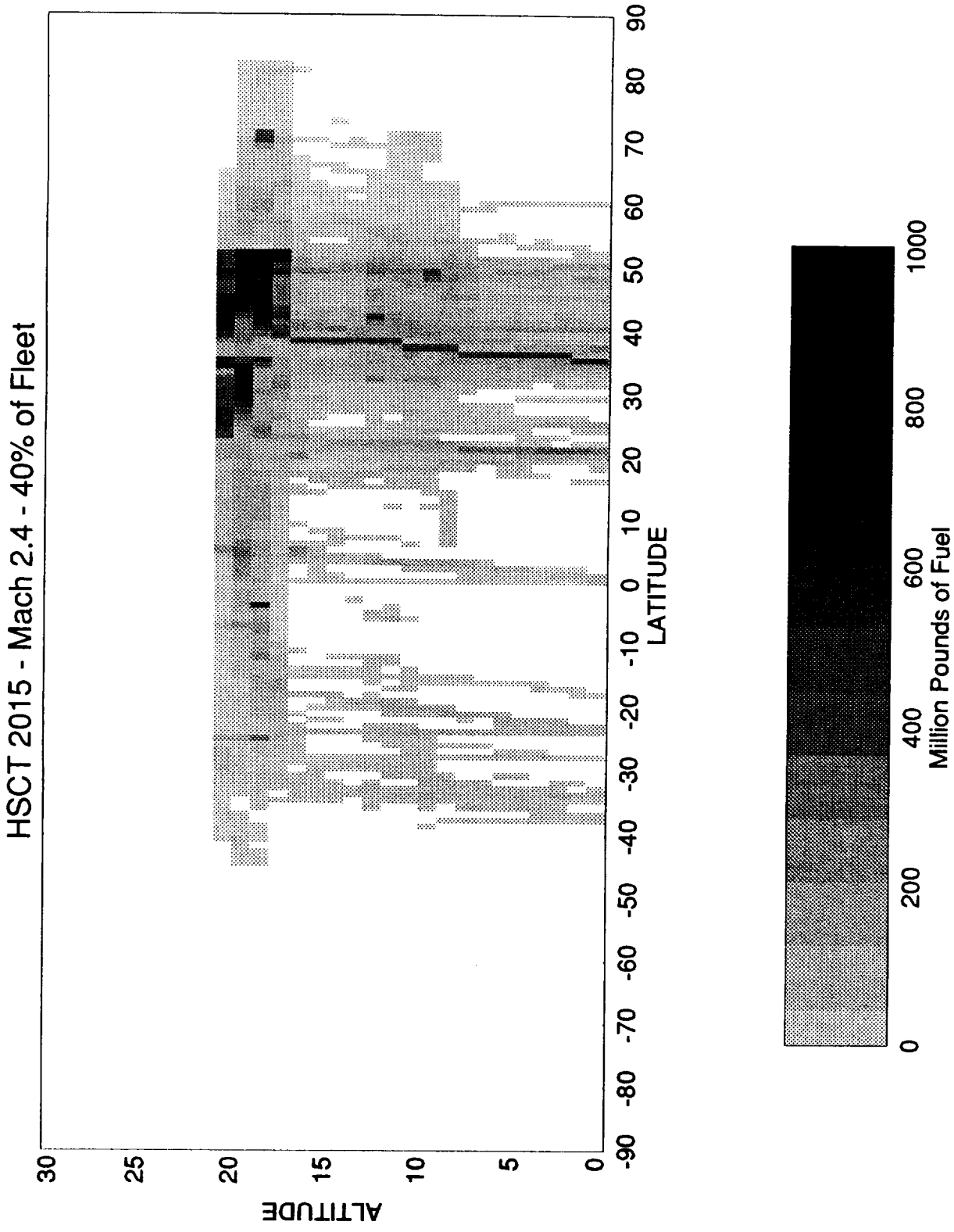


Figure 24 Mach 2.4 Altitude fuel distribution as a function of latitude (40% fleet, 565 units)

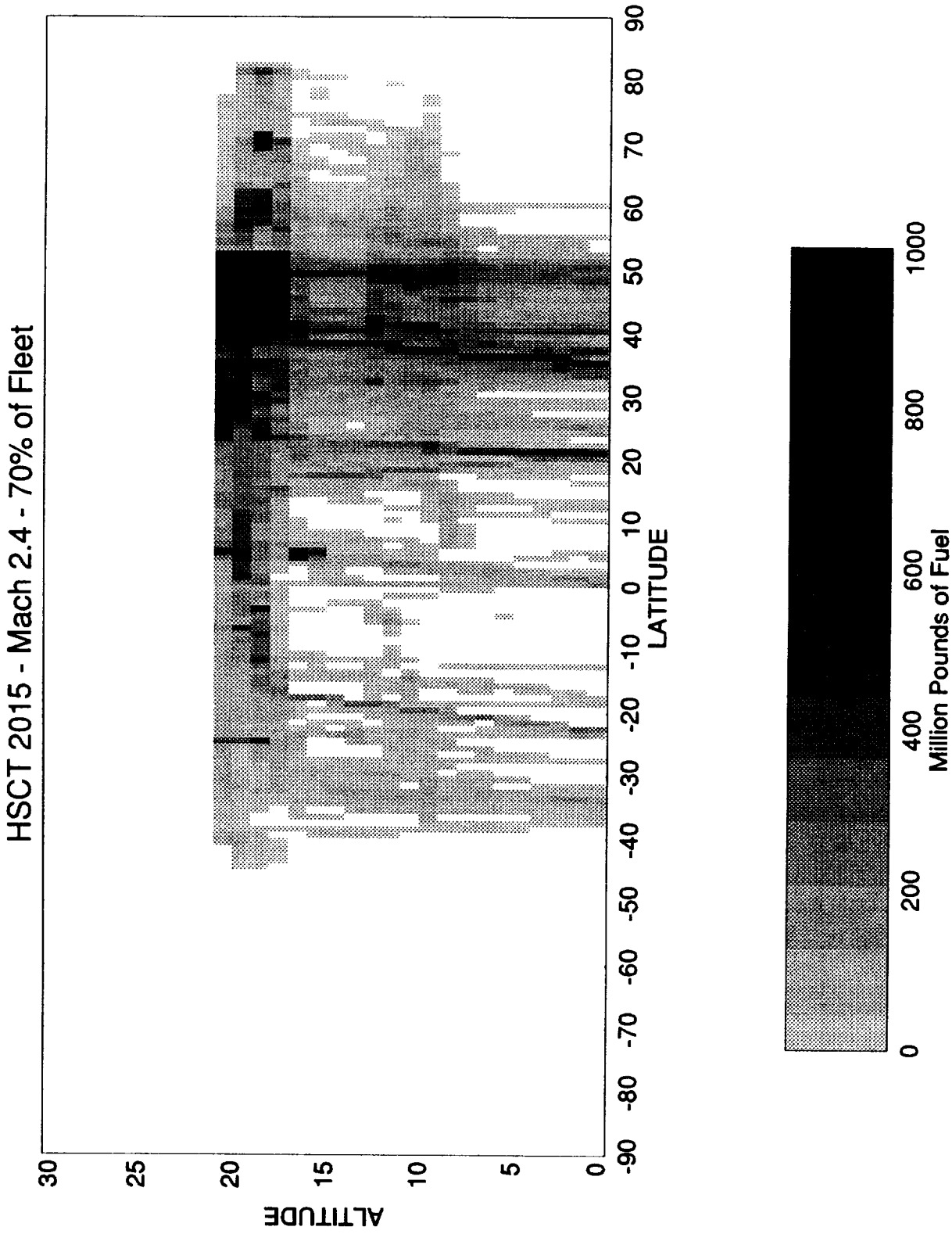


Figure 25 Mach 2.4 Altitude fuel distribution as a function of latitude (70% fleet, 1059 units)

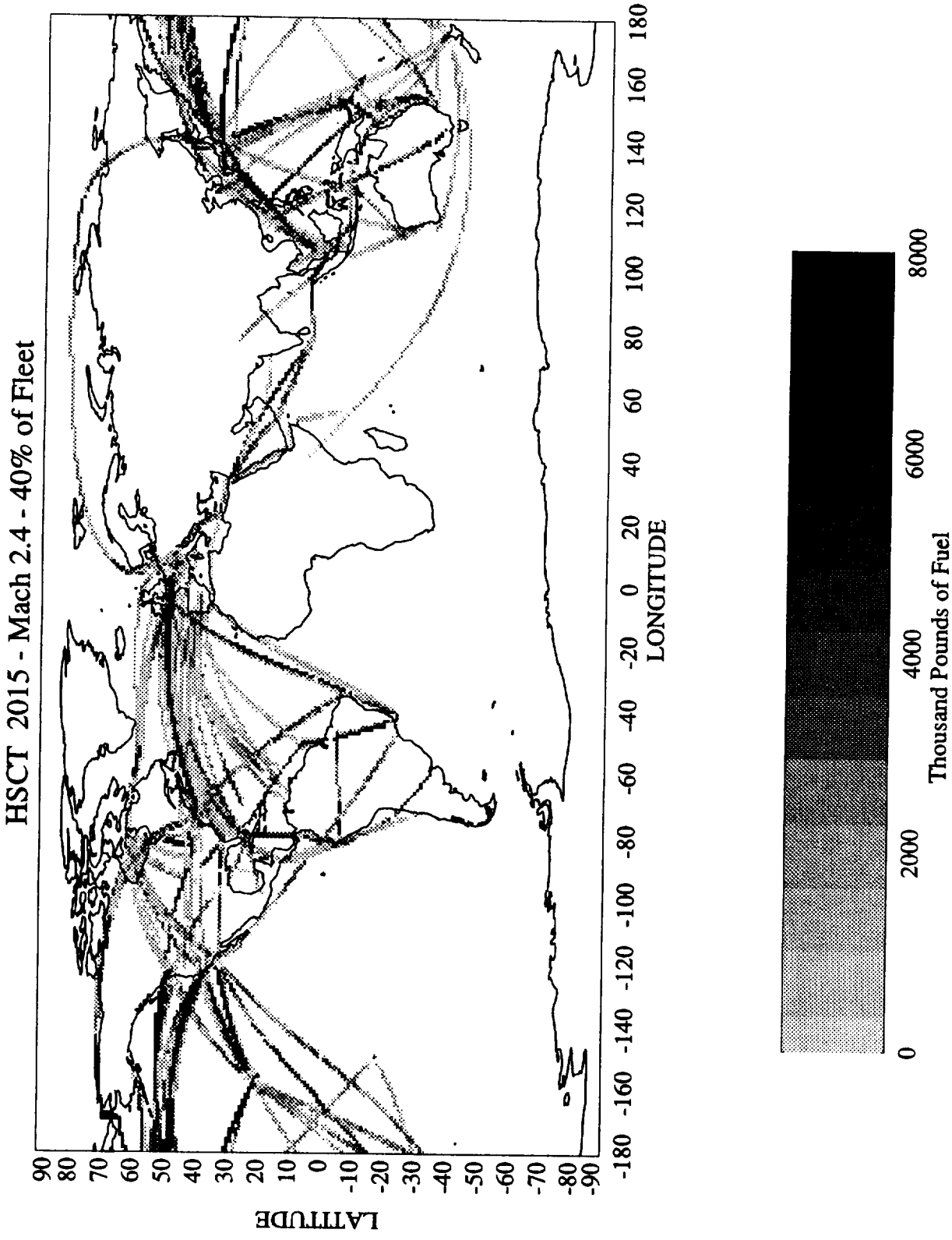


Figure 26 Mach 2.4 Geographic fuel distribution (40% fleet, 565 units)

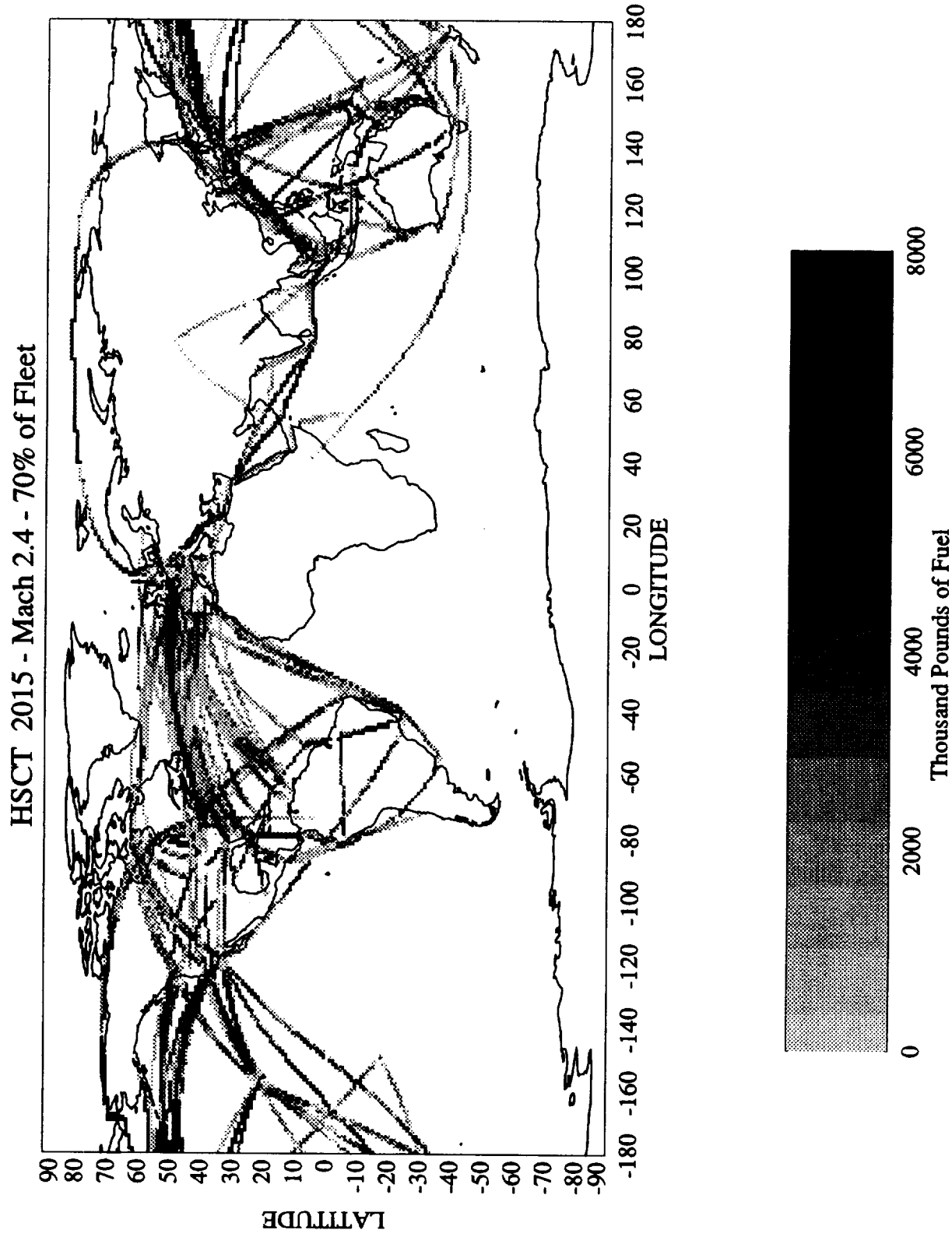


Figure 27 Mach 2.0 Geographic fuel distribution (70% fleet, 1059 units)

4.0 SEASONALITY EFFECTS ON SIMULATED AIRLINES SCENARIO

Previous emission databases have represented emissions on an annualized average basis. Although annualized averages may provide the sufficient time granularity for assessment, commercial aircraft have demonstrable seasonal fluctuations in traffic. MDC has performed substantial analysis of fluctuations in long range global jet traffic operations. An assessment was conducted by MDC to forecast HSCT seasonal traffic variations. MDC assumes that seasonal travel patterns that have been observed over the last 20 years will continue in the future. There will be summer, winter , holidays, and vacations. They will impact both the leisure and the business travel in the same patterns that the air travel industry has experienced in the past. As the next generation of aircraft, HSCT will serve all travel sectors, business or leisure, and in first, business, or economy class. MDC views on HSCT future seasonality are similar to those of ICAO's views (Metwally notes taken during informal 1994 meetings). As a result, MDC re-developed the 2015 scenario databases over smaller (monthly) time periods. The purpose in considering monthly time periods is an attempt to capture parametrically potential effects of traffic seasonality on the commercial HSCT emissions components.

4.1 Traffic Seasonality Database Development Process

MDC analysis of seasonal variations relied on weekly scheduled traffic statistics available from the Official Airline Guide (OAG). Available within the OAG databases are global weekly scheduled traffic statistics for departures, aircraft miles and seats. Each record also contains relative locations of both the origin and destination using World Area Code (WAC) designations. An individual WAC covers a small prescribed area of the earth's surface (i.e. state), with a numeric series identifying a geographic/political entity (i.e. the 900 series represents Canada). The HSCT seasonality study considered only non-stop, international passenger jet traffic, with ranges greater than 2000 statute miles. Using both routed distance and origin/destination WAC codes, an effective mechanism for selecting records meeting these criteria was developed. Independently, the HSCT traffic network models utilized regions designated by the International Air Transport Association (IATA) as shown in Table 16. These regions provide a much broader geographic area, with 19 IATA regions providing global coverage, and represent international traffic between land masses. Prior to initiating the HSCT seasonal time series analysis, a table look up procedure was developed for creation of OAG based records, that met the criteria, but assigned an IATA region code. Once these records were extracted and reformatted, a time series analysis was performed whose purpose was to quantify seasonal fluctuations. The HSCT time series analysis used a classical time series approach. This approach begins with the premise that a typical time series has four components:

1. Secular Trend - the general behavior of the variable of interest over a long period of time.

2. Seasonal Variation - a fluctuation of a periodic nature. The unit of time is less than a year. It may be a quarter, month or day
3. Cyclical Variation - fluctuations having a long periodicity (i.e. longer than a year).
4 Random variation - are fluctuations not accounted for by secular, seasonal or cyclical.

Using these four components, the relationship between them is usually described by one of two models: the multiplicative and the additive. In the additive model the parameter can be expressed as:

Parameter(at Time(t)) = Secular(t) + Seasonal(t) + Cyclical(t) + Random(t)

where the Seasonal, Cyclical, and Random components are quantitative deviations about the Secular and are assumed to be independent of another. In the multiplicative model the parameter is expressed as:

Parameter(at Time(t)) = Secular(t) * Seasonal(t) * Cyclical(t) * Random(t)

In this model, the quantitative deviations for Seasonal, Cyclical and Random are expressed in percent of the Secular Trend. This model was chosen since the objective of this model is to produce a seasonal index that is a percentage of the parameters overall average. The chosen method of employing the model uses the ratio-to-moving average method. The method consists of the following steps:

1. Develop an estimate for the product of the Secular and Seasonal components by calculating a centered 12 month moving average for each available time period.
2. Develop an estimate for the Cyclical and Random components by dividing each time period's value by the periods moving average and convert to percentage form to obtain a ratio-to-moving-average.
3. Develop an estimate for the Seasonal component by eliminating the Random component remaining in Step 2. This is performed by obtaining the mean of the ratio-to-moving-averages for each time period, which then represents the average seasonality for the month.
4. Obtain the seasonal indices by adjusting the sum of the monthly seasonality so their sum is equal to the total of all time intervals

This procedure was used for the analysis of 212 months, starting with January 1976, of OAG data whose data satisfied the HSCT traffic model criteria. The results of the procedure are shown in Appendix E.

IATA REGION	INTRA -SERVICE AREA
1	NORTH/SOUTH AMERICA
2	NORTH/CENTRAL AMERICA
3	NORTH TRANS ATLANTIC
4	MID TRANS ATLANTIC
5	SOUTH TRANS ATLANTIC
6	EUROPE NORTH AFRICA
7	EUROPE SOUTH AFRICA
8	EUROPE MIDDLE EAST
9	EUROPE FAR EAST
10	AMERICAS MID PACIFIC
11	AMERICAS SOUTH PACIFIC
12	WITHIN NORTH AMERICA
13	WITHIN CENTRAL AMERICA
14	WITHIN SOUTH AMERICA
15	WITHIN EUROPE
16	WITHIN AFRICA
17	WITHIN MIDDLE EAST
18	WITHIN FAR EAST
19	MISCELLANEOUS

Table 16 IATA Region Intra-Service Areas

4.2 Seasonality Region Database Development Process

The developed IATA region indices represent only intra-regional service traffic (i.e. IATA region 1 supports only traffic between North and South America). This apportionment was inadequate to support the emission seasonality studies which are geographically oriented. To provide a bridge between an IATA service region and the required geographic based indices, an intermediate set of regions was developed. These regions, termed Seasonality Regions (SR) and shown in Figure 28, were developed by MDC traffic experts, and insure at least one IATA named service area lies within a SR. (SR).

A single SR normally contains traffic attributable to multiple IATA regions. For example, Figure 29 isolates SR 2 and depicts notional traffic associated with IATA Regions 1, 3, and 4 as being the dominant traffic sources. Considering the individual traffic contributions (using average departures) from each IATA region, a composite regional seasonality factor is developed. In this example, and considering only these three IATA regions as participants, Figure 30 shows approximately 29.2 percent of the world traffic passes through this seasonality region. Using the individual IATA regions world percentage contributions as weighing factors, IATA region 1 contributes 8.5 percent (2.5 of 29.2). Similarly, IATA region 3 has a contribution of 79.5 percent, with IATA region 4 contributing the remaining 12.0 percent of the SR 2 traffic.

The results of repeating this process for all SR is presented in Table 17. Some attention should be noted for SR 10 (essentially the Middle East) since its IATA equivalent supporting data was not available. This absence was a consequence of the minimum 2000 statute mile route restriction, making no meaningful routes available in this small area. To fill this void, multiple possible IATA region contributors were judged as possible motivators in SR 10's seasonality. Since SR 10 is the smallest physical region, effects of minor errors in the actual seasonality of this region on overall study results are expected to be minor. Worthy of note are two significant assumptions made during this process. First, only those IATA regions assigned to a SR contribute, and secondly the traffic effects are uniformly distributed throughout the region. Regarding the first assumption, contributors were chosen based on perceived transit distances through the SR. Although other IATA regions may provide traffic, their possible contributions will have negligible effect since their SR dwell time is minor. The second assumption is a result of the extensive geographic areas SR's cover. As a consequence, isolated areas within an SR may exhibit seasonality different than the regions average (i.e. within SR 4, individually Norway and Italy may neither equate to each other follow nor SR 4 overall). The second assumption, although a weakness, can be corrected if emission seasonality is found to be consequential and a extremely detailed analysis is performed..

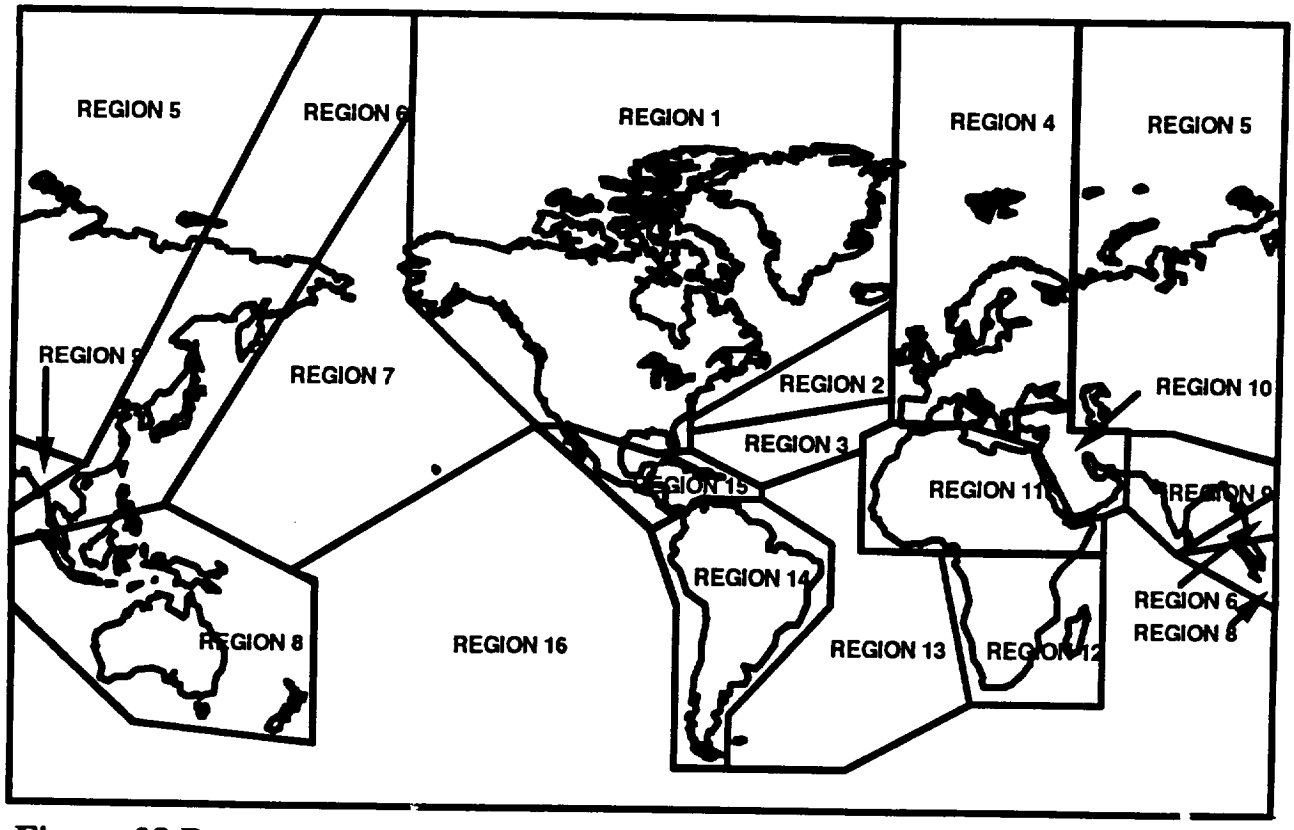
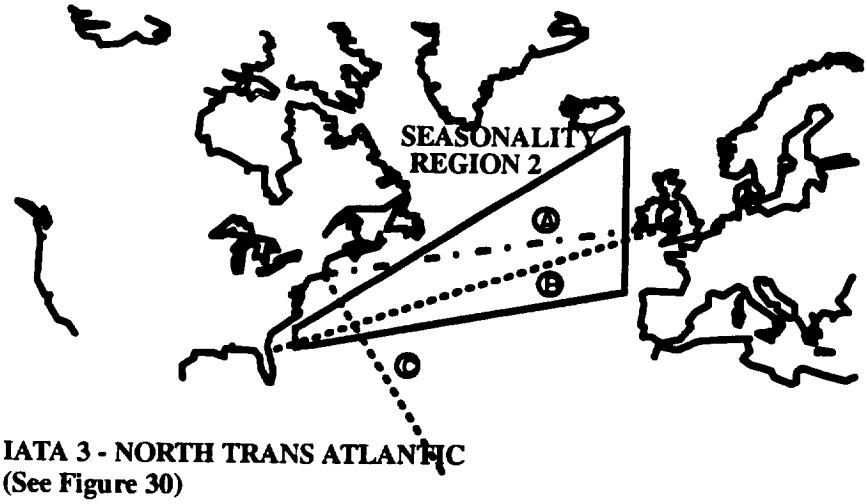


Figure 28 Boundaries of the Seasonality Regions



Ⓐ IATA 3 - NORTH TRANS ATLANTIC
(See Figure 30)

Ⓑ IATA 4 - MID TRANS ATLANTIC

Ⓒ IATA 1 - NORTH/SOUTH AMERICA

Figure 29 Notional Traffic Contribution Within A Seasonality Region

IATA REGION	INTRA SERVICE AREA	AVERAGE DEPARTURES* (PCT. WORLD TOTAL)
1	NORTH/SOUTH AMERICA	2.5
2	NORTH/CENTRAL AMERICA	2.3
3	NORTH TRANS ATLANTIC	23.2
4	MID TRANS ATLANTIC	3.5
5	SOUTH TRANS ATLANTIC	1.8
6	EUROPE NORTH AFRICA	3.3
7	EUROPE SOUTH AFRICA	2.2
8	EUROPE MIDDLE EAST	8.3
9	EUROPE FAR EAST	4.7
10	AMERICAS MID PACIFIC	6.9
11	AMERICAS SOUTH PACIFIC	1.5
12	WITHIN NORTH AMERICA	28.7
13	WITHIN CENTRAL AMERICA	0.1
14	WITHIN SOUTH AMERICA	0.7
15	WITHIN EUROPE	0.2
16	WITHIN AFRICA	0.6
17	WITHIN MIDDLE EAST	N/A
18	WITHIN FAR EAST	7.6
19	MISCELLANEOUS	1.9

*: INTERNATIONAL JET TRAFFIC, RANGE > 2000 MILES

PERCENT CONTRIBUTION OF IATA REGION TO COMPOSITE SEASONALITY VALUE

IATA REG	SEASONALITY REGION 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	3.8	8.5												77.8	40.4	
2	3.6															
3	35.6	79.5		49.0												
4		12.0	100.0	7.4						11.9					57.5	
5				3.9							24.5		49.9			
6				7.0						11.2	44.1					
7				4.7							29.5	94.0				
8				17.6						28.3						
9				10.0	38.3	22.4		30.1	38.3	16.0						
10	10.6					32.6	67.2									
11	2.3						14.6	9.5								
12	44.1															
13															2.1	
14														22.2		
15				0.4												
16										0.5	1.9	6.0				
17																
18					61.7	36.1		48.5	61.7	25.8						
19						8.9	18.2	11.9		6.3			50.1			100.0

Figure 30 IATA Regional Contributions To Seasonality Regions

SEASONAL REGION	PERCENT SEASONAL TRAFFIC VARIATION FROM ANNUAL AVERAGE											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	94.4	92.7	91.6	92.7	100.1	110.7	113.8	112.9	103.7	97.6	94.9	94.9
2	88.8	87.1	84.3	90.9	103.5	116.0	120.5	119.6	110.2	97.1	92.0	90.2
3	97.8	94.0	90.6	92.0	96.5	101.7	115.3	116.4	109.1	91.8	96.0	98.7
4	92.4	90.6	87.6	94.7	102.5	110.8	114.9	114.2	107.2	97.8	94.4	93.0
5	100.3	97.9	95.9	100.6	101.8	101.0	102.0	101.3	100.2	98.0	100.6	100.3
6	99.6	97.6	96.0	99.3	100.4	101.5	103.1	103.0	101.0	98.8	100.3	99.5
7	99.2	98.0	96.8	97.5	98.5	101.6	104.2	104.5	101.3	99.6	99.8	98.9
8	100.6	98.5	96.3	100.1	101.2	100.8	101.9	101.3	100.0	98.1	100.5	100.6
9	100.3	97.9	95.9	100.6	101.8	101.0	102.0	101.3	100.2	98.0	100.6	100.3
10	99.2	96.8	93.8	99.4	100.5	101.7	105.6	105.6	102.2	97.4	98.9	98.9
11	101.0	99.9	96.9	99.5	98.1	99.7	103.9	103.7	102.0	96.2	98.6	100.4
12	100.7	99.3	96.9	99.0	98.0	99.2	103.5	104.8	101.8	97.8	98.1	100.9
13	101.1	99.1	94.1	99.1	98.9	100.7	102.8	103.4	102.3	98.0	99.6	100.9
14	102.7	101.7	99.7	97.0	97.8	99.2	104.4	102.7	99.9	93.0	99.6	103.1
15	99.4	96.7	93.9	93.5	96.7	100.9	111.9	111.4	105.2	92.1	97.5	101.0
16	101.2	98.8	95.3	98.8	99.7	101.0	102.2	102.5	100.6	98.7	100.6	100.7
COMPOSITE AVERAGE	94.7	92.8	90.6	94.5	99.5	105.3	108.7	108.2	102.6	96.2	95.4	95.0

Table 17 Regional Monthly Traffic Seasonality Factors

4.2.1 Regional Seasonality Methodology

Seasonality factors for individual SRs were developed using the assigned IATA regions seasonality factors, and their relative traffic contribution for weight averaging. Continuing the example of SR 2, in the month of January, IATA region 1 seasonal traffic is 2.8 percent above annual average (indicating migration from the northernhemisphere), but contributes only 8.5 percent of the SR 2 traffic. Similarly, IATA region 3 is 14.0 percent lower than annual (tourist off season across the North Atlantic), and IATA region 4 is off 2.2 percent (off season to Europe, mitigated by Florida/Caribbean traffic), with IATA regions 3 and 4 contributing 79.5 and 12.0 percent of the traffic, respectively. Using traffic as the weighing factor for an average, yields a seasonality factor for SR 2 in January of 88.8 percent of annual. Figure 33 presents both the composite SR 2 seasonality factor for the year and its three components. The seasonality of this region follows historical Northern Hemisphere trends, with high vacation travel during summer months followed by retrenchment during mid-winter. The process was repeated for all months and all SR, with the results presented in Appendix E. Graphical presentations of all SR seasonality factors are also presented in Appendix E.

Global composite seasonality factors are presented in both in tabular and graphical form in Appendix E. As shown, the months of June, July, and August are the three contiguous months containing maximum variances. This result is not unexpected since the weighing factors are dominated by the Northern Hemisphere traffic (specifically North America and North Trans-Atlantic) where prime vacation travel occurs during the summer June/July/August period. Minimum global traffic is observed during the months of December, January, and February.

4.3 Seasonality Adjusted Emission Database Development Process

The initial emission database describes annualized global emissions (fuel burn, nitrogen oxides (NO_x), carbon monoxide (CO), unburned hydrocarbons (HC)) within a three-dimensional cell. Emission data for each cell represents composite worldwide activity associated with a cell, and therefore no accountability is available for determination of route information or flight characteristics. Assignment of the correct seasonal variation to a cell, required parsing of the existing annualized database cells into appropriate regional databases. Upon completion of the update, consolidation of the individual regional databases into a global database was performed.

4.4 Seasonality Application On Simulated Airlines Models

The influence of historic seasonal traffic patterns on HSCT global emissions was evaluated. Tabular results of this evaluation are presented in Table 18 and Table 19 only for the Mach 2.4 aircraft since seasonality effects are not related to design Mach number.

although minimal variations are observed between traffic levels (variations attributable to route deletions), significant variations are visible between months. Peak monthly global fuel burn is predicted to occur during the Northern Hemisphere summer vacation months of June, July and August. Similarly, minimal global fuel burn is predicted to occur during the Northern Hemisphere winter months of January, February and March..

	WORLD TOTALS			
MONTH	FUEL (KILOGRAMS)	NOX (GRAMS)	CO (GRAMS)	THC (GRAMS)
JAN.	1.27661E+10	8.52371E+10	3.24912E+10	4.07867E+09
FEB.	1.25439E+10	8.37404E+10	3.19208E+10	4.00680E+09
MAR.	1.23057E+10	8.21520E+10	3.13201E+10	3.93120E+09
APR.	1.26573E+10	8.45193E+10	3.22225E+10	4.04433E+09
MAY	1.32143E+10	8.82229E+10	3.36474E+10	4.22029E+09
JUNE	1.39369E+10	9.30338E+10	3.54888E+10	4.44869E+09
JULY	1.43324E+10	9.56455E+10	3.64847E+10	4.57274E+09
AUG.	1.42825E+10	9.52942E+10	3.63512E+10	4.55543E+09
SEP.	1.36012E+10	9.07429E+10	3.46107E+10	4.33822E+09
OCT.	1.29321E+10	8.62985E+10	3.29115E+10	4.12739E+09
NOV.	1.28577E+10	8.58251E+10	3.27246E+10	4.10609E+09
DEC.	1.27965E+10	8.54356E+10	3.25702E+10	4.08799E+09
ANNUAL TOTAL	1.58227E+11	1.05615E+12	4.02744E+11	5.05178E+10

Table 18. Mach 2.4 HSCT Upper Limit Fleet (1059 Units) Monthly Seasonality Effects

	WORLD TOTALS			
MONTH	FUEL (KILOGRAMS)	NOX (GRAMS)	CO (GRAMS)	THC (GRAMS)
JAN.	5.89136E+09	3.92272E+10	1.49869E+10	1.88095E+09
FEB.	5.79020E+09	3.85514E+10	1.47270E+10	1.84837E+09
MAR.	5.67998E+09	3.78160E+10	1.44495E+10	1.81331E+09
APR.	5.83511E+09	3.88592E+10	1.48470E+10	1.86327E+09
MAY	6.08142E+09	4.05025E+10	1.54699E+10	1.94132E+09
JUNE	6.40483E+09	4.26598E+10	1.62849E+10	2.04368E+09
JULY	6.58718E+09	4.38625E+10	1.67419E+10	2.10083E+09
AUG.	6.56541E+09	4.37098E+10	1.66833E+10	2.09319E+09
SEP.	6.25968E+09	4.16640E+10	1.59074E+10	1.99560E+09
OCT.	5.95622E+09	3.96480E+10	1.51436E+10	1.89974E+09
NOV.	5.93037E+09	3.94792E+10	1.50836E+10	1.89261E+09
DEC.	5.90542E+09	3.93219E+10	1.50218E+10	1.88542E+09
ANNUAL TOTAL	7.28872E+10	4.85302E+11	1.85347E+11	2.32583E+10

Table 19. Mach 2.4 HSCT Producible Fleet (565 Units) Monthly Seasonality Effects

SUMMARY

MDC modeled global HSCT aircraft operations (for Mach 1.6, Mach 2.0, and Mach 2.4 HSCT conceptual aircraft) on a commercial scheduled airline network. Estimates of minimum and maximum HSCT year 2015 airline fleets were used to globally distribute six global HSCT fuel burn and engine exhaust emission levels. These databases, will contribute to an assessment of the environmental impact resulting from introducing a fleet of HSCT aircraft into global commercial airline operations.

A commercial HSCT airline network was developed by initially reviewing 21 international carriers for both their route structures and traffic volumes. The carriers were grouped into four global service areas by their region of domicile: European, Far-East, Americas-East, and Americas-West. Routes within these regions were screened for utility by an HSCT fleet adhering to specific traffic and route diversion requirements. A forecast of both the traffic demand and traffic capture was performed to both populate the network and identify fleet size boundaries in the 2015 time frame.

A producible fleet (40% market capture) in the year 2015 will consume from 62 (Mach 1.6, 687 HSCT units) to 73 (Mach 2.4, 565 HSCT units) billion kilograms of fuel. A second scenario in which a maximum producible fleet captures 70% of candidate HSCT operations was also developed. Year 2015 operations of this fleet will consume between 145 (Mach 1.6, 1288 units) to 158 (Mach 2.4, 1059 units) billion kilograms of fuel. These fleets will deposit between 131.6 (Mach 1.6, 687 units) and 573.6 (Mach 2.4, 1059 units) billion grams of NOX at altitudes above 16 kilometers. The effect of HSCT operations at these relatively high altitudes in the stratosphere where, in particular, the sensitivity of ozone concentrations to engine exhaust emission levels, is the focus of on going investigations within AESA.

The impact of traffic seasonal variances on fleet emissions was also investigated. A time series analysis of historic (212 months) seasonal traffic fluctuations was performed on existing OAG data. The analysis results provided regional monthly percentage change from annual average.. Each global cell in the HSCT databases were adjusted by the amount appropriate to both its regional position and month. Peak global changes resulting from this adjustment occur during June/July/August with an average increase of 7.4 percent increase from annual average emissions. Similarly, December/ January/February result in an average emission decrease of 5.8 percent.

This is the first time a database has been developed which reflects supersonic commercial networks with actual airline operational requirements. The accuracy of these forecast estimates is difficult to ascertain. However these six databases can provide guidance to the sensitivity of HSCT fleet size and operations on atmospheric impact assessment models.

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APPENDIX A

ROUTES ELIGIBLE FOR SCREENING

ONE DIRECTION ONLY WEEKLY AIRCRAFT STATISTICS

FOR JULY 1990

NON-STOP JET PASSENGER ONLY FLIGHTS GREATER THAN 2000 MILES

AIRPORT CODES	IATA CODE	DPRTS	SCEHD TIME/ DPRT	FLT BLOCK TIME	GC N.MI.	Ovrlnd DIST	DVRT N.MI.	Ovrlnd DIST	%ovlnd	YR2015 WKLY SEATS
ADD-FCO	6	3	6.00	5.80	2416	1698	2692	546	20.3	1807
ADD-FRA	6	2	7.00	6.92	2884	1996	3140	666	21.2	1205
AGP-KWI	8	3	6.33	6.35	2645	672	2645	672	25.4	2079
AKL-EZE	11	1	12.00	13.36	5568	1153	5904	207	3.5	1747
AKL-HKG	18	4	11.00	11.85	4939	1131	5008	0	0.0	15103
AKL-HNL	11	20	8.15	9.18	3826	0	3826	0	0.0	29871
AKL-KUL	18	1	11.00	11.30	4711	2063	5041	207	4.1	2750
AKL-LAX	11	8	12.00	13.57	5658	0	5658	0	0.0	13438
AKL-NRT	18	6	11.00	11.45	4771	0	4771	0	0.0	20811
AKL-PER	18	6	7.67	6.91	2880	660	3171	0	0.0	16322
AKL-PPT	18	3	5.00	5.30	2208	0	2208	0	0.0	9479
AKL-SIN	18	9	10.67	10.93	4556	1904	4867	0	0.0	23864
AMS-ANC	3	5	9.00	9.32	3884	1321	3925	844	21.5	3630
AMS-ATL	3	13	9.46	9.14	3812	1395	4157	191	4.6	8296
AMS-AUA	4	8	10.00	10.20	4252	272	4278	0	0.0	6621
AMS-AUH	8	2	7.00	6.69	2789	2346	3155	1716	54.4	1140
AMS-BKK	9	3	11.33	11.88	4951	4951	4951	4951	100.0	7583
AMS-BOS	3	7	7.71	7.18	2993	1266	3141	0	0.0	4567
AMS-BWI	3	2	8.00	7.95	3314	1581	3448	0	0.0	1323
AMS-CCS	4	2	10.00	10.15	4230	309	4350	0	0.0	1407
AMS-CKY	6	1	7.00	6.52	2717	2717	3262	0	0.0	903
AMS-CUR	4	3	10.00	10.14	4227	309	4253	0	0.0	2111
AMS-DHA	8	6	6.00	6.14	2560	2560	2560	2560	100.0	4815
AMS-DXB	8	7	6.86	6.69	2787	2787	3149	1467	46.6	5697
AMS-FNA	6	2	7.00	6.64	2766	2766	3316	0	0.0	1807
AMS-GIG	5	2	12.00	12.38	5160	1976	5358	0	0.0	3075
AMS-IAH	3	7	10.29	10.42	4343	2662	5055	0	0.0	5275
AMS-JFK	3	26	7.88	7.57	3156	814	3353	34	1.0	19526
AMS-KWI	8	2	6.00	5.63	2345	2345	2717	1320	48.6	1377
AMS-LAX	3	8	11.50	11.59	4833	3025	5111	1452	28.4	6580
AMS-MCO	3	3	9.67	9.44	3935	555	4124	0	0.0	1730
AMS-MCT	8	3	7.00	7.14	2975	2975	3346	1951	58.3	2065
AMS-NBO	7	3	8.33	8.64	3603	3178	3603	3178	88.2	6281
AMS-NRT	9	2	11.50	12.06	5026	5026	5375	779	14.5	5127
AMS-ORD	3	8	8.63	8.56	3568	1745	4028	628	15.6	6258
AMS-PBM	4	7	9.71	9.74	4061	256	4061	256	6.3	5351

ONE DIRECTION ONLY

WEEKLY AIRCRAFT STATISTICS
FOR JULY 1990
NON-STOP JET PASSENGER ONLY FLIGHTS GREATER THAN 2000 MILES

AIRPORT CODES	IATA CODE	DPRTS	SCEHD TIME/ DPRT	FLT BLOCK TIME	GC N.MI.	Ovrlnd DIST	DVRT N.MI.	Ovrlnd DIST	%ovlnd	YR2015 WKLY SEATS
AMS-POS	4	1	9.00	9.66	4028	363	4041	0	0.0	704
AMS-SXM	4	1	9.00	8.98	3742	311	3766	0	0.0	704
AMS-YHZ	3	2	7.00	6.34	2644	1021	2773	0	0.0	1323
AMS-YMX	3	7	7.29	7.15	2979	1341	3312	255	7.7	5918
AMS-YVR	3	1	10.00	9.98	4159	3207	4486	1207	26.9	577
AMS-YYC	3	3	9.00	11.68	4868	3748	5274	1319	25.0	1730
AMS-YYZ	3	14	8.00	7.75	3232	1587	3625	442	12.2	9461
ANC-BCN	3	1	10.00	10.80	4502	3048	4582	1104	24.1	675
ANC-CDG	3	3	9.00	9.73	4057	1655	4119	643	15.6	1723
ANC-CPH	3	3	8.67	8.98	3745	1258	3968	694	17.5	1544
ANC-DTW	12	7	6.14	6.20	2585	2585	2585	2585	100.0	4086
ANC-FRA	3	3	9.00	9.71	4048	1368	4087	752	18.4	2670
ANC-JFK	12	3	6.67	7.03	2930	2930	2930	2930	100.0	3597
ANC-LHR	3	4	8.75	9.32	3886	2273	3969	766	19.3	3722
ANC-MAD	3	2	9.50	10.80	4502	2665	4717	769	16.3	1351
ANC-MSP	12	14	5.29	5.23	2180	2180	2180	2180	100.0	8172
ANC-NRT	10	26	7.19	7.14	2977	444	3031	255	8.4	91257
ANC-ORD	12	14	5.79	5.91	2463	2463	2463	2463	100.0	8616
ANC-OSA	10	1	8.00	7.60	3166	1311	3348	338	10.1	5035
ANC-SEL	10	13	8.77	7.86	3275	874	3417	372	10.9	50478
ANC-TPE	10	3	9.67	9.72	4050	1061	4237	280	6.6	10481
ANC-ZRH	3	3	9.67	10.08	4200	1373	4238	924	21.8	1523
ANU-LGW	4	1	8.00	8.47	3532	177	3532	177	5.0	1135
ANU-LHR	4	2	8.00	8.47	3532	177	3532	177	5.0	2271
ARN-BKK	9	3	10.67	10.70	4460	4460	4460	4460	100.0	5870
ARN-EWR	3	7	8.57	8.17	3404	1454	3628	210	5.8	4085
ARN-JFK	3	14	8.79	8.11	3382	1383	3536	392	11.1	6709
ARN-PEK	9	1	9.00	8.67	3612	3612	3612	3612	100.0	1737
ATH-BKK	9	4	9.25	10.25	4271	4271	4271	4271	100.0	7967
ATH-JFK	3	12	10.25	10.25	4274	1607	4889	220	4.5	11899
ATH-NBO	7	2	6.00	5.91	2464	2048	2464	2048	83.1	4227
ATH-SIN	9	7	11.00	11.73	4889	3545	5232	832	15.9	17539
ATH-YMX	3	5	10.00	9.89	4124	2450	4924	527	10.7	3219
ATL-FRA	3	14	8.64	9.59	3998	1915	4179	485	11.6	10453
ATL-HNL	12	5	9.00	9.36	3903	1643	3903	1643	42.1	4267
ATL-LGW	3	21	8.10	8.79	3664	1718	3826	264	6.9	12624

ONE DIRECTION ONLY

WEEKLY AIRCRAFT STATISTICS
FOR JULY 1990
NON-STOP JET PASSENGER ONLY FLIGHTS GREATER THAN 2000 MILES

AIRPORT CODES	IATA CODE	DPRTS	SCEHD TIME/ DPRT	FLT BLOCK TIME	GC N.MI.	Ovrlnd DIST	DVRT N.MI.	Ovrlnd DIST	%ovlnd	YR2015 WKLY SEATS
ATL-MUC	3	7	8.86	9.98	4159	2583	4376	639	14.6	4326
ATL-NRT	10	9	16.11	14.25	5938	3313	6375	1211	19.0	31542
ATL-ORY	3	7	8.86	9.13	3807	1949	4029	355	8.8	4085
ATL-SNN	3	6	7.17	7.98	3328	1664	3488	199	5.7	3708
ATL-ZRH	3	7	9.00	9.75	4064	2231	4288	583	13.6	3554
AUH-CGK	19	7	7.86	8.55	3563	1290	3689	192	5.2	5615
AUH-LHR	8	3	7.67	7.11	2964	2614	3230	1835	56.8	1737
AUH-SIN	19	8	7.00	7.65	3190	935	3486	112	3.2	7020
AUH-ZRH	8	1	6.00	6.16	2566	2135	2805	1408	50.2	528
BAH-BKK	19	6	6.83	6.99	2915	2915	2915	2915	100.0	3401
BAH-HKG	19	7	8.00	8.29	3457	3457	3457	3457	100.0	6708
BAH-LGW	8	7	6.86	6.55	2732	2732	2732	2732	100.0	6892
BAH-MNL	19	3	10.00	9.56	3984	3052	3984	3052	76.6	1549
BCN-JFK	3	12	8.58	7.96	3319	461	3458	218	6.3	6015
BDA-LGW	4	6	6.83	7.17	2990	141	2990	141	4.7	4154
BEG-DXB	8	4	5.00	4.94	2057	2057	2057	2057	100.0	2648
BEG-JFK	3	4	10.00	9.35	3898	2249	3953	874	22.1	2546
BGI-LGW	4	2	8.00	8.74	3643	175	3643	175	4.8	2271
BGI-LHR	4	4	8.00	8.74	3643	175	3643	175	4.8	3650
BGI-MAN	4	1	8.00	8.67	3615	275	3615	275	7.6	1135
BGI-YYZ	2	4	5.00	5.06	2110	390	2110	390	18.5	4715
BIK-HNL	11	4	9.25	9.80	4085	0	4085	0	0.0	4032
BJL-LGW	6	3	6.00	5.77	2405	1597	2651	178	6.7	3623
BKK-CAI	19	2	10.00	9.39	3914	3456	4336	1756	40.5	2093
BKK-CNS	18	2	7.50	7.80	3251	1908	3776	0	0.0	4404
BKK-CPH	9	10	11.50	11.14	4644	4644	4644	4644	100.0	18030
BKK-DHA	19	4	7.00	7.00	2918	2918	2918	2918	100.0	2570
BKK-DXB	19	19	6.21	6.32	2635	1249	2635	1249	47.4	11191
BKK-FCO	9	10	11.80	11.46	4775	4775	4775	4775	100.0	25445
BKK-FRA	9	13	12.00	11.61	4839	4839	4839	4839	100.0	32400
BKK-HEL	9	4	11.00	10.19	4247	4247	4247	4247	100.0	6038
BKK-JED	19	2	8.00	8.44	3518	1960	3925	1005	25.6	1693
BKK-PER	18	3	6.67	6.93	2889	439	3241	0	0.0	8468
BNE-GUM	18	4	5.75	6.06	2528	13	2595	0	0.0	9602
BNE-HKG	18	1	8.00	9.02	3761	1892	4032	0	0.0	3799
BNE-HNL	11	3	9.00	9.83	4096	0	4096	0	0.0	3945

ONE DIRECTION ONLY WEEKLY AIRCRAFT STATISTICS

FOR JULY 1990

NON-STOP JET PASSENGER ONLY FLIGHTS GREATER THAN 2000 MILES

AIRPORT CODES	IATA CODE	DPRTS	SCEHD TIME/ DPRT	FLT BLOCK TIME	GC N.MI.	Ovrlnd DIST	DVRT N.MI.	Ovrlnd DIST	%ovlnd	YR2015 WKLY SEATS
BNE-MNL	18	2	7.50	7.62	3177	1773	3700	0	0.0	5330
BNE-NRT	18	6	9.00	9.32	3886	323	3940	0	0.0	17796
BNE-SIN	18	7	8.00	7.98	3325	1905	3776	0	0.0	16861
BOD-FDF	4	1	8.00	8.48	3533	0	3533	0	0.0	1337
BOD-JFK	3	1	8.00	7.48	3119	1004	3137	0	0.0	565
BOD-JIB	6	1	7.00	7.21	3004	1712	3165	532	16.8	2280
BOG-JFK	1	7	5.57	5.17	2156	0	2156	0	0.0	10206
BOM-CDG	9	4	9.00	9.05	3774	3774	4216	1969	46.7	6733
BOM-FRA	9	9	8.89	8.50	3545	3545	3545	3545	100.0	19695
BOM-NBO	19	5	6.00	5.87	2446	866	2446	866	35.4	1975
BOM-ZRH	9	7	9.00	8.47	3529	3529	3529	3529	100.0	10464
BOS-BRU	3	6	6.33	7.23	3013	1338	3097	111	3.6	4301
BOS-CDG	3	9	6.56	7.12	2967	629	3072	169	5.6	5523
BOS-FCO	3	2	7.50	8.50	3544	1517	3661	608	16.6	1990
BOS-FRA	3	14	7.14	7.62	3178	953	3312	265	8.0	10695
BOS-GLA	3	7	6.14	6.29	2624	585	2693	0	0.0	4567
BOS-LAS	12	7	5.57	4.95	2062	2062	2062	2062	100.0	4219
BOS-LAX	12	42	6.07	5.43	2263	2263	2263	2263	100.0	27913
BOS-LGW	3	7	6.57	6.82	2843	847	2889	95	3.3	6433
BOS-LHR	3	21	6.38	6.78	2827	591	2956	74	2.5	16034
BOS-SFO	12	28	6.21	5.62	2343	2343	2343	2343	100.0	21451
BOS-SNN	3	7	5.71	6.01	2507	521	2548	0	0.0	6449
BOS-ZRH	3	7	7.00	7.78	3243	1281	3290	345	10.5	5328
BRU-CKY	6	4	6.75	6.32	2636	2636	3012	93	3.1	4015
BRU-FIH	7	4	7.25	8.08	3370	2955	3370	2955	87.7	5181
BRU-JFK	3	38	8.24	7.62	3176	794	3338	107	3.2	20610
BRU-ORD	3	19	9.21	8.64	3602	1740	3966	738	18.6	9144
BRU-YMX	3	9	7.44	7.21	3007	1320	3269	350	10.7	5535
BTK-VKO	9	7	7.14	5.03	2098	2098	2098	2098	100.0	6876
BUD-JFK	3	2	9.50	9.08	3785	2067	3953	530	13.4	965
BWI-KEF	3	4	6.00	5.74	2394	1216	2611	112	4.3	2059
BWI-LAX	12	21	5.52	4.85	2021	2021	2021	2021	100.0	10792
BWI-LGW	3	7	7.14	7.59	3164	1528	3228	284	8.8	2959
CAI-JFK	3	3	12.67	11.66	4861	2173	5054	96	1.9	1980
CAI-SIN	19	1	10.00	10.69	4458	1814	4662	1604	34.4	707
CAY-CDG	4	2	8.00	9.21	3841	223	3841	223	5.8	1402

ONE DIRECTION ONLY

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CAY-ORY	4	2	8.00	9.18	3827	222	3827	222	5.8	2674
CCS-CDG	4	1	9.00	9.88	4118	280	4118	280	6.8	1009
CCS-FCO	4	2	9.50	10.79	4496	940	4496	940	20.9	2428
CCS-FRA	4	4	10.00	10.45	4357	392	4357	392	9.0	4272
CCS-LHR	4	2	9.00	9.33	3890	167	3890	167	4.3	2271
CCS-LIS	4	3	8.00	8.42	3508	0	3508	0	0.0	2074
CCS-MAD	4	9	8.33	9.07	3779	242	3779	242	6.4	6722
CCS-MXP	4	3	9.33	10.43	4347	530	4347	530	12.2	2170
CCS-SCQ	4	2	8.00	8.61	3590	0	3590	0	0.0	1469
CCS-TFS	4	2	7.00	7.24	3018	0	3018	0	0.0	1491
CCS-ZRH	4	2	10.00	10.43	4346	391	4346	391	9.0	1343
CDG-DHA	8	2	6.00	6.20	2584	2584	2810	1413	50.3	2000
CDG-DKR	6	3	6.00	5.47	2280	1407	2402	207	8.6	2988
CDG-DOH	8	1	7.00	6.43	2680	2680	2901	1506	51.9	531
CDG-DTW	3	7	8.71	8.23	3431	1791	3575	651	18.2	4567
CDG-DXB	8	1	7.00	6.78	2825	2825	3094	1414	45.7	1140
CDG-EWR	3	5	8.00	7.58	3161	1309	3214	219	6.8	3125
CDG-EZE	5	2	16.00	14.36	5985	2430	6242	262	4.2	1796
CDG-FDF	4	8	9.00	8.89	3707	308	3707	308	8.3	8289
CDG-GIG	5	6	11.17	11.89	4956	1888	5121	200	3.9	5130
CDG-GRU	5	1	12.00	12.19	5083	2104	5333	219	4.1	833
CDG-IAD	3	17	8.47	8.02	3344	883	3376	300	8.9	9158
CDG-IAH	3	5	10.40	10.45	4355	3427	4949	153	3.1	3630
CDG-JED	8	5	5.60	5.76	2399	1327	2500	628	25.1	2610
CDG-JFK	3	48	7.38	7.55	3148	762	3194	147	4.6	34572
CDG-JIB	6	2	7.00	7.24	3018	2270	3134	671	21.4	4068
CDG-KHI	9	2	7.00	7.92	3302	2754	3973	1959	49.3	2995
CDG-KWI	8	3	6.00	5.69	2373	2373	2662	1264	47.5	1682
CDG-LAX	3	9	11.33	11.78	4912	2869	5097	1840	36.1	6670
CDG-MIA	4	8	9.75	9.54	3977	183	3977	183	4.6	7731
CDG-MLE	9	1	10.00	10.71	4464	3143	4642	1880	40.5	2480
CDG-NBO	7	4	8.00	8.41	3505	2503	3505	2503	71.4	6541
CDG-NDJ	6	3	6.00	5.52	2299	1887	2299	1887	82.1	3351
CDG-NIM	6	3	5.33	5.11	2132	1840	2132	1840	86.3	3198
CDG-NRT	9	10	11.80	12.56	5237	4509	5607	1110	19.8	20575
CDG-ORD	3	5	9.00	8.63	3596	1917	3822	959	25.1	3106

ONE DIRECTION ONLY

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CDG-PEK	9	1	14.00	10.60	4419	4419	4419	4419	100.0	2396
CDG-PTP	4	7	8.00	8.76	3653	321	3653	321	8.8	7241
CDG-REC	5	3	9.00	9.48	3953	731	4003	196	4.9	3090
CDG-RUH	8	3	6.00	6.05	2520	2520	2670	1274	47.7	1501
CDG-SDA	8	1	5.00	5.00	2083	2083	2374	874	36.8	495
CDG-SEL	9	1	18.00	11.58	4826	4826	4826	4826	100.0	1497
CDG-SEL	9	4	12.50	11.58	4826	4826	4826	4826	100.0	9392
CDG-SEZ	7	1	10.00	10.16	4234	1702	4664	569	12.2	1419
CDG-SFO	3	7	11.14	11.60	4836	4033	5014	1870	37.3	3828
CDG-SIN	9	2	12.50	13.88	5786	4172	6449	2019	31.3	5056
CDG-SIN	9	4	15.25	13.88	5786	4172	6449	2019	31.3	9776
CDG-STL	3	7	9.57	9.14	3809	2194	4424	708	16.0	2959
CDG-SXM	4	3	8.00	8.73	3637	276	3637	276	7.6	3683
CDG-THR	8	1	6.00	5.42	2261	1741	2261	1741	77.0	495
CDG-YMX	3	17	7.47	7.18	2993	1116	3203	400	12.5	10970
CDG-YYZ	3	2	8.00	7.79	3248	1566	3491	422	12.1	822
CGK-FRA	9	3	16.00	14.38	5994	4939	6850	2199	32.1	6445
CGK-NRT	18	7	7.29	7.55	3148	466	3245	0	0.0	25802
CGK-RUH	19	4	8.50	9.54	3978	1416	4110	740	18.0	3657
CGN-EWR	3	3	8.67	7.87	3282	1592	3394	204	6.0	1406
CGN-IAD	3	4	9.00	8.31	3464	1770	3567	325	9.1	1875
CHC-PER	18	1	7.00	6.65	2771	515	2981	158	5.3	2741
CLT-LGW	3	7	7.86	8.33	3474	1838	3539	471	13.3	3377
CMB-KWI	19	6	5.17	5.37	2237	602	2288	59	2.6	3624
CMN-JED	8	3	6.00	6.16	2568	2327	2833	187	6.6	1749
CMN-JFK	3	3	8.00	7.50	3125	0	3125	0	0.0	2532
CNS-HNL	11	1	9.00	9.18	3826	0	3826	0	0.0	1747
CNS-NRT	18	6	7.00	7.61	3174	225	3435	0	0.0	20849
CNS-SIN	18	2	6.00	6.48	2702	1229	2970	0	0.0	4933
CPH-EWR	3	7	8.71	8.04	3350	724	3484	150	4.3	4085
CPH-GIG	5	3	13.33	13.19	5497	1275	5673	147	2.6	1078
CPH-JFK	3	15	8.40	8.01	3340	792	3451	169	4.9	9562
CPH-NRT	9	1	11.00	11.27	4699	4356	4699	4356	92.7	1342
CPH-ORD	3	7	9.14	8.87	3698	1609	4385	706	16.1	4085
CPH-PEK	9	1	9.00	9.32	3883	3883	3883	3883	100.0	599
CPH-SEA	3	20	9.80	10.11	4214	2748	5074	624	12.3	11258

ONE DIRECTION ONLY

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CPH-SIN	9	2	13.00	12.90	5378	5378	6180	2101	34.0	1198
CPH-YYZ	3	5	8.80	8.12	3383	1231	3574	379	10.6	2794
CPT-LHR	7	2	13.00	11.25	4688	4336	4688	4336	92.5	2260
CVG-FRA	3	7	8.14	9.06	3778	2059	4294	704	16.4	4326
CVG-LGW	3	7	7.57	8.28	3450	1839	3653	424	11.6	4326
CVG-ORY	3	12	8.33	8.64	3601	1426	3700	651	17.6	7003
DEL-FCO	9	6	8.00	7.68	3203	3203	3203	3203	100.0	11327
DEL-FRA	9	13	8.77	7.92	3303	3303	3303	3303	100.0	29297
DEL-SIN	18	8	5.25	5.38	2243	998	2288	737	32.2	26397
DEN-HNL	12	10	7.00	6.98	2908	846	2908	846	29.1	8026
DEN-LGW	3	7	8.86	9.78	4075	2306	4376	1291	29.5	4069
DFW-FRA	3	21	9.71	10.68	4453	2814	4805	1081	22.5	13734
DFW-HNL	12	28	7.86	7.87	3281	1014	3281	1014	30.9	26825
DFW-LGW	3	21	9.38	9.89	4121	2415	4279	1356	31.7	11820
DFW-MAD	3	7	9.86	10.32	4300	2468	4531	983	21.7	3458
DFW-NRT	10	7	13.14	13.36	5570	1688	5576	1411	25.3	19582
DFW-ORY	3	7	9.86	10.28	4287	3031	4635	1112	24.0	3458
DHA-LHR	8	5	7.20	6.55	2731	2731	2980	1585	53.2	3699
DHA-SIN	19	2	8.00	8.25	3440	1008	3723	119	3.2	879
DKR-FCO	6	1	5.00	5.36	2236	2236	2456	0	0.0	1128
DKR-GVA	6	2	5.00	5.35	2231	2231	2380	169	7.1	1802
DKR-LYS	6	1	5.00	5.22	2176	2176	2333	156	6.7	990
DKR-MRS	6	2	5.00	5.09	2123	1369	2283	0	0.0	2730
DME-GDX	9	7	7.86	7.62	3178	3178	3178	3178	100.0	6541
DME-HTA	9	14	8.14	6.12	2552	2552	2552	2552	100.0	13753
DME-IKT	9	21	5.71	5.43	2262	2262	2262	2262	100.0	20629
DME-KHV	9	21	8.67	7.95	3312	3312	3312	3312	100.0	27757
DME-PKC	9	7	8.86	8.79	3666	3666	3666	3666	100.0	6541
DME-VVO	9	7	8.57	8.28	3452	3452	3452	3452	100.0	6541
DME-YKS	7	7	6.71	9.06	3776	3776	3776	3776	100.0	5342
DOH-LHR	8	5	7.00	6.78	2827	2827	3071	1674	54.5	3236
DPS-GUM	18	3	5.33	5.30	2209	311	2328	0	0.0	7202
DPS-NGO	18	3	7.00	6.99	2913	361	3066	0	0.0	6578
DTW-FRA	3	7	8.14	8.65	3604	1971	3802	810	21.3	4567
DTW-LHR	3	7	7.57	7.83	3262	1706	3516	626	17.8	3088
DTW-NRT	10	7	13.29	13.30	5544	3321	6083	1077	17.7	36055

ONE DIRECTION ONLY

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DTW-SEL	10	7	19.00	13.76	5737	4211	6314	1124	17.8	36055
DTW-SEL	10	4	14.50	13.76	5737	4211	6314	1124	17.8	22379
DUS-JFK	3	8	8.13	7.79	3247	1555	3364	212	6.3	4312
DUS-LAX	3	6	11.33	11.82	4929	3283	5201	1774	34.1	4611
DUS-MIA	4	4	9.75	9.84	4102	595	4152	170	4.1	2627
DUS-NRT	9	2	17.00	12.12	5053	4563	5546	832	15.0	3917
DUS-ORD	3	12	9.17	8.79	3663	1648	3988	897	22.5	6123
DUS-SFO	3	2	11.00	11.60	4835	3467	5105	1720	33.7	1323
DXB-FCO	8	3	6.33	5.62	2343	2343	2506	887	35.4	2471
DXB-FRA	8	14	7.07	6.27	2612	2612	2955	1274	43.1	9452
DXB-HKG	19	5	7.20	7.70	3210	3210	3210	3210	100.0	4710
DXB-KUL	19	12	7.00	7.16	2984	534	3340	87	2.6	7829
DXB-LGW	8	16	7.69	7.08	2952	2952	3246	1574	48.5	12243
DXB-LHR	8	4	8.00	7.11	2965	2965	3264	1583	48.5	3191
DXB-MAN	8	1	9.00	7.32	3050	3050	3381	1335	39.5	968
DXB-MNL	19	6	8.67	8.94	3728	2856	3728	2856	76.6	5248
DXB-RUN	19	1	7.00	6.64	2768	484	2768	484	17.5	1110
DXB-SIN	19	7	7.14	7.57	3156	707	3438	0	0.0	4154
DXB-SVO	8	9	5.22	4.80	2001	2001	2001	2001	100.0	3025
DXB-ZRH	8	6	6.50	6.17	2571	2571	2571	2571	100.0	5050
EWR-FBU	3	7	7.57	7.66	3194	1239	3329	156	4.7	4085
EWR-FRA	3	7	7.71	8.04	3352	1699	3432	257	7.5	3281
EWR-LAX	12	84	5.68	5.10	2125	2125	2125	2125	100.0	63561
EWR-LGW	3	18	6.83	7.24	3018	803	3183	146	4.6	16431
EWR-LHR	3	7	6.71	7.20	3002	1324	3070	98	3.2	5146
EWR-LIS	3	3	6.67	7.04	2933	0	2933	0	0.0	1576
EWR-NRT	10	7	13.71	14.02	5845	4185	6039	1184	19.6	21148
EWR-ORY	3	21	7.19	7.58	3161	699	3301	158	4.8	19749
EWR-SEA	12	7	5.71	4.99	2080	2080	2080	2080	100.0	6040
EWR-SFO	12	35	6.06	5.33	2221	2221	2221	2221	100.0	29268
EZE-LPA	5	1	9.00	10.69	4458	2184	4831	0	0.0	1056
EZE-MAD	5	6	11.50	13.04	5437	2409	5712	263	4.6	8935
EZE-MIA	1	13	9.00	9.19	3831	2984	4137	691	16.7	19864
FCO-GIG	5	5	11.60	11.87	4948	2558	5261	0	0.0	7411
FCO-HKG	9	3	12.33	12.04	5020	5020	5020	5020	100.0	7404
FCO-JFK	3	29	9.10	8.89	3705	1041	3766	218	5.8	27808

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FCO-NBO	7	2	7.00	6.99	2913	2185	2913	2185	75.0	2074
FCO-ORD	3	3	10.00	10.02	4178	2227	4370	1446	33.1	2006
FCO-SIN	9	1	12.00	13.01	5424	4166	5921	1640	27.7	2480
FCO-YMX	3	3	9.00	8.56	3568	1634	3745	1082	28.9	2240
FCO-YYZ	3	4	9.00	9.17	3824	1847	4008	1214	30.3	3161
FDF-LIL	4	1	8.00	8.98	3745	0	3745	0	0.0	1337
FDF-NTE	4	1	8.00	8.45	3522	0	3522	0	0.0	1337
FDF-ORY	4	4	8.00	8.87	3697	307	3697	307	8.3	5348
FRA-GIG	5	5	12.00	12.39	5163	1492	5360	434	8.1	6894
FRA-GRU	5	4	12.00	12.70	5294	2324	5572	446	8.0	4009
FRA-IAD	3	21	8.90	8.48	3534	1428	3619	362	10.0	13638
FRA-IAH	3	2	11.00	10.88	4534	2893	5166	253	4.9	1751
FRA-JED	8	3	5.33	5.37	2240	1010	2361	508	21.5	1329
FRA-JFK	3	46	8.48	8.01	3340	1069	3420	250	7.3	36215
FRA-JNB	7	8	12.00	11.25	4688	4688	4688	4688	100.0	14192
FRA-KHI	9	6	7.17	7.37	3073	3073	3073	3073	100.0	9913
FRA-KWI	8	7	5.57	5.19	2165	2165	2523	1128	44.7	4165
FRA-MCO	3	4	9.75	9.86	4112	699	4137	281	6.8	2472
FRA-MEX	4	2	12.00	12.37	5155	2871	5369	403	7.5	2366
FRA-MIA	4	9	10.00	10.05	4188	725	4210	274	6.5	6383
FRA-MRU	7	2	11.00	11.91	4964	3649	5476	509	9.3	2837
FRA-NBO	7	8	8.13	8.18	3408	2498	3408	2498	73.3	7465
FRA-NRT	9	13	11.15	12.12	5053	4073	5211	917	17.6	28878
FRA-ORD	3	26	9.38	9.02	3761	1809	4055	1087	26.8	15531
FRA-OSA	9	4	17.00	11.96	4984	4486	5574	814	14.6	10111
FRA-PEK	9	6	9.83	10.08	4202	4202	4202	4202	100.0	14034
FRA-PIT	3	7	9.43	8.56	3569	1974	3709	612	16.5	3377
FRA-RUH	8	6	5.67	5.58	2327	2327	2531	1134	44.8	2655
FRA-SEL	9	5	17.80	11.09	4621	4621	4621	4621	100.0	12016
FRA-SFO	3	7	11.43	11.84	4937	3767	5204	1681	32.3	6127
FRA-SIN	9	9	12.33	13.30	5546	5546	5546	5546	100.0	22588
FRA-SXM	4	1	9.00	9.30	3875	372	3875	372	9.6	650
FRA-THR	8	7	5.14	4.88	2033	2033	2033	2033	100.0	4380
FRA-YMX	3	7	8.00	7.60	3169	1534	3425	493	14.4	4758
FRA-YVR	3	8	10.25	10.44	4351	3263	4671	1224	26.2	4264
FRA-YYC	3	5	9.40	9.75	4063	3129	4385	1096	25.0	2904

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FRA-YYZ	3	14	8.50	8.21	3423	1089	3699	544	14.7	9167
FUK-SIN	18	3	5.67	5.85	2440	142	2445	0	0.0	11115
GEO-JFK	1	4	6.00	5.27	2196	0	2196	0	0.0	3459
GIG-GVA	5	3	10.67	11.84	4934	2151	5206	281	5.4	2382
GIG-JFK	1	13	9.46	10.01	4171	1852	4796	0	0.0	24092
GIG-LAX	1	4	12.00	13.12	5470	5470	5619	2467	43.9	7235
GIG-LHR	5	5	11.00	11.98	4994	1903	5116	61	1.2	6671
GIG-LIS	5	6	9.00	9.99	4163	1099	4272	0	0.0	5066
GIG-MAD	5	16	9.63	10.55	4396	725	4444	213	4.8	14183
GIG-MIA	1	33	8.33	8.70	3625	2708	4149	116	2.8	49633
GIG-MXP	5	4	11.00	11.96	4987	1696	5217	162	3.1	5953
GIG-YYZ	1	4	10.50	10.71	4464	2232	5120	420	8.2	4515
GLA-ORD	3	7	8.57	7.64	3183	1369	3556	612	17.2	3458
GLA-YYZ	3	2	7.00	6.84	2852	1098	3164	351	11.1	1659
GRU-LAX	1	1	12.00	12.83	5347	5347	5447	2331	42.8	1644
GRU-LHR	5	2	11.00	12.26	5112	1370	5328	96	1.8	2799
GRU-LIS	5	3	9.33	10.29	4289	1274	4490	0	0.0	2565
GUM-HNL	10	13	7.23	7.92	3300	0	3300	0	0.0	35856
GVA-JED	8	1	5.00	5.25	2189	1473	2313	458	19.8	511
GVA-JFK	3	7	8.29	8.03	3347	1406	3377	422	12.5	5045
GVA-KWI	8	3	5.67	5.27	2195	2195	2476	1080	43.6	1486
GVA-LAX	3	5	11.80	12.31	5132	3423	5311	2093	39.4	2539
GVA-NBO	7	3	7.67	7.88	3284	2621	3284	2621	79.8	3243
HAM-JFK	3	5	8.60	7.92	3301	1060	3356	0	0.0	2346
HAV-MAD	4	7	9.00	9.65	4024	233	4024	233	5.8	4031
HAV-SXF	4	4	10.00	10.85	4521	764	4613	198	4.3	2063
HAV-YQX	2	7	4.86	4.89	2037	191	2039	120	5.9	8592
HEL-JFK	3	11	9.09	8.55	3566	1562	3746	566	15.1	6123
HKG-LGW	9	12	16.17	12.49	5206	5206	5206	5206	100.0	29405
HKG-LGW	9	9	13.78	12.49	5206	5206	5206	5206	100.0	22307
HKG-LHR	9	5	14.00	12.48	5204	5204	5204	5204	100.0	12130
HKG-MCT	19	3	7.33	7.33	3055	2575	3055	2575	84.3	2010
HKG-MEL	18	6	9.00	9.59	3998	1675	3998	1675	41.9	23080
HKG-MRU	19	1	10.00	10.04	4186	1055	4186	1055	25.2	637
HKG-PER	18	1	7.00	7.96	3317	1403	3682	0	0.0	3894
HKG-SEA	10	10	12.00	13.41	5588	1743	5907	0	0.0	36068

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HKG-SFO	10	14	12.29	14.38	5994	851	6181	0	0.0	70495
HKG-SYD	18	6	9.00	9.56	3983	2410	4497	0	0.0	23439
HKG-YVR	10	14	11.79	13.28	5534	2308	5832	216	3.7	58049
HND-HNL	10	5	7.00	9.56	3983	0	3983	0	0.0	23623
HNL-IAH	12	7	7.00	8.12	3385	1090	3385	1090	32.2	9638
HNL-LAS	12	9	5.56	5.75	2395	266	2395	266	11.1	10288
HNL-LAX	12	154	5.13	5.32	2217	0	2217	0	0.0	147041
HNL-MNL	10	9	10.00	11.03	4597	0	4597	0	0.0	39014
HNL-NAN	11	9	6.44	6.61	2755	0	2755	0	0.0	11861
HNL-NGO	10	4	8.25	8.35	3481	0	3481	0	0.0	25164
HNL-NRT	10	79	8.03	7.95	3314	0	3314	0	0.0	402540
HNL-OAK	12	7	4.86	5.01	2090	0	2090	0	0.0	4441
HNL-ORD	12	21	8.05	8.83	3680	1579	3680	1579	42.9	19608
HNL-OSA	10	20	8.50	8.53	3557	0	3557	0	0.0	111324
HNL-PHX	12	6	5.67	6.07	2529	281	2529	281	11.1	7252
HNL-PPG	11	5	5.60	5.44	2267	0	2267	0	0.0	4510
HNL-SAN	12	7	5.14	5.44	2267	0	2267	0	0.0	6706
HNL-SEA	12	21	5.43	5.58	2325	0	2325	0	0.0	17143
HNL-SEL	10	24	9.79	9.46	3944	181	4592	0	0.0	96517
HNL-SFO	12	83	4.93	4.99	2080	0	2080	0	0.0	78030
HNL-SIN	10	3	15.33	13.97	5822	605	6360	0	0.0	15442
HNL-SJC	12	7	5.00	5.03	2096	0	2096	0	0.0	6440
HNL-STL	12	7	7.86	8.59	3580	1475	3580	1475	41.2	9571
HNL-SYD	11	20	10.05	10.58	4409	66	4416	26	0.6	28858
HNL-TPE	10	3	10.00	10.50	4378	0	4378	0	0.0	15442
HNL-YVR	12	5	5.80	6.08	2534	0	2534	0	0.0	4977
HRE-PER	19	4	9.00	11.01	4590	1060	4600	304	6.6	2335
IAD-LHR	3	17	6.71	7.64	3185	1271	3260	339	10.4	13828
IAD-NRT	10	6	14.00	14.04	5853	4624	6171	1271	20.6	39387
IAD-PDX	12	7	5.43	4.83	2015	2015	2015	2015	100.0	4308
IAD-SFO	12	34	5.50	5.02	2095	2095	2095	2095	100.0	25080
IAH-LGW	3	14	9.07	10.10	4210	2404	4826	256	5.3	8041
IKT-SVO	9	6	5.33	5.43	2262	2262	2262	2262	100.0	5139
IST-SIN	9	2	10.50	11.22	4677	3400	5070	1156	22.8	3642
JED-JFK	3	3	13.00	13.26	5527	2570	5606	465	8.3	2709
JED-LHR	8	9	6.44	6.17	2572	1422	2572	1422	55.3	7509

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JED-NCE	8	1	5.00	4.97	2071	466	2300	214	9.3	495
JED-ZRH	8	2	5.50	5.15	2147	1074	2245	373	16.6	1056
JFK-KEF	3	8	5.88	5.39	2247	1038	2451	0	0.0	4117
JFK-LAX	12	131	5.77	5.14	2142	2142	2142	2142	100.0	111197
JFK-LGW	3	14	6.93	7.21	3006	833	3092	223	7.2	10993
JFK-LHR	3	97	6.39	7.17	2990	831	3076	221	7.2	77174
JFK-LIL	3	2	7.00	7.52	3134	1492	3222	16	0.5	1654
JFK-LIS	3	12	6.75	7.00	2917	0	2917	0	0.0	7143
JFK-LYS	3	3	7.00	7.95	3315	1442	3357	258	7.7	1696
JFK-MAD	3	22	7.09	7.46	3109	413	3109	413	13.3	20018
JFK-MAN	3	7	6.71	6.94	2894	1210	3030	70	2.3	5146
JFK-MUC	3	13	8.00	8.40	3501	1390	3549	568	16.0	6518
JFK-MXP	3	28	7.75	8.30	3460	1059	3488	551	15.8	27452
JFK-NCE	3	7	8.43	8.31	3464	1399	3469	343	9.9	3088
JFK-NRT	10	24	13.88	14.02	5845	4185	6046	1185	19.6	114631
JFK-NTE	3	1	7.00	7.28	3033	998	3037	0	0.0	565
JFK-ORY	3	10	7.40	7.55	3148	1281	3189	140	4.4	6031
JFK-RUH	3	2	12.00	13.59	5666	3949	5927	859	14.5	1806
JFK-SAN	12	7	5.71	5.08	2118	2118	2118	2118	100.0	4774
JFK-SCQ	3	1	6.00	6.83	2849	0	2849	0	0.0	611
JFK-SEA	12	21	5.90	5.03	2097	2097	2097	2097	100.0	14723
JFK-SFO	12	88	6.16	5.37	2239	2239	2239	2239	100.0	77986
JFK-SJC	12	14	6.43	5.34	2224	2224	2224	2224	100.0	9060
JFK-SNN	3	17	6.18	6.40	2669	544	2716	27	1.0	14104
JFK-SVO	3	5	9.20	9.68	4037	2176	4148	913	22.0	4296
JFK-TLV	3	18	10.28	11.81	4921	2746	5178	52	1.0	19305
JFK-TXL	3	4	8.00	8.31	3463	1306	3550	202	5.7	1764
JFK-VIE	3	11	8.73	8.80	3670	2007	3736	919	24.6	4567
JFK-WAW	3	11	8.73	8.86	3695	1655	3828	532	13.9	6203
JFK-ZRH	3	21	7.71	8.17	3405	1611	3441	630	18.3	15976
JIB-LYS	6	1	7.00	6.78	2827	2168	3234	524	16.2	2280
JIB-MRS	6	3	6.67	6.58	2741	1642	2947	330	11.2	5359
JIB-ORY	6	1	7.00	7.24	3018	2270	3134	671	21.4	2280
KHG-SHA	18	7	2.14	5.40	2252	2252	2252	2252	100.0	17664
KHI-PEK	18	9	6.56	6.26	2610	2610	2610	2610	100.0	21974
KHI-SIN	18	3	6.00	6.14	2558	1195	3026	0	0.0	7618

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KHV-TAS	18	6	7.50	6.59	2747	2747	2747	2747	100.0	8846
KHV-VKO	9	7	11.29	7.97	3322	3322	3322	3322	100.0	14675
KIN-LHR	4	2	9.00	9.73	4057	105	4057	105	2.6	2271
KOA-SFO	12	7	4.71	4.93	2057	0	2057	0	0.0	4441
KUL-NRT	18	8	6.63	6.96	2900	281	2900	281	9.7	20377
KWI-LHR	8	12	6.92	6.04	2517	2361	2762	1304	47.2	10073
KWI-SIN	19	2	8.50	8.65	3604	2162	3900	0	0.0	1340
LAX-LGW	3	17	10.47	11.39	4747	2777	5159	1986	38.5	15195
LAX-LHR	3	21	10.29	11.34	4727	2765	5138	1978	38.5	20071
LAX-LIM	1	3	8.00	8.70	3626	1425	3664	0	0.0	4661
LAX-MAD	3	3	11.00	12.15	5065	3074	5213	2028	38.9	2964
LAX-MBJ	2	4	5.50	5.63	2348	1186	2348	1186	50.5	4071
LAX-MIA	12	49	5.02	4.87	2029	2029	2029	2029	100.0	39905
LAX-MXP	3	5	11.20	12.56	5234	4114	5419	2168	40.0	3343
LAX-NRT	10	58	11.34	11.34	4727	0	4727	0	0.0	280610
LAX-OGG	12	14	5.29	5.17	2156	0	2156	0	0.0	13080
LAX-OSA	10	4	12.00	11.03	4597	336	4597	336	7.3	19893
LAX-PHL	12	28	5.00	4.99	2080	2080	2080	2080	100.0	17632
LAX-PPT	11	6	8.00	8.56	3569	0	3569	0	0.0	8207
LAX-SEL	10	17	13.06	12.41	5175	347	5175	347	6.7	79919
LAX-TPE	10	10	13.80	14.11	5883	682	5898	59	1.0	50689
LAX-ZRH	3	5	11.40	12.35	5146	3741	5350	2231	41.7	2539
LGW-LUN	7	2	9.50	10.23	4265	3894	4265	3894	91.3	2417
LGW-MCO	3	1	9.00	9.05	3773	400	3798	133	3.5	930
LGW-MIA	4	11	9.91	9.23	3849	362	3859	185	4.8	8412
LGW-MSP	3	7	9.00	8.38	3495	1754	3942	706	17.9	6433
LGW-NAS	4	2	9.00	9.06	3777	355	3791	182	4.8	2271
LGW-NRT	9	6	12.00	12.35	5149	4289	5448	844	15.5	16209
LGW-ROB	6	1	7.00	6.58	2741	2741	3230	155	4.8	1530
LGW-SEL	9	2	12.50	11.51	4798	3872	5563	868	15.6	5067
LGW-SJU	4	1	8.00	8.73	3639	146	3639	146	4.0	1135
LGW-STL	3	7	9.29	8.77	3656	2014	4342	521	12.0	2959
LGW-UVF	4	1	9.00	8.80	3670	147	3670	147	4.0	1135
LGW-YYZ	3	11	8.09	7.43	3097	1505	3347	653	19.5	5282
LHR-MBJ	4	1	10.00	9.78	4076	318	4076	318	7.8	1135
LHR-MIA	4	7	9.29	9.20	3836	361	3842	85	2.2	8084

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LHR-NBO	7	9	8.78	8.85	3691	2776	3691	2776	75.2	15826
LHR-NRT	9	14	11.79	12.35	5147	3829	5880	759	12.9	30692
LHR-ORD	3	21	8.62	8.21	3423	1807	3702	1140	30.8	17401
LHR-OSA	9	1	18.00	12.30	5128	4108	5473	821	15.0	2426
LHR-PEK	9	1	17.00	10.56	4401	4401	4401	4401	100.0	2426
LHR-PHL	3	14	8.00	7.36	3068	1460	3145	198	6.3	9472
LHR-POS	4	1	9.00	9.18	3828	165	3828	165	4.3	690
LHR-RUH	8	6	6.50	6.42	2676	2676	2676	2676	100.0	4529
LHR-SEA	3	9	9.67	9.97	4156	3051	4746	1253	26.4	8455
LHR-SFO	3	14	10.79	11.16	4650	2646	5040	2016	40.0	13139
LHR-SIN	9	19	13.16	14.09	5872	5872	6619	2184	33.0	45494
LHR-SIN	9	6	15.50	14.09	5872	5872	6619	2184	33.0	11093
LHR-THR	8	3	5.67	5.71	2382	2382	2382	2382	100.0	2366
LHR-UVF	4	1	9.00	8.79	3664	169	3664	169	4.6	690
LHR-YMX	3	14	7.07	6.78	2825	1212	3200	384	12.0	9891
LHR-YVR	3	10	9.40	9.81	4090	2597	4512	1430	31.7	6233
LHR-YYC	3	4	9.00	9.08	3786	2026	4108	978	23.8	1967
LHR-YYT	3	5	5.80	4.81	2007	345	2046	158	7.7	2056
LHR-YYZ	3	23	7.65	7.39	3079	1512	3341	809	24.2	19363
LIL-SXM	4	1	9.00	8.80	3668	0	3668	0	0.0	1337
LIM-MEX	19	3	5.67	5.49	2290	273	2290	273	11.9	2387
LIM-MIA	1	19	5.42	5.46	2277	1025	2647	183	6.9	23167
LIS-REC	5	3	7.33	7.58	3160	0	3160	0	0.0	2533
LIS-YMX	3	6	7.17	6.83	2848	869	2954	239	8.1	3476
LPA-MVD	5	2	10.00	10.59	4415	2119	4566	0	0.0	3090
MAD-MEX	4	5	11.00	11.74	4893	161	5133	0	0.0	6027
MAD-MIA	4	10	8.90	9.20	3834	222	3834	222	5.8	10332
MAD-ORD	3	2	9.00	8.73	3640	1671	3918	921	23.5	1351
MAD-SDQ	4	7	8.00	8.66	3609	303	3609	303	8.4	5219
MAD-SJU	4	5	8.00	8.17	3404	235	3404	235	6.9	3728
MAD-YMX	3	3	7.00	7.24	3016	1128	3229	520	16.1	2964
MAN-MCO	3	2	9.00	8.81	3672	371	3674	316	8.6	1861
MAN-ORD	3	7	8.57	7.95	3313	1633	3806	818	21.5	3458
MEL-NAN	18	8	4.88	5.00	2086	309	2255	0	0.0	23779
MEL-NRT	18	2	10.00	10.60	4417	2027	4979	0	0.0	5992
MIA-SCL	1	12	8.17	8.64	3603	1802	3945	150	3.8	10241

ONE DIRECTION ONLY

WEEKLY AIRCRAFT STATISTICS
FOR JULY 1990
NON-STOP JET PASSENGER ONLY FLIGHTS GREATER THAN 2000 MILES

AIRPORT CODES	IATA CODE	DPRTS	SCEHD TIME/ DPRT	FLT BLOCK TIME	GC N.MI.	Ovrlnd DIST	DVRT N.MI.	Ovrlnd DIST	%ovlnd	YR2015 WKLY SEATS
MLE-ZRH	9	2	9.50	10.09	4208	2899	4387	1588	36.2	4960
MNL-RUH	19	5	9.40	10.07	4199	3578	4199	3578	85.2	4571
MRS-PTP	4	1	9.00	8.94	3727	596	3747	274	7.3	1337
MRU-SIN	19	2	7.00	7.24	3017	332	3313	0	0.0	1575
MRU-TPE	19	3	10.67	11.09	4621	679	5062	0	0.0	2128
MSP-NRT	10	3	12.33	12.37	5155	2578	5800	1375	23.7	14919
MUC-ORD	3	7	10.14	9.42	3928	2251	4151	1528	36.8	3458
MXP-NRT	9	2	12.00	12.61	5258	4885	5258	4885	92.9	5187
MXP-ORD	3	3	9.33	9.40	3917	2280	4120	1215	29.5	2006
MXP-YYZ	3	3	9.00	12.88	5368	2593	5763	1222	21.2	1652
NAN-NRT	18	2	9.00	9.21	3841	0	3841	0	0.0	7192
NBO-TLV	19	2	5.00	4.80	2001	1693	2001	1693	84.6	1617
NBO-ZRH	7	4	8.00	7.88	3284	2883	3284	2883	87.8	4222
NGO-SIN	18	2	6.00	6.57	2740	0	2740	0	0.0	5198
NGO-SYD	18	1	10.00	10.14	4227	1746	4423	0	0.0	3799
NGO-YVR	10	3	9.00	10.05	4189	335	4189	335	8.0	9511
NRT-ORD	10	12	11.50	13.04	5437	2876	5537	1744	31.5	55140
NRT-ORD	10	7	16.14	13.04	5437	2876	5537	1744	31.5	34812
NRT-PDX	10	7	8.71	10.03	4180	0	4180	0	0.0	23411
NRT-PER	18	4	10.00	10.28	4287	643	4620	0	0.0	10585
NRT-PPT	18	1	11.00	12.23	5099	0	5099	0	0.0	3922
NRT-SEA	10	20	8.70	9.92	4133	174	4144	108	2.6	99513
NRT-SFO	10	41	9.29	10.65	4441	0	4441	0	0.0	193008
NRT-SIN	18	41	6.83	6.93	2889	0	2889	0	0.0	146020
NRT-SVO	9	37	10.14	9.71	4049	3656	4049	3656	90.3	53712
NRT-SYD	18	19	9.21	10.14	4226	1040	4388	22	0.5	69419
NRT-YVR	10	19	8.68	9.72	4052	288	4069	208	5.1	72745
NRT-YYZ	10	6	12.00	13.34	5559	4230	5823	1147	19.7	18426
OGG-SFO	12	14	4.71	4.87	2029	0	2029	0	0.0	10814
ORD-ORY	3	7	8.43	8.63	3599	1911	3817	920	24.1	3281
ORD-WAW	3	5	9.20	9.73	4057	1874	4845	1313	27.1	3249
ORD-ZAG	3	3	9.00	9.97	4157	2461	4395	1499	34.1	1909
ORD-ZRH	3	14	8.79	9.23	3848	2213	4073	1250	30.7	7288
ORY-PTP	4	4	8.00	8.74	3643	270	3643	270	7.4	5348
ORY-RDU	3	7	9.14	8.42	3510	527	3518	250	7.1	3458
ORY-RUN	7	3	12.00	12.11	5046	3179	5606	673	12.0	3874

ONE DIRECTION ONLY WEEKLY AIRCRAFT STATISTICS

FOR JULY 1990

NON-STOP JET PASSENGER ONLY FLIGHTS GREATER THAN 2000 MILES

AIRPORT CODES	IATA CODE	DPRTS	SCEHD TIME/ DPRT	FLT BLOCK TIME	GC N.MI.	Ovrlnd DIST	DVRT N.MI.	Ovrlnd DIST	%ovlnd	YR2015 WKLY SEATS
OSA-SFO	10	7	9.71	11.20	4670	369	4670	369	7.9	34812
OSA-SIN	18	11	6.18	6.40	2667	0	2667	0	0.0	34393
PDX-SEL	10	7	11.57	10.95	4564	393	4606	0	0.0	23411
PEK-SHJ	19	8	8.88	7.57	3154	3154	3154	3154	100.0	5455
PEK-SIN	18	1	6.00	5.77	2407	1877	2879	124	4.3	1777
PEK-SVO	9	6	8.83	7.49	3124	3124	3124	3124	100.0	6781
PHL-SFO	12	7	5.71	5.24	2185	2185	2185	2185	100.0	6373
POS-YYZ	2	2	6.00	5.28	2201	409	2201	409	18.6	2804
PPT-SFO	11	3	8.00	8.75	3649	0	3649	0	0.0	2985
PPT-SYD	18	2	9.00	7.92	3302	0	3302	0	0.0	4971
PTP-TLS	4	1	8.00	8.54	3561	449	3580	100	2.8	1337
RUH-ZRH	8	3	6.00	5.43	2262	2262	2415	1019	42.2	1190
SDA-ZRH	8	2	5.00	5.00	2083	2083	2374	693	29.2	793
SEA-SEL	10	7	11.43	10.80	4501	900	4566	0	0.0	34312
SEL-SFO	10	7	10.43	11.71	4883	0	4883	0	0.0	21148
SEL-SIN	18	4	6.25	6.03	2513	563	2537	0	0.0	11341
SEL-YVR	10	4	10.00	10.58	4409	1706	4517	235	5.2	18053
SFO-SHA	10	3	12.00	12.79	5333	251	5410	0	0.0	11724
SFO-TPE	10	10	13.10	13.42	5596	716	5633	0	0.0	31629
SHA-SIN	18	1	5.00	4.93	2055	592	2215	0	0.0	1777
SIN-VIE	9	1	13.00	12.57	5238	4018	6238	1778	28.5	1408
THR-ZRH	8	1	5.00	4.84	2016	2016	2016	2016	100.0	528
TLV-YMX	3	3	11.00	11.42	4762	3062	5209	229	4.4	3246
UUD-VKO	9	14	7.86	5.75	2397	2397	2397	2397	100.0	13753
UUS-VKO	9	7	14.29	8.64	3603	3603	3603	3603	100.0	14675
YMX-ZAG	3	3	7.67	8.55	3563	1920	3830	892	23.3	1909
YYZ-ZRH	3	6	8.00	8.40	3503	1850	3669	741	20.2	2548

APPENDIX B

HSCT AMSTERDAM ROUTES

HSCT AMSTERDAM ROUTES

WayPoint	Latitude	Longitude	Great Circle NM	WayPoint Dist NM	Route Cum NM	Overland Cum NM
AMS	52.32	4.78				
1	50.00	359.00		5400	5400	0
2	49.00	354.00		5400	10800	0
3	31.50	279.50		5400	16200	0
ATL	33.65	275.57		5400	21600	5400
AMS	52.32	4.78	5400		4.00	25.0%

AMS	52.32	4.78				
1	50.00	359.00		5400	5400	0
2	49.50	354.00		5400	10800	0
AUA	12.50	289.98		5400	16200	0
AMS	52.32	4.78	5400		3.00	0.0%

DXB	25.25	55.33				
1	26.50	50.00		5400	5400	0
2	29.50	35.00		5400	10800	5400
3	31.00	33.00		5400	16200	10800
4	34.50	22.00		5400	21600	10800
5	40.50	18.75		5400	27000	10800
6	45.50	12.33		5400	32400	10800
AMS	52.32	4.78		5400	37800	16200
DXB	25.25	55.33	5400		7.00	42.9%

AMS	52.32	4.78				
1	50.00	359.00		5400	5400	0
2	49.50	354.00		5400	10800	0
3	46.50	308.00		5400	16200	0
4	43.00	295.00		5400	21600	0
BOS	42.37	289.00		5400	27000	0
AMS	52.32	4.78	5400		5.00	0.0%

AMS	52.32	4.78				
1	50.00	359.00		5400	5400	0
2	49.50	354.00		5400	10800	0
3	24.00	280.00		5400	16200	0
IAH	29.98	264.67		5400	21600	0
AMS	52.32	4.78	5400		4.00	0.0%

AMS	52.32	4.78				
1	50.03	359.00		5400	5400	0
2	49.00	354.00		5400	10800	0
3	41.23	292.00		5400	16200	0
JFK	40.63	286.22		5400	21600	0
AMS	52.32	4.78	5400		4.00	0.0%

HSCT AMSTERDAM ROUTES

WayPoint	Latitude	Longitude	Great Circle NM	WayPoint Dist NM	Route Cum NM	Overland Cum NM
2	58.00	310.00		5400	10800	0
3	63.00	281.00		5400	16200	0
4	57.50	267.30		5400	21600	0
LAX	33.93	241.60		5400	27000	5400
AMS	52.32	4.78	5400		5.00	20.0%

AMS	52.32	4.78				
1	62.50	2.85		5400	5400	0
2	80.00	120.00		5400	10800	0
3	71.50	133.00		5400	16200	0
4	58.00	140.75		5400	21600	5400
5	47.00	141.25		5400	27000	5400
6	40.00	137.25		5400	32400	5400
7	38.00	139.00		5400	37800	5400
NRT	35.77	140.32		5400	43200	10800
AMS	52.32	4.78	5400		8.00	25.0%

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AMS	52.32	4.78				
1	50.00	359.00		5400	5400	0
2	49.00	354.00		5400	10800	0
3	46.00	307.50		5400	16200	0
4	38.50	286.00		5400	21600	0
ORD	41.98	272.10		5400	27000	5400
AMS	52.32	4.78	5400		5.00	20.0%

AMS	52.32	4.78				
PBM	5.45	304.80		5400	5400	0
AMS	52.32	4.78	5400		1.00	0.0%

AMS	52.32	4.78				
1	50.00	359.00		5400	5400	0
2	49.50	354.00		5400	10800	0
3	46.50	308.00		5400	16200	0
4	43.00	295.00		5400	21600	0
5	44.00	291.50		5400	27000	0
YMX	45.85	285.55		5400	32400	5400
AMS	52.32	4.78	5400		6.00	16.7%

AMS	52.32	4.78				
1	50.00	359.00		5400	5400	0
2	49.00	354.00		5400	10800	0
3	46.00	307.50		5400	16200	0
4	41.23	292.00		5400	21600	0
5	41.75	289.00		5400	27000	0
YYZ	43.68	280.37		5400	32400	5400
AMS	52.32	4.78	5400		6.00	16.7%

APPENDIX C

HSCT SIMULATED REGIONAL AIRLINES

This appendix contains ICAO city codes associated with network origin/destinations and detailed network descriptions for each of the four Regional HSCT simulated airlines .

NETWORK CITY CODES

ICAO	LOCALITY	ICAO	LOCALITY	ICAO	LOCALITY	ICAO	LOCALITY	ICAO	LOCALITY
ACA	Acapulco	CNS	Cairns	IST	Istanbul	NAN	Fiji	SHA	Shanghai
AKL	Auckland	CPH	Copenhagen	JED	Jeddah	NBO	Nairobi	SIN	Singapore
AMS	Amsterdam	CTS	Sapporo	JFK	New York City	NCE	Nice	SJC	San Jose
ANC	Anchorage	CUR	Curacao	JIB	Djibouti	NGO	Nagoya	SJU	San Juan
ANU	Antigua	CVG	Cincinnati	JKT	Jakarta	NRT	Tokyo	SNN	Shannon
ARN	Stockholm	DEL	Delhi	KHI	Karachi	OGG	Kahului	SOF	Sofia
ATH	Athens	DFW	Dallas	KIN	Kingston	ORD	Chicago	STL	St. Louis
ATL	Atlanta	DHA	Dahrain	KOA	Kona	ORY	Paris	STN	London
AUA	Aruba	DKR	Dakar	KUL	Kuala Lumpur	OSA	Osaka	STO	Stockholm
AZZ	Ambriz	DTW	Detroit	KWI	Kuwait	OSL	Oslo	SVO	Moscow
BAH	Bahrain	DUS	Dusseldorf	LAX	Los Angeles	PAR	Paris	SXM	St. Marten
BCN	Barcelona	DXB	Dubai	LCA	Larnica	PDX	Portland	SYD	Sydney
BEL	Belgrade	EWR	Newark	LGW	London	PEK	Beijing	TFS	Tenerife
BGI	Barbados	EZE	Buenos Aires	LHR	London	PER	Perth	TLV	Tel Aviv
BGR	Bangor	FBU	Oslo	LIM	Lima	PHL	Philadelphia	TPA	Tampa
BKK	Bangkok	FCO	Rome	LIS	Lisbon	PHX	Phoenix	TPE	Taipei
BNE	Brisbane	FDF	Martinque	MAD	Madrid	POP	Puerto Plata	TUN	Tunis
BOG	Bogata	FLL	Ft. Lauderdale	MAN	Manchester	PPT	Papeete	TXL	Berlin
BOM	Bombay	FRA	Frankfort	MBJ	Montego Bay	PTP	Pointe a Pitre	UIO	Quito
BOS	Boston	FUK	Fukuoka	MCO	Orlando	RDU	Raleigh/Durham	VIE	Vienna
BRU	Brussels	GIG	Rio de Janeiro	MEL	Melbourne	REC	Recife	WAW	Warsaw
BUD	Budapest	GLA	Glasgow	MEX	Mexico City	ROM	Rome	WTD	Bahamas
BUE	Buenos Aires	GRU	Sao Paulo	MIA	Miami	SAN	San Diego	YEG	Edmonton
CAI	Cairo	GUM	Guam	MLA	Malta	SCL	Santiago, Chile	YMQ	Montreal
CAY	Cayenne	GVA	Geneva	MLE	Male	SCQ	Santiago, Spain	YMX	Montreal
CCS	Caracas	HAM	Hamburg	MNL	Manila	SDJ	Sendai	YVR	Vancouver
CDG	Paris	HEL	Helsinki	MRS	Marseille	SDQ	Santo Domingo	YYC	Calgary
CGK	Jakarta	HKG	Hong Kong	MRU	Maruritius	SEA	Seattle	YYZ	Toronto
CHC	Christchurch	HNL	Honolulu	MSP	Minneapolis	SEL	Seoul	ZRH	Zurich
CLT	Charlotte	IAD	Washington, D.C.	MUC	Munich	SEZ	Seychelles		
CMB	Colombo	IAH	Houston	MXP	Milan	SFO	San Francisco		

HSCT Simulated Airlines Network - Composite Americas-East Airline

		1992 Weekly Data					Season	2015	2015		
Rank	AIRPORT PAIR	Dpts	ACM St.Mi	SEAT	A/C Hrs	ASM(K)	Adjusted Seats	Weekly Seats	Weekly Depts	GCD N.Mi	DVRT N.Mi
1	AMS-ATL	14	61432	3262	123.67	14314	4058	10724	36	3812	4101
2	AMS-BOS	14	48230	4172	100.34	14372	5190	13715	46	2993	3141
3	AMS-DTW	14	54978	5600	110.25	21992	6966	18410	61	3412	3780
4	AMS-JFK	14	50848	2422	108.50	8798	3013	7962	27	3156	3353
5	AMS-JFK	14	50848	2576	108.50	9356	3205	8468	28	3156	3353
6	AMS-MSP	6	24900	2400	49.00	9960	2986	7890	26	3502	3874
7	ARN-JFK	14	54712	2576	118.30	10068	3205	8468	28	3382	3536
8	ARN-JFK	12	46896	2076	100.00	8114	2583	6825	23	3382	3536
9	ATH-JFK	10	49190	4310	99.58	21200	5362	14169	47	4274	4889
10	ATL-FRA	28	128800	6314	262.50	29049	7855	20757	69	3998	4179
11	ATL-HAM	14	63714	3052	130.08	13890	3797	10033	33	3954	4180
12	ATL-LGW	28	118048	6524	236.84	27504	8116	21447	71	3664	3826
13	ATL-MAD	14	60522	3262	120.75	14102	4058	10724	36	3755	3851
14	ATL-MAN	14	57204	3262	113.75	13328	4058	10724	36	3551	3744
15	ATL-MUC	14	66948	3262	133.00	15598	4058	10724	36	4159	4376
16	ATL-ORY	14	61334	3262	123.08	14290	4058	10724	36	3807	4029
17	ATL-SNN	14	53606	3262	107.92	12490	4058	10724	36	3328	3488
18	BCN-JFK	14	53480	2576	115.50	9840	3205	8468	28	3319	3458
19	BOG-JFK	14	34734	2478	75.84	6148	2632	10785	36	2156	2156
20	BOS-CDG	14	48104	3808	98.58	13086	4737	12519	42	2967	3022
21	BOS-CDG	14	48104	4172	102.67	14335	5190	13715	46	2967	3022
22	BOS-FRA	14	51198	4172	107.92	15258	5190	13715	46	3178	3312
23	BOS-GLA	14	42364	4172	89.25	12624	5190	13715	46	2624	2693
24	BOS-LGW	14	45808	5600	96.25	18323	6966	18410	61	2843	2889
25	BOS-LHR	14	45556	4060	96.83	13212	5051	13347	44	2827	2956
26	BRU-IAD	14	54306	2856	113.75	11078	3553	9389	31	3370	3476
27	BRU-JFK	14	51170	2422	109.66	8852	3013	7962	27	3176	3338
28	BRU-JFK	14	51170	3808	106.16	13916	4737	12519	42	3176	3338
29	BRU-JFK	14	51170	2478	109.08	9058	3083	8146	27	3176	3338
30	BRU-ORD	14	58030	2478	123.66	10272	3083	8146	27	3602	3966
31	CDG-DTW	14	55272	4172	114.34	16472	5190	13715	46	3431	3575
32	CDG-GIG	8	45632	2104	88.91	12000	2197	7448	25	4956	5121
33	CDG-GRU	5	29245	1315	56.92	7692	1373	4655	16	5083	5333
34	CDG-IAD	14	53872	5600	108.50	21548	6966	18410	61	3344	3376
35	CDG-IAD	14	53872	3808	108.50	14654	4737	12519	42	3344	3376
36	CDG-JFK	28	101444	12068	211.63	43726	15013	39673	132	3148	3194
37	CDG-LAX	14	79128	2926	161.00	16538	3640	9619	32	4912	5097
38	CDG-LAX	6	33912	2586	66.75	14616	3217	8501	28	4912	5097
39	CDG-ORD	14	57932	2926	125.42	12108	3640	9619	32	3596	3822
40	CDG-SFO	14	77910	2926	160.41	16284	3640	9619	32	4836	5014
41	CDG-STL	14	61348	2576	126.59	11288	3205	8468	28	3809	4424
42	CDG-YMX	16	54944	4856	112.26	16678	6041	15964	53	2993	3203
43	CDG-YYZ	14	52332	4114	107.84	15378	5118	13525	45	3248	3491
44	CPH-JFK	10	38430	1730	79.17	6649	2152	5687	19	3340	3451
45	CPH-JFK	14	53802	3808	111.42	14634	4737	12519	42	3340	3451
46	CVG-FRA	14	60676	3052	124.84	13228	3797	10033	33	3778	4294
47	CVG-LGW	14	55384	3262	113.16	12904	4058	10724	36	3450	3653
48	CVG-ORY	14	57820	2422	124.25	10002	3013	7962	27	3601	3700
49	DFW-FRA	14	71750	3178	144.66	16288	3953	10448	35	4453	4805
50	DFW-FRA	14	71750	3052	145.25	15642	3797	10033	33	3281	3281
51	DFW-LGW	28	133112	6356	268.91	30216	7907	20895	70	4121	4279
52	DFW-MAD	14	69230	3514	142.92	17376	4371	11552	39	4300	4531
53	DFW-ORY	14	69062	3514	140.59	17334	4371	11552	39	4287	4635
54	DTW-FRA	14	58058	4172	118.42	17302	5190	13715	46	3604	3802
55	DTW-LGW	14	52822	2422	112.00	9138	3013	7962	27	4300	4531
56	DUS-ORD	14	58996	2800	123.09	11800	3483	9205	31	3663	3988
57	EWR-FRA	14	53998	3052	113.17	11772	3797	10033	33	3352	3432
58	EWR-LHR	14	48356	4886	100.92	16876	6078	16062	54	3002	3070
59	EZE-MIA	28	123452	5334	255.15	23518	5665	23216	77	3831	4137
60	EZE-MIA	14	61726	5600	120.75	24690	5947	24374	81	3831	4137
61	FBU-JFK	10	36660	1730	79.59	6340	2152	5687	19	3186	3320
62	FCO-JFK	14	59696	3262	123.08	13910	4058	10724	36	3705	3767
63	FCO-JFK	24	102336	10344	210.95	44107	12868	34005	113	3705	3767
64	FCO-YYZ	6	26400	1740	54.24	7656	2165	5720	19	3824	4007
65	FRA-GRU	5	30465	1250	59.16	7615	1305	4425	15	5294	5572
66	FRA-IAD	14	56938	5600	116.66	22776	6966	18410	61	3534	3619
67	FRA-IAD	14	56938	3262	117.25	13268	4058	10724	36	3534	3619
68	FRA-JFK	28	107632	6314	227.50	24273	7855	20757	69	3340	3420
69	FRA-JFK	14	53816	6034	113.18	23196	7506	19836	66	3340	3420
70	FRA-LAX	14	81046	3052	156.92	17668	3797	10033	33	5031	5305
71	FRA-MCO	14	66248	3262	133.02	15438	4058	10724	36	4112	4137
72	FRA-MIA	10	48200	2330	97.09	11230	2735	10382	35	4188	4210

HSCT Simulated Airlines Network - Composite Americas-East Airline

		1992 Weekly Data					Season	2015	2015		
	AIRPORT		ACM		A/C		Adjusted	Weekly	Weekly	GCD	DVRT
Rank	PAIR	Dpts	St.Mi	SEAT	Hrs	ASM(K)	Seats	Seats	Depts	N.Mi	N.Mi
73	FRA-ORD	14	60592	2856	131.25	12360	3553	9389	31	3761	4055
74	FRA-ORD	14	60592	2478	130.09	10724	3083	8146	27	3761	4055
75	FRA-YVR	16	80112	4640	155.34	23234	5772	15254	51	4351	4672
76	FRA-YYC	8	37400	1960	73.96	9160	2438	6443	21	4063	4385
77	GIG-JFK	14	67200	3416	131.83	16396	3628	14868	50	4171	4796
78	GIG-JFK	8	38400	3210	75.33	15408	3409	13971	47	4171	4796
79	GIG-LAX	4	25180	1040	48.00	6548	1104	4527	15	5470	5619
80	GIG-LHR	5	28730	2060	55.16	11836	2151	7292	24	4994	5116
81	GIG-LIS	7	33530	2030	68.00	9723	2119	7186	24	4163	4272
82	GIG-MAD	12	60696	3480	124.01	17604	3633	12319	41	4396	4444
83	GIG-MIA	14	58408	2478	122.5	10338	2632	10785	36	3625	3882
84	GIG-MIA	14	58408	2926	122.50	12208	3107	12735	42	3625	3882
85	GIG-MIA	14	58408	4626	115.50	19298	4913	20134	67	3625	3882
86	GIG-ORD	8	42432	2064	87.67	10946	2192	8983	30	4609	5372
87	GLA-ORD	14	51366	2478	110.25	9092	3083	8146	27	3183	3556
88	GRU-LAX	6	36924	2520	70.23	15510	2676	10968	37	5347	5447
89	GRU-LIS	5	24675	1450	49.75	7155	1514	5133	17	4289	4490
90	GRU-MXP	4	23596	1648	45.67	9722	1721	5834	19	5126	5403
91	GRU-YYZ	6	30534	1740	61.00	8854	1848	7573	25	4422	5304
92	GRU-YYZ	6	30534	1740	61.00	8854	1848	7573	25	4422	5304
93	HAM-JFK	10	37990	1730	82.92	6572	2152	5687	19	3301	3356
94	IAD-LHR	32	117280	12596	238.68	46164	15669	41409	138	3185	3260
95	IAD-MAD	14	53256	2856	113.17	10864	3553	9389	31	3305	3305
96	IAD-MXP	12	50496	4800	101.50	20198	5971	15780	53	3657	3681
97	JFK-LHR	49	168609	8673	361.09	29841	10789	28512	95	2990	3076
98	JFK-LHR	42	144522	8568	314.99	29484	10659	28167	94	2990	3076
99	JFK-LIS	14	46998	3808	98.00	12784	4737	12519	42	2917	2917
100	JFK-LIS	8	26856	1384	58.33	4646	1722	4550	15	2917	2917
101	JFK-MAD	14	50092	6034	103.83	21590	7506	19836	66	3109	3109
102	JFK-MAN	14	46620	2478	101.5	8252	3083	8146	27	2894	3030
103	JFK-MUC	14	56350	2422	120.76	9749	3013	7962	27	3501	3549
104	JFK-MXP	14	55762	6034	114.91	24034	7506	19836	66	3460	3490
105	JFK-MXP	14	55762	2422	120.17	9646	3013	7962	27	3460	3490
106	JFK-NCE	14	55706	2422	117.25	9638	3013	7962	27	3464	3469
107	JFK-ORY	28	101444	4844	222.83	17548	6026	15924	53	3148	3189
108	JFK-ORY	14	50722	3514	107.33	12730	4371	11552	39	3148	3189
109	JFK-SVO	8	37168	1744	78.33	8102	2170	5733	19	4037	4198
110	JFK-TLV	8	45304	3448	89.93	19526	4289	11335	38	4921	5178
111	JFK-TXL	14	55370	2422	119.00	9580	3013	7962	27	3463	3550
112	JFK-VIE	8	33704	1384	71.68	5832	1722	4550	15	3670	3736
113	JFK-ZRH	14	54866	2667	117.84	10452	3318	8768	29	3405	3441
114	JFK-ZRH	14	54866	2422	120.17	9492	3013	7962	27	3405	3441
115	LAX-LHR	28	152320	4956	311.5	26960	6165	16293	54	4727	5138
116	LAX-LHR	28	152320	6832	298.66	37168	8499	22460	75	4727	5138
117	LAX-LIM	6	25032	1532	49.25	6391	1627	6668	22	3626	3664
118	LAX-NGO	2	11234	840	22.34	4718	885	7674	26	4881	4894
119	LGW-MIA	14	62006	3262	126.58	14448	3830	14535	48	3849	3859
120	LGW-MSP	14	56308	5600	116.66	22524	6966	18410	61	3495	3882
121	LGW-STL	14	58884	6034	119.00	25380	7506	19836	66	3656	4342
122	LGW-YYC	6	26286	1740	53.50	7622	2165	5720	19	3794	4114
123	LGW-YYZ	14	49896	4060	105.57	14470	5051	13347	44	3097	3347
124	LHR-MIA	14	61796	2478	133	10938	2909	11041	37	3836	3842
125	LHR-ORD	28	110292	4956	234.5	19520	6165	16293	54	3423	3702
126	LHR-SEA	14	66962	3416	131.84	16338	4250	11230	37	4156	4746
127	LHR-SFO	18	96318	6282	189.75	33613	7815	20652	69	4650	5040
128	LIM-MIA	26	68120	6066	148.84	15894	6442	26402	88	2277	2626
129	LIS-REC	4	14544	1160	30.00	4218	1211	4106	14	3160	3160
130	MAD-MIA	14	61782	2478	131.25	10936	2909	11041	37	3834	3834
131	MAN-ORD	20	76260	4576	159.33	17448	5693	15043	50	3313	3806
132	MCO-ORY	8	35944	1864	72.00	8374	2319	6128	20	3904	3904
133	MIA-ORY	14	64036	2478	138.84	11334	2909	11041	37	3974	3974
134	MIA-SCL	14	58044	2478	122.73	10274	2632	10785	36	3603	3946
135	MUC-ORD	14	63196	2478	133.58	11186	3083	8146	27	3928	4151
136	MUC-YYZ	6	24744	1740	50.52	7176	2165	5720	19	3588	3804
137	MXP-ORD	14	63112	2478	135.34	11170	3083	8146	27	3917	4118
138	MXP-YYZ	6	24630	1740	50.75	7142	2165	5720	19	3568	3760
139	ORD-ORY	14	57988	2667	123.66	11047	3318	8768	29	3599	3817
140	ORD-STN	14	55328	2478	119.58	9794	3083	8146	27	3434	3929
141	ORD-TXL	7	30779	1239	62.42	5448	1541	4073	14	3821	4329
142	ORD-ZRH	14	61992	2667	131.25	11809	3318	8768	29	3848	4073
143	ORY-RDU	14	56532	2478	119.58	10006	3083	8146	27	3510	3518

HSCT Simulated Airlines Network - Composite Americas - West Airline

		1992 Weekly Data					Season	2015	2015		
Rank	AIRPORT PAIR	Dpts	ACM St.Mi	SEATS	A/C Hrs	ASM(K)	Adjusted Seats	Weekly Seats	Weekly Depts	GCD N.Mi	DVRT N.Mi
1	AKL=HNL	6	26364	1482	54.25	6512	1495	6333	21	3826	3826
2	AKL=HNL	14	61516	4068	120.75	17874	4105	17384	58	3826	3826
3	AKL=LAX	6	39036	1464	73.75	9524	1477	6256	21	5658	5658
4	ANC=HKG	6	30360	1398	60.50	7074	1473	12772	43	4398	4677
5	ANC=LAX	6	14052	1398	30.00	3274	1539	5190	17	2035	2103
6	ATL=HNL	10	44920	2550	86.66	11454	2808	9467	32	3903	3903
7	DFW=HNL	28	106176	8120	213.61	30792	8940	30147	100	3281	3281
8	DFW=HNL	14	53088	3570	103.25	13538	3931	13254	44	4121	4279
9	DFW=NRT	14	90006	3514	173.83	22592	3704	32103	107	5570	5577
10	DTW=NRT	14	89320	5600	172.66	35728	5902	51160	171	5544	5950
11	DTW=SEL	14	92442	5656	189.59	37348	5961	51671	172	5737	6315
12	EWR=NRT	14	94010	5234	186.00	35146	5517	47816	159	5845	6039
13	HKG=SFO	28	193088	12208	367.50	84188	12867	111528	372	5994	6181
14	HKG=YVR	16	101856	5684	194.92	36185	5991	51927	173	5534	5832
15	HNL=LAX	70	178570	20244	375.43	51642	22289	75159	251	2217	2217
16	HNL=LAX	56	142856	16912	296.09	43144	18620	62788	209	2217	2217
17	HNL=LAX	30	76530	8700	159.49	22196	9579	32300	108	2217	2217
18	HNL=LAX	14	35714	3808	74.67	9714	4193	14138	47	2217	2217
19	HNL=LAX	30	76530	9144	161.69	23324	10068	33948	113	2217	2217
20	HNL=NAN	9	28539	2713	56.86	8601	2737	11593	39	2755	2755
21	HNL=NGO	14	56084	4172	110.25	16714	4397	38114	127	3481	3481
22	HNL=NRT	40	152520	16000	308.32	61006	16864	146171	487	3314	3314
23	HNL=NRT	44	167772	16220	331.02	61846	17096	148180	494	3314	3314
24	HNL=ORD	14	59290	4172	118.06	17668	4593	15489	52	3680	3680
25	HNL=ORD	14	59290	4060	116.55	17194	4470	15073	50	3680	3680
26	HNL=OSA	8	32744	3200	64.33	13098	3373	29234	97	3557	3557
27	HNL=OSA	14	57302	5600	113.17	22922	5902	51160	171	3557	3557
28	HNL=SAN	14	36526	4228	75.13	11030	4655	15697	52	2267	2267
29	HNL=SEA	14	37450	5600	78.52	14980	6166	20791	69	2325	2325
30	HNL=SEA	14	37450	4018	78.05	10748	4424	14917	50	2325	2325
31	HNL=SEL	14	63532	5600	127.75	25412	5902	51160	171	3944	4592
32	HNL=SFO	14	33516	4060	70.58	9720	4470	15073	50	2080	2080
33	HNL=SFO	14	33516	4228	69.30	10122	4655	15697	52	2080	2080
34	HNL=SFO	14	33516	4074	70.35	9752	4485	15125	50	2080	2080
35	HNL=SFO	84	201096	24388	424.45	58389	26851	90544	302	2080	2080
36	HNL=STL	14	57834	6034	114.33	24926	6643	22402	75	3580	3580
37	HNL=SYD	2	10148	800	19.42	4060	807	3419	11	4409	4416
38	HNL=SYD	14	71036	4438	134.75	22517	4478	18965	63	4409	4416
39	HNL=YVR	18	48654	4410	100.51	11916	4855	16373	55	2534	2534
40	HNL=YYZ	6	27828	1650	55.34	7652	1817	6126	20	4031	4031
41	JFK=NRT	14	94178	5600	183.75	37672	5902	51160	171	5845	6046
42	JFK=NRT	14	94178	5756	184.42	38720	6067	52585	175	5845	6046
43	JFK=OSA	6	41400	2416	81.75	16670	2546	22072	74	5996	6359
44	KOA=SFO	14	33278	4018	69.77	9550	4424	14917	50	2057	2057
45	LAX=NRT	14	76160	6104	147.00	33206	6434	55764	186	4727	4727
46	LAX=NRT	14	76160	5600	149.36	30464	5902	51160	171	4727	4727
47	LAX=NRT	12	65280	3000	128.00	16320	3162	27407	91	4727	4727
48	LAX=OGG	14	34734	4018	71.99	9968	4424	14917	50	2156	2156
49	LAX=OGG	14	34734	4228	71.40	10490	4655	15697	52	2156	2156
50	LAX=OSA	10	57040	4000	111.66	22816	4216	36543	122	4597	4597
51	LAX=SEL	14	83384	5600	169.17	33354	5902	51160	171	5175	5175
52	LAX=SYD	14	104860	6104	195.41	45720	6159	26084	87	6508	6508
53	LAX=SYD	6	44940	2424	84.00	18156	2446	10358	35	6508	6508
54	LAX=TPE	6	40632	2424	78.00	16416	2555	22145	74	5883	5898
55	MSP=NRT	6	35598	2400	69.50	14240	2530	21926	73	5155	5751
56	NGO=PDX	14	69650	3500	133.58	17414	3689	31975	107	4323	4467

HSCT Simulated Airlines Network - Composite Americas - West Airline

		1992 Weekly Data					Season	2015	2015		
Rank	AIRPORT PAIR	Dpts	ACM St.Mi	SEATS	A/C Hrs	ASM(K)	Adjusted Seats	Weekly Seats	Weekly Depts	GCD N.Mi	DVRT N.Mi
57	NGO=YVR	4	19284	980	37.00	4724	1033	8953	30	4189	4189
58	NRT=ORD	12	75084	5232	146.00	32736	5515	47798	159	5437	5537
59	NRT=ORD	14	87598	5600	169.75	35040	5902	51160	171	5437	5537
60	NRT=PDX	14	67340	3262	131.25	15690	3438	29801	99	4180	4180
61	NRT=SEA	14	66598	3514	133.59	16716	3704	32103	107	4133	4144
62	NRT=SEA	14	66598	5600	131.25	26640	5902	51160	171	4133	4144
63	NRT=SFO	42	214704	16590	418.83	84809	17486	151561	505	4441	4441
64	NRT=SFO	14	71568	5600	141.17	28628	5902	51160	171	4441	4441
65	NRT=SIN	14	46676	5600	94.50	18670	5690	49938	166	2889	2889
66	NRT=SIN	14	46676	5600	96.25	18670	5690	49938	166	2889	2889
67	NRT=SJC	12	61716	3012	121.5	15490	3175	27517	92	4469	4469
68	NRT=YEG	3	14595	739	27.83	3596	779	6751	23	4227	4321
69	NRT=YVR	21	97902	7207	188.00	33599	7596	65841	219	4052	4069
70	NRT=YYZ	6	38382	1482	74.25	9480	1562	13539	45	5559	5823
71	OGG=SFO	28	65380	8036	136.97	18764	8848	29835	99	2029	2029
72	OSA=SFO	14	75236	4886	147.00	26258	5150	44637	149	4670	4670
73	OSA=SYD	6	29118	2416	56.75	11724	2455	21544	72	4216	4430
74	PDX=SEL	14	73528	3500	149.34	18382	3689	31975	107	4564	4606
75	SEA=SEL	14	72520	5600	149.92	29008	5902	51160	171	4501	4566
76	SEL=SFO	14	78666	3416	159.25	19194	3600	31207	104	4883	4883
77	SFO=SHA	6	36822	1464	71.75	8984	1543	13375	45	5333	5410
78	SFO=TPE	14	90188	6104	172.08	39322	6434	55764	186	5596	5633
79	TPE=YVR	8	47584	2104	90.58	12515	2218	19221	64	5167	5268

HSCT Simulated Airlines Network - Composite European Airline

		1992 Weekly Data					Season	2015	2015		
	AIRPORT		ACM		A/C		Adjusted	Weekly	Weekly	GCD	DVRT
Rank	PAIR	Dpts	St.Mi	SEATS	Hrs	ASM(K)	Seats	Seats	Depts	N.Mi	N.Mi
1	AKL=PER	4	13260	1648	26.84	5464	1674	14696	49	2880	3171
2	AMS=ATL	12	52656	3336	106.00	14638	4150	10967	37	3812	4101
3	AMS=AUA	6	29358	1980	57.68	9688	2325	8822	29	4252	4278
4	AMS=BWI	8	30504	2224	62.00	8480	2767	7311	24	3314	3448
5	AMS=CCS	5	24340	1405	47.92	6840	1649	6260	21	4230	4350
6	AMS=CUR	14	68110	4522	131.68	21998	5309	20149	67	4227	4253
7	AMS=DTW	14	54978	3892	110.25	15284	4842	12795	43	3412	3780
8	AMS=GIG	4	23748	1712	46.16	10164	1787	6060	20	5160	5358
9	AMS=IAH	14	69972	4328	135.91	21630	5384	14228	47	4343	5055
10	AMS=JFK	28	101696	9310	211.17	33814	11582	30606	102	3156	3353
11	AMS=KUL	4	25340	1152	50.50	7296	1187	6040	20	5505	6395
12	AMS=LAX	14	77868	4546	152.58	25284	5655	14945	50	4833	5111
13	AMS=MCO	6	27168	2322	54.75	10514	2889	7633	25	3935	4124
14	AMS=MSP	6	24900	1886	49.00	7826	2346	6200	21	3502	3874
15	AMS=NRT	10	57840	3720	118.34	21518	3832	19505	65	5026	5387
16	AMS=ORD	14	57484	3892	114.92	15980	4842	12795	43	3568	4028
17	AMS=SIN	14	91350	4032	182.58	26308	4153	21141	70	5672	6504
18	AMS=YMX	14	47880	5200	96.25	17784	6469	17095	57	2979	3312
19	AMS=YVR	6	28716	2048	55.50	9802	2548	6733	22	4159	4486
20	AMS=YYZ	14	52080	4764	106.17	17722	5926	15661	52	3232	3625
21	ANC=LHR	4	17888	1464	35.33	6548	1821	4813	16	3886	3970
22	ANC=OSA	4	14572	1464	29.84	5334	1543	13375	45	3166	3348
23	ANU=LGW	8	32648	2928	64.68	11952	3437	13046	43	3532	3532
24	ARN=EWR	14	54838	1806	114.33	7074	2247	5937	20	3404	3628
25	ATL=FRA	14	64400	3444	127.75	15842	4284	11322	38	3998	4179
26	ATL=LGW	14	59024	3206	122.50	13516	3988	10540	35	3664	3826
27	ATL=ZRH	14	65478	3304	132.42	15453	4110	10862	36	4064	4288
28	BCN=JFK	6	22920	1596	46.45	6096	1985	5247	17	3319	3458
29	BDA=LGW	4	13764	916	28.17	3152	1075	4081	14	2990	2990
30	BGI=LGW	8	33576	2928	66.36	12288	3437	13046	43	3643	3643
31	BKK=CDG	4	23412	1368	47.33	8006	1409	7173	24	3914	4336
32	BOM=CDG	6	26058	1632	53.53	7086	1681	8557	29	3774	4216
33	BOM=ZRH	8	32488	2024	66.00	8218	2085	10613	35	3529	3961
34	BOS=FCO	6	24474	2598	48.75	10598	3232	8541	28	3544	3661
35	BOS=FRA	14	51198	3444	105.00	12594	4284	11322	38	3178	3312
36	BOS=LHR	28	91112	8158	194.83	26546	10149	26819	89	2827	2956
37	BOS=ZRH	14	52248	4762	108.50	17772	5924	15655	52	3243	3290
38	CAY=CDG	6	26448	2308	51.25	10174	2710	10284	34	3841	3841
39	CCS=CDG	6	28428	1716	54.99	8132	2015	7646	25	4118	4118
40	CCS=FCO	5	25870	2165	50.08	11202	2542	9647	32	4496	4595
41	CCS=FRA	6	30084	1620	57.75	8124	1902	7218	24	4357	4357
42	CCS=LHR	4	18552	1464	36.83	6791	1719	6523	22	3890	3890
43	CCS=MAD	14	60886	3724	118.50	16196	4372	16593	55	3779	3779
44	CCS=SCQ	4	16524	1108	34.20	4578	1301	4937	16	3590	3590
45	CCS=TFS	4	13880	1108	26.00	3844	1301	4937	16	2091	2101
46	CDG=DKR	4	10496	1084	23.00	2844	1139	4612	15	2280	2402
47	CDG=FDF	3	12798	1132	24.92	4830	1329	5044	17	3707	3707
48	CDG=GIG	5	28520	1528	55.01	8715	1595	5409	18	4956	5121
49	CDG=IAD	14	53872	3600	112.67	13852	4478	11835	39	3344	3376
50	CDG=IAH	14	70168	3808	137.67	19086	4737	12519	42	4355	4949
51	CDG=JFK	40	144920	9144	244.88	33130	11375	30060	100	3148	3194
52	CDG=KHI	4	15200	1088	30.86	4136	1121	5705	19	3302	3973
53	CDG=LAX	14	79128	4368	153.92	24688	5434	14360	48	4912	5097
54	CDG=MIA	10	45770	2580	92.50	11808	3029	11496	38	3977	3977
55	CDG=NRT	18	108486	5036	217.42	30351	5187	26406	88	5237	5607
56	CDG=ORD	14	57932	4060	121.33	16800	5051	13347	44	3596	3822
57	CDG=PTP	8	33632	2848	65.67	11975	3344	12690	42	3653	3653
58	CDG=SEZ	8	38976	2548	77.46	12412	2617	10593	35	4234	4664

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		1992 Weekly Data					Season	2015	2015		
	AIRPORT		ACM		A/C		Adjusted	Weekly	Weekly	GCD	DVRT
Rank	PAIR	Dpts	St.Mi	SEATS	Hrs	ASM(K)	Seats	Seats	Depts	N.Mi	N.Mi
59	CDG-SXM	3	12555	1196	25.26	5006	1404	5329	18	3637	3637
60	CDG-YMX	16	54944	4664	114.93	16018	5802	15333	51	2993	3203
61	CDG-YYZ	14	52332	4024	107.83	15042	5006	13229	44	3248	3491
62	CLT-FRA	6	26298	1620	53.25	7100	2015	5326	18	3809	3928
63	CPH-EWR	26	100204	3354	210.75	12926	4172	11026	37	3350	3484
64	CPH-LAX	14	78498	1806	158.68	10128	2247	5937	20	4872	5165
65	CPH-ORD	8	34040	1584	69.66	6740	1970	5207	17	3698	4385
66	CPH-SEA	14	67886	1806	135.92	8758	2247	5937	20	4214	4765
67	CPH-SIN	6	37128	902	77.51	5581	929	4730	16	5378	6180
68	DFW-FRA	12	61500	3240	119.83	16606	4031	10651	36	4453	4805
69	DFW-LGW	14	66556	3206	136.50	15242	3988	10540	35	4121	4279
70	DKR-FCO	4	10292	1240	22.67	3190	1303	5276	18	2236	2456
71	DUS-JFK	14	52304	2940	110.25	10984	3657	9665	32	3247	3364
72	DUS-MIA	4	18880	984	37.00	4644	1155	4384	15	4102	4152
73	DUS-ORD	14	58996	2940	123.09	12390	3657	9665	32	3663	3988
74	DXB-FCO	5	13480	1550	31.33	4180	1688	4342	14	2343	2506
75	DXB-FRA	6	18036	1488	39.75	4472	1620	4168	14	2612	2969
76	DXB-LGW	4	13588	1464	28.67	4974	1594	4101	14	2952	3260
77	DXB-LHR	11	37532	2167	85.08	7392	2360	6070	20	2965	3264
78	EWR-ORY	14	50932	4060	106.75	14770	5051	13347	44	3161	3301
79	EWR-FBU	14	51464	1806	107.93	6638	2247	5937	20	3194	3330
80	EWR-FRA	14	53998	2940	116.67	11340	3657	9665	32	3352	3432
81	EWR-HAM	14	53354	2940	114.92	11204	3657	9665	32	3244	3373
82	EWR-LHR	14	48356	5124	101.50	17698	6374	16845	56	3002	3070
83	EZE-FRA	4	28548	1160	53.68	8278	1211	4106	14	6202	6502
84	EZE-LHR	4	27636	1648	52.17	11386	1721	5834	19	6004	6258
85	EZE-MAD	14	87598	6020	163.33	37668	6285	21310	71	5437	5646
86	FCO-GIG	6	34164	2598	66.00	14794	2712	9197	31	4948	5261
87	FCO-JFK	26	110864	10690	222.07	45582	13298	35143	117	3705	3767
88	FCO-MIA	8	41376	2612	81.33	13508	3066	11638	39	4483	4517
89	FCO-ORD	10	48070	2630	97.50	12642	3272	8646	29	4178	4369
90	FCO-YMX	4	16380	1732	32.50	7092	2155	5694	19	3568	3745
91	FCO-YYZ	4	17600	1448	35.00	6370	1801	4760	16	3824	4007
92	FDF-ORY	12	51060	4272	100.49	18180	5015	19035	63	3697	3697
93	FRA-GIG	6	35652	1700	67.98	10100	1775	6018	20	5163	5360
94	FRA-IAD	14	56938	3444	113.75	14006	4284	11322	38	3534	3619
95	FRA-JED	6	15468	1488	33.50	3836	1620	4168	14	2240	2361
96	FRA-JFK	28	107632	7280	226.91	27982	9056	23933	80	3340	3420
97	FRA-KWI	6	14844	1488	33.25	3684	1620	4168	14	2165	2523
98	FRA-LAX	12	69468	3720	132.52	21538	4628	12229	41	5031	5305
99	FRA-MEX	8	47456	2160	90.00	12814	2536	9624	32	5155	5369
100	FRA-MIA	14	67480	4004	132.41	19298	4701	17841	59	4188	4210
101	FRA-MRU	4	22800	1160	45.92	6612	1191	4822	16	4964	5476
102	FRA-NRT	14	81396	4340	162.17	25232	4470	22756	76	5053	5211
103	FRA-ORD	14	60592	4340	123.09	18784	5399	14268	48	3761	4055
104	FRA-SFO	14	79534	4180	151.68	23746	5200	13742	46	4937	5204
105	FRA-SIN	18	114840	5340	224.56	34074	5500	28000	93	5546	6319
106	FRA-YMX	14	50946	3444	102.67	12532	4284	11322	38	3169	3425
107	FRA-YVR	16	80112	4576	155.35	22914	5693	15043	50	4351	4672
108	FRA-YYC	8	37400	1968	74.00	9200	2448	6470	22	4063	4385
109	FRA-YYZ	14	55146	4260	112.00	16782	5299	14005	47	3423	3699
110	GIG-MAD	12	60696	3192	116.50	16144	3332	11299	38	4396	4444
111	GRU-LHR	6	35298	2472	67.76	14543	2581	8750	29	5112	5328
112	GVA-JFK	14	53928	4396	111.43	16934	5469	14452	48	3347	3377
113	GVA-LAX	6	35436	1416	69.50	8362	1762	4655	16	5132	5311
114	HAM-MIA	4	19232	984	38.16	4732	1155	4384	15	4176	4354
115	IAD-LHR	34	124610	8482	250.17	31088	10552	27884	93	3185	3260
116	IAH-LGW	14	67760	3206	135.33	15518	3988	10540	35	4210	4826

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		1992 Weekly Data					Season	2015	2015		
	AIRPORT		ACM		A/C		Adjusted	Weekly	Weekly	GCD	DVRT
Rank	PAIR	Dpts	St.Mi	SEATS	Hrs	ASM(K)	Seats	Seats	Depts	N.Mi	N.Mi
117	JFK-LGW	14	48426	3206	102.67	11090	3988	10540	35	3006	3092
118	JFK-LHR	70	240870	18172	407.83	62531	22606	59739	199	2990	3076
119	JFK-MAD	14	50092	5420	102.09	19394	6742	17818	59	3109	3109
120	JFK-MAN	14	46620	2758	103.25	9184	3431	9067	30	2894	3030
121	JFK-MUC	14	56350	2940	116.08	11834	3657	9665	32	3501	3549
122	JFK-MXP	14	55762	6062	113.75	24144	7541	19929	66	3460	3490
123	JFK-ZRH	14	54866	4640	112.00	18185	5772	15254	51	3405	3441
124	JIB-MRS	4	12616	1256	25.50	3962	1320	5344	18	2741	2928
125	KIN-LGW	5	23400	1830	45.35	8565	2148	8154	27	4067	4067
126	KUL-LHR	4	26256	1648	52.50	10818	1697	8641	29	5704	6554
127	LAX-LHR	28	152320	11536	298.66	62756	14351	37924	126	4727	5138
128	LAX-MAD	6	34974	2580	67.00	15038	3210	8482	28	5065	5213
129	LAX-MXP	12	72252	3156	141.50	19002	3926	10375	35	5234	5483
130	LAX-ZRH	8	47368	1888	93.34	11178	2349	6207	21	5146	5350
131	LGW-MBJ	3	14100	1098	29.01	5160	1289	4892	16	4076	4076
132	LGW-MCO	8	34736	2928	69.67	12714	3642	9626	32	3773	3798
133	LHR-MIA	28	123592	10248	250.84	45236	12031	45663	152	3836	3842
134	LHR-NGO	4	23636	1648	49.01	9740	1697	8641	29	5134	5427
135	LHR-NRT	26	154804	10712	317.41	63778	11033	56167	187	5147	5880
136	LHR-ORD	28	110292	10248	229.09	40367	12749	33690	112	3423	3702
137	LHR-PHL	14	49462	5768	104.42	20378	7175	18962	63	3070	3145
138	LHR-SEA	8	38264	3296	75.67	15764	4100	10835	36	4156	4746
139	LHR-SFO	14	74914	5492	147.00	29386	6832	18055	60	4650	5040
140	LHR-SIN	14	94570	5768	188.41	38962	5941	30244	101	5872	6619
141	LHR-YMX	14	45388	5768	93.91	18700	7175	18962	63	2825	3200
142	LHR-YVR	6	28242	2380	55.99	11203	2961	7824	26	4090	4512
143	LHR-YYZ	16	56704	5856	118.66	20754	7285	19251	64	3079	3341
144	MAD-MEX	12	67572	5160	126.50	29056	6058	22992	77	4893	5133
145	MAD-MIA	20	88260	5320	174.17	23478	6246	23705	79	3834	3834
146	MAD-SDQ	27	112455	8986	219.50	37429	10550	40039	133	3610	3610
147	MAD-SJU	6	23760	1596	46.50	6318	1985	5247	17	3404	3404
148	MAD-YMX	6	20736	1596	41.50	5516	1985	5247	17	3016	3229
149	MIA-MUC	4	19976	984	40.01	4915	1155	4384	15	4341	4342
150	MIA-MXP	4	19668	1732	38.50	8516	2033	7717	26	4273	4273
151	MRU-MUC	4	22060	1140	43.33	6286	1171	4739	16	4796	5325
152	MUC-ORD	14	63196	4060	133.58	18326	5051	13347	44	3928	4151
153	MUC-YYZ	6	24744	1740	50.51	7176	2165	5720	19	3588	3804
154	MXP-NRT	6	36306	2276	72.17	13772	2344	11934	40	5258	5786
155	NRT-PPT	2	11736	544	22.42	3192	553	4851	16	5099	5099
156	NRT-ZRH	7	41699	1652	85.50	9842	1702	8662	29	5240	5700
157	ORD-ZRH	14	61992	3474	125.42	15382	4322	11421	38	4157	4395
158	ORY-PTP	16	67088	5696	131.36	23887	6687	25380	85	3643	3643
159	YMX-ZRH	14	52192	3304	106.76	12318	4110	10862	36	3503	3669

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		1992 Weekly Data					Season	2015	2015		
	AIRPORT		ACM		A/C		Adjusted	Weekly	Weekly	GCD	DVRT
Rank	PAIR	Dpts	St.Mi	SEATS	Hrs	ASM(K)	Seats	Seats	Depts	St.Mi	St.Mi
1	AKL-HKG	4	22704	1688	42.50	9582	1715	15053	50	4939	5008
2	AKL-LAX	10	65060	4045	123.34	26316	4081	17285	58	5658	5658
3	AKL-NGO	6	33240	1398	68.25	7746	1420	12467	42	4823	4826
4	AKL-NRT	5	27400	2002	52.82	10971	2034	17853	60	4771	4771
5	AKL-PER	4	13260	1160	28.00	3846	1179	10344	34	2880	3171
6	AKL-SIN	6	31332	2374	60.62	12397	2412	21170	71	4556	4867
7	AMS-NRT	6	34704	1932	68.25	11172	1990	10130	34	5026	5387
8	AMS-SIN	6	39150	2460	76.74	16051	2534	12899	43	5672	6504
9	ANC-SEL	23	86687	8657	190.84	32629	9124	79087	264	3275	3417
10	ATH-BKK	4	19680	1148	39.86	5648	1182	6019	20	4274	5080
11	ATH-SIN	4	22488	1656	44.84	9311	1706	8683	29	4889	5232
12	BKK-BNE	2	9044	752	18.66	3400	764	6706	22	3947	4580
13	BKK-LHR	2	11868	810	24.26	4806	834	4247	14	7167	7902
14	BKK-PER	3	9948	741	20.17	2457	753	6608	22	2889	3241
15	BKK-PER	4	13264	1624	26.51	5384	1650	14482	48	2889	3241
16	BNE-FUK	2	8934	466	18.17	2082	473	4156	14	3905	4054
17	BNE-HKG	4	17220	1624	33.18	6992	1650	14482	48	3761	4032
18	BNE-HKG	3	12915	1266	24.83	5451	1286	11289	38	3761	4032
19	BNE-HNL	4	18788	956	37.99	4491	965	4085	14	4096	4096
20	BNE-NGO	3	13368	1014	26.50	4518	1030	9042	30	3896	3977
21	BNE-SIN	14	53438	3192	108.50	12184	3243	28464	95	3325	3776
22	BNE-SIN	4	15268	1436	30.16	5480	1459	12805	43	3325	3776
23	BRU-JFK	6	21930	2460	46.25	8992	3060	8087	27	3176	3338
24	BRU-SIN	6	39312	2460	77.00	16118	2534	12899	43	5695	6450
25	CDG-NRT	14	84378	4508	169.16	27170	4643	23637	79	5237	5607
26	CDG-SIN	8	53256	3280	104.68	21832	3378	17198	57	5786	6449
27	CGK-SEL	6	19704	1512	41.75	4966	1536	13483	45	2854	2865
28	CHC-SIN	2	10444	806	18.86	4209	819	7187	24	4535	5038
29	CNS-FUK	4	14508	808	30.66	2932	821	7205	24	3152	3595
30	CNS-HNL	10	46350	2390	93.75	11078	2412	10213	34	3826	3826
31	CNS-NGO	11	40106	3038	84.17	11075	3087	27091	90	3168	3511
32	CNS-NRT	10	36530	4200	72.08	15343	4267	37453	125	3174	3435
33	CNS-NRT	14	51142	5426	100.92	19820	5513	48386	161	3174	3435
34	CNS-OSA	3	10893	966	21.75	3508	981	8614	29	3155	3519
35	CNS-SIN	4	12464	808	25.84	2516	821	7205	24	2702	2970
36	CTS-HNL	4	14972	1100	29.83	4118	1159	10049	33	3253	3253
37	DEL-SIN	6	15474	1594	32.00	4110	1620	14214	47	2243	2288
38	FCO-MLE	2	9116	828	17.92	3774	853	4342	14	3961	4150
39	FRA-JFK	6	23064	2460	47.25	9456	3060	8087	27	3340	3420
40	FRA-NRT	13	75582	4186	151.33	24338	4312	21949	73	5053	5211
41	FRA-SIN	10	63800	4100	126.25	26158	4223	21498	72	5546	6319
42	FUK-HNL	2	8772	550	17.08	2412	580	5025	17	3811	3872
43	FUK-SIN	14	39424	2646	83.42	7451	2688	23596	79	2440	2445
44	FUK-SYD	2	9702	466	20.00	2260	473	4156	14	4215	4496
45	GRU-LAX	8	49232	2576	94.15	15854	2736	11212	37	5347	5447
46	HKG-LAX	14	101220	5068	198.33	36642	5342	46300	154	6284	6565
47	HKG-MEL	7	32207	2954	63.00	13593	3001	26342	88	3998	3998
48	HKG-MEL	8	36808	1824	74.33	8392	1853	16265	54	3998	3998
49	HKG-PER	4	14996	1688	29.34	6328	1715	15053	50	3317	3682
50	HKG-SFO	14	96544	5740	184.91	39584	6050	52439	175	5994	6181
51	HKG-SYD	10	45820	4220	88.41	19339	4288	37632	125	3983	4497
52	HKG-SYD	10	45820	4060	87.91	18602	4125	36205	121	3983	4497

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		1992 Weekly Data					Season	2015	2015		
	AIRPORT		ACM		A/C		Adjusted	Weekly	Weekly	GCD	DVRT
Rank	PAIR	Dpts	St.Mi	SEATS	Hrs	ASM(K)	Seats	Seats	Depts	St.Mi	St.Mi
53	HKG-YVR	14	89124	5908	174.42	37610	6227	53973	180	5534	5832
54	HKT-NRT	3	9774	741	22.25	2414	753	6608	22	2831	3080
55	HNL-LAX	6	15306	2400	32.75	6122	2642	8910	30	2217	2217
56	HNL-LAX	14	35714	3722	76.75	9495	4098	13818	46	2217	2217
57	HNL-NAN	6	19026	2430	37.25	7704	2452	10384	35	2755	2755
58	HNL-NGO	14	56084	5600	109.67	22434	5902	51160	171	3481	3481
59	HNL-NRT	54	205902	18480	409.51	70466	19478	168827	563	3314	3314
60	HNL-OSA	22	90046	8800	175.09	36018	9275	80394	268	3557	3557
61	HNL-SEL	20	90760	6068	181.67	27538	6396	55435	185	3944	4592
62	HNL-SFO	8	19152	1912	43.33	4576	2105	7099	24	2080	2080
63	HNL-SYD	14	71036	4730	134.75	24000	4773	20213	67	4409	4416
64	HNL-TPE	2	10082	820	18.33	4134	864	7491	25	4378	4378
65	HNL-YVR	14	37842	3570	78.16	9650	3931	13254	44	2534	2534
66	HNL-YYZ	6	27828	1670	55.33	7746	1839	6200	21	4031	4031
67	IAD-NRT	4	26944	1288	51.83	8676	1358	11767	39	5853	6171
68	JFK-NRT	14	94178	7952	184.33	53494	8381	72647	242	5845	6046
69	KHI-SIN	6	17634	1134	37.00	3332	1152	10112	34	2558	3026
70	KUL-NRT	14	46718	4004	95.07	13362	4068	35705	119	2900	2900
71	LAX-NGO	2	11234	644	22.34	3618	679	5883	20	4881	4894
72	LAX-NRT	34	184960	10948	361.33	59559	11539	100017	333	4727	4727
73	LAX-NRT	14	76160	5796	149.34	31530	6109	52950	177	4727	4727
74	LAX-NRT	14	76160	3738	148.75	20334	3940	34149	114	4727	4727
75	LAX-NRT	8	43520	3240	85.33	17626	3415	29600	99	4727	4727
76	LAX-PPT	6	24630	1488	48.00	6108	1501	6359	21	3569	3569
77	LAX-SEL	6	35736	2430	72.50	14474	2561	22200	74	5175	5175
78	LAX-SEL	20	119120	7092	239.00	42242	7475	64790	216	5175	5175
79	LAX-SYD	14	104860	5684	197.16	42574	5735	24289	81	6508	6508
80	LAX-TPE	8	54176	3280	102.75	22213	3457	29965	100	5883	5898
81	LHR-NRT	24	142896	11172	288.99	66518	11507	58579	195	5147	5880
82	LHR-SEL	6	33078	2346	78.75	12934	2416	12301	41	4798	5564
83	LHR-SIN	14	94570	5740	184.34	38774	5912	30097	100	5872	6619
84	LHR-SIN	15	101325	6090	202.16	41140	6273	31932	106	5872	6619
85	MEL-NAN	8	19208	2320	41.67	5570	2357	20688	69	2086	2255
86	MLE-ZRH	2	9686	828	19.33	4010	853	4342	14	4208	4404
87	MXP-NRT	4	24204	1288	48.51	7793	1327	6754	23	5258	5786
88	NGO-SIN	4	12652	1100	25.51	3480	1118	9809	33	2740	2740
89	NGO-SIN	8	25304	2432	51.33	7694	2471	21687	72	2740	2740
90	NRT-ORD	14	87598	4508	169.75	28206	4751	41184	137	5437	5537
91	NRT-PER	6	29598	1212	60.50	5978	1231	10808	36	4287	4620
92	NRT-PER	4	19732	932	40.34	4597	947	8311	28	4287	4620
93	NRT-PPT	2	11736	1136	22.42	6666	1154	10130	34	5099	5099
94	NRT-SEA	4	19028	1288	37.00	6128	1358	11767	39	4133	4144
95	NRT-SFO	22	112464	7084	218.18	36212	7467	64717	216	4441	4441
96	NRT-SIN	26	86684	10264	175.49	34221	10428	91528	305	2889	2889
97	NRT-SIN	24	80016	10702	162.00	35682	10873	95434	318	2889	2889
98	NRT-SYD	14	68082	4508	131.25	21922	4580	40200	134	4226	4388
99	NRT-SYD	14	68082	5451	130.68	26508	5538	48609	162	4226	4388
100	NRT-YVR	18	83916	5796	163.50	27018	6109	52950	177	4052	4069
101	NRT-YYZ	6	38382	1716	74.25	10979	1809	15677	52	5559	5823
102	NRT-ZRH	4	23828	1052	49.50	6267	1084	5516	18	5240	5700
103	ORD-SEL	3	19554	825	38.75	5377	870	7537	25	5664	6056
104	OSA-SIN	12	36936	4836	74.50	14886	4913	43125	144	2667	2667

HSCT Simulated Airlines Network - Composite Far Eastern Airline

		1992 Weekly Data					Season	2015	2015		
	AIRPORT		ACM		A/C		Adjusted	Weekly	Weekly	GCD	DVRT
Rank	PAIR	Dpts	St.Mi	SEATS	Hrs	ASM(K)	Seats	Seats	Depts	St.Mi	St.Mi
105	OSA-SIN	10	30780	2750	61.66	8464	2794	24523	82	2667	2667
106	OSA-SYD	3	14559	966	28.50	4688	981	8614	29	4216	4430
107	PEK-SIN	3	8379	567	17.83	1584	576	5056	17	2407	2879
108	PPT-SYD	6	22800	1488	45.00	5654	1512	13269	44	3302	3302
109	SDJ-SIN	6	20760	1134	43.25	3924	1152	10112	34	3036	3094
110	SEA-TPE	6	36300	1722	70.50	10418	1815	15732	52	5256	5341
111	SEL-SIN	6	17400	1512	37.25	4384	1536	13483	45	2513	2537
112	SEL-SIN	4	11600	1216	23.66	3526	1235	10844	36	2513	2537
113	SEL-SYD	2	10346	800	20.33	4138	813	7134	24	4495	4905
114	SEL-SYD	2	10346	812	20.00	4200	825	7241	24	4495	4905
115	SEL-YVR	6	30438	1602	63.00	8126	1689	14635	49	4409	4517
116	SEL-YVR	4	20292	1216	41.50	6168	1282	11109	37	4409	4517
117	SHA-SIN	3	7119	567	15.50	1345	576	5056	17	2055	2215
118	SIN-ZRH	8	51168	3280	100.01	20977	3378	17198	57	5560	6194

APPENDIX D

HSCT SIMULATED AIRLINES NETWORKS

Mach 1.6, 2.0, and 2.4

This appendix contains network descriptions for each of the HSCT simulated airlines operating at Mach 1.6, 2.0, and 2.4 . Duplicated origin/destination pairs from Regional HSCT airlines have been rolled up to a single representative route.

Mach 1.6
40%/70% Market Penetration

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40 %

	Supersonic Operation Circa 2015					M=1.6		Saved		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	185271	618	9634102	36765	4.32	4.32	3.28	3.28	12.30	12.30	31.0	31.0
LAX=NRT	73.0%	140419	468	7301775	39745	5.87	5.87	4.75	4.75	13.43	13.43	29.3	29.3
NRT=SIN	72.0%	114735	382	5966227	19848	3.85	3.85	2.92	2.92	11.85	11.85	17.8	17.8
NRT=SFO	73.0%	106975	357	5562696	28447	5.56	5.56	4.42	4.42	13.24	13.24	21.4	21.4
HNL=LAX	68.0%	96425	321	5014088	12801	3.11	3.11	2.24	2.24	10.96	10.96	13.0	13.0
JFK=NRT	73.0%	70557	235	3668940	24694	10.09	8.18	3.07	4.98	15.02	14.46	22.6	19.0
HKG=SFO	73.0%	65587	219	3410510	23540	7.88	7.49	5.27	5.66	14.36	14.21	17.2	16.5
HNL=OSA	73.0%	64315	214	3344383	13698	4.58	4.58	3.43	3.43	12.53	12.53	11.2	11.2
HNL=SFO	68.0%	57415	191	2985595	7151	2.96	2.96	2.10	2.10	10.75	10.75	7.5	7.5
NRT=ORD	73.0%	56056	187	2914933	18250	8.72	8.02	3.42	4.12	14.64	14.41	15.9	14.9
LAX=SEL	73.0%	55260	184	2873509	17124	6.62	6.62	5.40	5.40	13.82	13.82	12.6	12.6
NRT=YVR	73.0%	47516	158	2470853	11529	5.34	5.30	3.67	3.71	13.10	13.07	9.2	9.2
JFK=LHR	68.9%	46567	155	2421502	8337	4.58	4.22	2.16	2.51	12.53	12.21	8.1	7.7
LHR=NRT	79.0%	45899	153	2386733	14146	9.10	7.70	3.03	4.43	14.76	14.29	13.5	11.8
HNL=SEL	73.0%	42638	142	2217174	10070	5.14	5.73	3.96	3.37	12.96	13.34	8.1	8.7
HKG=YVR	73.0%	42360	141	2202732	14037	8.42	7.25	3.89	5.06	14.54	14.11	11.7	10.4
NRT=SEA	73.0%	38012	127	1976606	9407	5.35	5.31	4.09	4.12	13.10	13.07	7.4	7.4
LHR=SIN	79.0%	36909	123	1919289	12978	11.32	9.51	2.05	3.86	15.30	14.87	13.0	11.2
HNL=NGO	73.0%	35709	119	1856892	7443	4.50	4.50	3.35	3.35	12.46	12.46	6.1	6.1
NRT=SYD	72.0%	35523	118	1847219	8989	6.08	5.52	3.27	3.84	13.54	13.21	7.6	7.1
CNS=NRT	72.0%	34336	114	1785453	6526	4.33	4.45	2.88	2.76	12.31	12.42	5.7	5.9
FCO=JFK	68.9%	31949	106	1661334	7088	5.51	4.96	3.18	3.73	13.21	12.83	6.3	5.9
ANC=SEL	73.0%	31635	105	1645018	6204	4.92	4.71	3.38	3.59	12.80	12.63	5.8	5.6
LAX=LHR	68.9%	30671	102	1594870	8681	7.88	7.75	2.94	3.07	14.36	14.31	8.0	7.9
HKG=SYD	72.0%	29535	98	1535794	7044	6.82	5.62	2.00	3.20	13.92	13.28	6.9	6.0
FRA=JFK	68.9%	29045	97	1510353	5809	5.13	4.62	2.96	3.47	12.95	12.56	5.5	5.1
CDG=JFK	68.9%	27893	93	1450453	5258	4.70	4.29	2.02	2.42	12.62	12.28	4.9	4.6
IAD=LHR	68.9%	27717	92	1441291	5286	5.11	4.51	2.29	2.90	12.94	12.47	5.2	4.8
OSA=SIN	72.0%	27059	90	1407069	4321	3.61	3.61	2.58	2.58	11.58	11.58	4.0	4.0
LAX=SYD	73.0%	24293	81	1263219	9467	7.85	7.85	6.16	6.16	14.35	14.35	6.3	6.3
LHR=MIA	69.9%	22682	76	1179442	5210	5.16	4.96	3.98	4.18	12.97	12.83	4.3	4.2
SFO=TPE	73.0%	22306	74	1159893	7474	7.35	6.88	4.94	5.41	14.15	13.95	5.5	5.2
LAX=TPE	73.0%	20844	69	1083884	7343	7.64	7.22	5.27	5.69	14.27	14.09	5.3	5.1
DTW=SEL	73.0%	20669	69	1074763	7100	9.99	8.42	3.55	5.13	15.00	14.54	6.6	5.7
SEA=SEL	73.0%	20464	68	1064122	5515	6.28	5.70	4.43	5.01	13.65	13.32	4.5	4.2
DTW=NRT	73.0%	20464	68	1064122	6793	9.15	7.93	3.18	4.40	14.77	14.38	6.0	5.4
CDG=NRT	79.0%	20017	67	1040896	6277	9.68	7.65	2.40	4.43	14.92	14.27	6.2	5.1
LHR=ORD	68.9%	19993	67	1039633	4098	5.77	5.58	2.51	2.70	13.37	13.25	4.1	4.0
FRA=SIN	79.0%	19799	66	1029554	6575	10.75	8.28	1.78	4.25	15.18	14.50	6.7	5.4
EWR=NRT	73.0%	19126	64	994574	6694	10.09	8.17	3.20	5.12	15.02	14.46	6.1	5.1
JFK=MXP	68.9%	19091	64	992725	3955	5.26	4.85	3.05	3.45	13.04	12.75	3.7	3.5
EZE=MIA	63.0%	19036	63	989861	4367	7.08	5.73	1.87	3.22	14.03	13.34	4.6	3.9
AMS=JFK	68.9%	18815	63	978365	3556	4.74	4.38	2.90	3.26	12.66	12.36	3.4	3.2
HKG=LAX	73.0%	18520	62	963030	6969	8.45	7.92	5.72	6.25	14.55	14.37	5.1	4.9
FRA=NRT	79.0%	17882	60	929870	5411	9.17	7.07	2.44	4.54	14.78	14.03	5.3	4.3
OSA=SFO	73.0%	17855	60	928446	4993	6.08	6.08	4.42	4.42	13.54	13.54	3.8	3.8
GIG=MIA	63.0%	17462	58	908021	3790	6.65	5.97	1.93	2.61	13.84	13.49	4.0	3.7
DFW=HNL	68.0%	17360	58	902737	4284	6.97	6.49	0.57	1.06	13.99	13.76	4.1	3.9
CDG=IAD	68.9%	17105	57	889473	3425	5.00	4.61	2.85	3.24	12.86	12.55	3.2	3.0
HKG=MEL	72.0%	17043	57	886235	4080	6.29	6.29	2.87	2.87	13.66	13.66	3.7	3.7
HNL=SYD	73.0%	17038	57	885996	4498	5.57	5.55	4.06	4.06	13.25	13.23	3.4	3.4
BNE=SIN	72.0%	16508	55	858412	3287	5.74	4.82	1.97	2.88	13.35	12.73	3.4	3.0
FRA=IAD	68.9%	16182	54	841471	3424	5.61	4.92	2.67	3.36	13.27	12.80	3.3	3.0
BOS=LHR	68.9%	16066	54	835454	2720	4.22	3.98	2.72	2.97	12.21	11.98	2.6	2.5

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40 %

AIRPORT PAIR	Supersonic Operation Circa 2015					M=1.6 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
MAD=SDQ	69.9%	16016	53	832820	3462	4.83	4.83	3.30	3.30	12.73	12.73	2.9	2.9
LHR=SFO	68.9%	15483	52	805093	4311	7.71	7.67	2.81	2.85	14.29	14.28	4.0	4.0
JFK=MAD	68.9%	15062	50	783212	2804	4.40	4.40	2.96	2.96	12.37	12.37	2.5	2.5
BRU=JFK	68.9%	14686	49	763656	2793	4.75	4.42	2.98	3.31	12.67	12.39	2.6	2.5
LAX=OSA	73.0%	14617	49	760087	4024	5.98	5.98	5.19	5.19	13.49	13.49	3.1	3.1
HNL=SEA	68.0%	14283	48	742731	1989	3.23	3.23	2.36	2.36	11.12	11.12	2.0	2.0
KUL=NRT	72.0%	14282	48	742671	2480	3.97	3.97	2.82	2.82	11.97	11.97	2.3	2.3
MAD=MIA	69.9%	13898	46	722717	3191	5.07	5.07	3.91	3.91	12.91	12.91	2.6	2.6
AMS=SIN	79.0%	13616	45	708036	4624	10.97	9.30	2.00	3.66	15.22	14.82	4.7	4.1
EWR=LHR	68.9%	13163	44	684473	2366	4.95	4.12	2.28	3.11	12.82	12.12	2.4	2.1
CDG=LAX	68.9%	12992	43	675584	3821	8.15	7.61	3.07	3.62	14.45	14.25	3.5	3.3
DFW=NRT	73.0%	12841	43	667736	4283	8.02	7.93	4.40	4.48	14.41	14.38	3.4	3.4
ATL=FRA	68.9%	12832	43	667241	3072	6.47	5.62	2.82	3.67	13.75	13.28	2.9	2.6
ATL=LGW	68.9%	12795	43	665327	2807	5.97	5.07	2.59	3.48	13.48	12.91	2.7	2.4
JFK=ZRH	68.9%	12793	43	665258	2608	5.60	4.92	2.73	3.41	13.27	12.80	2.6	2.3
NGO=PDX	73.0%	12790	43	665076	3311	5.68	5.59	3.86	3.95	13.31	13.26	2.6	2.6
PDX=SEL	73.0%	12790	43	665076	3495	5.98	5.74	4.69	4.93	13.49	13.35	2.7	2.6
FRA=ORD	68.9%	12721	42	661498	2865	6.14	5.93	3.02	3.23	13.58	13.46	2.7	2.7
NGO=SIN	72.0%	12599	42	655124	2067	3.69	3.69	2.72	2.72	11.67	11.67	1.9	1.9
DFW=LGW	68.9%	12574	42	653839	3103	6.97	6.49	2.68	3.16	13.99	13.76	3.0	2.8
CDG=YMX	68.9%	12519	42	650967	2244	4.79	4.49	2.31	2.61	12.70	12.45	2.2	2.1
SEL=SFO	73.0%	12483	42	649114	3650	6.05	6.05	5.33	5.33	13.53	13.53	2.7	2.7
AMS=DTW	68.9%	12482	42	649053	2550	5.50	5.15	2.38	2.72	13.20	12.97	2.5	2.4
DFW=FRA	68.9%	12453	42	647548	2447	5.03	5.03	5.21	5.21	12.88	12.88	2.3	2.3
LAX=OGG	68.0%	12246	41	636781	1581	3.05	3.05	2.07	2.07	10.87	10.87	1.6	1.6
HNL=ORD	68.0%	12225	41	635700	2694	5.88	5.88	2.50	2.50	13.43	13.43	2.5	2.5
FRA=YVR	68.9%	12119	40	630180	3157	7.84	6.87	1.87	2.84	14.34	13.94	3.2	2.8
OSA=SYD	72.0%	12063	40	627301	3045	6.12	5.55	3.35	3.93	13.57	13.23	2.6	2.4
OGG=SFO	68.0%	11934	40	620564	1450	2.91	2.91	1.98	1.98	10.67	10.67	1.5	1.5
NRT=PDX	73.0%	11920	40	619851	2984	5.27	5.27	4.10	4.10	13.05	13.05	2.3	2.3
AMS=NRT	79.0%	11854	40	616424	3568	9.83	7.20	1.83	4.46	14.96	14.09	3.7	2.9
HNL=YVR	68.0%	11851	40	616239	1798	3.46	3.46	2.12	2.12	11.41	11.41	1.7	1.7
NRT=YYZ	73.0%	11686	39	607690	3890	9.82	7.91	2.56	4.47	14.95	14.37	3.7	3.1
GIG=JFK	63.0%	11536	38	599855	2881	6.61	5.95	2.80	3.47	13.82	13.47	2.6	2.4
FRA=MIA	69.9%	11289	38	587033	2831	5.81	5.50	3.75	4.06	13.39	13.20	2.3	2.2
NRT=SJC	73.0%	11007	37	572345	2945	5.59	5.59	4.54	4.54	13.26	13.26	2.2	2.2
JFK=ORY	68.9%	10991	37	571511	2072	5.08	4.28	2.78	3.58	12.92	12.27	2.1	1.8
CNS=NGO	72.0%	10836	36	563495	2056	4.33	4.53	3.32	3.12	12.31	12.49	1.8	1.9
CDG=YYZ	68.9%	10701	36	556468	2081	5.40	4.82	2.30	2.88	13.14	12.72	2.1	1.9
LIM=MIA	63.0%	10561	35	549158	1440	3.94	3.69	1.79	2.03	11.94	11.68	1.7	1.6
BOS=CDG	68.9%	10494	35	545664	1864	4.40	4.12	2.79	3.07	12.38	12.12	1.8	1.7
BNE=HKG	72.0%	10309	34	536044	2322	6.20	5.11	2.09	3.18	13.61	12.93	2.2	1.9
SEL=YVR	73.0%	10298	34	535481	2719	6.77	5.81	3.70	4.66	13.89	13.39	2.4	2.1
ORY=PTP	69.9%	10152	34	527904	2215	4.88	4.88	3.33	3.33	12.76	12.76	1.8	1.8
AKL=PER	72.0%	10016	33	520835	1727	4.33	4.16	2.53	2.70	12.31	12.16	1.7	1.6
BOS=FRA	68.9%	10015	33	520774	1906	4.87	4.51	2.73	3.09	12.76	12.47	1.8	1.7
SEL=SIN	72.0%	9731	32	505996	1464	3.86	3.46	2.24	2.63	11.85	11.41	1.5	1.4
AKL=HNL	73.0%	9487	32	493306	2173	4.88	4.88	3.87	3.87	12.77	12.77	1.7	1.7
GIG=MAD	70.0%	9447	31	491251	2487	6.04	5.72	3.98	4.30	13.52	13.33	2.0	1.9
FUK=SIN	72.0%	9438	31	490786	1379	3.46	3.36	2.82	2.92	11.41	11.29	1.4	1.3
AKL=LAX	73.0%	9417	31	489662	3190	6.91	6.91	5.41	5.41	13.96	13.96	2.2	2.2
MAD=MEX	69.9%	9197	31	478227	2695	6.17	6.32	4.37	4.22	13.60	13.67	2.0	2.0
CDG=ORD	68.9%	9186	31	477695	1978	6.04	5.58	2.77	3.23	13.52	13.25	2.0	1.8
HNL=STL	68.0%	8961	30	465963	1921	5.70	5.70	2.47	2.47	13.32	13.32	1.8	1.8

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40 %

	Supersonic Operation Circa 2015					M=1.6		Saved		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		Hrs/Dey/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
FRA=LAX	68.9%	8905	30	463062	2683	8.83	7.94	2.31	3.19	14.67	14.38	2.6	2.3
GRU=LAX	63.0%	8872	30	461344	2841	10.39	8.34	1.35	3.40	15.09	14.52	2.9	2.4
JFK=OSA	73.0%	8829	29	459093	3170	9.34	8.80	4.29	4.82	14.83	14.67	2.6	2.5
LHR=SEA	68.9%	8826	29	458959	2196	7.47	6.80	1.96	2.63	14.20	13.91	2.2	2.1
HNL=NAN	73.0%	8791	29	457130	1450	3.70	3.70	2.57	2.57	11.69	11.69	1.3	1.3
MSP=NRT	73.0%	8770	29	456052	2707	8.20	8.17	3.38	3.41	14.47	14.46	2.4	2.4
AMS=ATL	68.9%	8676	29	451164	1980	5.89	5.33	2.94	3.50	13.44	13.09	1.8	1.7
MUC=ORD	68.9%	8597	29	447061	2022	6.64	6.35	2.90	3.19	13.83	13.69	2.0	1.9
EZE=MAD	70.0%	8524	28	443245	2775	8.38	7.08	3.28	4.59	14.53	14.03	2.3	2.0
AKL=SIN	72.0%	8468	28	440335	2310	7.07	6.03	3.03	4.07	14.03	13.52	2.0	1.8
BKK=PER	72.0%	8436	28	438666	1459	4.18	4.24	2.49	2.43	12.17	12.23	1.4	1.4
MEL=NAN	72.0%	8275	28	430319	1034	3.20	3.16	2.01	2.05	11.08	11.02	1.1	1.1
ORD=ZRH	68.9%	8075	27	419915	2010	7.04	6.60	2.12	2.57	14.02	13.81	1.9	1.8
AMS=CUR	69.9%	8060	27	419098	2040	5.55	5.35	3.86	4.06	13.23	13.10	1.6	1.6
LGW=STL	68.9%	7935	26	412598	1737	6.18	5.83	2.32	2.67	13.60	13.40	1.7	1.6
EWR=FRA	68.9%	7879	26	409726	1582	5.61	4.64	2.60	3.57	13.27	12.57	1.6	1.4
LHR=YYZ	68.9%	7701	26	400427	1420	5.18	4.94	2.24	2.47	12.98	12.81	1.5	1.4
TPE=YVR	73.0%	7689	26	399806	2379	6.81	6.47	4.51	4.85	13.91	13.75	1.8	1.7
NRT=PER	72.0%	7648	25	397674	1963	5.86	5.76	4.23	4.33	13.42	13.36	1.6	1.6
FDF=ORY	69.9%	7614	25	395928	1686	4.96	4.96	3.41	3.41	12.83	12.83	1.4	1.4
LHR=YMX	68.9%	7585	25	394410	1283	4.68	4.47	2.03	2.23	12.61	12.44	1.3	1.3
LHR=PHL	68.9%	7585	25	394410	1394	5.13	4.28	2.33	3.18	12.95	12.26	1.4	1.3
DUS=ORD	68.9%	7548	25	392495	1656	5.91	5.72	2.88	3.08	13.45	13.33	1.6	1.5
MXP=NRT	79.0%	7475	25	388700	2353	9.97	8.11	2.09	3.96	14.99	14.44	2.4	2.0
BOS=LGW	68.9%	7364	25	382922	1254	4.43	3.92	2.45	2.95	12.40	11.92	1.3	1.2
LGW=MSP	68.9%	7364	25	382922	1541	5.81	5.49	2.52	2.84	13.39	13.19	1.5	1.5
CPH=JFK	68.9%	7282	24	378682	1456	4.93	4.59	3.01	3.35	12.80	12.54	1.3	1.3
AKL=NRT	72.0%	7141	24	371336	2040	5.92	5.92	4.64	4.64	13.46	13.46	1.5	1.5
JFK=MUC	68.9%	7051	24	366648	1478	5.55	4.99	2.91	3.47	13.23	12.85	1.4	1.3
JFK=MAN	68.9%	6885	23	358032	1193	4.75	4.06	2.56	3.26	12.67	12.06	1.2	1.1
CDG=SIN	79.0%	6879	23	357726	2383	10.02	9.21	3.06	3.88	15.01	14.79	2.2	2.0
SIN=ZRH	79.0%	6879	23	357726	2290	10.77	8.75	1.73	3.75	15.18	14.65	2.3	2.0
AMS=YMX	68.9%	6838	23	355570	1220	4.94	4.50	1.93	2.37	12.81	12.46	1.3	1.2
JFK=LIS	68.9%	6827	23	355023	1193	3.88	3.88	3.23	3.23	11.88	11.88	1.1	1.1
CCS=MAD	69.9%	6637	22	345139	1502	5.01	5.01	3.46	3.46	12.86	12.86	1.2	1.2
IAD=MXP	68.9%	6312	21	328219	1382	5.90	5.18	2.55	3.28	13.45	12.98	1.3	1.2
SEA=TPE	73.0%	6293	21	327217	1980	6.65	6.56	5.10	5.19	13.84	13.79	1.4	1.4
HNL=SAN	68.0%	6279	21	326499	852	3.17	3.17	2.20	2.20	11.03	11.03	0.9	0.9
AMS=YYZ	68.9%	6265	21	325757	1212	5.40	4.98	2.18	2.60	13.13	12.85	1.2	1.2
BOS=ZRH	68.9%	6262	21	325620	1216	5.19	4.54	2.56	3.21	12.99	12.50	1.2	1.1
ARN=JFK	68.9%	6117	20	318099	1239	5.41	4.85	2.98	3.55	13.14	12.74	1.2	1.1
GRU=YYZ	63.0%	6059	20	315046	1604	7.35	6.75	2.82	3.42	14.15	13.89	1.5	1.4
AKL=HKG	72.0%	6021	20	313094	1781	6.93	6.19	3.70	4.44	13.97	13.60	1.4	1.3
HKG=PER	72.0%	6021	20	313094	1196	5.36	4.72	1.98	2.61	13.11	12.64	1.2	1.1
MAN=ORD	68.9%	6017	20	312902	1194	5.52	5.46	2.44	2.51	13.21	13.17	1.2	1.2
NRT=PPT	72.0%	5993	20	311610	1830	6.29	6.29	4.92	4.92	13.66	13.66	1.3	1.3
AMS=LAX	68.9%	5978	20	310851	1730	8.18	7.34	2.72	3.55	14.46	14.15	1.6	1.5
KOA=SFO	68.0%	5967	20	310282	735	2.94	2.94	2.04	2.04	10.71	10.71	0.8	0.8
LGW=MIA	69.9%	5814	19	302321	1340	5.17	5.05	3.87	3.99	12.98	12.89	1.1	1.1
GVA=JFK	68.9%	5781	19	300594	1159	5.39	4.70	2.57	3.26	13.13	12.62	1.1	1.0
SEL=SYD	72.0%	5750	19	298998	1548	7.14	6.07	2.94	4.01	14.06	13.54	1.4	1.2
AMS=IAH	68.9%	5691	19	295944	1480	7.39	6.24	2.32	3.47	14.17	13.63	1.4	1.2
DEL=SIN	72.0%	5686	19	295659	764	3.88	3.72	1.45	1.61	11.88	11.71	0.9	0.9
NRT=ZRH	79.0%	5671	19	294906	1779	9.95	7.80	2.32	4.47	14.99	14.33	1.8	1.5

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40 %

AIRPORT PAIR	Supersonic Operation Circa 2015					M=1.6 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
ATH=JFK	68.9%	5668	19	294713	1450	6.55	6.21	3.41	3.75	13.79	13.62	1.3	1.2
AMS=MSP	68.9%	5636	19	293072	1182	5.88	5.46	2.28	2.71	13.43	13.17	1.2	1.1
FRA=YYZ	68.9%	5602	19	291294	1148	5.24	5.14	2.76	2.86	13.03	12.96	1.1	1.1
FRA=SFO	68.9%	5497	18	285824	1625	8.83	7.76	2.01	3.07	14.68	14.31	1.6	1.4
BCN=JFK	68.9%	5486	18	285277	1090	4.66	4.64	3.44	3.46	12.60	12.57	1.0	1.0
DTW=FRA	68.9%	5486	18	285277	1184	6.09	5.45	2.37	3.01	13.55	13.17	1.2	1.1
CDG=DTW	68.9%	5486	18	285277	1127	5.77	5.08	2.40	3.08	13.36	12.92	1.1	1.0
BOS=GLA	68.9%	5486	18	285277	862	3.99	3.63	2.38	2.74	11.99	11.61	0.9	0.8
AMS=BOS	68.9%	5486	18	285277	983	4.90	4.13	2.27	3.04	12.78	12.12	1.0	0.9
LAX=NGO	73.0%	5423	18	281992	1585	6.29	6.19	4.88	4.98	13.66	13.60	1.2	1.2
CGK=SEL	72.0%	5393	18	280449	922	3.85	3.82	3.10	3.13	11.85	11.82	0.8	0.8
SFO=SHA	73.0%	5350	18	278192	1708	6.73	6.63	5.23	5.33	13.87	13.83	1.2	1.2
ANC=OSA	73.0%	5350	18	278192	1014	5.12	4.60	2.34	2.86	12.95	12.55	1.0	0.9
LGW=YYZ	68.9%	5339	18	277618	990	5.19	4.83	2.35	2.71	12.99	12.73	1.0	1.0
EWR=ORY	68.9%	5339	18	277618	1011	4.66	4.42	2.96	3.21	12.60	12.39	0.9	0.9
PPT=SYD	72.0%	5308	18	275998	1049	4.30	4.30	3.20	3.20	12.29	12.29	0.9	0.9
BGI=LGW	69.9%	5219	17	271366	1138	4.81	4.81	3.49	3.49	12.71	12.71	0.9	0.9
ANU=LGW	69.9%	5219	17	271366	1104	4.69	4.69	3.40	3.40	12.62	12.62	0.9	0.9
FRA=YYC	68.9%	5165	17	268592	1257	7.43	6.29	1.82	2.95	14.18	13.66	1.3	1.1
BRU=SIN	79.0%	5160	17	268295	1759	10.25	9.21	2.59	3.62	15.06	14.79	1.7	1.5
CDG=GIG	70.0%	5143	17	267420	1526	7.49	6.45	3.58	4.62	14.21	13.74	1.3	1.2
AMS=ORD	68.9%	5118	17	266131	1093	5.88	5.56	2.33	2.65	13.43	13.24	1.1	1.0
ANC=HKG	73.0%	5109	17	265650	1345	7.58	6.14	2.51	3.94	14.24	13.58	1.3	1.1
CDG=PTP	69.9%	5076	17	263952	1110	4.93	4.93	3.28	3.28	12.80	12.80	0.9	0.9
CDG=IAH	68.9%	5007	17	260387	1306	7.96	6.23	1.87	3.60	14.39	13.63	1.3	1.1
AKL=NGO	72.0%	4987	17	259304	1440	5.98	5.98	5.39	5.39	13.49	13.49	1.1	1.1
HNL=YYZ	68.0%	4930	16	256380	1190	6.56	6.56	2.66	2.66	13.79	13.79	1.1	1.1
LHR=SEL	79.0%	4920	16	255862	1414	8.76	7.40	4.37	5.72	14.65	14.17	1.4	1.2
IAD=NRT	73.0%	4707	16	244748	1650	10.41	8.38	2.55	4.58	15.10	14.53	1.5	1.3
FCO=MIA	69.9%	4655	16	242079	1250	5.87	5.81	4.30	4.36	13.42	13.39	1.0	1.0
DFW=MAD	68.9%	4621	15	240283	1190	7.20	6.37	3.01	3.84	14.09	13.70	1.1	1.0
DFW=ORY	68.9%	4621	15	240283	1186	7.60	6.58	2.44	3.46	14.25	13.80	1.2	1.0
CDG=MIA	69.9%	4598	15	239114	1095	5.18	5.18	4.07	4.07	12.99	12.99	0.9	0.9
MUC=YYZ	68.9%	4576	15	237959	983	5.98	5.52	2.44	2.90	13.49	13.21	1.0	0.9
JFK=TLV	68.9%	4534	15	235770	1336	8.07	6.41	3.17	4.83	14.43	13.72	1.2	1.0
FRA=YMX	68.9%	4529	15	235497	859	5.29	4.80	2.04	2.53	13.06	12.71	0.9	0.8
MIA=ORY	69.9%	4417	15	229660	1051	5.15	5.15	4.77	4.77	12.96	12.96	0.8	0.8
CPH=EWR	68.9%	4410	15	229343	885	4.89	4.61	3.22	3.49	12.78	12.56	0.8	0.8
ATL=ZRH	68.9%	4345	14	225924	1057	6.78	5.81	2.68	3.64	13.90	13.39	1.0	0.9
YMX=ZRH	68.9%	4345	14	225924	911	5.89	5.25	1.74	2.37	13.44	13.04	0.9	0.8
BOG=JFK	63.0%	4314	14	224335	557	3.05	3.05	2.37	2.37	10.87	10.87	0.6	0.6
MIA=SCL	63.0%	4314	14	224335	931	5.96	5.14	2.81	3.62	13.48	12.96	0.9	0.8
CVG=LGW	68.9%	4289	14	223052	886	5.82	5.00	2.26	3.08	13.40	12.86	0.9	0.8
ATL=MAD	68.9%	4289	14	223052	964	5.37	5.27	3.25	3.35	13.12	13.05	0.8	0.8
ATL=MAN	68.9%	4289	14	223052	912	5.95	5.20	2.18	2.93	13.47	13.00	0.9	0.8
ATL=SNN	68.9%	4289	14	223052	855	5.56	4.65	2.15	3.05	13.24	12.59	0.9	0.8
ATL=ORY	68.9%	4289	14	223052	978	6.29	5.36	2.50	3.43	13.66	13.11	0.9	0.8
FRA=MCO	68.9%	4289	14	223052	1056	5.71	5.43	3.80	4.07	13.33	13.15	0.9	0.8
ATL=MUC	68.9%	4289	14	223052	1068	7.14	5.95	2.36	3.55	14.06	13.47	1.0	0.9
BOM=ZRH	79.0%	4245	14	220743	897	7.16	6.28	1.09	1.97	14.07	13.65	1.0	0.9
CDG=SEZ	60.7%	4237	14	220330	1074	6.57	6.21	3.11	3.47	13.80	13.62	1.0	0.9
JFK=LGW	68.9%	4216	14	219223	759	4.59	4.24	2.74	3.10	12.54	12.23	0.7	0.7
IAH=LGW	68.9%	4216	14	219223	1063	7.06	6.17	2.61	3.50	14.03	13.59	1.0	0.9
FCO=YYZ	68.9%	4192	14	217992	960	6.23	6.02	2.69	2.90	13.63	13.51	0.9	0.9

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40 %

	Supersonic Operation Circa 2015					M=1.6		Saved		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
LAX=MXP	68.9%	4150	14	215804	1301	9.39	8.32	2.40	3.47	14.84	14.51	1.3	1.1
CAY=CDG	69.9%	4114	14	213905	946	5.06	5.06	3.48	3.48	12.90	12.90	0.8	0.8
CNS=HNL	73.0%	4085	14	212433	936	4.88	4.88	4.49	4.49	12.77	12.77	0.7	0.7
SDJ=SIN	72.0%	4045	13	210337	735	4.54	4.08	2.67	3.13	12.50	12.07	0.7	0.7
KHI=SIN	72.0%	4045	13	210337	620	4.37	4.00	1.79	2.17	12.35	12.00	0.7	0.6
CTS=HNL	73.0%	4020	13	209024	783	4.25	4.25	3.21	3.21	12.24	12.24	0.7	0.7
CVG=FRA	68.9%	4013	13	208692	908	6.34	5.91	2.58	3.01	13.68	13.45	0.9	0.8
ATL=HAM	68.9%	4013	13	208692	950	6.39	5.41	2.90	3.88	13.71	13.14	0.9	0.8
EWR=HAM	68.9%	3866	13	201034	751	5.03	4.38	3.18	3.83	12.88	12.36	0.7	0.7
DUS=JFK	68.9%	3866	13	201034	752	5.39	4.53	2.48	3.35	13.13	12.48	0.8	0.7
CCS=FCO	69.9%	3859	13	200652	1039	6.30	5.73	3.71	4.29	13.66	13.34	0.8	0.8
LGW=MCC	68.9%	3850	13	200213	870	5.11	4.95	3.59	3.76	12.94	12.82	0.7	0.7
FRA=MEX	69.9%	3850	13	200188	1188	8.41	6.87	2.84	4.38	14.54	13.94	1.1	0.9
CDG=SFO	68.9%	3848	13	200077	1114	8.91	7.54	2.54	3.92	14.70	14.23	1.1	1.0
ATL=HNL	68.0%	3787	13	196919	885	6.17	6.17	2.50	2.50	13.59	13.59	0.8	0.8
BRU=IAD	68.9%	3756	13	195290	758	5.59	4.60	2.53	3.53	13.26	12.54	0.8	0.7
IAD=MAD	68.9%	3756	13	195290	743	4.63	4.63	3.45	3.45	12.57	12.57	0.7	0.7
FCO=GIG	70.0%	3679	12	191287	1090	7.97	6.47	3.03	4.53	14.39	13.75	1.0	0.8
BNE=NGO	72.0%	3617	12	188079	844	5.19	5.05	3.64	3.79	13.00	12.89	0.7	0.7
GIG=ORD	63.0%	3593	12	186855	992	7.96	7.06	3.00	3.90	14.39	14.03	0.9	0.9
NGO=YVR	73.0%	3581	12	186221	898	5.53	5.53	3.72	3.72	13.22	13.22	0.7	0.7
AMS=AUA	69.9%	3529	12	183506	898	5.55	5.38	4.07	4.24	13.23	13.12	0.7	0.7
ORD=ORY	68.9%	3507	12	182367	756	6.04	5.55	2.80	3.29	13.52	13.23	0.7	0.7
GRU=LHR	70.0%	3500	12	182010	1071	7.29	6.61	4.01	4.68	14.12	13.82	0.9	0.8
ATH=SIN	79.0%	3473	12	180608	1017	8.62	7.04	2.59	4.17	14.61	14.02	1.0	0.8
FCO=ORD	68.9%	3458	12	179837	865	6.90	6.65	2.85	3.10	13.95	13.84	0.8	0.8
LHR=NGO	79.0%	3456	12	179736	1063	9.08	7.25	3.17	5.00	14.75	14.11	1.0	0.8
KUL=LHR	79.0%	3456	12	179736	1181	9.81	9.42	3.32	3.70	14.95	14.85	1.1	1.0
CNS=OSA	72.0%	3446	11	179176	651	4.32	4.54	2.93	2.71	12.30	12.50	0.6	0.6
BOM=CDG	79.0%	3423	11	177991	774	7.60	6.75	1.32	2.17	14.25	13.89	0.9	0.8
BOS=FCO	68.9%	3416	11	177648	725	5.69	5.14	2.44	2.98	13.32	12.96	0.7	0.6
LAX=MAD	68.9%	3393	11	176418	1029	8.46	7.87	2.70	3.30	14.56	14.35	0.9	0.9
CDG=STL	68.9%	3387	11	176144	773	6.47	6.05	2.57	2.99	13.75	13.53	0.8	0.7
KIN=LGW	69.9%	3262	11	169604	794	5.22	5.22	3.85	3.85	13.02	13.02	0.6	0.6
MXP=ORD	68.9%	3259	11	169443	764	6.65	6.13	3.01	3.54	13.84	13.57	0.7	0.7
BRU=ORD	68.9%	3259	11	169443	703	5.91	5.57	2.92	3.26	13.45	13.25	0.7	0.7
ORD=STN	68.9%	3259	11	169443	670	6.10	5.86	2.44	2.68	13.55	13.42	0.7	0.7
GLA=ORD	68.9%	3259	11	169443	621	5.18	5.03	2.69	2.84	12.99	12.88	0.6	0.6
ORY=RDU	68.9%	3259	11	169443	685	4.92	4.72	3.62	3.82	12.80	12.65	0.6	0.6
CVG=ORY	68.9%	3185	11	165614	687	5.68	5.22	3.19	3.66	13.31	13.01	0.6	0.6
DTW=LGW	68.9%	3185	11	165614	820	7.20	6.37	0.80	1.63	14.09	13.70	0.8	0.7
JFK=NCE	68.9%	3185	11	165614	661	5.51	4.74	2.86	3.64	13.21	12.66	0.6	0.6
JFK=TXL	68.9%	3185	11	165614	660	5.44	4.72	3.06	3.78	13.16	12.65	0.6	0.6
LHR=YVR	68.9%	3130	10	162742	766	7.07	6.68	2.26	2.66	14.03	13.85	0.8	0.7
MIA=MXP	69.9%	3087	10	160521	790	5.72	5.72	3.91	3.91	13.34	13.34	0.6	0.6
CCS=CDG	69.9%	3058	10	159038	754	5.41	5.41	3.76	3.76	13.14	13.14	0.6	0.6
AMS=MCO	68.9%	3053	10	158776	719	5.41	5.21	3.72	3.92	13.14	13.01	0.6	0.6
ORD=SEL	73.0%	3015	10	156768	1022	10.37	8.40	2.54	4.51	15.09	14.54	1.0	0.8
HNL=TPE	73.0%	2996	10	155818	786	5.49	5.49	3.68	3.68	13.19	13.19	0.6	0.6
AMS=BWI	68.9%	2925	10	152075	580	5.48	4.46	2.27	3.29	13.19	12.43	0.6	0.5
GIG=LHR	70.0%	2917	10	151675	872	7.54	6.35	3.49	4.68	14.23	13.69	0.7	0.6
CCS=FRA	69.9%	2887	10	150141	753	5.75	5.75	3.87	3.87	13.36	13.36	0.6	0.6
CNS=SIN	72.0%	2882	10	149870	466	4.56	3.94	1.90	2.52	12.51	11.94	0.5	0.5
CNS=FUK	72.0%	2882	10	149870	544	4.42	4.63	3.25	3.04	12.39	12.57	0.5	0.5

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40 %

	Supersonic Operation Circa 2015					M=1.6 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
AIRPORT PAIR	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
CHC=SIN	72.0%	2875	10	149499	781	7.74	6.22	1.69	3.21	14.31	13.62	0.7	0.6
GIG=LIS	70.0%	2874	10	149466	717	6.05	5.37	3.66	4.34	13.53	13.12	0.6	0.6
BKK=CDG	79.0%	2869	10	149198	672	7.52	6.73	4.32	5.11	14.22	13.87	0.7	0.7
NRT=YEG	73.0%	2701	9	140426	684	6.50	5.85	2.78	3.42	13.76	13.42	0.6	0.6
AMS=YVR	68.9%	2693	9	140040	671	7.59	6.49	1.66	2.76	14.25	13.76	0.7	0.6
BKK=BNE	72.0%	2682	9	139483	634	7.02	5.71	2.31	3.62	14.01	13.33	0.6	0.5
LAX=LIM	63.0%	2667	9	138693	579	5.71	4.70	2.50	3.51	13.33	12.63	0.5	0.5
HKT=NRT	72.0%	2643	9	137442	448	4.56	4.18	2.86	3.24	12.51	12.17	0.5	0.4
CCS=LHR	69.9%	2609	9	135683	608	5.07	5.07	4.13	4.13	12.91	12.91	0.5	0.5
LAX=PPT	73.0%	2543	8	132259	544	4.60	4.60	3.40	3.40	12.54	12.54	0.4	0.4
AMS=CCS	69.9%	2504	8	130215	634	5.55	5.46	4.03	4.13	13.23	13.17	0.5	0.5
LAX=ZRH	68.9%	2483	8	129099	765	9.03	8.16	2.64	3.50	14.74	14.46	0.7	0.7
MCO=ORY	68.9%	2451	8	127458	573	5.07	5.07	3.93	3.93	12.91	12.91	0.5	0.5
DXB=LHR	60.7%	2428	8	126251	431	6.13	5.43	1.61	2.31	13.57	13.15	0.5	0.5
AMS=GIG	70.0%	2424	8	126052	749	7.78	6.57	3.76	4.97	14.32	13.80	0.6	0.5
AMS=KUL	79.0%	2416	8	125640	796	9.69	9.17	2.93	3.46	14.92	14.78	0.7	0.7
ATH=BKK	79.0%	2408	8	125204	616	8.50	7.47	1.47	2.50	14.57	14.20	0.7	0.6
FRA=GIG	70.0%	2407	8	125169	744	7.43	6.89	3.90	4.44	14.18	13.95	0.6	0.6
ARN=EWR	68.9%	2375	8	123492	484	5.49	4.82	2.68	3.35	13.19	12.72	0.5	0.4
CPH=LAX	68.9%	2375	8	123492	693	8.85	7.74	2.49	3.59	14.68	14.30	0.7	0.6
CPH=SEA	68.9%	2375	8	123492	599	7.32	6.93	2.39	2.78	14.14	13.97	0.6	0.6
EWR=FBU	68.9%	2375	8	123492	454	5.10	4.45	2.61	3.26	12.93	12.42	0.4	0.4
GRU=MXP	70.0%	2333	8	121340	716	8.14	6.77	3.28	4.65	14.45	13.89	0.6	0.5
EZE=LHR	70.0%	2333	8	121340	839	8.91	7.70	4.13	5.35	14.70	14.29	0.7	0.6
JFK=SVO	68.9%	2293	8	119253	554	6.71	5.96	3.09	3.83	13.86	13.48	0.5	0.5
MXP=YYZ	68.9%	2288	8	118979	489	5.87	5.47	2.59	2.99	13.42	13.18	0.5	0.5
LGW=YYC	68.9%	2288	8	118979	520	6.34	5.80	2.58	3.12	13.68	13.38	0.5	0.5
CDG=KHI	79.0%	2282	8	118660	451	6.34	6.48	1.38	1.23	13.68	13.75	0.5	0.5
FCO=YMX	68.9%	2278	8	118432	487	5.80	5.59	2.33	2.54	13.38	13.25	0.5	0.5
HAM=JFK	68.9%	2275	8	118296	450	5.08	4.36	3.21	3.93	12.92	12.34	0.4	0.4
FBU=JFK	68.9%	2275	8	118296	434	5.10	4.43	2.86	3.53	12.93	12.40	0.4	0.4
JIB=MRS	60.7%	2137	7	111147	351	4.90	4.07	1.47	2.31	12.78	12.07	0.4	0.3
CDG=SXM	69.9%	2132	7	110845	464	4.87	4.87	3.55	3.55	12.76	12.76	0.4	0.4
CLT=FRA	68.9%	2130	7	110774	486	6.44	5.45	2.44	3.43	13.73	13.17	0.5	0.4
DKR=FCO	60.7%	2110	7	109731	283	4.79	3.37	0.88	2.29	12.70	11.30	0.4	0.3
MAD=SJU	68.9%	2099	7	109133	428	4.59	4.59	3.16	3.16	12.54	12.54	0.4	0.4
MAD=YMX	68.9%	2099	7	109133	379	4.82	4.61	2.09	2.31	12.72	12.55	0.4	0.4
CPH=ORD	68.9%	2083	7	108312	461	5.92	6.01	2.79	2.70	13.46	13.51	0.4	0.4
ANC=LAX	68.0%	2076	7	107958	253	3.39	3.04	1.61	1.96	11.32	10.85	0.3	0.3
GRU=LIS	70.0%	2053	7	106762	527	6.32	5.61	3.63	4.34	13.67	13.27	0.5	0.4
PEK=SIN	72.0%	2022	7	105169	291	4.71	3.93	1.23	2.01	12.64	11.93	0.4	0.3
SHA=SIN	72.0%	2022	7	105169	249	3.37	3.11	1.79	2.05	11.30	10.96	0.3	0.3
CDG=FDF	69.9%	2018	7	104913	448	4.97	4.97	3.33	3.33	12.84	12.84	0.4	0.4
FUK=HNL	73.0%	2010	7	104512	459	5.10	4.93	3.44	3.61	12.93	12.81	0.4	0.4
CCS=TFS	69.9%	1975	7	102689	247	3.40	3.31	3.10	3.19	11.34	11.22	0.3	0.3
CCS=SCQ	69.9%	1975	7	102689	425	4.62	4.62	3.93	3.93	12.56	12.56	0.3	0.3
LGW=MBJ	69.9%	1957	7	101762	478	5.39	5.39	4.28	4.28	13.13	13.13	0.4	0.4
FRA=MRU	60.7%	1929	6	100307	573	8.77	7.06	2.71	4.42	14.66	14.03	0.5	0.5
ANC=LHR	68.9%	1925	6	100107	448	6.61	5.57	2.22	3.26	13.82	13.25	0.4	0.4
MRU=MUC	60.7%	1896	6	98578	544	8.07	6.65	2.76	4.19	14.42	13.84	0.5	0.4
CPH=SIN	79.0%	1892	6	98375	609	10.45	8.98	2.46	3.94	15.11	14.72	0.6	0.5
GVA=LAX	68.9%	1862	6	96825	572	8.79	8.02	2.80	3.56	14.66	14.41	0.5	0.5
CDG=GRU	70.0%	1862	6	96822	567	7.78	6.70	3.60	4.68	14.32	13.86	0.5	0.4
CDG=DKR	60.7%	1845	6	95926	252	4.22	3.47	1.53	2.28	12.21	11.42	0.3	0.3

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40 %

	Supersonic Operation Circa 2015					M=1.6		Saved		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
JFK-VIE	68.9%	1820	6	94636	400	6.19	5.46	2.77	3.50	13.60	13.17	0.4	0.4
GIG-LAX	63.0%	1811	6	94152	593	10.61	8.62	1.39	3.38	15.14	14.61	0.6	0.5
FRA-GRU	70.0%	1770	6	92036	561	8.17	7.13	3.66	4.70	14.46	14.06	0.5	0.4
MIA-MUC	69.9%	1754	6	91197	456	5.94	5.73	4.06	4.27	13.46	13.34	0.4	0.4
HAM-MIA	69.9%	1754	6	91197	439	5.37	5.46	4.17	4.08	13.12	13.18	0.3	0.3
DUS-MIA	69.9%	1754	6	91197	431	5.62	5.36	3.63	3.89	13.27	13.11	0.4	0.3
DXB-FCO	60.7%	1737	6	90304	244	4.98	4.09	1.28	2.18	12.85	12.08	0.3	0.3
FCO-MLE	79.0%	1737	6	90304	412	6.98	6.44	1.98	2.52	13.99	13.74	0.4	0.4
MLE-ZRH	79.0%	1737	6	90304	438	7.42	6.76	2.24	2.90	14.18	13.89	0.4	0.4
BKK-LHR	79.0%	1699	6	88341	729	11.06	9.42	1.07	2.71	15.24	14.85	0.6	0.5
FRA-JED	60.7%	1667	6	86692	224	3.88	3.65	1.70	1.94	11.88	11.62	0.3	0.2
FRA-KWI	60.7%	1667	6	86692	216	4.66	4.28	0.89	1.26	12.59	12.27	0.3	0.3
DXB-FRA	60.7%	1667	6	86692	261	5.48	4.79	1.14	1.83	13.19	12.70	0.3	0.3
BNE-FUK	72.0%	1662	6	86435	389	5.20	5.13	3.88	3.95	13.00	12.95	0.3	0.3
FUK-SYD	72.0%	1662	6	86435	420	6.78	5.68	3.22	4.32	13.90	13.31	0.4	0.3
EZE-FRA	70.0%	1642	5	85409	610	10.21	8.15	3.21	5.27	15.05	14.45	0.5	0.4
LIS-REC	70.0%	1642	5	85409	311	4.15	4.15	3.35	3.35	12.14	12.14	0.3	0.3
DXB-LGW	60.7%	1640	5	85294	290	6.10	5.33	1.06	1.84	13.56	13.09	0.4	0.3
BNE-HNL	73.0%	1634	5	84973	401	5.18	5.18	4.32	4.32	12.98	12.98	0.3	0.3
BDA-LGW	69.9%	1633	5	84895	292	4.06	4.06	2.98	2.98	12.06	12.06	0.3	0.3
ORD-TXL	68.9%	1629	5	84721	373	5.96	6.16	2.95	2.76	13.48	13.59	0.3	0.4

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70 %

AIRPORT PAIR	Supersonic Operation Circa 2015					M=1.6 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	324225	1081	16859679	64339	4.32	4.32	3.28	3.28	12.30	12.30	54.2	54.2
LAX=NRT	73.0%	245733	819	12778107	69554	5.87	5.87	4.75	4.75	13.43	13.43	51.2	51.2
NRT=SIN	72.0%	200786	669	10440896	34734	3.85	3.85	2.92	2.92	11.85	11.85	31.1	31.1
NRT=SFO	73.0%	187206	624	9734719	49782	5.56	5.56	4.42	4.42	13.24	13.24	37.4	37.4
HNL=LAX	68.0%	168743	562	8774655	22401	3.11	3.11	2.24	2.24	10.96	10.96	22.8	22.8
JFK=NRT	73.0%	123474	412	6420645	43215	10.09	8.18	3.07	4.98	15.02	14.46	39.5	33.2
HKG=SFO	73.0%	114777	383	5968393	41195	7.88	7.49	5.27	5.66	14.36	14.21	30.0	28.8
HNL=OSA	73.0%	112551	375	5852670	23972	4.58	4.58	3.43	3.43	12.53	12.53	19.6	19.6
HNL=SFO	68.0%	100477	335	5224791	12514	2.96	2.96	2.10	2.10	10.75	10.75	13.2	13.2
NRT=ORD	73.0%	98099	327	5101134	31937	8.72	8.02	3.42	4.12	14.64	14.41	27.8	26.0
LAX=SEL	73.0%	96705	322	5028640	29966	6.62	6.62	5.40	5.40	13.82	13.82	22.1	22.1
NRT=YVR	73.0%	83154	277	4323992	20176	5.34	5.30	3.67	3.71	13.10	13.07	16.1	16.1
JFK=LHR	68.9%	81493	272	4237629	14590	4.58	4.22	2.16	2.51	12.53	12.21	14.2	13.4
LHR=NRT	79.0%	80323	268	4176782	24755	9.10	7.70	3.03	4.43	14.76	14.29	23.6	20.6
HNL=SEL	73.0%	74616	249	3880054	17622	5.14	5.73	3.96	3.37	12.96	13.34	14.1	15.3
HKG=YVR	73.0%	74130	247	3854781	24565	8.42	7.25	3.89	5.06	14.54	14.11	20.4	18.1
NRT=SEA	73.0%	66520	222	3459061	16462	5.35	5.31	4.09	4.12	13.10	13.07	12.9	12.9
LHR=SIN	79.0%	64591	215	3358756	22711	11.32	9.51	2.05	3.86	15.30	14.87	22.8	19.7
HNL=NGO	73.0%	62492	208	3249562	13026	4.50	4.50	3.35	3.35	12.46	12.46	10.7	10.7
NRT=SYD	72.0%	62166	207	3232633	15731	6.08	5.52	3.27	3.84	13.54	13.21	13.3	12.4
CNS=NRT	72.0%	60087	200	3124544	11420	4.33	4.45	2.88	2.76	12.31	12.42	10.1	10.3
FCO=JFK	68.9%	55910	186	2907334	12404	5.51	4.96	3.18	3.73	13.21	12.83	11.1	10.3
ANC=SEL	73.0%	55361	185	2878782	10857	4.92	4.71	3.38	3.59	12.80	12.63	10.1	9.8
LAX=LHR	68.9%	53673	179	2791022	15192	7.88	7.75	2.94	3.07	14.36	14.31	14.0	13.8
HKG=SYD	72.0%	51685	172	2687640	12327	6.82	5.62	2.00	3.20	13.92	13.28	12.1	10.4
FRA=JFK	68.9%	50629	169	2643118	10166	5.13	4.62	2.96	3.47	12.95	12.56	9.6	8.9
CDG=JFK	68.9%	48813	163	2538293	9201	4.70	4.29	2.02	2.42	12.62	12.28	8.6	8.1
IAD=LHR	68.9%	48505	162	2522259	9251	5.11	4.51	2.29	2.90	12.94	12.47	9.1	8.4
OSA=SIN	72.0%	47353	158	2462371	7562	3.61	3.61	2.58	2.58	11.58	11.58	7.0	7.0
LAX=SYD	73.0%	42512	142	2210634	16567	7.85	7.85	6.16	6.16	14.35	14.35	11.1	11.1
LHR=MIA	69.9%	39693	132	2064024	9117	5.16	4.96	3.98	4.18	12.97	12.83	7.5	7.3
SFO=TPE	73.0%	39035	130	2029812	13080	7.35	6.88	4.94	5.41	14.15	13.95	9.7	9.2
LAX=TPE	73.0%	36477	122	1896797	12850	7.64	7.22	5.27	5.69	14.27	14.09	9.3	8.9
DTW=SEL	73.0%	36170	121	1880835	12425	9.99	8.42	3.55	5.13	15.00	14.54	11.5	10.0
SEA=SEL	73.0%	35812	119	1862213	9652	6.28	5.70	4.43	5.01	13.65	13.32	7.8	7.3
DTW=NRT	73.0%	35812	119	1862213	11888	9.15	7.93	3.18	4.40	14.77	14.38	10.6	9.4
CDG=NRT	79.0%	35030	117	1821569	10985	9.68	7.65	2.40	4.43	14.92	14.27	10.8	8.9
LHR=ORD	68.9%	34988	117	1819358	7171	5.77	5.58	2.51	2.70	13.37	13.25	7.2	7.0
FRA=SIN	79.0%	34648	115	1801719	11506	10.75	8.28	1.78	4.25	15.18	14.50	11.7	9.4
EWR=NRT	73.0%	33471	112	1740504	11715	10.09	8.17	3.20	5.12	15.02	14.46	10.7	9.0
JFK=MXP	68.9%	33409	111	1737269	6922	5.26	4.85	3.05	3.45	13.04	12.75	6.4	6.1
EZE=MIA	63.0%	33313	111	1732257	7642	7.08	5.73	1.87	3.22	14.03	13.34	8.0	6.8
AMS=JFK	68.9%	32926	110	1712140	6222	4.74	4.38	2.90	3.26	12.66	12.36	5.9	5.6
HKG=LAX	73.0%	32410	108	1685303	12195	8.45	7.92	5.72	6.25	14.55	14.37	9.0	8.5
FRA=NRT	79.0%	31294	104	1627273	9469	9.17	7.07	2.44	4.54	14.78	14.03	9.3	7.5
OSA=SFO	73.0%	31246	104	1624781	8737	6.08	6.08	4.42	4.42	13.54	13.54	6.7	6.7
GIG=MIA	63.0%	30558	102	1589037	6633	6.65	5.97	1.93	2.61	13.84	13.49	7.0	6.4
DFW=HNL	68.0%	30381	101	1579789	7497	6.97	6.49	0.57	1.06	13.99	13.76	7.2	6.8
CDG=IAD	68.9%	29934	100	1556577	5994	5.00	4.61	2.85	3.24	12.86	12.55	5.5	5.2
HKG=MEL	72.0%	29625	99	1550911	7140	6.29	6.29	2.87	2.87	13.66	13.66	6.5	6.5
HNL=SYD	73.0%	29617	99	1550492	7872	5.57	5.55	4.06	4.08	13.25	13.23	6.0	6.0
BNE=SIN	72.0%	28889	96	1502222	5752	5.74	4.82	1.97	2.88	13.35	12.73	5.9	5.2
FRA=IAD	68.9%	28319	94	1472574	5993	5.61	4.92	2.67	3.36	13.27	12.80	5.7	5.2
BOS=LHR	68.9%	28116	94	1462044	4759	4.22	3.98	2.72	2.97	12.21	11.98	4.6	4.4

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70 %

	Supersonic Operation Circa 2015					M=1.6 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
AIRPORT PAIR	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
MAD=SDQ	69.9%	28028	93	1457435	6059	4.83	4.83	3.30	3.30	12.73	12.73	5.1	5.1
LHR=SFO	68.9%	27094	90	1408913	7544	7.71	7.67	2.81	2.85	14.29	14.28	7.0	6.9
JFK=MAD	68.9%	26358	88	1370621	4907	4.40	4.40	2.96	2.96	12.37	12.37	4.5	4.5
BRU=JFK	68.9%	25700	86	1336397	4888	4.75	4.42	2.98	3.31	12.67	12.39	4.6	4.4
LAX=OSA	73.0%	25580	85	1330152	7041	5.98	5.98	5.19	5.19	13.49	13.49	5.4	5.4
HNL=SEA	68.0%	24996	83	1299779	3480	3.23	3.23	2.36	2.36	11.12	11.12	3.5	3.5
KUL=NRT	72.0%	24994	83	1299675	4340	3.97	3.97	2.82	2.82	11.97	11.97	4.0	4.0
MAD=MIA	69.9%	24322	81	1264754	5584	5.07	5.07	3.91	3.91	12.91	12.91	4.6	4.6
AMS=SIN	79.0%	23828	79	1239064	8093	10.97	9.30	2.00	3.66	15.22	14.82	8.2	7.1
EWR=LHR	68.9%	23035	77	1197828	4141	4.95	4.12	2.28	3.11	12.82	12.12	4.2	3.7
CDG=LAX	68.9%	22736	76	1182271	6687	8.15	7.61	3.07	3.62	14.45	14.25	6.1	5.8
DFW=NRT	73.0%	22472	75	1168539	7495	8.02	7.93	4.40	4.48	14.41	14.38	6.0	5.9
ATL=FRA	68.9%	22455	75	1167672	5376	6.47	5.62	2.62	3.67	13.75	13.28	5.0	4.5
ATL=LGW	68.9%	22391	75	1164322	4912	5.97	5.07	2.59	3.48	13.48	12.91	4.7	4.2
JFK=ZRH	68.9%	22389	75	1164202	4565	5.60	4.92	2.73	3.41	13.27	12.80	4.5	4.1
NGO=PDX	73.0%	22382	75	1163883	5794	5.68	5.59	3.86	3.95	13.31	13.26	4.5	4.5
PDX=SEL	73.0%	22382	75	1163883	6117	5.98	5.74	4.69	4.93	13.49	13.35	4.7	4.6
FRA=ORD	68.9%	22262	74	1157621	5014	6.14	5.93	3.02	3.23	13.58	13.46	4.8	4.7
NGO=SIN	72.0%	22047	73	1146467	3617	3.69	3.69	2.72	2.72	11.67	11.67	3.3	3.3
DFW=LGW	68.9%	22004	73	1144218	5430	6.97	6.49	2.68	3.16	13.99	13.76	5.2	4.9
CDG=YMX	68.9%	21908	73	1139193	3926	4.79	4.49	2.31	2.61	12.70	12.45	3.9	3.8
SEL=SFO	73.0%	21845	73	1135950	6387	6.05	6.05	5.33	5.33	13.53	13.53	4.7	4.7
AMS=DTW	68.9%	21843	73	1135842	4463	5.50	5.15	2.38	2.72	13.20	12.97	4.3	4.1
DFW=FRA	68.9%	21792	73	1133209	4281	5.03	5.03	5.21	5.21	12.88	12.88	4.1	4.1
LAX=OGG	68.0%	21430	71	1114366	2767	3.05	3.05	2.07	2.07	10.87	10.87	2.9	2.9
HNL=ORD	68.0%	21394	71	1112474	4714	5.88	5.88	2.50	2.50	13.43	13.43	4.5	4.5
FRA=YVR	68.9%	21208	71	1102815	5525	7.84	6.87	1.87	2.84	14.34	13.94	5.5	5.0
OSA=SYD	72.0%	21111	70	1097778	5329	6.12	5.55	3.35	3.93	13.57	13.23	4.5	4.2
OGG=SFO	68.0%	20884	70	1085987	2537	2.91	2.91	1.98	1.98	10.67	10.67	2.7	2.7
NRT=PDX	73.0%	20860	70	1084739	5221	5.27	5.27	4.10	4.10	13.05	13.05	4.0	4.0
AMS=NRT	79.0%	20745	69	1078741	6243	9.83	7.20	1.83	4.46	14.96	14.09	6.5	5.0
HNL=YVR	68.0%	20739	69	1078419	3147	3.46	3.46	2.12	2.12	11.41	11.41	3.0	3.0
NRT=YYZ	73.0%	20451	68	1063457	6808	9.82	7.91	2.56	4.47	14.95	14.37	6.4	5.4
GIG=JFK	63.0%	20187	67	1049747	5042	6.61	5.95	2.80	3.47	13.82	13.47	4.6	4.2
FRA=MIA	69.9%	19756	66	1027308	4954	5.81	5.50	3.75	4.06	13.39	13.20	4.1	3.9
NRT=SJC	73.0%	19262	64	1001605	5154	5.59	5.59	4.54	4.54	13.26	13.26	3.9	3.9
JFK=ORY	68.9%	19234	64	1000144	3626	5.08	4.28	2.78	3.58	12.92	12.27	3.6	3.2
CNS=NGO	72.0%	18964	63	986117	3597	4.33	4.53	3.32	3.12	12.31	12.49	3.2	3.3
CDG=YYZ	68.9%	18727	62	973818	3642	5.40	4.82	2.30	2.88	13.14	12.72	3.7	3.4
LIM=MIA	63.0%	18481	62	961027	2520	3.94	3.69	1.79	2.03	11.94	11.68	2.9	2.8
BOS=CDG	68.9%	18364	61	954911	3263	4.40	4.12	2.79	3.07	12.38	12.12	3.1	3.0
BNE=HKG	72.0%	18040	60	938077	4063	6.20	5.11	2.09	3.18	13.61	12.93	3.9	3.4
SEL=YVR	73.0%	18021	60	937092	4758	6.77	5.81	3.70	4.66	13.89	13.39	4.2	3.7
ORY=PTP	69.9%	17766	59	923832	3875	4.88	4.88	3.33	3.33	12.76	12.76	3.2	3.2
AKL=PER	72.0%	17528	58	911460	3023	4.33	4.16	2.53	2.70	12.31	12.16	2.9	2.9
BOS=FRA	68.9%	17526	58	911354	3335	4.87	4.51	2.73	3.09	12.76	12.47	3.2	3.0
SEL=SIN	72.0%	17029	57	885493	2562	3.96	3.46	2.24	2.63	11.85	11.41	2.6	2.5
AKL=HNL	73.0%	16602	55	863286	3803	4.88	4.88	3.87	3.87	12.77	12.77	3.0	3.0
GIG=MAD	70.0%	16532	55	859689	4352	6.04	5.72	3.98	4.30	13.52	13.33	3.5	3.4
FUK=SIN	72.0%	16517	55	858876	2413	3.46	3.36	2.82	2.92	11.41	11.29	2.4	2.3
AKL=LAX	73.0%	16479	55	856908	5583	6.91	6.91	5.41	5.41	13.96	13.96	3.9	3.9
MAD=MEX	69.9%	16094	54	836898	4715	6.17	6.32	4.37	4.22	13.60	13.67	3.5	3.5
CDG=ORD	68.9%	16076	54	835966	3462	6.04	5.58	2.77	3.23	13.52	13.25	3.4	3.2
HNL=STL	68.0%	15681	52	815436	3362	5.70	5.70	2.47	2.47	13.32	13.32	3.2	3.2

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70 %

AIRPORT PAIR	Supersonic Operation Circa 2015					M=1.6 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
FRA=LAX	68.9%	15584	52	810358	4695	8.83	7.94	2.31	3.19	14.67	14.38	4.5	4.1
GRU=LAX	63.0%	15526	52	807351	4971	10.39	8.34	1.35	3.40	15.09	14.52	5.1	4.2
JFK=OSA	73.0%	15450	52	803412	5547	9.34	8.80	4.29	4.82	14.83	14.67	4.6	4.4
LHR=SEA	68.9%	15446	51	803179	3844	7.47	6.80	1.96	2.63	14.20	13.91	3.9	3.6
HNL=NAN	73.0%	15384	51	799978	2538	3.70	3.70	2.57	2.57	11.69	11.69	2.3	2.3
MSP=NRT	73.0%	15348	51	798091	4738	8.20	8.17	3.38	3.41	14.47	14.46	4.1	4.1
AMS=ATL	68.9%	15183	51	789537	3466	5.89	5.33	2.94	3.50	13.44	13.09	3.2	2.9
MUC=ORD	68.9%	15045	50	782357	3539	6.64	6.35	2.90	3.19	13.83	13.69	3.4	3.3
EZE=MAD	70.0%	14917	50	775679	4856	8.38	7.08	3.28	4.59	14.53	14.03	4.1	3.6
AKL=SIN	72.0%	14819	49	770587	4043	7.07	6.03	3.03	4.07	14.03	13.52	3.6	3.1
BKK=PER	72.0%	14763	49	767665	2554	4.18	4.24	2.49	2.43	12.17	12.23	2.4	2.4
MEL=NAN	72.0%	14482	48	753058	1809	3.20	3.16	2.01	2.05	11.08	11.02	2.0	2.0
ORD=ZRH	68.9%	14132	47	734851	3518	7.04	6.60	2.12	2.57	14.02	13.81	3.4	3.2
AMS=CUR	69.9%	14104	47	733421	3570	5.55	5.35	3.86	4.06	13.23	13.10	2.8	2.7
LGW=STL	68.9%	13886	46	722047	3040	6.18	5.83	2.32	2.67	13.60	13.40	3.0	2.9
EWR=FRA	68.9%	13789	46	717021	2768	5.61	4.64	2.60	3.57	13.27	12.57	2.8	2.4
LHR=YYZ	68.9%	13476	45	700747	2485	5.18	4.94	2.24	2.47	12.98	12.81	2.6	2.5
TPE=YVR	73.0%	13455	45	699660	4163	6.81	6.47	4.51	4.85	13.91	13.75	3.1	3.0
NRT=PER	72.0%	13383	45	695930	3436	5.86	5.76	4.23	4.33	13.42	13.36	2.8	2.7
FDF=ORY	69.9%	13324	44	692874	2950	4.96	4.96	3.41	3.41	12.83	12.83	2.5	2.5
LHR=YMX	68.9%	13273	44	690217	2245	4.68	4.47	2.03	2.23	12.61	12.44	2.3	2.3
LHR=PHL	68.9%	13273	44	690217	2440	5.13	4.28	2.33	3.18	12.95	12.26	2.5	2.2
DUS=ORD	68.9%	13209	44	686866	2897	5.91	5.72	2.88	3.08	13.45	13.33	2.8	2.7
MXP=NRT	79.0%	13081	44	680225	4119	9.97	8.11	2.09	3.96	14.99	14.44	4.1	3.5
BOS=LGW	68.9%	12887	43	670113	2194	4.43	3.92	2.45	2.95	12.40	11.92	2.2	2.0
LGW=MSP	68.9%	12887	43	670113	2697	5.81	5.49	2.52	2.84	13.39	13.19	2.7	2.6
CPH=JFK	68.9%	12744	42	662694	2549	4.93	4.59	3.01	3.35	12.80	12.54	2.3	2.2
AKL=NRT	72.0%	12497	42	649838	3570	5.92	5.92	4.64	4.64	13.46	13.46	2.6	2.6
JFK=MUC	68.9%	12339	41	641633	2587	5.55	4.99	2.91	3.47	13.23	12.85	2.5	2.3
JFK=MAN	68.9%	12049	40	626556	2088	4.75	4.06	2.56	3.26	12.67	12.06	2.2	1.9
CDG=SIN	79.0%	12039	40	626021	4171	10.02	9.21	3.06	3.88	15.01	14.79	3.8	3.6
SIN=ZRH	79.0%	12039	40	626021	4008	10.77	8.75	1.73	3.75	15.18	14.65	4.1	3.4
AMS=YMX	68.9%	11966	40	622248	2135	4.94	4.50	1.93	2.37	12.81	12.46	2.2	2.1
JFK=LIS	68.9%	11948	40	621291	2087	3.88	3.88	3.23	3.23	11.88	11.88	1.9	1.9
CCS=MAD	69.9%	11615	39	603994	2628	5.01	5.01	3.46	3.46	12.86	12.86	2.2	2.2
IAD=MXP	68.9%	11046	37	574383	2419	5.90	5.18	2.55	3.28	13.45	12.98	2.3	2.1
SEA=TPE	73.0%	11012	37	572631	3466	6.65	6.56	5.10	5.19	13.84	13.79	2.5	2.5
HNL=SAN	68.0%	10988	37	571373	1492	3.17	3.17	2.20	2.20	11.03	11.03	1.5	1.5
AMS=YYZ	68.9%	10963	37	570075	2122	5.40	4.98	2.18	2.60	13.13	12.85	2.1	2.0
BOS=ZRH	68.9%	10958	37	569836	2128	5.19	4.54	2.56	3.21	12.99	12.50	2.1	1.9
ARN=JFK	68.9%	10705	36	556673	2168	5.41	4.85	2.98	3.55	13.14	12.74	2.1	1.9
GRU=YYZ	63.0%	10603	35	551331	2807	7.35	6.75	2.82	3.42	14.15	13.89	2.6	2.5
AKL=HKG	72.0%	10537	35	547915	3116	6.93	6.19	3.70	4.44	13.97	13.60	2.5	2.3
HKG=PER	72.0%	10537	35	547915	2093	5.36	4.72	1.98	2.61	13.11	12.64	2.1	1.9
MAN=ORD	68.9%	10530	35	547578	2089	5.52	5.46	2.44	2.51	13.21	13.17	2.1	2.1
NRT=PPT	72.0%	10487	35	545318	3202	6.29	6.29	4.92	4.92	13.66	13.66	2.3	2.3
AMS=LAX	68.9%	10461	35	543988	3027	8.18	7.34	2.72	3.55	14.46	14.15	2.8	2.6
KOA=SFO	68.0%	10442	35	542993	1286	2.94	2.94	2.04	2.04	10.71	10.71	1.4	1.4
LGW=MIA	69.9%	10174	34	529062	2345	5.17	5.05	3.87	3.99	12.98	12.89	1.9	1.9
GVA=JFK	68.9%	10116	34	526039	2027	5.39	4.70	2.57	3.26	13.13	12.62	2.0	1.8
SEL=SYD	72.0%	10062	34	523246	2708	7.14	6.07	2.94	4.01	14.06	13.54	2.4	2.1
AMS=IAH	68.9%	9960	33	517902	2590	7.39	6.24	2.32	3.47	14.17	13.63	2.5	2.2
DEL=SIN	72.0%	9950	33	517403	1336	3.88	3.72	1.45	1.61	11.88	11.71	1.5	1.5
NRT=ZRH	79.0%	9925	33	516086	3114	9.95	7.80	2.32	4.47	14.99	14.33	3.1	2.6

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70 %

AIRPORT PAIR	Supersonic Operation Circa 2015					M=1.6 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wdy Seats	Wdy Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
ATH-JFK	68.9%	9918	33	515748	2538	6.55	6.21	3.41	3.75	13.79	13.62	2.2	2.2
AMS-MSP	68.9%	9863	33	512876	2068	5.88	5.46	2.28	2.71	13.43	13.17	2.1	1.9
FRA-YYZ	68.9%	9803	33	509765	2009	5.24	5.14	2.76	2.86	13.03	12.96	1.9	1.9
FRA-SFO	68.9%	9619	32	500192	2844	8.83	7.76	2.01	3.07	14.68	14.31	2.8	2.5
BCN-JFK	68.9%	9601	32	499234	1908	4.66	4.64	3.44	3.46	12.60	12.57	1.7	1.7
DTW-FRA	68.9%	9601	32	499234	2072	6.09	5.45	2.37	3.01	13.55	13.17	2.1	1.9
CDG-DTW	68.9%	9601	32	499234	1972	5.77	5.08	2.40	3.08	13.36	12.92	2.0	1.8
BOS-GLA	68.9%	9601	32	499234	1508	3.99	3.63	2.38	2.74	11.99	11.61	1.5	1.4
AMS-BOS	68.9%	9601	32	499234	1721	4.90	4.13	2.27	3.04	12.78	12.12	1.8	1.6
LAX-NGO	73.0%	9490	32	493486	2774	6.29	6.19	4.88	4.98	13.66	13.60	2.1	2.1
CGK-SEL	72.0%	9438	31	490786	1613	3.85	3.82	3.10	3.13	11.85	11.82	1.5	1.5
SFO-SHA	73.0%	9362	31	486836	2990	6.73	6.63	5.23	5.33	13.87	13.83	2.2	2.1
ANC-OSA	73.0%	9362	31	486836	1775	5.12	4.60	2.34	2.86	12.95	12.55	1.8	1.6
LGW-YYZ	68.9%	9343	31	485832	1733	5.19	4.83	2.35	2.71	12.99	12.73	1.8	1.7
EWR-ORY	68.9%	9343	31	485832	1768	4.66	4.42	2.96	3.21	12.60	12.39	1.6	1.6
PPT-SYD	72.0%	9288	31	482996	1837	4.30	4.30	3.20	3.20	12.29	12.29	1.5	1.5
BGI-LGW	68.9%	9133	30	474891	1992	4.81	4.81	3.49	3.49	12.71	12.71	1.6	1.6
ANU-LGW	68.9%	9133	30	474891	1931	4.69	4.69	3.40	3.40	12.62	12.62	1.6	1.6
FRA-YYC	68.9%	9039	30	470037	2199	7.43	6.29	1.82	2.95	14.18	13.66	2.3	2.0
BRU-SIN	79.0%	9029	30	469516	3079	10.25	9.21	2.59	3.62	15.06	14.79	2.9	2.7
CDG-GIG	70.0%	9000	30	467984	2671	7.49	6.45	3.58	4.62	14.21	13.74	2.3	2.0
AMS-ORD	68.9%	8956	30	465729	1914	5.88	5.56	2.33	2.65	13.43	13.24	1.9	1.8
ANC-HKG	73.0%	8940	30	464888	2354	7.58	6.14	2.51	3.94	14.24	13.58	2.3	1.9
CDG-PTP	68.9%	8883	30	461916	1943	4.93	4.93	3.28	3.28	12.80	12.80	1.6	1.6
CDG-IAH	68.9%	8763	29	455677	2285	7.96	6.23	1.87	3.60	14.39	13.63	2.3	1.9
AKL-NGO	72.0%	8727	29	453783	2520	5.98	5.98	5.39	5.39	13.49	13.49	1.8	1.8
HNL-YYZ	68.0%	8628	29	448666	2083	6.56	6.56	2.66	2.66	13.79	13.79	2.0	2.0
LHR-SEL	79.0%	8611	29	447758	2474	8.76	7.40	4.37	5.72	14.65	14.17	2.5	2.1
IAD-NRT	73.0%	8237	27	428309	2887	10.41	8.38	2.55	4.58	15.10	14.53	2.7	2.3
FCO-MIA	69.9%	8147	27	423639	2187	5.87	5.81	4.30	4.36	13.42	13.39	1.7	1.7
DFW-MAD	68.9%	8086	27	420496	2082	7.20	6.37	3.01	3.84	14.09	13.70	2.0	1.8
DFW-ORY	68.9%	8086	27	420496	2076	7.60	6.58	2.44	3.46	14.25	13.80	2.1	1.8
CDG-MIA	69.9%	8047	27	418449	1916	5.18	5.18	4.07	4.07	12.99	12.99	1.5	1.5
MUC-YYZ	68.9%	8008	27	416428	1721	5.98	5.52	2.44	2.90	13.49	13.21	1.7	1.6
JFK-TLV	68.9%	7935	26	412596	2338	8.07	6.41	3.17	4.83	14.43	13.72	2.1	1.8
FRA-YMX	68.9%	7925	26	412120	1504	5.29	4.80	2.04	2.53	13.06	12.71	1.5	1.4
MIA-ORY	69.9%	7729	26	401906	1839	5.15	5.15	4.77	4.77	12.96	12.96	1.5	1.5
CPH-EWF	68.9%	7718	26	401350	1548	4.89	4.61	3.22	3.49	12.78	12.56	1.4	1.4
ATL-ZRH	68.9%	7603	25	395367	1850	6.78	5.81	2.68	3.64	13.90	13.39	1.8	1.6
YMX-ZRH	68.9%	7603	25	395367	1595	5.89	5.25	1.74	2.37	13.44	13.04	1.6	1.5
BOG-JFK	63.0%	7550	25	392586	975	3.05	3.05	2.37	2.37	10.87	10.87	1.0	1.0
MIA-SCL	63.0%	7550	25	392586	1629	5.96	5.14	2.81	3.62	13.48	12.96	1.6	1.4
CVG-LGW	68.9%	7507	25	390341	1551	5.82	5.00	2.26	3.08	13.40	12.86	1.6	1.4
ATL-MAD	68.9%	7507	25	390341	1688	5.37	5.27	3.25	3.35	13.12	13.05	1.5	1.4
ATL-MAN	68.9%	7507	25	390341	1596	5.95	5.20	2.18	2.93	13.47	13.00	1.6	1.4
ATL-SNN	68.9%	7507	25	390341	1496	5.56	4.65	2.15	3.05	13.24	12.59	1.5	1.3
ATL-ORY	68.9%	7507	25	390341	1711	6.29	5.36	2.50	3.43	13.66	13.11	1.6	1.5
FRA-MCO	68.9%	7507	25	390341	1848	5.71	5.43	3.80	4.07	13.33	13.15	1.5	1.5
ATL-MUC	68.9%	7507	25	390341	1869	7.14	5.95	2.36	3.55	14.06	13.47	1.8	1.6
BOM-ZRH	79.0%	7429	25	386301	1570	7.16	6.28	1.09	1.97	14.07	13.65	1.8	1.6
CDG-SEZ	60.7%	7415	25	385577	1880	6.57	5.21	3.11	3.47	13.80	13.62	1.7	1.6
JFK-LGW	68.9%	7378	25	383640	1328	4.59	4.24	2.74	3.10	12.54	12.23	1.3	1.2
IAH-LGW	68.9%	7378	25	383640	1860	7.06	6.17	2.61	3.50	14.03	13.59	1.8	1.6
FCO-YYZ	68.9%	7336	24	381486	1680	6.23	6.02	2.69	2.90	13.63	13.51	1.6	1.6

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70 %

AIRPORT PAIR	Supersonic Operation Circa 2015					M=1.6 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
LAX=MXP	68.9%	7263	24	377657	2276	9.39	8.32	2.40	3.47	14.84	14.51	2.2	2.0
CAY=CDG	69.9%	7199	24	374333	1656	5.06	5.06	3.48	3.48	12.90	12.90	1.3	1.3
CNS=HNL	73.0%	7149	24	371757	1638	4.88	4.88	4.49	4.49	12.77	12.77	1.3	1.3
SDJ=SIN	72.0%	7079	24	368090	1287	4.54	4.08	2.67	3.13	12.50	12.07	1.2	1.1
KHI=SIN	72.0%	7079	24	368090	1084	4.37	4.00	1.79	2.17	12.35	12.00	1.2	1.1
CTS=HNL	73.0%	7034	23	365792	1370	4.25	4.25	3.21	3.21	12.24	12.24	1.2	1.2
CVG=FRA	68.9%	7023	23	365212	1589	6.34	5.91	2.58	3.01	13.68	13.45	1.5	1.5
ATL=HAM	68.9%	7023	23	365212	1663	6.39	5.41	2.90	3.88	13.71	13.14	1.6	1.4
EWR=HAN	68.9%	6766	23	351809	1314	5.03	4.38	3.18	3.83	12.88	12.36	1.3	1.1
DUS=JFK	68.9%	6766	23	351809	1315	5.39	4.53	2.48	3.35	13.13	12.48	1.3	1.2
CCS=FCO	69.9%	6753	23	351140	1818	6.30	5.73	3.71	4.29	13.66	13.34	1.5	1.4
LGW=MCC	68.9%	6738	22	350374	1522	5.11	4.95	3.59	3.76	12.94	12.82	1.3	1.2
FRA=MEX	69.9%	6737	22	350329	2080	8.41	6.87	2.84	4.38	14.54	13.94	1.9	1.6
CDG=SFO	68.9%	6733	22	350134	1950	8.91	7.54	2.54	3.92	14.70	14.23	1.9	1.7
ATL=HNL	68.0%	6627	22	344608	1549	6.17	6.17	2.50	2.50	13.59	13.59	1.4	1.4
BRU=IAD	68.9%	6572	22	341758	1326	5.59	4.60	2.53	3.53	13.26	12.54	1.3	1.1
IAD=MAD	68.9%	6572	22	341758	1301	4.63	4.63	3.45	3.45	12.57	12.57	1.2	1.2
FCO=GIG	70.0%	6438	21	334753	1907	7.97	6.47	3.03	4.53	14.39	13.75	1.7	1.4
BNE=NGO	72.0%	6330	21	329138	1477	5.19	5.05	3.64	3.79	13.00	12.89	1.2	1.2
GIG=ORD	63.0%	6288	21	326996	1735	7.96	7.06	3.00	3.90	14.39	14.03	1.7	1.5
NGO=YVR	73.0%	6267	21	325887	1572	5.53	5.53	3.72	3.72	13.22	13.22	1.2	1.2
AMS=AUA	69.9%	6176	21	321135	1572	5.55	5.38	4.07	4.24	13.23	13.12	1.2	1.2
ORD=ORY	68.9%	6137	20	319141	1323	6.04	5.55	2.80	3.29	13.52	13.23	1.3	1.2
GRU=LHR	70.0%	6125	20	318518	1875	7.29	6.61	4.01	4.68	14.12	13.82	1.5	1.4
ATH=SIN	79.0%	6078	20	316064	1779	8.62	7.04	2.59	4.17	14.61	14.02	1.7	1.5
FCO=ORD	68.9%	6052	20	314714	1514	6.90	6.65	2.85	3.10	13.95	13.84	1.4	1.4
LHR=NGO	79.0%	6049	20	314537	1860	9.08	7.25	3.17	5.00	14.75	14.11	1.8	1.5
KUL=LHR	79.0%	6049	20	314537	2066	9.81	9.42	3.32	3.70	14.95	14.85	1.9	1.8
CNS=OSA	72.0%	6030	20	313558	1139	4.32	4.54	2.93	2.71	12.30	12.50	1.0	1.0
BOM=CDG	79.0%	5990	20	311484	1354	7.60	6.75	1.32	2.17	14.25	13.89	1.5	1.4
BOS=FCO	68.9%	5979	20	310885	1269	5.69	5.14	2.44	2.98	13.32	12.96	1.2	1.1
LAX=MAD	68.9%	5937	20	308731	1801	8.46	7.87	2.70	3.30	14.56	14.35	1.6	1.6
CDG=STL	68.9%	5928	20	308252	1352	6.47	6.05	2.57	2.99	13.75	13.53	1.3	1.3
KIN=LGW	69.9%	5708	19	296807	1390	5.22	5.22	3.85	3.85	13.02	13.02	1.1	1.1
MXP=ORD	68.9%	5702	19	296525	1337	6.65	6.13	3.01	3.54	13.84	13.57	1.3	1.2
BRU=ORD	68.9%	5702	19	296525	1230	5.91	5.57	2.92	3.26	13.45	13.25	1.2	1.1
ORD=STN	68.9%	5702	19	296525	1173	6.10	5.86	2.44	2.68	13.55	13.42	1.2	1.2
GLA=ORD	68.9%	5702	19	296525	1087	5.18	5.03	2.69	2.84	12.99	12.88	1.1	1.1
ORY=RDU	68.9%	5702	19	296525	1199	4.92	4.72	3.62	3.82	12.80	12.65	1.0	1.0
CVG=ORY	68.9%	5574	19	289824	1202	5.68	5.22	3.19	3.66	13.31	13.01	1.1	1.1
DTW=LGW	68.9%	5574	19	289824	1435	7.20	6.37	0.80	1.63	14.09	13.70	1.4	1.2
JFK=NCE	68.9%	5574	19	289824	1156	5.51	4.74	2.86	3.64	13.21	12.66	1.1	1.0
JFK=TXL	68.9%	5574	19	289824	1156	5.44	4.72	3.06	3.78	13.16	12.65	1.1	1.0
LHR=YVR	68.9%	5477	18	284798	1341	7.07	6.68	2.26	2.66	14.03	13.85	1.3	1.3
MIA=MXP	69.9%	5402	18	280912	1382	5.72	5.72	3.91	3.91	13.34	13.34	1.1	1.1
CCS=CDG	69.9%	5352	18	278317	1320	5.41	5.41	3.76	3.76	13.14	13.14	1.0	1.0
AMS=MCC	68.9%	5343	18	277858	1259	5.41	5.21	3.72	3.92	13.14	13.01	1.0	1.0
ORD=SEL	73.0%	5276	18	274344	1789	10.37	8.40	2.54	4.51	15.09	14.54	1.7	1.5
HNL=TPE	73.0%	5244	17	272681	1375	5.49	5.49	3.68	3.68	13.19	13.19	1.0	1.0
AMS=BWI	68.9%	5118	17	266131	1016	5.48	4.46	2.27	3.29	13.19	12.43	1.0	0.9
GIG=LHR	70.0%	5104	17	265432	1526	7.54	6.35	3.49	4.68	14.23	13.69	1.3	1.1
CCS=FRA	69.9%	5053	17	262747	1318	5.75	5.75	3.87	3.87	13.36	13.36	1.0	1.0
CNS=SIN	72.0%	5044	17	262272	816	4.56	3.94	1.90	2.52	12.51	11.94	0.9	0.8
CNS=FUK	72.0%	5044	17	262272	952	4.42	4.63	3.25	3.04	12.39	12.57	0.9	0.9

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70 %

	Supersonic Operation Circa 2015					M=1.6		Saved		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
CHC=SIN	72.0%	5031	17	261623	1366	7.74	6.22	1.69	3.21	14.31	13.62	1.3	1.1
GIG=LIS	70.0%	5030	17	261566	1254	6.05	5.37	3.66	4.34	13.53	13.12	1.1	1.0
BKK=CDG	79.0%	5021	17	261097	1177	7.52	6.73	4.32	5.11	14.22	13.87	1.3	1.2
NRT=YEG	73.0%	4726	16	245746	1196	6.50	5.85	2.78	3.42	13.76	13.42	1.1	1.0
AMS=YVR	68.9%	4713	16	245070	1174	7.59	6.49	1.66	2.76	14.25	13.76	1.2	1.1
BKK=BNE	72.0%	4694	16	244095	1109	7.02	5.71	2.31	3.62	14.01	13.33	1.1	1.0
LAX=LIM	63.0%	4668	16	242712	1013	5.71	4.70	2.50	3.51	13.33	12.63	1.0	0.8
HKT=NRT	72.0%	4625	15	240524	784	4.56	4.18	2.86	3.24	12.51	12.17	0.8	0.8
CCS=LHR	69.9%	4566	15	237445	1064	5.07	5.07	4.13	4.13	12.91	12.91	0.9	0.9
LAX=PPT	73.0%	4451	15	231454	951	4.60	4.60	3.40	3.40	12.54	12.54	0.8	0.8
AMS=CCS	69.9%	4382	15	227876	1110	5.55	5.46	4.03	4.13	13.23	13.17	0.9	0.9
LAX=ZRH	68.9%	4345	14	225924	1339	9.03	8.16	2.64	3.50	14.74	14.46	1.3	1.2
MCO=ORY	68.9%	4289	14	223052	1003	5.07	5.07	3.93	3.93	12.91	12.91	0.8	0.8
DXB=LHR	60.7%	4249	14	220940	754	6.13	5.43	1.61	2.31	13.57	13.15	0.9	0.8
AMS=GIG	70.0%	4242	14	220592	1311	7.78	6.57	3.76	4.97	14.32	13.80	1.1	1.0
AMS=KUL	79.0%	4228	14	219871	1394	9.69	9.17	2.93	3.46	14.92	14.78	1.3	1.2
ATH=BKK	79.0%	4214	14	219107	1078	8.50	7.47	1.47	2.50	14.57	14.20	1.2	1.1
FRA=GIG	70.0%	4212	14	219046	1302	7.43	6.89	3.90	4.44	14.18	13.95	1.1	1.0
ARN=EWF	68.9%	4156	14	216112	847	5.49	4.82	2.68	3.35	13.19	12.72	0.8	0.7
CPH=LAX	68.9%	4156	14	216112	1212	8.85	7.74	2.49	3.59	14.68	14.30	1.2	1.1
CPH=SEA	68.9%	4156	14	216112	1049	7.32	6.93	2.39	2.78	14.14	13.97	1.0	1.0
EWR=FBU	68.9%	4156	14	216112	795	5.10	4.45	2.61	3.26	12.93	12.42	0.8	0.7
GRU=MXP	70.0%	4084	14	212345	1253	8.14	6.77	3.28	4.65	14.45	13.89	1.1	0.9
EZE=LHR	70.0%	4084	14	212345	1468	8.91	7.70	4.13	5.35	14.70	14.29	1.2	1.0
JFK=SVO	68.9%	4013	13	208692	970	6.71	5.96	3.09	3.83	13.86	13.48	0.9	0.8
MXP=YYZ	68.9%	4004	13	208214	855	5.87	5.47	2.59	2.99	13.42	13.18	0.8	0.8
LGW=YYC	68.9%	4004	13	208214	910	6.34	5.80	2.58	3.12	13.68	13.38	0.9	0.8
CDG=KHI	79.0%	3993	13	207656	790	6.34	6.48	1.38	1.23	13.68	13.75	0.9	0.9
FCO=YMX	68.9%	3986	13	207256	852	5.80	5.59	2.33	2.54	13.38	13.25	0.8	0.8
HAM=JFK	68.9%	3981	13	207017	787	5.08	4.36	3.21	3.93	12.92	12.34	0.7	0.7
FBU=JFK	68.9%	3981	13	207017	759	5.10	4.43	2.86	3.53	12.93	12.40	0.7	0.7
JIB=MRS	60.7%	3741	12	194506	614	4.90	4.07	1.47	2.31	12.78	12.07	0.7	0.6
CDG=SXM	69.9%	3730	12	193979	812	4.87	4.87	3.55	3.55	12.76	12.76	0.7	0.7
CLT=FRA	68.9%	3728	12	193854	850	6.44	5.45	2.44	3.43	13.73	13.17	0.8	0.7
DKR=FCO	60.7%	3693	12	192029	494	4.79	3.37	0.88	2.29	12.70	11.30	0.7	0.5
MAD=SJU	68.9%	3673	12	190982	749	4.59	4.59	3.16	3.16	12.54	12.54	0.6	0.6
MAD=YMX	68.9%	3673	12	190982	663	4.82	4.61	2.09	2.31	12.72	12.55	0.7	0.6
CPH=ORD	68.9%	3645	12	189546	907	5.92	6.01	2.79	2.70	13.46	13.51	0.8	0.8
ANC=LAX	68.0%	3633	12	188926	443	3.39	3.04	1.61	1.96	11.32	10.85	0.5	0.5
GRU=LIS	70.0%	3593	12	186833	923	6.32	5.61	3.63	4.34	13.67	13.27	0.8	0.7
PEK=SIN	72.0%	3539	12	184045	510	4.71	3.93	1.23	2.01	12.64	11.93	0.6	0.6
SHA=SIN	72.0%	3539	12	184045	436	3.37	3.11	1.79	2.05	11.30	10.96	0.5	0.5
CDG=FDF	69.9%	3531	12	183599	784	4.97	4.97	3.33	3.33	12.84	12.84	0.7	0.7
FUK=HNL	73.0%	3517	12	182896	803	5.10	4.93	3.44	3.61	12.93	12.81	0.7	0.6
CCS=TFS	69.9%	3456	12	179706	433	3.40	3.31	3.10	3.19	11.34	11.22	0.5	0.5
CCS=SCQ	69.9%	3456	12	179706	743	4.62	4.62	3.93	3.93	12.56	12.56	0.6	0.6
LGW=MBJ	69.9%	3425	11	178084	836	5.39	5.39	4.28	4.28	13.13	13.13	0.7	0.7
FRA=MRU	60.7%	3376	11	175538	1003	8.77	7.06	2.71	4.42	14.66	14.03	1.0	0.8
ANC=LHR	68.9%	3369	11	175187	784	6.61	5.57	2.22	3.26	13.82	13.25	0.8	0.7
MRU=MUC	60.7%	3318	11	172511	953	8.07	6.65	2.76	4.19	14.42	13.84	0.9	0.8
CPH=SIN	79.0%	3311	11	172156	1066	10.45	8.98	2.46	3.94	15.11	14.72	1.1	1.0
GVA=LAX	68.9%	3259	11	169443	1001	8.79	8.02	2.80	3.56	14.66	14.41	0.9	0.9
CDG=GRU	70.0%	3258	11	169438	992	7.78	6.70	3.60	4.68	14.32	13.86	0.8	0.8
CDG=DKR	60.7%	3228	11	167870	441	4.22	3.47	1.53	2.28	12.21	11.42	0.5	0.5

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70 %

AIRPORT PAIR	Supersonic Operation Circa 2015					M=1.6 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
JFK=VIE	68.9%	3185	11	165614	700	6.19	5.46	2.77	3.50	13.60	13.17	0.7	0.6
GIG=LAX	63.0%	3169	11	164766	1038	10.61	8.62	1.39	3.38	15.14	14.61	1.1	0.9
FRA=GRU	70.0%	3097	10	161063	982	8.17	7.13	3.66	4.70	14.46	14.06	0.8	0.7
MIA=MUC	69.9%	3069	10	159594	798	5.94	5.73	4.06	4.27	13.46	13.34	0.6	0.6
HAM=MIA	69.9%	3069	10	159594	767	5.37	5.46	4.17	4.08	13.12	13.18	0.6	0.6
DUS=MIA	69.9%	3069	10	159594	754	5.62	5.36	3.63	3.89	13.27	13.11	0.6	0.6
DXB=FCO	60.7%	3039	10	158033	426	4.98	4.09	1.28	2.18	12.85	12.08	0.6	0.5
FCO=MLE	79.0%	3039	10	158032	721	6.98	6.44	1.98	2.52	13.99	13.74	0.7	0.7
MLE=ZRH	79.0%	3039	10	158032	766	7.42	6.76	2.24	2.90	14.18	13.89	0.8	0.7
BKK=LHR	79.0%	2973	10	154597	1276	11.06	9.42	1.07	2.71	15.24	14.85	1.0	0.9
FRA=JED	60.7%	2918	10	151711	391	3.88	3.65	1.70	1.94	11.88	11.62	0.5	0.4
FRA=KWI	60.7%	2918	10	151711	378	4.66	4.28	0.89	1.26	12.59	12.27	0.5	0.5
DXB=FRA	60.7%	2918	10	151711	456	5.48	4.79	1.14	1.83	13.19	12.70	0.6	0.5
BNE=FUK	72.0%	2909	10	151261	680	5.20	5.13	3.88	3.95	13.00	12.95	0.6	0.5
FUK=SYD	72.0%	2909	10	151261	734	6.78	5.68	3.22	4.32	13.90	13.31	0.7	0.6
EZE=FRA	70.0%	2874	10	149466	1067	10.21	8.15	3.21	5.27	15.05	14.45	0.9	0.8
LIS=REC	70.0%	2874	10	149466	544	4.15	4.15	3.35	3.35	12.14	12.14	0.5	0.5
DXB=LGW	60.7%	2870	10	149264	507	6.10	5.33	1.06	1.84	13.56	13.09	0.6	0.6
BNE=HNL	73.0%	2860	10	148703	701	5.18	5.18	4.32	4.32	12.98	12.98	0.5	0.5
BDA=LGW	69.9%	2857	10	148566	512	4.06	4.06	2.98	2.98	12.06	12.06	0.5	0.5
ORD=TXL	68.9%	2851	10	148263	652	5.96	6.16	2.95	2.76	13.48	13.59	0.6	0.6

Mach 2.0
40%/70% Market Penetration

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
AIRPORT PAIR	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	Hours/Trip GC	Hours/Trip DVRT	Hours/Trip GC	Hours/Trip DVRT	AC Hours GC	AC Hours DVRT	Hrs/Day/Ac GC	Hrs/Day/Ac DVRTD	Units GC	Units DVRTD
HNL=NRT	73.0%	185271	618	9634102	36765	3.72	3.72	3.88	3.88	119315	119315	11.70	11.70	28.0	28.0
HNL=NRT	73.0%	185271	618	9634102	36765	3.72	3.72	3.88	3.88	119315	119315	11.70	11.70	28.0	28.0
LAX=NRT	73.0%	140419	468	7301775	39745	5.00	5.00	5.62	5.62	121779	121779	12.86	12.86	26.0	26.0
NRT=SIN	72.0%	114735	382	5966227	19848	3.34	3.34	3.43	3.43	66499	66499	11.26	11.26	16.2	16.2
NRT=SFO	73.0%	106975	357	5562696	28447	4.74	4.74	5.24	5.24	87911	87911	12.66	12.66	19.1	19.1
HNL=LAX	68.0%	96425	321	5014088	12801	2.76	2.76	2.59	2.59	46094	46094	10.43	10.43	12.1	12.1
JFK=NRT	73.0%	70557	235	3668940	24694	10.16	7.32	3.00	5.84	124225	89511	15.04	14.14	22.7	17.4
HKG=SFO	73.0%	65587	219	3410510	23540	6.94	6.34	6.22	6.81	78863	72124	13.97	13.69	15.5	14.5
HNL=OSA	73.0%	64315	214	3344383	13698	3.93	3.93	4.08	4.08	43848	43848	11.93	11.93	10.1	10.1
HNL=SFO	68.0%	57415	191	2985595	7151	2.64	2.64	2.42	2.42	26263	26263	10.24	10.24	7.0	7.0
NRT=ORD	73.0%	56056	187	2914933	18250	8.48	7.43	3.66	4.71	82383	72182	14.56	14.18	15.5	14.0
LAX=SEL	73.0%	55260	184	2873509	17124	5.70	5.70	6.31	6.31	54620	54620	13.33	13.33	11.3	11.3
NRT=YVR	73.0%	47516	158	2470853	11529	4.65	4.59	4.36	4.43	38315	37774	12.59	12.53	8.4	8.3
JFK=LHR	68.9%	46567	155	2421502	8337	4.27	3.73	2.47	3.00	34442	30098	12.26	11.72	7.7	7.1
LHR=NRT	79.0%	45899	153	2386733	14146	9.18	6.75	2.95	5.38	73057	53663	14.78	13.88	13.6	10.6
HNL=SEL	73.0%	42638	142	2217174	10070	4.45	4.88	4.65	4.22	32890	36062	12.42	12.77	7.3	7.8
HKG=YVR	73.0%	42360	141	2202732	14037	7.99	6.15	4.32	6.16	58688	45184	14.40	13.58	11.2	9.1
NRT=SEA	73.0%	38012	127	1976606	9407	4.61	4.55	4.82	4.88	30364	29992	12.55	12.51	6.6	6.6
LHR=SIN	79.0%	36909	123	1919289	12978	11.88	8.84	1.49	4.53	76011	56545	15.41	14.68	13.6	10.6
HNL=NGO	73.0%	35709	119	1856892	7443	3.86	3.86	3.99	3.99	23917	23917	11.86	11.86	5.5	5.5
NRT=SYD	72.0%	35523	118	1847219	8989	5.56	4.68	3.79	4.67	34241	28817	13.24	12.61	7.1	6.3
CNS=NRT	72.0%	34336	114	1785453	6526	3.82	3.82	3.39	3.39	22731	22746	11.81	11.82	5.3	5.3
FCO=JFK	68.9%	31949	106	1661334	7088	5.10	4.31	3.59	4.38	28263	23857	12.93	12.29	6.0	5.3
ANC=SEL	73.0%	31635	105	1645018	6204	4.56	4.18	3.74	4.12	25008	22921	12.51	12.17	5.5	5.2
LAX=LHR	68.9%	30671	102	1594870	8681	7.74	7.31	3.06	3.51	41132	38855	14.3[illegible]	14.13	7.9	7.6
HKG=SYD	72.0%	29535	98	1535794	7044	6.73	4.79	2.09	4.02	34429	24532	13.8	12.70	6.8	5.3
FRA=JFK	68.9%	29045	97	1510353	5809	4.81	4.06	3.28	4.03	24225	20430	12.72	12.06	5.2	4.7
CDG=JFK	68.9%	27893	93	1450453	5258	4.34	3.76	2.38	2.96	20960	18165	12.32	11.75	4.7	4.2
IAD=LHR	68.9%	27717	92	1441291	5286	4.88	4.01	2.53	3.40	23443	19255	12.77	12.01	5.0	4.4
OSA=SIN	72.0%	27059	90	1407069	4321	3.15	3.15	3.04	3.04	14775	14775	11.01	11.01	3.7	3.7
LAX=SYD	73.0%	24293	81	1263219	9467	6.65	6.65	7.37	7.37	27991	27991	13.84	13.84	5.6	5.6
LHR=MIA	69.9%	22682	76	1179442	5210	4.53	4.26	4.60	4.88	17827	16757	12.49	12.25	3.9	3.8
SFO=TPE	73.0%	22306	74	1159893	7474	6.45	5.84	5.84	6.45	24928	22569	13.74	13.41	5.0	4.6
LAX=TPE	73.0%	20844	69	1083884	7343	6.67	6.05	6.24	6.86	24093	21876	13.85	13.53	4.8	4.4
DTW=SEL	73.0%	20669	69	1074763	7100	10.09	7.48	3.45	6.06	36139	26792	15.02	14.20	6.6	5.2
SEA=SEL	73.0%	20464	68	1064122	5515	5.66	4.86	5.05	5.85	20089	17223	13.30	12.75	4.1	3.7
DTW=NRT	73.0%	20464	68	1064122	6793	9.02	7.04	3.31	5.30	31998	24954	14.73	14.02	6.0	4.9
CDG=NRT	79.0%	20017	67	1040896	6277	9.95	6.86	2.13	5.22	34510	23788	14.99	13.94	6.3	4.7
LHR=ORD	68.9%	19993	67	1039633	4098	5.63	5.20	2.65	3.08	19501	18023	13.28	13.00	4.0	3.8
FRA=SIN	79.0%	19799	66	1029554	6575	11.26	7.28	1.27	5.25	38654	24992	15.29	14.12	6.9	4.9
EWR=NRT	73.0%	19126	64	994574	6694	10.16	7.31	3.13	5.97	33675	24239	15.04	14.13	6.2	4.7
JFK=MXP	68.9%	19091	64	992725	3955	4.91	4.34	3.40	3.97	16237	14345	12.79	12.32	3.5	3.2
EZE=MIA	63.0%	19036	63	989861	4367	7.17	5.13	1.78	3.82	23647	16923	14.07	12.95	4.6	3.6
AMS=JFK	68.9%	18815	63	978365	3556	4.39	3.78	3.25	3.86	14333	12334	12.37	11.77	3.2	2.9
HKG=LAX	73.0%	18520	62	963030	6969	7.55	6.70	6.62	7.47	24225	21509	14.23	13.86	4.7	4.3
FRA=NRT	79.0%	17882	60	929870	5411	9.34	6.31	2.27	5.30	28964	19560	14.83	13.67	5.4	3.9
OSA=SFO	73.0%	17855	60	928446	4993	5.28	5.28	5.22	5.22	16335	16335	13.05	13.05	3.4	3.4
GIG=MIA	63.0%	17462	58	908021	3790	6.71	5.63	1.88	2.96	20304	17032	13.87	13.28	4.0	3.5
DFW=HNL	68.0%	17360	58	902737	4284	6.85	6.09	0.69	1.46	20614	18321	13.93	13.55	4.1	3.7
CDG=IAD	68.9%	17105	57	889473	3425	4.63	4.07	3.22	3.78	13723	12069	12.57	12.07	3.0	2.7
HKG=MEL	72.0%	17043	57	886235	4080	5.99	5.99	3.17	3.17	17688	17688	13.49	13.49	3.6	3.6
HNL=SYD	73.0%	17038	57	885996	4498	4.74	4.71	4.89	4.92	14009	13909	12.66	12.63	3.0	3.0
BNE=SIN	72.0%	16508	55	858412	3287	5.64	4.13	2.06	3.57	16141	11825	13.29	12.13	3.3	2.7
FRA=IAD	68.9%	16182	54	841471	3424	5.34	4.35	2.93	3.93	14986	12188	13.10	12.33	3.1	2.7
BOS=LHR	68.9%	16066	54	835454	2720	3.88	3.48	3.06	3.47	10814	9679	11.88	11.43	2.5	2.3

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		AC Hours		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	185271	618	9634102	36765	3.72	3.72	3.88	3.88	119315	119315	11.70	11.70	28.0	28.0
MAD=SDQ	69.9%	16016	53	832820	3462	4.22	4.22	3.91	3.91	11727	11727	12.22	12.22	2.6	2.6
LHR=SFO	68.9%	15483	52	805093	4311	7.55	7.26	2.97	3.26	20259	19484	14.23	14.11	3.9	3.8
JFK=MAD	68.9%	15062	50	783212	2804	3.95	3.95	3.40	3.40	10315	10315	11.95	11.95	2.4	2.4
BRU=JFK	68.9%	14686	49	763656	2793	4.39	3.84	3.34	3.89	11180	9781	12.37	11.84	2.5	2.3
LAX=OSA	73.0%	14617	49	760087	4024	5.18	5.18	5.99	5.99	13125	13125	12.99	12.99	2.8	2.8
HNL=SEA	68.0%	14283	48	742731	1989	2.85	2.85	2.74	2.74	7060	7060	10.58	10.58	1.8	1.8
KUL=NRT	72.0%	14282	48	742671	2480	3.51	3.51	3.29	3.29	8677	8677	11.46	11.46	2.1	2.1
MAD=MIA	69.9%	13898	46	722717	3191	4.42	4.42	4.56	4.56	10650	10650	12.39	12.39	2.4	2.4
AMS=SIN	79.0%	13616	45	708036	4624	11.50	8.62	1.46	4.35	27146	20342	15.33	14.61	4.9	3.8
EWR=LHR	68.9%	13163	44	684473	2366	4.77	3.60	2.46	3.63	10890	8213	12.68	11.57	2.4	1.9
CDG=LAX	68.9%	12992	43	675584	3821	8.00	7.13	3.22	4.09	18026	16064	14.40	14.06	3.4	3.1
DFW=NRT	73.0%	12841	43	667736	4283	7.40	7.28	5.02	5.14	16474	16205	14.17	14.12	3.2	3.2
ATL=FRA	68.9%	12832	43	667241	3072	6.24	4.96	3.05	4.33	13878	11033	13.63	12.83	2.8	2.4
ATL=LGW	68.9%	12795	43	665327	2807	5.75	4.43	2.81	4.13	12750	9821	13.35	12.40	2.6	2.2
JFK=ZRH	68.9%	12793	43	665258	2608	5.41	4.46	2.92	3.87	12005	9887	13.14	12.43	2.5	2.2
NGO=PDX	73.0%	12790	43	665076	3311	4.95	4.76	4.59	4.78	10972	10563	12.82	12.68	2.4	2.3
PDX=SEL	73.0%	12790	43	665076	3495	5.21	4.89	5.46	5.77	11547	10846	13.01	12.78	2.4	2.3
FRA=ORD	68.9%	12721	42	661498	2865	5.93	5.46	3.23	3.70	13065	12032	13.46	13.17	2.7	2.5
NGO=SIN	72.0%	12599	42	655124	2067	3.21	3.21	3.19	3.19	7018	7018	11.10	11.10	1.7	1.7
DFW=LGW	68.9%	12574	42	653839	3103	6.85	6.09	2.80	3.56	14931	13270	13.93	13.55	2.9	2.7
CDG=YMX	68.9%	12519	42	650967	2244	4.56	4.02	2.54	3.08	9887	8723	12.51	12.02	2.2	2.0
SEL=SFO	73.0%	12483	42	649114	3650	5.15	5.15	6.23	6.23	11136	11136	12.96	12.96	2.4	2.4
AMS=DTW	68.9%	12482	42	649053	2550	5.27	4.57	2.61	3.31	11391	9881	13.04	12.52	2.4	2.2
DFW=FRA	68.9%	12453	42	647548	2447	4.70	4.70	5.54	5.54	10156	10156	12.63	12.63	2.2	2.2
LAX=OGG	68.0%	12246	41	636781	1581	2.70	2.70	2.42	2.42	5741	5741	10.35	10.35	1.5	1.5
HNL=ORD	68.0%	12225	41	635700	2694	5.62	5.62	2.76	2.76	11914	11914	13.28	13.28	2.5	2.5
FRA=YVR	68.9%	12119	40	630180	3157	7.91	6.38	1.80	3.33	16608	13398	14.37	13.70	3.2	2.7
OSA=SYD	72.0%	12063	40	627301	3045	5.63	4.73	3.85	4.74	11764	9892	13.28	12.65	2.4	2.1
OGG=SFO	68.0%	11934	40	620564	1450	2.59	2.59	2.30	2.30	5367	5367	10.16	10.16	1.5	1.5
NRT=PDX	73.0%	11920	40	619851	2984	4.50	4.50	4.87	4.87	9302	9302	12.46	12.46	2.1	2.1
AMS=NRT	79.0%	11854	40	616424	3568	10.28	6.37	1.38	5.29	21121	13095	15.07	13.70	3.9	2.6
HNL=YVR	68.0%	11851	40	616239	1798	3.03	3.03	2.55	2.55	6231	6231	10.85	10.85	1.6	1.6
NRT=YYZ	73.0%	11686	39	607690	3890	9.95	7.08	2.43	5.29	20153	14347	14.99	14.04	3.7	2.8
GIG=JFK	63.0%	11536	38	599855	2881	6.33	5.06	3.09	4.35	12650	10123	13.68	12.90	2.5	2.2
FRA=MIA	69.9%	11289	38	587033	2831	5.21	4.78	4.35	4.79	10195	9345	13.01	12.69	2.2	2.0
NRT=SJC	73.0%	11007	37	572345	2945	4.77	4.77	5.36	5.36	9094	9094	12.68	12.68	2.0	2.0
JFK=ORY	68.9%	10991	37	571511	2072	4.86	3.75	3.00	4.11	9254	7136	12.75	11.73	2.0	1.7
CNS=NGO	72.0%	10836	36	563495	2056	3.83	3.89	3.83	3.76	7187	7309	11.82	11.89	1.7	1.7
CDG=YYZ	68.9%	10701	36	556468	2081	5.23	4.29	2.47	3.41	9703	7965	13.02	12.28	2.0	1.8
LIM=MIA	63.0%	10561	35	549158	1440	3.84	3.29	1.89	2.43	7028	6031	11.83	11.20	1.6	1.5
BOS=CDG	68.9%	10494	35	545664	1864	4.04	3.63	3.14	3.56	7355	6601	12.04	11.60	1.7	1.6
BNE=HKG	72.0%	10309	34	536044	2322	6.01	4.37	2.28	3.92	10738	7802	13.51	12.35	2.2	1.7
SEL=YVR	73.0%	10298	34	535481	2719	6.39	5.01	4.08	5.46	11411	8940	13.71	12.86	2.3	1.9
ORY=PTP	69.9%	10152	34	527904	2215	4.27	4.27	3.94	3.94	7520	7520	12.26	12.26	1.7	1.7
AKL=PER	72.0%	10016	33	520835	1727	4.00	3.59	2.86	3.26	6943	6233	12.00	11.56	1.6	1.5
BOS=FRA	68.9%	10015	33	520774	1906	4.55	3.98	3.05	3.63	7906	6907	12.51	11.98	1.7	1.6
SEL=SIN	72.0%	9731	32	505996	1464	3.58	3.04	2.51	3.05	6042	5122	11.55	10.85	1.4	1.3
AKL=HNL	73.0%	9487	32	493306	2173	4.18	4.18	4.57	4.57	6871	6871	12.17	12.17	1.6	1.6
GIG=MAD	70.0%	9447	31	491251	2487	5.39	4.92	4.63	5.10	8833	8058	13.13	12.80	1.8	1.7
FUK=SIN	72.0%	9438	31	490786	1379	3.09	2.96	3.19	3.32	5063	4837	10.93	10.74	1.3	1.2
AKL=LAX	73.0%	9417	31	489662	3190	5.86	5.86	6.46	6.46	9566	9566	13.42	13.42	2.0	2.0
MAD=MEX	69.9%	9197	31	478227	2695	5.27	5.38	5.28	5.17	8393	8569	13.04	13.12	1.8	1.8
CDG=ORD	68.9%	9186	31	477695	1978	5.89	5.12	2.92	3.69	9377	8159	13.44	12.95	1.9	1.7
HNL=STL	68.0%	8961	30	465963	1921	5.43	5.43	2.74	2.74	8434	8434	13.15	13.15	1.8	1.8

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	Hours/Trip		Hours/Trip		AC Hours		Hrs/Day/Ac		Units	
						GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	185271	618	9634102	36765	3.72	3.72	3.88	3.88	119315	119315	11.70	11.70	28.0	28.0
FRA=LAX	68.9%	8905	30	463062	2683	8.87	7.47	2.26	3.66	13696	11527	14.69	14.20	2.6	2.2
GRU=LAX	63.0%	8872	30	461344	2841	10.88	7.94	0.86	3.81	16731	12203	15.20	14.38	3.0	2.3
JFK=OSA	73.0%	8829	29	459093	3170	9.00	8.00	4.62	5.63	13775	12241	14.73	14.40	2.6	2.3
LHR=SEA	68.9%	8826	29	458959	2196	7.52	6.23	1.91	3.20	11506	9535	14.22	13.63	2.2	1.9
HNL=NAN	73.0%	8791	29	457130	1450	3.23	3.23	3.05	3.05	4917	4917	11.11	11.11	1.2	1.2
MSP=NRT	73.0%	8770	29	456052	2707	7.93	7.50	3.65	4.08	12052	11404	14.37	14.21	2.3	2.2
AMS=ATL	68.9%	8676	29	451164	1980	5.55	4.61	3.28	4.23	8352	6928	13.23	12.55	1.7	1.5
MUC=ORD	68.9%	8597	29	447061	2022	6.52	5.98	3.03	3.56	9710	8918	13.77	13.49	1.9	1.8
EZE=MAD	70.0%	8524	28	443245	2775	8.01	6.03	3.66	5.64	11830	8911	14.40	13.52	2.3	1.8
AKL=SIN	72.0%	8468	28	440335	2310	6.72	5.13	3.38	4.97	9866	7532	13.87	12.95	2.0	1.6
BKK=PER	72.0%	8436	28	438666	1459	3.79	3.65	2.88	3.02	5535	5339	11.78	11.63	1.3	1.3
MEL=NAN	72.0%	8275	28	430319	1034	2.96	2.79	2.25	2.42	4239	4004	10.74	10.49	1.1	1.0
ORD=ZRH	68.9%	8075	27	419915	2010	6.93	6.17	2.24	3.00	9698	8637	13.97	13.59	1.9	1.7
AMS=CUR	69.9%	8060	27	419098	2040	4.83	4.57	4.58	4.84	6742	6381	12.73	12.52	1.5	1.4
LGW=STL	68.9%	7935	26	412598	1737	6.04	5.14	2.46	3.36	8307	7070	13.52	12.96	1.7	1.5
EWR=FRA	68.9%	7879	26	409726	1582	5.46	4.08	2.75	4.13	7452	5567	13.17	12.08	1.6	1.3
LHR=YYZ	68.9%	7701	26	400427	1420	5.03	4.55	2.39	2.87	6713	6074	12.88	12.50	1.4	1.3
TPE=YVR	73.0%	7689	26	399806	2379	5.98	5.50	5.35	5.82	7963	7331	13.49	13.20	1.6	1.5
NRT=PER	72.0%	7648	25	397674	1963	5.22	4.90	4.87	5.18	6914	6502	13.01	12.79	1.5	1.4
FDF=ORY	69.9%	7614	25	395928	1686	4.36	4.36	4.02	4.02	5752	5752	12.34	12.34	1.3	1.3
LHR=YMX	68.9%	7585	25	394410	1283	4.51	4.00	2.20	2.71	5924	5260	12.47	12.00	1.3	1.2
LHR=PHL	68.9%	7585	25	394410	1394	4.97	3.77	2.49	3.69	6535	4951	12.84	11.76	1.4	1.2
DUS=ORD	68.9%	7548	25	392495	1656	5.68	5.21	3.11	3.58	7428	6813	13.31	13.01	1.5	1.4
MXP=NRT	79.0%	7475	25	388700	2353	10.34	7.39	1.73	4.68	13401	9573	15.08	14.17	2.4	1.9
BOS=LGW	68.9%	7364	25	382922	1254	4.15	3.44	2.72	3.44	5303	4389	12.15	11.38	1.2	1.1
LGW=MSP	68.9%	7364	25	382922	1541	5.64	4.97	2.70	3.37	7195	6338	13.29	12.83	1.5	1.4
CPH=JFK	68.9%	7282	24	378682	1456	4.53	4.00	3.41	3.94	5722	5054	12.49	12.00	1.3	1.2
AKL=NRT	72.0%	7141	24	371336	2040	5.04	5.04	5.52	5.52	6243	6243	12.89	12.89	1.3	1.3
JFK=MUC	68.9%	7051	24	366648	1478	5.28	4.49	3.18	3.97	6448	5489	13.05	12.45	1.4	1.2
JFK=MAN	68.9%	6885	23	358032	1193	4.56	3.54	2.75	3.78	5447	4220	12.52	11.50	1.2	1.0
CDG=SIN	79.0%	6879	23	357726	2383	10.09	8.52	2.99	4.57	12037	10159	15.02	14.58	2.2	1.9
SIN=ZRH	79.0%	6879	23	357726	2290	11.29	8.03	1.21	4.47	13462	9577	15.29	14.41	2.4	1.8
AMS=YMX	68.9%	6838	23	355570	1220	4.77	3.97	2.11	2.91	5653	4704	12.68	11.97	1.2	1.1
JFK=LIS	68.9%	6827	23	355023	1193	3.37	3.37	3.74	3.74	3985	3985	11.29	11.29	1.0	1.0
CCS=MAD	69.9%	6637	22	345139	1502	4.37	4.37	4.10	4.10	5022	5022	12.34	12.34	1.1	1.1
IAD=MXP	68.9%	6312	21	328219	1382	5.67	4.66	2.79	3.80	6203	5100	13.31	12.60	1.3	1.1
SEA=TPE	73.0%	6293	21	327217	1980	5.69	5.57	6.06	6.18	6206	6073	13.32	13.24	1.3	1.3
HNL=SAN	68.0%	6279	21	326499	852	2.80	2.80	2.57	2.57	3049	3049	10.50	10.50	0.8	0.8
AMS=YYZ	68.9%	6265	21	325757	1212	5.24	4.43	2.35	3.15	5688	4812	13.03	12.40	1.2	1.1
BOS=ZRH	68.9%	6262	21	325620	1216	4.94	4.04	2.81	3.71	5362	4386	12.81	12.04	1.1	1.0
ARN=JFK	68.9%	6117	20	318099	1239	5.16	4.30	3.23	4.09	5476	4563	12.98	12.29	1.2	1.0
GRU=YYZ	63.0%	6059	20	315046	1604	7.19	5.80	2.98	4.37	7549	6091	14.08	13.38	1.5	1.3
AKL=HKG	72.0%	6021	20	313094	1781	6.28	5.26	4.34	5.36	6556	5491	13.65	13.04	1.3	1.2
HKG=PER	72.0%	6021	20	313094	1196	5.13	4.05	2.21	3.29	5353	4224	12.95	12.05	1.1	1.0
MAN=ORD	68.9%	6017	20	312902	1194	5.36	4.97	2.61	3.00	5586	5182	13.11	12.83	1.2	1.1
NRT=PPT	72.0%	5993	20	311610	1830	5.34	5.34	5.87	5.87	5552	5552	13.10	13.10	1.2	1.2
AMS=LAX	68.9%	5978	20	310851	1730	8.09	6.76	2.81	4.14	8385	7000	14.43	13.89	1.6	1.4
KOA=SFO	68.0%	5967	20	310282	735	2.62	2.62	2.36	2.36	2709	2709	10.21	10.21	0.7	0.7
LGW=MIA	69.9%	5814	19	302321	1340	4.55	4.38	4.49	4.66	4582	4412	12.50	12.36	1.0	1.0
GVA=JFK	68.9%	5781	19	300594	1159	5.16	4.19	2.80	3.77	5167	4202	12.97	12.19	1.1	0.9
SEL=SYD	72.0%	5750	19	298998	1548	6.86	5.17	3.22	4.92	6836	5149	13.94	12.98	1.3	1.1
AMS=IAH	68.9%	5691	19	295944	1480	7.29	5.30	2.41	4.40	7196	5231	14.13	13.07	1.4	1.1
DEL=SIN	72.0%	5686	19	295659	764	3.79	3.54	1.55	1.79	3730	3487	11.78	11.50	0.9	0.8
NRT=ZRH	79.0%	5671	19	294906	1779	10.32	7.01	1.95	5.26	10145	6896	15.08	14.01	1.8	1.4

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.0 Hours/Trip		Saved Hours/Trip		Annual AC Hours		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	185271	618	9634102	36765	3.72	3.72	3.88	3.88	119315	119315	11.70	11.70	28.0	28.0
ATH=JFK	68.9%	5668	19	294713	1450	6.17	5.32	3.79	4.64	6064	5226	13.60	13.08	1.2	1.1
AMS=MSP	68.9%	5636	19	293072	1182	5.73	4.93	2.43	3.24	5602	4812	13.35	12.80	1.2	1.0
FRA=YYZ	68.9%	5602	19	291294	1148	4.90	4.60	3.10	3.40	4762	4465	12.79	12.54	1.0	1.0
FRA=SFO	68.9%	5497	18	285824	1625	8.93	7.28	1.90	3.56	8508	6934	14.71	14.12	1.6	1.3
BCN=JFK	68.9%	5486	18	285277	1090	4.18	4.06	3.91	4.04	3977	3860	12.18	12.06	0.9	0.9
DTW=FRA	68.9%	5486	18	285277	1184	5.95	4.96	2.51	3.50	5659	4713	13.47	12.82	1.2	1.0
CDG=DTW	68.9%	5486	18	285277	1127	5.62	4.60	2.55	3.57	5342	4371	13.27	12.54	1.1	1.0
BOS=GLA	68.9%	5486	18	285277	862	3.70	3.17	2.67	3.20	3519	3016	11.68	11.04	0.8	0.8
AMS=BOS	68.9%	5486	18	285277	983	4.71	3.56	2.46	3.60	4476	3388	12.63	11.53	1.0	0.8
LAX=NGO	73.0%	5423	18	281992	1585	5.44	5.29	5.73	5.88	5111	4970	13.16	13.06	1.1	1.0
CGK=SEL	72.0%	5393	18	280449	922	3.37	3.32	3.59	3.64	3151	3106	11.30	11.24	0.8	0.8
SFO=SHA	73.0%	5350	18	278192	1708	5.75	5.63	6.21	6.33	5328	5222	13.35	13.28	1.1	1.1
ANC=OSA	73.0%	5350	18	278192	1014	4.90	4.09	2.56	3.37	4548	3788	12.79	12.08	1.0	0.9
LGW=YYZ	68.9%	5339	18	277618	990	5.04	4.40	2.50	3.14	4662	4071	12.89	12.37	1.0	0.9
EWR=ORY	68.9%	5339	18	277618	1011	4.28	3.86	3.34	3.76	3963	3574	12.27	11.86	0.9	0.8
PPT=SYD	72.0%	5308	18	275998	1049	3.70	3.70	3.80	3.80	3408	3408	11.69	11.69	0.8	0.8
BGI=LGW	69.9%	5219	17	271366	1138	4.18	4.18	4.12	4.12	3780	3780	12.17	12.17	0.9	0.9
ANU=LGW	69.9%	5219	17	271366	1104	4.08	4.08	4.00	4.00	3693	3693	12.08	12.08	0.8	0.8
FRA=YYC	68.9%	5165	17	268592	1257	7.52	5.76	1.73	3.49	6730	5154	14.22	13.36	1.3	1.1
BRU=SIN	79.0%	5160	17	268295	1759	10.47	8.52	2.36	4.31	9362	7621	15.11	14.58	1.7	1.4
CDG=GIG	70.0%	5143	17	267420	1526	7.06	5.51	4.01	5.57	6291	4908	14.03	13.20	1.2	1.0
AMS=ORD	68.9%	5118	17	266131	1093	5.69	4.97	2.52	3.24	5049	4411	13.32	12.84	1.0	0.9
ANC=HKG	73.0%	5109	17	265650	1345	7.52	5.36	2.57	4.73	6655	4742	14.22	13.11	1.3	1.0
CDG=PTP	69.9%	5076	17	263952	1110	4.33	4.33	3.87	3.87	3814	3814	12.32	12.32	0.9	0.9
CDG=IAH	68.9%	5007	17	260387	1306	8.08	5.31	1.76	4.53	7009	4606	14.43	13.07	1.3	1.0
AKL=NGO	72.0%	4987	17	259304	1440	5.09	5.09	6.28	6.28	4401	4403	12.92	12.93	0.9	0.9
HNL=YYZ	68.0%	4930	16	256380	1190	6.34	6.34	2.89	2.89	5416	5416	13.68	13.68	1.1	1.1
LHR=SEL	79.0%	4920	16	255862	1414	8.92	6.54	4.21	6.58	7805	5578	14.70	13.78	1.4	1.1
IAD=NRT	73.0%	4707	16	244748	1650	10.61	7.52	2.35	5.44	8653	6133	15.14	14.22	1.6	1.2
FCO=MIA	69.9%	4655	16	242079	1250	5.10	5.00	5.06	5.16	4117	4037	12.93	12.86	0.9	0.9
DFW=MAD	68.9%	4621	15	240283	1190	7.06	5.77	3.15	4.44	5656	4623	14.03	13.37	1.1	1.0
DFW=ORY	68.9%	4621	15	240283	1186	7.62	5.99	2.43	4.05	6100	4800	14.26	13.50	1.2	1.0
CDG=MIA	69.9%	4598	15	239114	1095	4.48	4.48	4.77	4.77	3571	3571	12.44	12.44	0.8	0.8
MUC=YYZ	68.9%	4576	15	237959	983	5.82	5.06	2.60	3.36	4616	4012	13.40	12.90	0.9	0.9
JFK=TLV	68.9%	4534	15	235770	1336	7.89	5.41	3.35	5.83	6200	4249	14.36	13.14	1.2	0.9
FRA=YMX	68.9%	4529	15	235497	859	5.13	4.31	2.20	3.03	4027	3381	12.95	12.29	0.9	0.8
MIA=ORY	69.9%	4417	15	229660	1051	4.44	4.44	5.48	5.48	3397	3397	12.41	12.41	0.8	0.8
CPH=EWR	68.9%	4410	15	229343	885	4.47	4.01	3.63	4.09	3420	3068	12.44	12.01	0.8	0.7
ATL=ZRH	68.9%	4345	14	225924	1057	6.62	5.16	2.84	4.30	4982	3882	13.82	12.97	1.0	0.8
YMX=ZRH	68.9%	4345	14	225924	911	5.74	4.77	1.89	2.86	4323	3593	13.35	12.68	0.9	0.8
BOG=JFK	63.0%	4314	14	224335	557	2.70	2.70	2.71	2.71	2022	2022	10.35	10.35	0.5	0.5
MIA=SCL	63.0%	4314	14	224335	931	5.78	4.45	2.99	4.32	4320	3327	13.37	12.42	0.9	0.7
CVG=LGW	68.9%	4289	14	223052	886	5.68	4.44	2.40	3.65	4225	3299	13.31	12.41	0.9	0.7
ATL=MAD	68.9%	4289	14	223052	964	4.88	4.68	3.74	3.94	3630	3483	12.77	12.61	0.8	0.8
ATL=MAN	68.9%	4289	14	223052	912	5.79	4.65	2.33	3.48	4307	3456	13.38	12.58	0.9	0.8
ATL=SNN	68.9%	4289	14	223052	855	5.40	4.07	2.31	3.64	4015	3023	13.14	12.07	0.8	0.7
ATL=ORY	68.9%	4289	14	223052	978	6.11	4.70	2.68	4.09	4540	3493	13.56	12.62	0.9	0.8
FRA=MCO	68.9%	4289	14	223052	1056	5.12	4.72	4.38	4.78	3805	3509	12.94	12.64	0.8	0.8
ATL=MUC	68.9%	4289	14	223052	1068	7.05	5.29	2.45	4.21	5244	3932	14.02	13.06	1.0	0.8
BOM=ZRH	79.0%	4245	14	220743	897	7.45	6.00	0.80	2.25	5485	4413	14.19	13.50	1.1	0.9
CDG=SEZ	60.7%	4237	14	220330	1074	6.23	5.47	3.45	4.21	4576	4017	13.63	13.18	0.9	0.8
JFK=LGW	68.9%	4216	14	219223	759	4.28	3.74	3.05	3.59	3129	2736	12.27	11.73	0.7	0.6
IAH=LGW	68.9%	4216	14	219223	1063	6.92	5.30	2.75	4.37	5055	3873	13.96	13.07	1.0	0.8
FCO=YYZ	68.9%	4192	14	217992	960	6.02	5.62	2.91	3.30	4373	4083	13.51	13.28	0.9	0.8

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		AC Hours		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	185271	618	9634102	36765	3.72	3.72	3.88	3.88	119315	119315	11.70	11.70	28.0	28.0
LAX=MXP	68.9%	4150	14	215804	1301	9.54	7.89	2.25	3.90	6864	5677	14.88	14.36	1.3	1.1
CAY=CDG	69.9%	4114	14	213905	946	4.40	4.40	4.14	4.14	3138	3138	12.38	12.38	0.7	0.7
CNS=HNL	73.0%	4085	14	212433	936	4.18	4.18	5.20	5.20	2959	2959	12.17	12.17	0.7	0.7
SDJ=SIN	72.0%	4045	13	210337	735	4.19	3.52	3.02	3.69	2937	2470	12.18	11.48	0.7	0.6
KHI=SIN	72.0%	4045	13	210337	620	4.26	3.46	1.91	2.70	2985	2428	12.25	11.41	0.7	0.6
CTS=HNL	73.0%	4020	13	209024	783	3.66	3.66	3.80	3.80	2552	2552	11.64	11.64	0.6	0.6
CVG=FRA	68.9%	4013	13	208692	908	6.19	5.28	2.73	3.63	4307	3675	13.61	13.06	0.9	0.8
ATL=HAM	68.9%	4013	13	208692	950	6.16	4.66	3.14	4.63	4283	3244	13.59	12.60	0.9	0.7
EWR=HAM	68.9%	3866	13	201034	751	4.73	3.77	3.48	4.44	3167	2524	12.65	11.76	0.7	0.6
DUS=JFK	68.9%	3866	13	201034	752	5.22	3.97	2.66	3.90	3498	2661	13.01	11.97	0.7	0.6
CCS=FCO	69.9%	3859	13	200652	1039	5.70	4.88	4.32	5.13	3811	3265	13.32	12.77	0.8	0.7
LGW=MCO	68.9%	3850	13	200213	870	4.52	4.27	4.19	4.44	3016	2851	12.48	12.26	0.7	0.6
FRA=MEX	69.9%	3850	13	200188	1188	8.22	5.93	3.03	5.32	5487	3957	14.48	13.46	1.0	0.8
CDG=SFO	68.9%	3848	13	200077	1114	9.11	7.09	2.35	4.37	6075	4729	14.76	14.04	1.1	0.9
ATL=HNL	68.0%	3787	13	196919	885	5.88	5.88	2.78	2.78	3861	3861	13.43	13.43	0.8	0.8
BRU=IAD	68.9%	3756	13	195290	758	5.42	4.00	2.71	4.13	3526	2601	13.15	12.00	0.7	0.6
IAD=MAD	68.9%	3756	13	195290	743	4.15	4.15	3.93	3.93	2703	2703	12.15	12.15	0.6	0.6
FCO=GIG	70.0%	3679	12	191287	1090	7.72	5.49	3.28	5.51	4925	3503	14.30	13.20	0.9	0.7
BNE=NGO	72.0%	3617	12	188079	844	4.55	4.32	4.28	4.52	2853	2706	12.50	12.30	0.6	0.6
GIG=ORD	63.0%	3593	12	186855	992	7.92	6.19	3.04	4.76	4935	3858	14.37	13.61	0.9	0.8
NGO=YVR	73.0%	3581	12	186221	898	4.82	4.82	4.43	4.43	2992	2992	12.72	12.72	0.6	0.6
AMS=AUA	69.9%	3529	12	183506	898	4.81	4.59	4.80	5.02	2943	2808	12.71	12.54	0.6	0.6
ORD=ORY	68.9%	3507	12	182367	756	5.89	5.08	2.95	3.75	3578	3088	13.43	12.92	0.7	0.7
GRU=LHR	70.0%	3500	12	182010	1071	6.67	5.58	4.62	5.71	4049	3388	13.85	13.25	0.8	0.7
ATH=SIN	79.0%	3473	12	180608	1017	8.67	6.24	2.54	4.97	5218	3759	14.63	13.63	1.0	0.8
FCO=ORD	68.9%	3458	12	179837	865	6.71	6.26	3.04	3.49	4023	3751	13.87	13.64	0.8	0.8
LHR=NGO	79.0%	3456	12	179736	1063	9.16	6.41	3.09	5.84	5489	3843	14.77	13.72	1.0	0.8
KUL=LHR	79.0%	3456	12	179736	1181	9.84	8.75	3.28	4.37	5896	5244	14.96	14.65	1.1	1.0
CNS=OSA	72.0%	3446	11	179176	651	3.81	3.90	3.44	3.35	2278	2328	11.81	11.90	0.5	0.5
BOM=CDG	79.0%	3423	11	177991	774	7.92	6.49	1.01	2.43	4697	3850	14.37	13.76	0.9	0.8
BOS=FCO	68.9%	3416	11	177648	725	5.44	4.63	2.68	3.50	3222	2741	13.16	12.57	0.7	0.6
LAX=MAD	68.9%	3393	11	176418	1029	8.35	7.43	2.82	3.74	4908	4366	14.52	14.18	0.9	0.8
CDG=STL	68.9%	3387	11	176144	773	6.35	5.40	2.69	3.64	3731	3171	13.69	13.14	0.7	0.7
KIN=LGW	69.9%	3262	11	169604	794	4.48	4.48	4.59	4.59	2533	2533	12.45	12.45	0.6	0.6
MXP=ORD	68.9%	3259	11	169443	764	6.54	5.69	3.13	3.97	3691	3217	13.78	13.32	0.7	0.7
BRU=ORD	68.9%	3259	11	169443	703	5.72	5.03	3.12	3.81	3229	2840	13.33	12.88	0.7	0.6
ORD=STN	68.9%	3259	11	169443	670	6.07	5.44	2.47	3.10	3427	3074	13.54	13.16	0.7	0.6
GLA=ORD	68.9%	3259	11	169443	621	4.98	4.54	2.90	3.33	2811	2565	12.84	12.50	0.6	0.6
ORY=RDU	68.9%	3259	11	169443	685	4.42	4.14	4.13	4.40	2494	2341	12.39	12.14	0.6	0.5
CVG=ORY	68.9%	3185	11	165614	687	5.40	4.71	3.48	4.17	2981	2599	13.13	12.63	0.6	0.6
DTW=LGW	68.9%	3185	11	165614	820	7.06	5.77	0.94	2.23	3898	3186	14.03	13.37	0.8	0.7
JFK=NCE	68.9%	3185	11	165614	661	5.25	4.20	3.12	4.18	2900	2316	13.04	12.19	0.6	0.5
JFK=TXL	68.9%	3185	11	165614	660	5.16	4.12	3.34	4.38	2847	2277	12.97	12.12	0.6	0.5
LHR=YVR	68.9%	3130	10	162742	766	7.01	6.20	2.32	3.13	3801	3366	14.00	13.61	0.7	0.7
MIA=MXP	69.9%	3087	10	160521	790	5.03	5.03	4.59	4.59	2693	2693	12.88	12.88	0.6	0.6
CCS=CDG	69.9%	3058	10	159038	754	4.70	4.70	4.46	4.46	2492	2492	12.63	12.63	0.5	0.5
AMS=MCO	68.9%	3053	10	158776	719	4.82	4.45	4.31	4.68	2549	2355	12.72	12.42	0.6	0.5
ORD=SEL	73.0%	3015	10	156768	1022	10.67	7.63	2.25	5.28	5575	3990	15.16	14.26	1.0	0.8
HNL=TPE	73.0%	2996	10	155818	786	4.68	4.68	4.48	4.48	2433	2433	12.61	12.61	0.5	0.5
AMS=BWI	68.9%	2925	10	152075	580	5.30	3.83	2.45	3.92	2689	1943	13.07	11.83	0.6	0.5
GIG=LHR	70.0%	2917	10	151675	872	7.11	5.36	3.93	5.67	3593	2711	14.05	13.11	0.7	0.6
CCS=FRA	69.9%	2887	10	150141	753	5.02	5.02	4.60	4.60	2515	2515	12.87	12.87	0.5	0.5
CNS=SIN	72.0%	2882	10	149870	466	4.42	3.41	2.04	3.05	2207	1706	12.39	11.35	0.5	0.4
CNS=FUK	72.0%	2882	10	149870	544	3.95	3.97	3.71	3.70	1974	1982	11.95	11.97	0.5	0.5

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
AIRPORT	Load	Widy	Widy	Annual	Annual	Hours/Trip		Hours/Trip		AC Hours		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	185271	618	9634102	36765	3.72	3.72	3.88	3.88	119315	119315	11.70	11.70	28.0	28.0
CHC=SIN	72.0%	2875	10	149499	781	7.67	5.29	1.76	4.14	3820	2636	14.28	13.06	0.7	0.6
GIG=LIS	70.0%	2874	10	149466	717	5.56	4.59	4.15	5.13	2772	2284	13.24	12.53	0.6	0.5
BKK=CDG	79.0%	2869	10	149198	672	7.72	6.38	4.11	5.45	3839	3173	14.30	13.70	0.7	0.6
NRT=YEG	73.0%	2701	9	140426	684	6.13	5.19	3.14	4.09	2870	2428	13.57	12.99	0.6	0.5
AMS=YVR	68.9%	2693	9	140040	671	7.68	5.96	1.57	3.29	3585	2781	14.28	13.48	0.7	0.6
BKK=BNE	72.0%	2682	9	139483	634	7.02	4.87	2.31	4.46	3264	2263	14.01	12.76	0.6	0.5
LAX=LIM	63.0%	2667	9	138693	579	5.42	4.03	2.79	4.18	2505	1862	13.15	12.03	0.5	0.4
HKT=NRT	72.0%	2643	9	137442	448	4.34	3.67	3.08	3.75	1987	1682	12.32	11.65	0.4	0.4
CCS=LHR	69.9%	2609	9	135683	608	4.39	4.39	4.82	4.82	1984	1984	12.36	12.36	0.4	0.4
LAX=PPT	73.0%	2543	8	132259	544	3.94	3.94	4.06	4.06	1739	1739	11.94	11.94	0.4	0.4
AMS=CCS	69.9%	2504	8	130215	634	4.83	4.66	4.76	4.93	2096	2021	12.73	12.59	0.5	0.4
LAX=ZRH	68.9%	2483	8	129099	765	9.09	7.75	2.58	3.92	3911	3335	14.75	14.31	0.7	0.6
MCO=ORY	68.9%	2451	8	127458	573	4.37	4.37	4.63	4.63	1858	1858	12.35	12.35	0.4	0.4
DXB=LHR	60.7%	2428	8	126251	431	6.39	5.26	1.35	2.47	2689	2214	13.71	13.04	0.5	0.5
AMS=GIG	70.0%	2424	8	126052	749	7.33	5.58	4.21	5.96	3079	2346	14.14	13.25	0.6	0.5
AMS=KUL	79.0%	2416	8	125640	796	9.80	8.49	2.82	4.13	4105	3557	14.95	14.57	0.8	0.7
ATH=BKK	79.0%	2408	8	125204	616	8.86	6.94	1.11	3.02	3697	2898	14.68	13.97	0.7	0.6
FRA=GIG	70.0%	2407	8	125169	744	6.84	5.95	4.49	5.38	2855	2484	13.93	13.47	0.6	0.5
ARN=EWR	68.9%	2375	8	123492	484	5.25	4.20	2.91	3.97	2163	1729	13.04	12.19	0.5	0.4
CPH=LAX	68.9%	2375	8	123492	693	8.99	7.28	2.34	4.06	3702	2995	14.73	14.12	0.7	0.6
CPH=SEA	68.9%	2375	8	123492	599	7.27	6.40	2.44	3.31	2991	2634	14.12	13.71	0.6	0.5
EWR=FBU	68.9%	2375	8	123492	454	4.86	3.89	2.85	3.82	1999	1601	12.75	11.89	0.4	0.4
GRU=MXP	70.0%	2333	8	121340	716	7.86	5.76	3.56	5.66	3177	2328	14.35	13.36	0.6	0.5
EZE=LHR	70.0%	2333	8	121340	839	8.39	6.49	4.65	6.55	3393	2625	14.53	13.76	0.6	0.5
JFK=SVO	68.9%	2293	8	119253	554	6.54	5.42	3.25	4.37	2598	2154	13.78	13.15	0.5	0.5
MXP=YYZ	68.9%	2288	8	118979	489	5.67	5.02	2.79	3.44	2249	1989	13.31	12.87	0.5	0.4
LGW=YYC	68.9%	2288	8	118979	520	6.18	5.24	2.74	3.68	2451	2078	13.60	13.03	0.5	0.4
CDG=KHI	79.0%	2282	8	118660	451	6.48	6.27	1.24	1.45	2562	2478	13.75	13.64	0.5	0.5
FCO=YMX	68.9%	2278	8	118432	487	5.58	5.18	2.54	2.94	2203	2045	13.25	12.99	0.5	0.4
HAM=JFK	68.9%	2275	8	118296	450	4.77	3.75	3.52	4.54	1880	1479	12.68	11.74	0.4	0.3
FBU=JFK	68.9%	2275	8	118296	434	4.86	3.86	3.10	4.10	1917	1523	12.75	11.86	0.4	0.4
JIB=MRS	60.7%	2137	7	111147	351	4.86	3.62	1.51	2.76	1802	1340	12.75	11.59	0.4	0.3
CDG=SXM	69.9%	2132	7	110845	464	4.28	4.28	4.14	4.14	1580	1580	12.26	12.26	0.4	0.4
CLT=FRA	68.9%	2130	7	110774	486	6.30	4.88	2.57	4.00	2328	1801	13.67	12.76	0.5	0.4
DKR=FCO	60.7%	2110	7	109731	283	5.02	2.96	0.65	2.70	1837	1084	12.87	10.75	0.4	0.3
MAD=SJU	68.9%	2099	7	109133	428	4.03	4.03	3.72	3.72	1466	1466	12.03	12.03	0.3	0.3
MAD=YMX	68.9%	2099	7	109133	379	4.59	4.16	2.33	2.75	1669	1514	12.54	12.16	0.4	0.3
CPH=ORD	68.9%	2083	7	108312	461	5.67	5.36	3.04	3.34	2047	1937	13.31	13.11	0.4	0.4
ANC=LAX	68.0%	2076	7	107958	253	3.24	2.72	1.76	2.28	1168	980	11.14	10.38	0.3	0.3
GRU=LIS	70.0%	2053	7	106762	527	5.85	4.78	4.10	5.17	2082	1703	13.41	12.69	0.4	0.4
PEK=SIN	72.0%	2022	7	105169	291	4.81	3.46	1.13	2.48	1687	1213	12.72	11.41	0.4	0.3
SHA=SIN	72.0%	2022	7	105169	249	3.21	2.76	1.95	2.41	1126	967	11.09	10.43	0.3	0.3
CDG=FDF	69.9%	2018	7	104913	448	4.37	4.37	3.94	3.94	1528	1528	12.35	12.35	0.3	0.3
FUK=HNL	73.0%	2010	7	104512	459	4.48	4.22	4.06	4.32	1560	1470	12.44	12.21	0.3	0.3
CCS=TFS	69.9%	1975	7	102689	247	3.23	3.09	3.27	3.41	1105	1059	11.12	10.93	0.3	0.3
CCS=SCQ	69.9%	1975	7	102689	425	3.96	3.96	4.59	4.59	1356	1356	11.96	11.96	0.3	0.3
LGW=MBJ	69.9%	1957	7	101762	478	4.70	4.70	4.97	4.97	1595	1595	12.63	12.63	0.3	0.3
FRA=MRU	60.7%	1929	6	100307	573	8.83	6.13	2.65	5.35	2953	2049	14.68	13.57	0.6	0.4
ANC=LHR	68.9%	1925	6	100107	448	6.50	5.02	2.33	3.81	2170	1676	13.77	12.87	0.4	0.4
MRU=MUC	60.7%	1896	6	98578	544	7.96	5.64	2.87	5.19	2616	1854	14.39	13.29	0.5	0.4
CPH=SIN	79.0%	1892	6	98375	609	10.95	8.36	1.97	4.56	3589	2742	15.22	14.53	0.6	0.5
GVA=LAX	68.9%	1862	6	96825	572	8.76	7.58	2.83	4.01	2826	2445	14.65	14.24	0.5	0.5
CDG=GRU	70.0%	1862	6	96822	567	7.39	5.71	4.00	5.67	2384	1844	14.17	13.33	0.5	0.4
CDG=DKR	60.7%	1845	6	95926	252	4.23	3.12	1.52	2.63	1351	999	12.22	10.98	0.3	0.3

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		AC Hours		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	185271	618	9634102	36765	3.72	3.72	3.88	3.88	119315	119315	11.70	11.70	28.0	28.0
JFK=VIE	68.9%	1820	6	94636	400	6.04	5.01	2.92	3.95	1907	1580	13.53	12.86	0.4	0.3
GIG=LAX	63.0%	1811	6	94152	593	11.11	8.22	0.89	3.78	3487	2581	15.25	14.48	0.6	0.5
FRA=GRU	70.0%	1770	6	92036	561	7.80	6.15	4.04	5.68	2391	1888	14.32	13.58	0.5	0.4
MIA=MUC	69.9%	1754	6	91197	456	5.29	5.01	4.71	4.99	1609	1523	13.06	12.86	0.3	0.3
HAM=MIA	69.9%	1754	6	91197	439	4.62	4.66	4.92	4.88	1404	1417	12.56	12.59	0.3	0.3
DUS=MIA	69.9%	1754	6	91197	431	5.00	4.62	4.25	4.63	1521	1405	12.86	12.56	0.3	0.3
DXB=FCO	60.7%	1737	6	90304	244	5.22	3.90	1.04	2.37	1572	1174	13.02	11.90	0.3	0.3
FCO=MLE	79.0%	1737	6	90304	412	6.96	6.10	2.00	2.86	2094	1837	13.98	13.56	0.4	0.4
MLE=ZRH	79.0%	1737	6	90304	438	7.42	6.39	2.25	3.28	2233	1923	14.18	13.71	0.4	0.4
BKK=LHR	79.0%	1699	6	88341	729	10.72	7.95	1.41	4.18	3155	2341	15.17	14.38	0.6	0.4
FRA=JED	60.7%	1667	6	86692	224	3.79	3.39	1.79	2.19	1096	980	11.78	11.32	0.3	0.2
FRA=KWI	60.7%	1667	6	86692	216	4.89	4.16	0.65	1.39	1413	1201	12.77	12.15	0.3	0.3
DXB=FRA	60.7%	1667	6	86692	261	5.73	4.58	0.90	2.05	1655	1322	13.34	12.52	0.3	0.3
BNE=FUK	72.0%	1662	6	86435	389	4.56	4.39	4.53	4.70	1314	1264	12.51	12.36	0.3	0.3
FUK=SYD	72.0%	1662	6	86435	420	6.53	4.84	3.47	5.16	1881	1394	13.78	12.74	0.4	0.3
EZE=FRA	70.0%	1642	5	85409	610	10.12	6.97	3.30	6.45	2881	1985	15.03	13.99	0.5	0.4
LIS=REC	70.0%	1642	5	85409	311	3.58	3.58	3.92	3.92	1019	1019	11.55	11.55	0.2	0.2
DXB=LGW	60.7%	1640	5	85294	290	6.36	5.12	0.80	2.04	1810	1457	13.70	12.95	0.4	0.3
BNE=HNL	73.0%	1634	5	84973	401	4.43	4.43	5.07	5.07	1253	1253	12.40	12.40	0.3	0.3
BDA=LGW	69.9%	1633	5	84895	292	3.57	3.57	3.47	3.47	1011	1011	11.54	11.54	0.2	0.2
ORD=TXL	68.9%	1629	5	84721	373	5.65	5.61	3.27	3.31	1595	1583	13.29	13.27	0.3	0.3

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		AC Hours		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	324225	1081	16859679	64339	3.72	3.72	3.88	3.88	208801	208801	11.70	11.70	49.0	49.0
MAD=SDQ	69.9%	28028	93	1457435	6059	4.22	4.22	3.91	3.91	20522	20522	12.22	12.22	4.6	4.6
LHR=SFO	68.9%	27094	90	1408913	7544	7.55	7.26	2.97	3.26	35453	34096	14.23	14.11	6.8	6.6
JFK=MAD	68.9%	26358	88	1370621	4907	3.95	3.95	3.40	3.40	18050	18050	11.95	11.95	4.1	4.1
BRU=JFK	68.9%	25700	86	1336397	4888	4.39	3.84	3.34	3.89	19565	17117	12.37	11.84	4.3	4.0
LAX=OSA	73.0%	25580	85	1330152	7041	5.18	5.18	5.99	5.99	22968	22968	12.99	12.99	4.9	4.9
HNL=SEA	68.0%	24996	83	1299779	3480	2.85	2.85	2.74	2.74	12355	12355	10.58	10.58	3.2	3.2
KUL=NRT	72.0%	24994	83	1299675	4340	3.51	3.51	3.29	3.29	15185	15185	11.46	11.46	3.6	3.6
MAD=MIA	69.9%	24322	81	1264754	5584	4.42	4.42	4.56	4.56	18637	18637	12.39	12.39	4.1	4.1
AMS=SIN	79.0%	23828	79	1239064	8093	11.50	8.62	1.46	4.35	47506	35598	15.33	14.61	8.5	6.7
EWR=LHR	68.9%	23035	77	1197828	4141	4.77	3.60	2.46	3.63	19058	14373	12.68	11.57	4.1	3.4
CDG=LAX	68.9%	22736	76	1182271	6687	8.00	7.13	3.22	4.09	31545	28113	14.40	14.06	6.0	5.5
DFW=NRT	73.0%	22472	75	1168539	7495	7.40	7.28	5.02	5.14	28829	28359	14.17	14.12	5.6	5.5
ATL=FRA	68.9%	22455	75	1167672	5376	6.24	4.96	3.05	4.33	24287	19307	13.63	12.83	4.9	4.1
ATL=LGW	68.9%	22391	75	1164322	4912	5.75	4.43	2.81	4.13	22312	17187	13.35	12.40	4.6	3.8
JFK=ZRH	68.9%	22389	75	1164202	4585	5.41	4.46	2.92	3.87	21009	17303	13.14	12.43	4.4	3.8
NGO=PDX	73.0%	22382	75	1163883	5794	4.95	4.76	4.59	4.78	19200	18486	12.82	12.68	4.1	4.0
PDX=SEL	73.0%	22382	75	1163883	6117	5.21	4.89	5.46	5.77	20206	18980	13.01	12.78	4.3	4.1
FRA=ORD	68.9%	22262	74	1157621	5014	5.93	5.46	3.23	3.70	22864	21057	13.46	13.17	4.7	4.4
NGO=SIN	72.0%	22047	73	1146467	3617	3.21	3.21	3.19	3.19	12282	12282	11.10	11.10	3.0	3.0
DFW=LGW	68.9%	22004	73	1144218	5430	6.85	6.09	2.80	3.56	26129	23223	13.93	13.55	5.2	4.7
CDG=YMX	68.9%	21908	73	1139193	3926	4.56	4.02	2.54	3.08	17302	15264	12.51	12.02	3.8	3.5
SEL=SFO	73.0%	21845	73	1135950	6387	5.15	5.15	6.23	6.23	19488	19488	12.96	12.96	4.1	4.1
AMS=DTW	68.9%	21843	73	1135842	4463	5.27	4.57	2.61	3.31	19935	17292	13.04	12.52	4.2	3.8
DFW=FRA	68.9%	21792	73	1133209	4281	4.70	4.70	5.54	5.54	17772	17772	12.63	12.63	3.9	3.9
LAX=OGG	68.0%	21430	71	1114366	2767	2.70	2.70	2.42	2.42	10048	10048	10.35	10.35	2.7	2.7
HNL=ORD	68.0%	21394	71	1112474	4714	5.62	5.62	2.76	2.76	20849	20849	13.28	13.28	4.3	4.3
FRA=YVR	68.9%	21208	71	1102815	5525	7.91	6.38	1.80	3.33	29064	23446	14.37	13.70	5.6	4.7
OSA=SYD	72.0%	21111	70	1097778	5329	5.63	4.73	3.85	4.74	20587	17311	13.28	12.65	4.3	3.8
OGG=SFO	68.0%	20884	70	1085987	2537	2.59	2.59	2.30	2.30	9393	9393	10.16	10.16	2.5	2.5
NRT=PDX	73.0%	20860	70	1084739	5221	4.50	4.50	4.87	4.87	16279	16279	12.46	12.46	3.6	3.6
AMS=NRT	79.0%	20745	69	1078741	6243	10.28	6.37	1.38	5.29	36962	22917	15.07	13.70	6.7	4.6
HNL=YVR	68.0%	20739	69	1078419	3147	3.03	3.03	2.55	2.55	10904	10904	10.85	10.85	2.8	2.8
NRT=YYZ	73.0%	20451	68	1063457	6808	9.95	7.08	2.43	5.29	35268	25107	14.99	14.04	6.5	4.9
GIG=JFK	63.0%	20187	67	1049747	5042	6.33	5.06	3.09	4.35	22137	17715	13.68	12.90	4.4	3.8
FRA=MIA	69.9%	19756	66	1027308	4954	5.21	4.78	4.35	4.79	17841	16354	13.01	12.69	3.8	3.5
NRT=SJC	73.0%	19262	64	1001605	5154	4.77	4.77	5.36	5.36	15915	15915	12.68	12.68	3.4	3.4
JFK=ORY	68.9%	19234	64	1000144	3626	4.86	3.75	3.00	4.11	16195	12488	12.75	11.73	3.5	2.9
CNS=NGO	72.0%	18964	63	986117	3597	3.83	3.89	3.83	3.76	12578	12790	11.82	11.89	2.9	3.0
CDG=YYZ	68.9%	18727	62	973818	3642	5.23	4.29	2.47	3.41	16980	13938	13.02	12.28	3.6	3.1
LIM=MIA	63.0%	18481	62	961027	2520	3.84	3.29	1.89	2.43	12299	10554	11.83	11.20	2.9	2.6
BOS=CDG	68.9%	18364	61	954911	3263	4.04	3.63	3.14	3.56	12871	11552	12.04	11.60	2.9	2.7
BNE=HKG	72.0%	18040	60	938077	4063	6.01	4.37	2.28	3.92	18791	13653	13.51	12.35	3.8	3.0
SEL=YVR	73.0%	18021	60	937092	4758	6.39	5.01	4.08	5.46	19970	15644	13.71	12.86	4.0	3.3
ORY=PTP	69.9%	17766	59	923832	3875	4.27	4.27	3.94	3.94	13161	13161	12.26	12.26	2.9	2.9
AKL=PER	72.0%	17528	58	911460	3023	4.00	3.59	2.86	3.26	12150	10907	12.00	11.56	2.8	2.6
BOS=FRA	68.9%	17526	58	911354	3335	4.55	3.98	3.05	3.63	13835	12087	12.51	11.98	3.0	2.8
SEL=SIN	72.0%	17029	57	885493	2562	3.58	3.04	2.51	3.05	10574	8964	11.55	10.85	2.5	2.3
AKL=HNL	73.0%	16602	55	863286	3803	4.18	4.18	4.57	4.57	12024	12024	12.17	12.17	2.7	2.7
GIG=MAD	70.0%	16532	55	859689	4352	5.39	4.92	4.63	5.10	15457	14102	13.13	12.80	3.2	3.0
FUK=SIN	72.0%	16517	55	858876	2413	3.09	2.96	3.19	3.32	8861	8466	10.93	10.74	2.2	2.2
AKL=LAX	73.0%	16479	55	856908	5583	5.86	5.86	6.46	6.46	16740	16740	13.42	13.42	3.4	3.4
MAD=MEX	69.9%	16094	54	836898	4715	5.27	5.38	5.28	5.17	14688	14995	13.04	13.12	3.1	3.1
CDG=ORD	68.9%	16076	54	835966	3462	5.89	5.12	2.92	3.69	16409	14279	13.44	12.95	3.4	3.0
HNL=STL	68.0%	15681	52	815436	3362	5.43	5.43	2.74	2.74	14760	14760	13.15	13.15	3.1	3.1

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		AC Hours		Hrs/Day/Ac		Units	
	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	324225	1081	16859679	64339	3.72	3.72	3.88	3.88	208801	208801	11.70	11.70	49.0	49.0
HNL=NRT	73.0%	324225	1081	16859679	64339	3.72	3.72	3.88	3.88	208801	208801	11.70	11.70	49.0	49.0
LAX=NRT	73.0%	245733	819	12778107	69554	5.00	5.00	5.62	5.62	213113	213113	12.86	12.86	45.5	45.5
NRT=SIN	72.0%	200786	669	10440696	34734	3.34	3.34	3.43	3.43	116373	116373	11.26	11.26	28.4	28.4
NRT=SFO	73.0%	187206	624	9734719	49782	4.74	4.74	5.24	5.24	153844	153844	12.66	12.66	33.4	33.4
HNL=LAX	68.0%	168743	562	8774655	22401	2.76	2.76	2.59	2.59	80664	80664	10.43	10.43	21.2	21.2
JFK=NRT	73.0%	123474	412	6420645	43215	10.16	7.32	3.00	5.84	217393	156645	15.04	14.14	39.7	30.4
HKG=SFO	73.0%	114777	383	5968393	41195	6.94	6.34	6.22	6.81	138009	126216	13.97	13.69	27.1	25.3
HNL=OSA	73.0%	112551	375	5852670	23972	3.93	3.93	4.08	4.08	76734	76734	11.93	11.93	17.7	17.7
HNL=SFO	68.0%	100477	335	5224791	12514	2.64	2.64	2.42	2.42	45960	45960	10.24	10.24	12.3	12.3
NRT=ORD	73.0%	98099	327	5101134	31937	8.48	7.43	3.66	4.71	144170	126319	14.56	14.18	27.2	24.5
LAX=SEL	73.0%	96705	322	5028640	29966	5.70	5.70	6.31	6.31	95584	95584	13.33	13.33	19.7	19.7
NRT=YVR	73.0%	83154	277	4323992	20176	4.65	4.59	4.36	4.43	67051	66105	12.59	12.53	14.6	14.5
JFK=LHR	68.9%	81493	272	4237629	14590	4.27	3.73	2.47	3.00	60274	52672	12.26	11.72	13.5	12.4
LHR=NRT	79.0%	80323	268	4176782	24755	9.18	6.75	2.95	5.38	127849	93911	14.78	13.88	23.8	18.6
HNL=SEL	73.0%	74616	249	3880054	17622	4.45	4.88	4.65	4.22	57557	63109	12.42	12.77	12.7	13.6
HKG=YVR	73.0%	74130	247	3854781	24565	7.99	6.15	4.32	6.16	102704	79072	14.40	13.58	19.6	16.0
NRT=SEA	73.0%	66520	222	3459061	16462	4.61	4.55	4.82	4.88	53137	52485	12.55	12.51	11.6	11.5
LHR=SIN	79.0%	64591	215	3358756	22711	11.88	8.84	1.49	4.53	133019	98955	15.41	14.68	23.7	18.5
HNL=NGO	73.0%	62492	208	3249562	13026	3.86	3.86	3.99	3.99	41855	41855	11.86	11.86	9.7	9.7
NRT=SYD	72.0%	62166	207	3232633	15731	5.56	4.68	3.79	4.67	59922	50431	13.24	12.61	12.4	11.0
CNS=NRT	72.0%	60087	200	3124544	11420	3.82	3.82	3.39	3.39	39779	39805	11.81	11.82	9.3	9.3
FCO=JFK	68.9%	55910	186	2907334	12404	5.10	4.31	3.59	4.38	49461	41749	12.93	12.29	10.5	9.3
ANC=SEL	73.0%	55361	185	2878782	10857	4.56	4.18	3.74	4.12	43765	40112	12.51	12.17	9.6	9.1
LAX=LHR	68.9%	53673	179	2791022	15192	7.74	7.31	3.08	3.51	71982	67996	14.30	14.13	13.8	13.2
HKG=SYD	72.0%	51685	172	2687640	12327	6.73	4.79	2.09	4.02	60251	42931	13.87	12.70	11.9	9.3
FRA=JFK	68.9%	50829	169	2643118	10166	4.81	4.06	3.28	4.03	42395	35753	12.72	12.06	9.2	8.1
CDG=JFK	68.9%	48813	163	2538293	9201	4.34	3.76	2.38	2.96	36680	31788	12.32	11.75	8.2	7.4
IAD=LHR	68.9%	48505	162	2522259	9251	4.88	4.01	2.53	3.40	41025	33697	12.77	12.01	8.8	7.7
OSA=SIN	72.0%	47353	158	2462371	7562	3.15	3.15	3.04	3.04	25857	25857	11.01	11.01	6.5	6.5
LAX=SYD	73.0%	42512	142	2210634	16567	6.65	6.65	7.37	7.37	48984	48984	13.84	13.84	9.7	9.7
LHR=MIA	69.9%	39693	132	2064024	9117	4.53	4.26	4.60	4.88	31198	29324	12.49	12.25	6.9	6.6
SFO=TPE	73.0%	39035	130	2029812	13080	6.45	5.84	5.84	6.45	43624	39496	13.74	13.41	8.7	8.1
LAX=TPE	73.0%	36477	122	1896797	12850	6.67	6.05	6.24	6.86	42163	38283	13.85	13.53	8.4	7.8
DTW=SEL	73.0%	36170	121	1880835	12425	10.09	7.48	3.45	6.06	63244	46886	15.02	14.20	11.6	9.1
SEA=SEL	73.0%	35812	119	1862213	9652	5.66	4.86	5.05	5.85	35155	30141	13.30	12.75	7.3	6.5
DTW=NRT	73.0%	35812	119	1862213	11888	9.02	7.04	3.31	5.30	55996	43670	14.73	14.02	10.4	8.6
CDG=NRT	79.0%	35030	117	1821569	10985	9.95	6.86	2.13	5.22	60392	41630	14.99	13.94	11.1	8.2
LHR=ORD	68.9%	34988	117	1819358	7171	5.63	5.20	2.65	3.08	34127	31540	13.28	13.00	7.1	6.7
FRA=SIN	79.0%	34648	115	1801719	11506	11.26	7.28	1.27	5.25	67645	43736	15.29	14.12	12.2	8.5
EWR=NRT	73.0%	33471	112	1740504	11715	10.16	7.31	3.13	5.97	58931	42419	15.04	14.13	10.8	8.2
JFK=MXP	68.9%	33409	111	1737269	6922	4.91	4.34	3.40	3.97	28415	25104	12.79	12.32	6.1	5.6
EZE=MIA	63.0%	33313	111	1732257	7642	7.17	5.13	1.78	3.82	41382	29614	14.07	12.95	8.1	6.3
AMS=JFK	68.9%	32926	110	1712140	6222	4.39	3.78	3.25	3.86	25083	21584	12.37	11.77	5.6	5.0
HKG=LAX	73.0%	32410	108	1685303	12195	7.55	6.70	6.62	7.47	42394	37640	14.23	13.96	8.2	7.5
FRA=NRT	79.0%	31294	104	1627273	9469	9.34	6.31	2.27	5.30	50686	34230	14.83	13.67	9.4	6.9
OSA=SFO	73.0%	31246	104	1624781	8737	5.28	5.28	5.22	5.22	28586	28586	13.05	13.05	6.0	6.0
GIG=MIA	63.0%	30558	102	1589037	6633	6.71	5.63	1.88	2.96	35531	29806	13.87	13.28	7.0	6.2
DFW=HNL	68.0%	30381	101	1579789	7497	6.85	6.09	0.69	1.46	36074	32061	13.93	13.55	7.1	6.5
CDG=IAD	68.9%	29934	100	1556577	5994	4.63	4.07	3.22	3.78	24014	21121	12.57	12.07	5.2	4.8
HKG=MEL	72.0%	29825	99	1550911	7140	5.99	5.99	3.17	3.17	30954	30954	13.49	13.49	6.3	6.3
HNL=SYD	73.0%	29817	99	1550492	7872	4.74	4.71	4.89	4.92	24516	24341	12.66	12.63	5.3	5.3
BNE=SIN	72.0%	28889	96	1502222	5752	5.64	4.13	2.06	3.57	28246	20694	13.29	12.13	5.8	4.7
FRA=IAD	68.9%	28319	94	1472574	5993	5.34	4.35	2.93	3.93	26225	21329	13.10	12.33	5.5	4.8
BOS=LHR	68.9%	28116	94	1462044	4759	3.88	3.48	3.06	3.47	18924	16939	11.88	11.43	4.4	4.1

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		AC Hours		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	324225	1081	16859679	64339	3.72	3.72	3.88	3.88	208801	208801	11.70	11.70	49.0	49.0
FRA=LAX	68.9%	15584	52	810358	4695	8.87	7.47	2.26	3.66	23967	20172	14.69	14.20	4.5	3.9
GRU=LAX	63.0%	15526	52	807351	4971	10.88	7.94	0.86	3.81	29279	21355	15.20	14.38	5.3	4.1
JFK=OSA	73.0%	15450	52	803412	5547	9.00	8.00	4.62	5.63	24107	21421	14.73	14.40	4.5	4.1
LHR=SEA	68.9%	15446	51	803179	3844	7.52	6.23	1.91	3.20	20135	16687	14.22	13.63	3.9	3.4
HNL=NAN	73.0%	15384	51	799978	2538	3.23	3.23	3.05	3.05	8606	8606	11.11	11.11	2.1	2.1
MSP=NRT	73.0%	15348	51	798091	4738	7.93	7.50	3.65	4.08	21092	19957	14.37	14.21	4.0	3.9
AMS=ATL	68.9%	15183	51	789537	3466	5.55	4.61	3.28	4.23	14616	12123	13.23	12.55	3.0	2.7
MUC=ORD	68.9%	15045	50	782357	3539	6.52	5.98	3.03	3.56	16993	15607	13.77	13.49	3.4	3.2
EZE=MAD	70.0%	14917	50	775679	4856	8.01	6.03	3.66	5.64	20703	15595	14.40	13.52	3.9	3.2
AKL=SIN	72.0%	14819	49	770587	4043	6.72	5.13	3.38	4.97	17265	13181	13.87	12.95	3.4	2.8
BKK=PER	72.0%	14763	49	767665	2554	3.79	3.65	2.88	3.02	9686	9343	11.78	11.63	2.3	2.2
MEL=NAN	72.0%	14482	48	753058	1809	2.96	2.79	2.25	2.42	7419	7008	10.74	10.49	1.9	1.8
ORD=ZRH	68.9%	14132	47	734851	3518	6.93	6.17	2.24	3.00	16972	15114	13.97	13.59	3.3	3.1
AMS=CUR	69.9%	14104	47	733421	3570	4.83	4.57	4.58	4.84	11798	11167	12.73	12.52	2.5	2.5
LGW=STL	68.9%	13886	46	722047	3040	6.04	5.14	2.46	3.36	14537	12372	13.52	12.96	3.0	2.6
EWR=FRA	68.9%	13789	46	717021	2768	5.46	4.08	2.75	4.13	13042	9743	13.17	12.08	2.7	2.2
LHR=YYZ	68.9%	13476	45	700747	2485	5.03	4.55	2.39	2.87	11748	10630	12.88	12.50	2.5	2.3
TPE=YVR	73.0%	13455	45	699660	4163	5.98	5.50	5.35	5.82	13936	12829	13.49	13.20	2.8	2.7
NRT=PER	72.0%	13383	45	695930	3436	5.22	4.90	4.87	5.18	12100	11378	13.01	12.79	2.6	2.4
FDF=ORY	69.9%	13324	44	692874	2950	4.36	4.36	4.02	4.02	10066	10066	12.34	12.34	2.2	2.2
LHR=YMX	68.9%	13273	44	690217	2245	4.51	4.00	2.20	2.71	10367	9205	12.47	12.00	2.3	2.1
LHR=PHL	68.9%	13273	44	690217	2440	4.97	3.77	2.49	3.69	11436	8664	12.84	11.76	2.4	2.0
DUS=ORD	68.9%	13209	44	686866	2897	5.68	5.21	3.11	3.58	12999	11923	13.31	13.01	2.7	2.5
MXP=NRT	79.0%	13081	44	680225	4119	10.34	7.39	1.73	4.68	23451	16753	15.08	14.17	4.3	3.2
BOS=LGW	68.9%	12887	43	670113	2194	4.15	3.44	2.72	3.44	9281	7681	12.15	11.38	2.1	1.9
LGW=MSP	68.9%	12887	43	670113	2697	5.64	4.97	2.70	3.37	12592	11091	13.29	12.83	2.6	2.4
CPH=JFK	68.9%	12744	42	662694	2549	4.53	4.00	3.41	3.94	10013	8845	12.49	12.00	2.2	2.0
AKL=NRT	72.0%	12497	42	649838	3570	5.04	5.04	5.52	5.52	10925	10925	12.89	12.89	2.3	2.3
JFK=MUC	68.9%	12339	41	641633	2587	5.28	4.49	3.18	3.97	11284	9605	13.05	12.45	2.4	2.1
JFK=MAN	68.9%	12049	40	626556	2088	4.56	3.54	2.75	3.78	9532	7385	12.52	11.50	2.1	1.8
CDG=SIN	79.0%	12039	40	626021	4171	10.09	8.52	2.99	4.57	21064	17779	15.02	14.58	3.9	3.4
SIN=ZRH	79.0%	12039	40	626021	4008	11.29	8.03	1.21	4.47	23559	16759	15.29	14.41	4.2	3.2
AMS=YMX	68.9%	11966	40	622248	2135	4.77	3.97	2.11	2.91	9893	8232	12.68	11.97	2.1	1.9
JFK=LIS	68.9%	11948	40	621291	2087	3.37	3.37	3.74	3.74	6974	6974	11.29	11.29	1.7	1.7
CCS=MAD	69.9%	11615	39	603994	2628	4.37	4.37	4.10	4.10	8788	8788	12.34	12.34	2.0	2.0
IAD=MXP	68.9%	11046	37	574383	2419	5.67	4.66	2.79	3.80	10855	8924	13.31	12.60	2.2	1.9
SEA=TPE	73.0%	11012	37	572631	3466	5.69	5.57	6.06	6.18	10860	10628	13.32	13.24	2.2	2.2
HNL=SAN	68.0%	10988	37	571373	1492	2.80	2.80	2.57	2.57	5335	5335	10.50	10.50	1.4	1.4
AMS=YYZ	68.9%	10963	37	570075	2122	5.24	4.43	2.35	3.15	9955	8421	13.03	12.40	2.1	1.9
BOS=ZRH	68.9%	10958	37	569836	2128	4.94	4.04	2.81	3.71	9384	7675	12.81	12.04	2.0	1.8
ARN=JFK	68.9%	10705	36	556673	2168	5.16	4.30	3.23	4.09	9584	7985	12.98	12.29	2.0	1.8
GRU=YYZ	63.0%	10603	35	551331	2807	7.19	5.80	2.98	4.37	13211	10659	14.08	13.38	2.6	2.2
AKL=HKG	72.0%	10537	35	547915	3116	6.28	5.26	4.34	5.36	11473	9609	13.65	13.04	2.3	2.0
HKG=PER	72.0%	10537	35	547915	2093	5.13	4.05	2.21	3.29	9367	7391	12.95	12.05	2.0	1.7
MAN=ORD	68.9%	10530	35	547578	2089	5.36	4.97	2.61	3.00	9776	9068	13.11	12.83	2.0	1.9
NRT=PPT	72.0%	10487	35	545318	3202	5.34	5.34	5.87	5.87	9716	9716	13.10	13.10	2.0	2.0
AMS=LAX	68.9%	10461	35	543988	3027	8.09	6.76	2.81	4.14	14674	12249	14.43	13.89	2.8	2.4
KOA=SFO	68.0%	10442	35	542993	1286	2.62	2.62	2.36	2.36	4740	4740	10.21	10.21	1.3	1.3
LGW=MIA	69.9%	10174	34	529062	2345	4.55	4.38	4.49	4.66	8019	7721	12.50	12.36	1.8	1.7
GVA=JFK	68.9%	10116	34	526039	2027	5.16	4.19	2.80	3.77	9042	7354	12.97	12.19	1.9	1.7
SEL=SYD	72.0%	10062	34	523246	2708	6.86	5.17	3.22	4.92	11963	9011	13.94	12.98	2.4	1.9
AMS=IAH	68.9%	9960	33	517902	2590	7.29	5.30	2.41	4.40	12593	9155	14.13	13.07	2.4	1.9
DEL=SIN	72.0%	9950	33	517403	1336	3.79	3.54	1.55	1.79	6528	6103	11.78	11.50	1.5	1.5
NRT=ZRH	79.0%	9925	33	516086	3114	10.32	7.01	1.95	5.26	17754	12067	15.08	14.01	3.2	2.4

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	Hours/Trip		Hours/Trip		AC Hours		Hrs/Day/Ac		Units	
						GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	324225	1081	16859679	64339	3.72	3.72	3.88	3.88	208801	208801	11.70	11.70	49.0	49.0
ATH=JFK	68.9%	9918	33	515748	2538	6.17	5.32	3.79	4.64	10612	9146	13.60	13.08	2.1	1.9
AMS=MSP	68.9%	9863	33	512876	2068	5.73	4.93	2.43	3.24	9804	8421	13.35	12.80	2.0	1.8
FRA=YYZ	68.9%	9803	33	509765	2009	4.90	4.60	3.10	3.40	8334	7813	12.79	12.54	1.8	1.7
FRA=SFO	68.9%	9619	32	500192	2844	8.93	7.28	1.90	3.56	14889	12134	14.71	14.12	2.8	2.4
BCN=JFK	68.9%	9601	32	499234	1908	4.18	4.06	3.91	4.04	6960	6755	12.18	12.06	1.6	1.5
DTW=FRA	68.9%	9601	32	499234	2072	5.95	4.96	2.51	3.50	9903	8248	13.47	12.82	2.0	1.8
CDG=DTW	68.9%	9601	32	499234	1972	5.62	4.60	2.55	3.57	9349	7650	13.27	12.54	1.9	1.7
BOS=GLA	68.9%	9601	32	499234	1508	3.70	3.17	2.67	3.20	6158	5279	11.68	11.04	1.4	1.3
AMS=BOS	68.9%	9601	32	499234	1721	4.71	3.56	2.46	3.60	7833	5929	12.63	11.53	1.7	1.4
LAX=NGO	73.0%	9490	32	493486	2774	5.44	5.29	5.73	5.88	8944	8697	13.16	13.06	1.9	1.8
CGK=SEL	72.0%	9438	31	490786	1613	3.37	3.32	3.59	3.64	5514	5436	11.30	11.24	1.3	1.3
SFO=SHA	73.0%	9362	31	486836	2990	5.75	5.63	6.21	6.33	9324	9139	13.35	13.28	1.9	1.9
ANC=OSA	73.0%	9362	31	486836	1775	4.90	4.09	2.56	3.37	7959	6629	12.79	12.08	1.7	1.5
LGW=YYZ	68.9%	9343	31	485832	1733	5.04	4.40	2.50	3.14	8159	7125	12.89	12.37	1.7	1.6
EWR=ORY	68.9%	9343	31	485832	1768	4.28	3.86	3.34	3.76	6936	6255	12.27	11.86	1.6	1.4
PPT=SYD	72.0%	9288	31	482996	1837	3.70	3.70	3.80	3.80	5964	5964	11.69	11.69	1.4	1.4
BGI=LGW	69.9%	9133	30	474891	1992	4.18	4.18	4.12	4.12	6614	6614	12.17	12.17	1.5	1.5
ANU=LGW	69.9%	9133	30	474891	1931	4.08	4.08	4.00	4.00	6463	6463	12.08	12.08	1.5	1.5
FRA=YYC	68.9%	9039	30	470037	2199	7.52	5.76	1.73	3.49	11778	9020	14.22	13.36	2.3	1.9
BRU=SIN	79.0%	9029	30	469516	3079	10.47	8.52	2.36	4.31	16384	13336	15.11	14.58	3.0	2.5
CDG=GIG	70.0%	9000	30	467984	2671	7.06	5.51	4.01	5.57	11010	8588	14.03	13.20	2.2	1.8
AMS=ORD	68.9%	8956	30	465729	1914	5.69	4.97	2.52	3.24	8835	7719	13.32	12.84	1.8	1.7
ANC=HKG	73.0%	8940	30	464888	2354	7.52	5.36	2.57	4.73	11647	8299	14.22	13.11	2.3	1.7
CDG=PTP	69.9%	8883	30	461916	1943	4.33	4.33	3.87	3.87	6674	6674	12.32	12.32	1.5	1.5
CDG=IAH	68.9%	8763	29	455677	2285	8.08	5.31	1.76	4.53	12265	8060	14.43	13.07	2.3	1.7
AKL=NGO	72.0%	8727	29	453783	2520	5.09	5.09	6.28	6.28	7701	7705	12.92	12.93	1.6	1.6
HNL=YYZ	68.0%	8628	29	448666	2083	6.34	6.34	2.89	2.89	9478	9478	13.68	13.68	1.9	1.9
LHR=SEL	79.0%	8611	29	447758	2474	8.92	6.54	4.21	6.58	13309	9762	14.70	13.78	2.5	1.9
IAD=NRT	73.0%	8237	27	428309	2887	10.61	7.52	2.35	5.44	15142	10732	15.14	14.22	2.7	2.1
FCO=MIA	69.9%	8147	27	423639	2187	5.10	5.00	5.06	5.16	7204	7064	12.93	12.86	1.5	1.5
DFW=MAD	68.9%	8086	27	420496	2082	7.06	5.77	3.15	4.44	9898	8090	14.03	13.37	1.9	1.7
DFW=ORY	68.9%	8086	27	420496	2076	7.62	5.99	2.43	4.05	10676	8401	14.26	13.50	2.1	1.7
CDG=MIA	69.9%	8047	27	418449	1916	4.48	4.48	4.77	4.77	6248	6248	12.44	12.44	1.4	1.4
MUC=YYZ	68.9%	8008	27	416428	1721	5.82	5.06	2.60	3.36	8078	7021	13.40	12.90	1.7	1.5
JFK=TLV	68.9%	7935	26	412598	2338	7.89	5.41	3.35	5.83	10850	7436	14.36	13.14	2.1	1.6
FRA=YMX	68.9%	7925	26	412120	1504	5.13	4.31	2.20	3.03	7047	5917	12.95	12.29	1.5	1.3
MIA=ORY	69.9%	7729	26	401906	1839	4.44	4.44	5.48	5.48	5944	5944	12.41	12.41	1.3	1.3
CPH=EWR	68.9%	7718	26	401350	1548	4.47	4.01	3.63	4.09	5985	5370	12.44	12.01	1.3	1.2
ATL=ZRH	68.9%	7603	25	395367	1850	6.62	5.16	2.84	4.30	8719	6794	13.82	12.97	1.7	1.4
YMX=ZRH	68.9%	7603	25	395367	1595	5.74	4.77	1.89	2.86	7564	6287	13.35	12.68	1.6	1.4
BOG=JFK	63.0%	7550	25	392586	975	2.70	2.70	2.71	2.71	3538	3538	10.35	10.35	0.9	0.9
MIA=SCL	63.0%	7550	25	392586	1629	5.78	4.45	2.99	4.32	7560	5822	13.37	12.42	1.6	1.3
CVG=LGW	68.9%	7507	25	390341	1551	5.68	4.44	2.40	3.65	7394	5773	13.31	12.41	1.5	1.3
ATL=MAD	68.9%	7507	25	390341	1688	4.88	4.68	3.74	3.94	6352	6095	12.77	12.61	1.4	1.3
ATL=MAN	68.9%	7507	25	390341	1596	5.79	4.65	2.33	3.48	7538	6048	13.38	12.58	1.5	1.3
ATL=SNN	68.9%	7507	25	390341	1496	5.40	4.07	2.31	3.64	7026	5291	13.14	12.07	1.5	1.2
ATL=ORY	68.9%	7507	25	390341	1711	6.11	4.70	2.68	4.09	7945	6112	13.56	12.62	1.6	1.3
FRA=MCO	68.9%	7507	25	390341	1848	5.12	4.72	4.38	4.78	6658	6140	12.94	12.64	1.4	1.3
ATL=MUC	68.9%	7507	25	390341	1869	7.05	5.29	2.45	4.21	9177	6882	14.02	13.06	1.8	1.4
BOM=ZRH	79.0%	7429	25	386301	1570	7.45	6.00	0.80	2.25	9599	7723	14.19	13.50	1.9	1.6
CDG=SEZ	60.7%	7415	25	385577	1880	6.23	5.47	3.45	4.21	8007	7030	13.63	13.18	1.6	1.5
JFK=LGW	68.9%	7378	25	383640	1328	4.28	3.74	3.05	3.59	5476	4788	12.27	11.73	1.2	1.1
IAH=LGW	68.9%	7378	25	383640	1860	6.92	5.30	2.75	4.37	8847	6778	13.96	13.07	1.7	1.4
FCO=YYZ	68.9%	7336	24	381486	1680	6.02	5.62	2.91	3.30	7653	7146	13.51	13.28	1.6	1.5

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		AC Hours		Hrs/Dep/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	324225	1081	16859679	64339	3.72	3.72	3.88	3.88	208801	208801	11.70	11.70	49.0	49.0
LAX=MXP	68.9%	7263	24	377657	2276	9.54	7.89	2.25	3.90	12012	9934	14.88	14.36	2.2	1.9
CAY=CDG	69.9%	7199	24	374333	1656	4.40	4.40	4.14	4.14	5491	5491	12.38	12.38	1.2	1.2
CNS=HNL	73.0%	7149	24	371757	1638	4.18	4.18	5.20	5.20	5178	5178	12.17	12.17	1.2	1.2
SDJ=SIN	72.0%	7079	24	368090	1287	4.19	3.52	3.02	3.69	5141	4322	12.18	11.48	1.2	1.0
KHI=SIN	72.0%	7079	24	368090	1084	4.26	3.46	1.91	2.70	5223	4249	12.25	11.41	1.2	1.0
CTS=HNL	73.0%	7034	23	365792	1370	3.66	3.66	3.80	3.80	4465	4465	11.64	11.64	1.1	1.1
CVG=FRA	68.9%	7023	23	365212	1589	6.19	5.28	2.73	3.63	7537	6431	13.61	13.06	1.5	1.4
ATL=HAM	68.9%	7023	23	365212	1663	6.16	4.66	3.14	4.63	7494	5677	13.59	12.60	1.5	1.2
EWR=HAM	68.9%	6766	23	351809	1314	4.73	3.77	3.48	4.44	5543	4416	12.65	11.76	1.2	1.0
DUS=JFK	68.9%	6766	23	351809	1315	5.22	3.97	2.66	3.90	6121	4657	13.01	11.97	1.3	1.1
CCS=FCO	69.9%	6753	23	351140	1818	5.70	4.88	4.32	5.13	6669	5713	13.32	12.77	1.4	1.2
LGW=MCO	68.9%	6738	22	350374	1522	4.52	4.27	4.19	4.44	5277	4989	12.48	12.26	1.2	1.1
FRA=MEX	69.9%	6737	22	350329	2080	8.22	5.93	3.03	5.32	9602	6924	14.48	13.46	1.8	1.4
CDG=SFO	68.9%	6733	22	350134	1950	9.11	7.09	2.35	4.37	10631	8275	14.76	14.04	2.0	1.6
ATL=HNL	68.0%	6627	22	344608	1549	5.88	5.88	2.78	2.78	6757	6757	13.43	13.43	1.4	1.4
BRU=IAD	68.9%	6572	22	341758	1326	5.42	4.00	2.71	4.13	6171	4552	13.15	12.00	1.3	1.0
IAD=MAD	68.9%	6572	22	341758	1301	4.15	4.15	3.93	3.93	4730	4730	12.15	12.15	1.1	1.1
FCO=GIG	70.0%	6438	21	334753	1907	7.72	5.49	3.28	5.51	8819	6129	14.30	13.20	1.7	1.3
BNE=NGO	72.0%	6330	21	329138	1477	4.55	4.32	4.28	4.52	4992	4735	12.50	12.30	1.1	1.1
GIG=ORD	63.0%	6288	21	326996	1735	7.92	6.19	3.04	4.76	8636	6751	14.37	13.61	1.7	1.4
NGO=YVR	73.0%	6267	21	325887	1572	4.82	4.82	4.43	4.43	5236	5236	12.72	12.72	1.1	1.1
AMS=AUA	69.9%	6176	21	321135	1572	4.81	4.59	4.80	5.02	5150	4914	12.71	12.54	1.1	1.1
ORD=ORY	68.9%	6137	20	319141	1323	5.89	5.08	2.95	3.75	6261	5404	13.43	12.92	1.3	1.1
GRU=LHR	70.0%	6125	20	318518	1875	6.67	5.58	4.62	5.71	7087	5929	13.85	13.25	1.4	1.2
ATH=SIN	79.0%	6078	20	316064	1779	8.67	6.24	2.54	4.97	9132	6578	14.63	13.63	1.7	1.3
FCO=ORD	68.9%	6052	20	314714	1514	6.71	6.26	3.04	3.49	7041	6564	13.87	13.64	1.4	1.3
LHR=NGO	79.0%	6049	20	314537	1860	9.16	6.41	3.09	5.84	9606	6726	14.77	13.72	1.8	1.3
KUL=LHR	79.0%	6049	20	314537	2066	9.84	8.75	3.28	4.37	10318	9176	14.96	14.65	1.9	1.7
CNS=OSA	72.0%	6030	20	313558	1139	3.81	3.90	3.44	3.35	3986	4075	11.81	11.90	0.9	0.9
BOM=CDG	79.0%	5990	20	311484	1354	7.92	6.49	1.01	2.43	8219	6738	14.37	13.76	1.6	1.3
BOS=FCO	68.9%	5979	20	310885	1269	5.44	4.63	2.68	3.50	5638	4797	13.16	12.57	1.2	1.0
LAX=MAD	68.9%	5937	20	308731	1801	8.35	7.43	2.82	3.74	8590	7641	14.52	14.18	1.6	1.5
CDG=STL	68.9%	5928	20	308252	1352	6.35	5.40	2.69	3.64	6529	5549	13.69	13.14	1.3	1.2
KIN=LGW	69.9%	5708	19	296807	1390	4.48	4.48	4.59	4.59	4433	4433	12.45	12.45	1.0	1.0
MXP=ORD	68.9%	5702	19	296525	1337	6.54	5.69	3.13	3.97	6460	5629	13.78	13.32	1.3	1.2
BRU=ORD	68.9%	5702	19	296525	1230	5.72	5.03	3.12	3.81	5650	4969	13.33	12.88	1.2	1.1
ORD=STN	68.9%	5702	19	296525	1173	6.07	5.44	2.47	3.10	5997	5380	13.54	13.16	1.2	1.1
GLA=ORD	68.9%	5702	19	296525	1087	4.98	4.54	2.90	3.33	4919	4489	12.84	12.50	1.1	1.0
ORY=RDU	68.9%	5702	19	296525	1199	4.42	4.14	4.13	4.40	4364	4096	12.39	12.14	1.0	0.9
CVG=ORY	68.9%	5574	19	289824	1202	5.40	4.71	3.48	4.17	5217	4548	13.13	12.63	1.1	1.0
DTW=LGW	68.9%	5574	19	289824	1435	7.06	5.77	0.94	2.23	6822	5576	14.03	13.37	1.3	1.1
JFK=NCE	68.9%	5574	19	289824	1156	5.25	4.20	3.12	4.18	5075	4053	13.04	12.19	1.1	0.9
JFK=TXL	68.9%	5574	19	289824	1156	5.16	4.12	3.34	4.38	4983	3984	12.97	12.12	1.1	0.9
LHR=YVR	68.9%	5477	18	284798	1341	7.01	6.20	2.32	3.13	6652	5890	14.00	13.61	1.3	1.2
MIA=MXP	69.9%	5402	18	280912	1382	5.03	5.03	4.59	4.59	4713	4713	12.88	12.88	1.0	1.0
CCS=CDG	69.9%	5352	18	278317	1320	4.70	4.70	4.46	4.46	4361	4361	12.63	12.63	0.9	0.9
AMS=MCO	68.9%	5343	18	277858	1259	4.82	4.45	4.31	4.68	4461	4121	12.72	12.42	1.0	0.9
ORD=SEL	73.0%	5276	18	274344	1789	10.67	7.63	2.25	5.28	9757	6982	15.16	14.26	1.8	1.3
HNL=TPE	73.0%	5244	17	272681	1375	4.68	4.68	4.48	4.48	4257	4257	12.61	12.61	0.9	0.9
AMS=BWI	68.9%	5118	17	266131	1016	5.30	3.83	2.45	3.92	4705	3400	13.07	11.83	1.0	0.8
GIG=LHR	70.0%	5104	17	265432	1526	7.11	5.36	3.93	5.67	6287	4744	14.05	13.11	1.2	1.0
CCS=FRA	69.9%	5053	17	262747	1318	5.02	5.02	4.60	4.60	4400	4400	12.87	12.87	0.9	0.9
CNS=SIN	72.0%	5044	17	262272	816	4.42	3.41	2.04	3.05	3862	2985	12.39	11.35	0.9	0.7
CNS=FUK	72.0%	5044	17	262272	952	3.95	3.97	3.71	3.70	3454	3469	11.95	11.97	0.8	0.8

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.0 Hours/Trip		Saved Hours/Trip		Annual AC Hours		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	324225	1081	16859679	64339	3.72	3.72	3.88	3.88	208801	208801	11.70	11.70	49.0	49.0
CHC=SIN	72.0%	5031	17	261623	1366	7.67	5.29	1.76	4.14	6685	4612	14.28	13.06	1.3	1.0
GIG=LIS	70.0%	5030	17	261566	1254	5.56	4.59	4.15	5.13	4852	3998	13.24	12.53	1.0	0.9
BKK=CDG	79.0%	5021	17	261097	1177	7.72	6.38	4.11	5.45	6718	5554	14.30	13.70	1.3	1.1
NRT=YEG	73.0%	4726	16	245746	1196	6.13	5.19	3.14	4.09	5023	4248	13.57	12.99	1.0	0.9
AMS=YVR	68.9%	4713	16	245070	1174	7.68	5.96	1.57	3.29	6274	4866	14.28	13.48	1.2	1.0
BKK=BNE	72.0%	4694	16	244095	1109	7.02	4.87	2.31	4.46	5713	3961	14.01	12.76	1.1	0.9
LAX=LIM	63.0%	4668	16	242712	1013	5.42	4.03	2.79	4.18	4384	3258	13.15	12.03	0.9	0.7
HKT=NRT	72.0%	4625	15	240524	784	4.34	3.67	3.08	3.75	3478	2944	12.32	11.65	0.8	0.7
CCS=LHR	69.9%	4566	15	237445	1064	4.39	4.39	4.82	4.82	3473	3473	12.36	12.36	0.8	0.8
LAX=PPT	73.0%	4451	15	231454	951	3.94	3.94	4.06	4.06	3043	3043	11.94	11.94	0.7	0.7
AMS=CCS	69.9%	4382	15	227876	1110	4.83	4.66	4.76	4.93	3668	3537	12.73	12.59	0.8	0.8
LAX=ZRH	68.9%	4345	14	225924	1339	9.09	7.75	2.58	3.92	6845	5837	14.75	14.31	1.3	1.1
MCO=ORY	68.9%	4289	14	223052	1003	4.37	4.37	4.63	4.63	3251	3251	12.35	12.35	0.7	0.7
DXB=LHR	60.7%	4249	14	220940	754	6.39	5.26	1.35	2.47	4705	3874	13.71	13.04	0.9	0.8
AMS=GIG	70.0%	4242	14	220592	1311	7.33	5.58	4.21	5.96	5387	4105	14.14	13.25	1.0	0.9
AMS=KUL	79.0%	4228	14	219871	1394	9.80	8.49	2.82	4.13	7184	6225	14.95	14.57	1.3	1.2
ATH=BKK	79.0%	4214	14	219107	1078	8.86	6.94	1.11	3.02	6470	5071	14.68	13.97	1.2	1.0
FRA=GIG	70.0%	4212	14	219046	1302	6.84	5.95	4.49	5.38	4996	4347	13.93	13.47	1.0	0.9
ARN=EWR	68.9%	4156	14	216112	847	5.25	4.20	2.91	3.97	3785	3026	13.04	12.19	0.8	0.7
CPH=LAX	68.9%	4156	14	216112	1212	8.99	7.28	2.34	4.06	6479	5241	14.73	14.12	1.2	1.0
CPH=SEA	68.9%	4156	14	216112	1049	7.27	6.40	2.44	3.31	5235	4609	14.12	13.71	1.0	0.9
EWR=FBU	68.9%	4156	14	216112	795	4.86	3.89	2.85	3.82	3498	2801	12.75	11.89	0.8	0.6
GRU=MXP	70.0%	4084	14	212345	1253	7.86	5.76	3.56	5.66	5561	4074	14.35	13.36	1.1	0.8
EZE=LHR	70.0%	4084	14	212345	1468	8.39	6.49	4.65	6.55	5938	4594	14.53	13.76	1.1	0.9
JFK=SVO	68.9%	4013	13	208692	970	6.54	5.42	3.25	4.37	4547	3769	13.78	13.15	0.9	0.8
MXP=YYZ	68.9%	4004	13	208214	855	5.67	5.02	2.79	3.44	3935	3482	13.31	12.87	0.8	0.7
LGW=YYC	68.9%	4004	13	208214	910	6.18	5.24	2.74	3.68	4289	3636	13.60	13.03	0.9	0.8
CDG=KHI	79.0%	3993	13	207656	790	6.48	6.27	1.24	1.45	4483	4337	13.75	13.64	0.9	0.9
FCO=YMX	68.9%	3986	13	207256	852	5.58	5.18	2.54	2.94	3855	3579	13.25	12.99	0.8	0.8
HAM=JFK	68.9%	3981	13	207017	787	4.77	3.75	3.52	4.54	3291	2588	12.68	11.74	0.7	0.6
FBU=JFK	68.9%	3981	13	207017	759	4.86	3.86	3.10	4.10	3355	2666	12.75	11.86	0.7	0.6
JIB=MRS	60.7%	3741	12	194506	614	4.86	3.62	1.51	2.76	3153	2345	12.75	11.59	0.7	0.6
CDG=SXM	69.9%	3730	12	193979	812	4.28	4.28	4.14	4.14	2764	2764	12.26	12.26	0.6	0.6
CLT=FRA	68.9%	3728	12	193854	850	6.30	4.88	2.57	4.00	4074	3151	13.67	12.76	0.8	0.7
DKR=FCO	60.7%	3693	12	192029	494	5.02	2.96	0.65	2.70	3214	1897	12.87	10.75	0.7	0.5
MAD=SJU	68.9%	3673	12	190982	749	4.03	4.03	3.72	3.72	2565	2565	12.03	12.03	0.6	0.6
MAD=YMX	68.9%	3673	12	190982	663	4.59	4.16	2.33	2.75	2921	2650	12.54	12.16	0.6	0.6
CPH=ORD	68.9%	3645	12	189546	807	5.67	5.36	3.04	3.34	3581	3389	13.31	13.11	0.7	0.7
ANC=LAX	68.0%	3633	12	188926	443	3.24	2.72	1.76	2.28	2043	1714	11.14	10.38	0.5	0.5
GRU=LIS	70.0%	3593	12	186833	923	5.85	4.78	4.10	5.17	3644	2980	13.41	12.69	0.7	0.6
PEK=SIN	72.0%	3539	12	184045	510	4.81	3.46	1.13	2.48	2952	2122	12.72	11.41	0.6	0.5
SHA=SIN	72.0%	3539	12	184045	436	3.21	2.76	1.95	2.41	1971	1691	11.09	10.43	0.5	0.4
CDG=FDF	69.9%	3531	12	183599	784	4.37	4.37	3.94	3.94	2673	2673	12.35	12.35	0.6	0.6
FUK=HNL	73.0%	3517	12	182896	803	4.48	4.22	4.06	4.32	2729	2573	12.44	12.21	0.6	0.6
CCS=TFS	69.9%	3456	12	179706	433	3.23	3.09	3.27	3.41	1934	1853	11.12	10.93	0.5	0.5
CCS=SCQ	69.9%	3456	12	179706	743	3.96	3.96	4.59	4.59	2374	2374	11.96	11.96	0.5	0.5
LGW=MBJ	69.9%	3425	11	178084	836	4.70	4.70	4.97	4.97	2791	2791	12.63	12.63	0.6	0.6
FRA=MRU	60.7%	3376	11	175538	1003	8.83	6.13	2.65	5.35	5168	3585	14.68	13.57	1.0	0.7
ANC=LHR	68.9%	3369	11	175187	784	6.50	5.02	2.33	3.81	3797	2934	13.77	12.87	0.8	0.6
MRU=MUC	60.7%	3318	11	172511	953	7.96	5.64	2.87	5.19	4578	3244	14.39	13.29	0.9	0.7
CPH=SIN	79.0%	3311	11	172156	1066	10.95	8.36	1.97	4.56	6281	4799	15.22	14.53	1.1	0.9
GVA=LAX	68.9%	3259	11	169443	1001	8.76	7.58	2.83	4.01	4946	4280	14.65	14.24	0.9	0.8
CDG=GRU	70.0%	3258	11	169438	992	7.39	5.71	4.00	5.67	4172	3226	14.17	13.33	0.8	0.7
CDG=DKR	60.7%	3228	11	167870	441	4.23	3.12	1.52	2.63	2365	1748	12.22	10.98	0.5	0.4

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

	Supersonic Operation Circa 2015					M=2.0		Saved		Annual		Utilization		Required A/C	
AIRPORT	Load	Wdy	Wdy	Annual	Annual	Hours/Trip		Hours/Trip		AC Hours		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
HNL=NRT	73.0%	324225	1081	16859679	64339	3.72	3.72	3.88	3.88	208801	208801	11.70	11.70	49.0	49.0
JFK=VIE	68.9%	3185	11	165614	700	6.04	5.01	2.92	3.95	3337	2765	13.53	12.86	0.7	0.6
GIG=LAX	63.0%	3169	11	164766	1038	11.11	8.22	0.89	3.78	6103	4517	15.25	14.48	1.1	0.9
FRA=GRU	70.0%	3097	10	161063	982	7.80	6.15	4.04	5.68	4185	3303	14.32	13.58	0.8	0.7
MIA=MUC	69.9%	3069	10	159594	798	5.29	5.01	4.71	4.99	2816	2665	13.06	12.86	0.6	0.6
HAM=MIA	69.9%	3069	10	159594	767	4.62	4.66	4.92	4.88	2457	2479	12.56	12.59	0.5	0.5
DUS=MIA	69.9%	3069	10	159594	754	5.00	4.62	4.25	4.63	2662	2458	12.86	12.56	0.6	0.5
DXB=FCO	60.7%	3039	10	158033	426	5.22	3.90	1.04	2.37	2751	2054	13.02	11.90	0.6	0.5
FCO=MLE	79.0%	3039	10	158032	721	6.96	6.10	2.00	2.86	3665	3215	13.98	13.56	0.7	0.7
MLE=ZRH	79.0%	3039	10	158032	766	7.42	6.39	2.25	3.28	3908	3366	14.18	13.71	0.8	0.7
BKK=LHR	79.0%	2973	10	154597	1276	10.72	7.95	1.41	4.18	5522	4097	15.17	14.38	1.0	0.8
FRA=JED	60.7%	2918	10	151711	391	3.79	3.39	1.79	2.19	1918	1715	11.78	11.32	0.4	0.4
FRA=KWI	60.7%	2918	10	151711	378	4.89	4.16	0.65	1.39	2472	2102	12.77	12.15	0.5	0.5
DXB=FRA	60.7%	2918	10	151711	456	5.73	4.58	0.90	2.05	2896	2314	13.34	12.52	0.6	0.5
BNE=FUK	72.0%	2909	10	151261	680	4.56	4.39	4.53	4.70	2299	2212	12.51	12.36	0.5	0.5
FUK=SYD	72.0%	2909	10	151261	734	6.53	4.84	3.47	5.16	3291	2440	13.78	12.74	0.7	0.5
EZE=FRA	70.0%	2874	10	149466	1067	10.12	6.97	3.30	6.45	5042	3473	15.03	13.99	0.9	0.7
LIS=REC	70.0%	2874	10	149466	544	3.58	3.58	3.92	3.92	1784	1784	11.55	11.55	0.4	0.4
DXB=LGW	60.7%	2870	10	149264	507	6.36	5.12	0.80	2.04	3167	2549	13.70	12.95	0.6	0.5
BNE=HNL	73.0%	2860	10	148703	701	4.43	4.43	5.07	5.07	2194	2194	12.40	12.40	0.5	0.5
BDA=LGW	69.9%	2857	10	148566	512	3.57	3.57	3.47	3.47	1769	1769	11.54	11.54	0.4	0.4
ORD=TXL	68.9%	2851	10	148263	652	5.65	5.61	3.27	3.31	2792	2771	13.29	13.27	0.6	0.6

Mach 2.4
40%/70% Market Penetration

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

	Supersonic Operation Circa 2015					M=2.4		Saved		Utilization		Required A/C	
AIRPORT	Load	Wdy	Wdy	Annual	Annual	Hours/Trip		Hours/Trip		Hrs/Dey/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
LHR=SIN	79.0%	36909	123	1919289	12978	10.99	7.81	2.38	5.56	15.23	14.33	12.7	9.6
HKG=LAX	73.0%	18520	62	963030	6969	6.59	5.61	7.57	8.56	13.81	13.27	4.2	3.7
KUL=LHR	79.0%	3456	12	179736	1181	8.98	7.74	4.14	5.39	14.72	14.30	1.0	0.9
LAX=SYD	73.0%	24293	81	1263219	9467	5.57	5.57	8.45	8.45	13.24	13.24	4.9	4.9
AMS=SIN	79.0%	13616	45	708036	4624	10.66	7.62	2.31	5.35	15.16	14.26	4.6	3.5
BRU=SIN	79.0%	5160	17	268295	1759	9.61	7.53	3.22	5.31	14.90	14.22	1.6	1.3
CDG=SIN	79.0%	6879	23	357726	2383	9.22	7.53	3.87	5.56	14.79	14.22	2.0	1.7
JFK=OSA	73.0%	8829	29	459093	3170	8.09	7.03	5.54	6.60	14.43	14.01	2.4	2.1
FRA=SIN	79.0%	19799	66	1029554	6575	10.45	6.32	2.08	6.21	15.11	13.67	6.5	4.4
DTW=SEL	73.0%	20669	69	1074763	7100	9.23	6.52	4.32	7.02	14.79	13.77	6.1	4.7
SIN=ZRH	79.0%	6879	23	357726	2290	10.47	7.08	2.03	5.42	15.11	14.04	2.3	1.7
HKG=SFO	73.0%	65587	219	3410510	23540	6.03	5.31	7.13	7.84	13.51	13.08	13.9	12.7
IAD=NRT	73.0%	4707	16	244748	1650	9.72	6.58	3.24	6.38	14.93	13.80	1.5	1.1
JFK=NRT	73.0%	70557	235	3668940	24694	9.27	6.40	3.88	6.76	14.81	13.71	21.0	15.7
EWR=NRT	73.0%	19126	64	994574	6694	9.27	6.39	4.01	6.89	14.81	13.71	5.7	4.2
DTW=NRT	73.0%	20464	68	1064122	6793	8.19	6.13	4.14	6.20	14.47	13.57	5.5	4.4
LAX=TPE	73.0%	20844	69	1083884	7343	5.77	5.16	7.14	7.75	13.37	12.97	4.3	3.9
LHR=NRT	79.0%	45899	153	2386733	14146	8.44	5.85	3.69	6.28	14.55	13.41	12.7	9.5
HKG=YVR	73.0%	42360	141	2202732	14037	7.16	5.26	5.15	7.05	14.07	13.04	10.3	8.1
NRT=YYZ	73.0%	11686	39	607690	3890	9.12	6.20	3.25	6.18	14.76	13.61	3.4	2.5
MXP=NRT	79.0%	7475	25	388700	2353	9.59	6.50	2.48	5.56	14.89	13.77	2.3	1.7
MSP=NRT	73.0%	8770	29	456052	2707	7.16	6.63	4.42	4.96	14.07	13.83	2.1	2.0
NRT=ZRH	79.0%	5671	19	294906	1779	9.57	6.14	2.70	6.13	14.89	13.58	1.7	1.2
AKL=LAX	73.0%	9417	31	489662	3190	4.91	4.91	7.40	7.40	12.79	12.79	1.7	1.7
EZE=MAD	70.0%	8524	28	443245	2775	7.19	5.17	4.47	6.50	14.08	12.98	2.1	1.6
SFO=TPE	73.0%	22306	74	1159893	7474	5.59	4.89	6.70	7.40	13.26	12.78	4.5	4.1
CDG=NRT	79.0%	9455	32	491656	2965	9.19	6.00	2.89	6.09	14.78	13.50	2.8	2.0
CDG-NRT	79.0%	10562	35	549241	3312	9.19	6.00	2.89	6.08	14.78	13.50	3.1	2.2
DFW=NRT	73.0%	12841	43	667736	4283	6.56	6.43	5.86	5.98	13.79	13.73	2.9	2.9
LHR=SEL	79.0%	4920	16	255862	1414	8.24	5.69	4.88	7.44	14.48	13.32	1.3	1.0
NRT=ORD	73.0%	56056	187	2914933	18250	7.67	6.59	4.47	5.55	14.28	13.81	14.3	12.7
LAX=MXP	68.9%	4150	14	215804	1301	8.79	7.07	3.00	4.72	14.66	14.03	1.2	1.0
GRU=LAX	63.0%	8872	30	461344	2841	10.12	7.12	1.62	4.62	15.03	14.05	2.8	2.1
LHR=NGO	79.0%	3456	12	179736	1063	8.42	5.58	3.84	6.67	14.54	13.25	1.0	0.7
SFO=SHA	73.0%	5350	18	278192	1708	4.92	4.72	7.04	7.23	12.80	12.65	1.0	1.0
AMS=NRT	79.0%	11854	40	616424	3568	9.58	5.54	2.08	6.12	14.89	13.23	3.6	2.4
GIG=ORD	63.0%	3593	12	186855	992	7.27	5.38	3.69	5.58	14.12	13.12	0.9	0.7
FRA=MEX	69.9%	3850	13	200188	1188	7.46	5.10	3.79	6.15	14.20	12.93	1.0	0.7
SEA=TPE	73.0%	6293	21	327217	1980	4.88	4.67	6.87	7.08	12.76	12.60	1.1	1.1
GRU=LHR	70.0%	3500	12	182010	1071	5.90	4.76	5.39	6.53	13.44	12.67	0.7	0.6
FRA=LAX	68.9%	8905	30	463062	2683	8.15	6.67	2.98	4.46	14.45	13.85	2.4	2.0
GRU=YYZ	63.0%	6059	20	315046	1604	6.56	4.99	3.61	5.18	13.79	12.85	1.4	1.1
TPE=YVR	73.0%	7689	26	399806	2379	5.18	4.62	6.14	6.71	12.98	12.56	1.5	1.3
FCO=GIG	70.0%	3679	12	191287	1090	7.00	4.61	4.00	6.39	14.00	12.56	0.9	0.6
ATH=SIN	79.0%	3473	12	180608	1017	7.97	5.44	3.24	5.77	14.39	13.16	0.9	0.7
LAX=MAD	68.9%	3393	11	176418	1029	7.61	6.64	3.56	4.52	14.25	13.84	0.9	0.8
FRA=NRT	79.0%	17882	60	929870	5411	8.62	5.51	2.99	6.10	14.61	13.20	5.0	3.6
FRA=SFO	68.9%	5497	18	285824	1625	8.23	6.50	2.60	4.34	14.48	13.76	1.5	1.2
JFK=TLV	68.9%	4534	15	235770	1336	7.17	4.60	4.07	6.64	14.07	12.55	1.1	0.8
LAX=SEL	73.0%	55260	184	2873509	17124	4.90	4.90	7.12	7.12	12.78	12.78	10.1	10.1
LAX=LHR	68.9%	30671	102	1594870	8681	7.05	6.54	3.76	4.28	14.02	13.78	7.3	6.9
MAD=MEX	69.9%	9197	31	478227	2695	4.50	4.51	6.04	6.03	12.46	12.47	1.6	1.6
AMS=LAX	68.9%	5978	20	310851	1730	7.40	5.98	3.50	4.92	14.17	13.49	1.5	1.3

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
NRT-PPT	72.0%	4052	14	210708	1237	4.49	4.49	6.72	6.72	12.45	12.45	0.7	0.7
CDG-LAX	68.9%	5744	19	298679	1689	7.29	6.37	3.70	4.63	14.13	13.70	1.4	1.3
CDG-LAX	68.9%	7248	24	376905	2132	7.29	6.37	4.10	5.02	14.13	13.70	1.8	1.6
AMS-IAH	68.9%	5691	19	295944	1480	6.68	4.46	3.03	5.25	13.85	12.42	1.3	1.0
LHR-SFO	68.9%	15483	52	805093	4311	6.88	6.51	3.65	4.02	13.94	13.77	3.6	3.5
CDG-SFO	68.9%	3848	13	200077	1114	8.43	6.34	3.02	5.12	14.55	13.68	1.1	0.8
AKL-HKG	72.0%	6021	20	313094	1781	5.53	4.42	5.10	6.21	13.22	12.39	1.2	1.0
CDG-IAH	68.9%	5007	17	260387	1306	7.48	4.53	2.35	5.30	14.20	12.49	1.3	0.9
SEL-SYD	72.0%	5750	19	298998	1548	6.20	4.34	3.89	5.74	13.61	12.32	1.2	1.0
LAX-NGO	73.0%	5423	18	281992	1585	4.67	4.52	6.50	6.65	12.61	12.48	1.0	0.9
ATH-JFK	68.9%	5668	19	294713	1450	5.53	4.56	4.42	5.40	13.22	12.51	1.1	1.0
SEL-SFO	73.0%	12483	42	649114	3650	4.32	4.32	7.05	7.05	12.31	12.31	2.1	2.1
AKL-SIN	72.0%	8468	28	440335	2310	6.04	4.31	4.06	5.79	13.52	12.30	1.8	1.4
IAH-LGW	68.9%	4216	14	219223	1063	6.32	4.54	3.35	5.12	13.67	12.50	0.9	0.7
AKL-NGO	72.0%	4987	17	259304	1440	4.28	4.28	7.10	7.09	12.27	12.27	0.8	0.8
GIG-JFK	63.0%	11536	38	599855	2881	5.71	4.26	3.70	5.16	13.33	12.25	2.4	1.9
AKL-NRT	72.0%	7141	24	371336	2040	4.24	4.24	6.32	6.32	12.23	12.23	1.2	1.2
LHR-SEA	68.9%	8826	29	458959	2196	6.95	5.51	2.48	3.92	13.98	13.21	2.1	1.8
LAX-NRT	73.0%	140419	468	7301775	39745	4.21	4.21	6.42	6.42	12.20	12.20	23.1	23.1
ANC-HKG	73.0%	5109	17	265650	1345	6.89	4.62	3.19	5.46	13.95	12.56	1.2	0.9
FRA-YVR	68.9%	12119	40	630180	3157	7.31	5.67	2.40	4.04	14.13	13.31	3.0	2.5
OSA-SFO	73.0%	17855	60	928446	4993	4.54	4.54	5.96	5.96	12.50	12.50	3.1	3.1
CDG-SEZ	60.7%	4237	14	220330	1074	5.60	4.75	4.08	4.94	13.27	12.66	0.9	0.8
DFW-ORY	68.9%	4621	15	240283	1186	7.02	5.28	3.02	4.76	14.01	13.06	1.1	0.9
NRT-PER	72.0%	7648	25	397674	1963	4.54	4.13	5.54	5.96	12.50	12.12	1.3	1.2
PDX-SEL	73.0%	12790	43	665076	3495	4.49	4.11	6.18	6.55	12.45	12.11	2.2	2.1
LAX-OSA	73.0%	14617	49	760087	4024	4.45	4.45	6.71	6.71	12.42	12.42	2.5	2.5
CCS-FCO	69.9%	3859	13	200652	1039	5.00	4.11	5.01	5.91	12.86	12.10	0.7	0.6
HNL-SEL	73.0%	42638	142	2217174	10070	3.81	4.10	5.29	5.00	11.80	12.10	6.5	6.9
SEA-SEL	73.0%	20464	68	1064122	5515	4.97	4.08	5.74	6.62	12.83	12.08	3.8	3.3
DFW-MAD	68.9%	4621	15	240283	1190	6.45	5.07	3.76	5.13	13.74	12.91	1.0	0.9
SEL-YVR	73.0%	5854	20	304415	1546	5.73	4.29	4.77	6.21	13.34	12.28	1.2	1.0
SEL-YVR	73.0%	10298	34	535481	2719	5.73	4.29	4.72	6.16	13.34	12.28	2.1	1.7
FCO-MIA	69.9%	4655	16	242079	1250	4.39	4.29	5.77	5.88	12.37	12.27	0.8	0.8
HKG-SYD	72.0%	29535	98	1535794	7044	6.16	4.03	2.66	4.78	13.59	12.03	6.4	4.7
NRT-SJC	73.0%	11007	37	572345	2945	4.01	4.01	6.11	6.11	12.01	12.01	1.8	1.8
NGO-PDX	73.0%	12790	43	665076	3311	4.26	4.01	5.28	5.53	12.25	12.01	2.1	2.0
GIG-MAD	70.0%	9447	31	491251	2487	4.71	4.21	5.31	5.81	12.63	12.21	1.7	1.6
NRT-SFO	73.0%	106975	357	5562696	28447	3.99	3.99	5.99	5.99	11.99	11.99	17.0	17.0
OSA-SYD	72.0%	12063	40	627301	3045	4.98	3.98	4.49	5.49	12.84	11.98	2.2	1.9
CDG-STL	68.9%	3387	11	176144	773	5.81	4.71	3.23	4.33	13.39	12.64	0.7	0.6
HNL-SYD	73.0%	17038	57	885996	4498	4.03	4.00	5.60	5.63	12.03	12.00	2.7	2.7
ORD-ZRH	68.9%	8075	27	419915	2010	6.34	5.51	2.83	3.66	13.68	13.21	1.8	1.6
NRT-SYD	72.0%	35523	118	1847219	8989	4.91	3.97	4.45	5.38	12.79	11.97	6.5	5.6
FRA-YYC	68.9%	5165	17	268592	1257	6.97	5.08	2.28	4.16	13.98	12.92	1.2	1.0
ATL-MUC	68.9%	4289	14	223052	1068	6.47	4.60	3.03	4.90	13.75	12.55	1.0	0.7
FCO-ORD	68.9%	3458	12	179837	865	6.11	5.60	3.64	4.15	13.56	13.27	0.7	0.7
LGW-STL	68.9%	7935	26	412598	1737	5.51	4.46	2.99	4.04	13.21	12.42	1.6	1.4
CVG-FRA	68.9%	4013	13	208692	908	5.65	4.61	3.27	4.31	13.29	12.55	0.8	0.7
ATL-ZRH	68.9%	4345	14	225924	1057	6.03	4.48	3.43	4.98	13.52	12.45	0.9	0.7
DFW-HNL	68.0%	17360	58	902737	4284	6.26	5.45	1.28	2.10	13.64	13.17	3.8	3.4
DFW-LGW	68.9%	12574	42	653839	3103	6.26	5.45	3.39	4.21	13.64	13.17	2.7	2.5
AMS-AUA	69.9%	3529	12	183506	898	4.13	3.87	5.48	5.75	12.13	11.86	0.6	0.5

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Dey/Ac		Required A/C Units	
	Load Factor	Wdy Seats	Wdy Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
AMS=CUR	69.9%	8060	27	419098	2040	4.15	3.85	5.26	5.56	12.15	11.85	1.3	1.2
BOM-CDG	79.0%	3423	11	177991	774	7.44	5.87	1.48	3.06	14.19	13.42	0.9	0.7
FRA=MIA	69.9%	11289	38	587033	2831	4.55	4.10	5.01	5.46	12.51	12.10	2.0	1.8
NGO=YVR	73.0%	3581	12	186221	898	4.15	4.15	5.10	5.10	12.15	12.15	0.6	0.6
NRT=PDX	73.0%	11920	40	619851	2984	3.79	3.79	5.58	5.58	11.79	11.79	1.8	1.8
ATL=HAM	68.9%	4013	13	208692	950	5.58	3.99	3.71	5.30	13.25	11.99	0.8	0.6
ATL=FRA	68.9%	12832	43	667241	3072	5.65	4.30	3.64	4.99	13.30	12.28	2.6	2.1
MUC=ORD	68.9%	8597	29	447061	2022	5.96	5.36	3.59	4.18	13.47	13.11	1.8	1.7
NRT=SEA	73.0%	38012	127	1976606	9407	3.94	3.88	5.49	5.55	11.94	11.88	6.0	5.9
FRA=MCO	68.9%	4289	14	223052	1056	4.47	4.05	5.03	5.45	12.44	12.05	0.7	0.7
EZE=MIA	63.0%	19036	63	989861	4367	6.65	4.48	2.30	4.47	13.84	12.45	4.4	3.3
MXP=ORD	68.9%	3259	11	169443	764	5.98	5.07	3.69	4.60	13.49	12.91	0.7	0.6
AMS=ATL	68.9%	8676	29	451164	1980	4.98	3.94	3.86	4.89	12.84	11.94	1.6	1.4
NRT=YVR	73.0%	47516	158	2470853	11529	4.00	3.93	5.02	5.09	12.00	11.93	7.5	7.4
KIN=LGW	69.9%	3262	11	169604	794	3.82	3.82	5.25	5.25	11.81	11.81	0.5	0.5
FRA=ORD	68.9%	12721	42	661498	2865	5.37	4.83	3.78	4.32	13.12	12.73	2.5	2.3
BNE=HKG	72.0%	10309	34	536044	2322	5.46	3.68	2.83	4.60	13.17	11.66	2.0	1.5
HNL=YYZ	68.0%	4930	16	256380	1190	5.75	5.75	3.47	3.47	13.35	13.35	1.0	1.0
ATL=ORY	68.9%	4289	14	223052	978	5.55	4.05	3.24	4.74	13.23	12.05	0.9	0.7
AMS=ORD	68.9%	5118	17	266131	1093	5.17	4.34	3.04	3.87	12.98	12.32	1.0	0.9
FCO=YYZ	68.9%	4192	14	217992	960	5.46	5.01	3.47	3.91	13.17	12.86	0.8	0.8
HKG=MEL	72.0%	17043	57	886235	4080	5.39	5.39	3.76	3.76	13.13	13.13	3.3	3.3
DUS=ORD	68.9%	7548	25	392495	1656	5.13	4.59	3.66	4.21	12.95	12.53	1.4	1.3
CDG-MIA	69.9%	4598	15	239114	1095	3.83	3.83	5.42	5.42	11.83	11.83	0.7	0.7
BNE=NGO	72.0%	3617	12	188079	844	3.92	3.64	4.91	5.19	11.92	11.62	0.6	0.5
MIA=ORY	69.9%	4417	15	229660	1051	3.79	3.79	6.13	6.13	11.78	11.78	0.7	0.7
BRU=ORD	68.9%	3259	11	169443	703	5.19	4.40	3.65	4.43	12.99	12.38	0.6	0.6
BOM=ZRH	79.0%	4245	14	220743	897	7.01	5.41	1.24	2.84	14.01	13.14	1.0	0.8
MIA=SCL	63.0%	4314	14	224335	931	5.25	3.81	3.51	4.96	13.04	11.80	0.8	0.7
ORD=STN	68.9%	3259	11	169443	670	5.59	4.84	2.95	3.70	13.25	12.74	0.7	0.6
ATL=HNL	68.0%	3787	13	196919	885	5.30	5.30	3.36	3.36	13.07	13.07	0.7	0.7
GIG=MIA	63.0%	17462	58	908021	3790	6.22	5.04	2.36	3.54	13.62	12.89	3.8	3.3
LGW=MSP	68.9%	7364	25	382922	1541	5.12	4.35	3.21	3.98	12.95	12.33	1.4	1.2
AMS=MSP	68.9%	5636	19	293072	1182	5.23	4.31	2.94	3.85	13.02	12.30	1.1	0.9
LGW=MIA	69.9%	5814	19	302321	1340	3.92	3.75	5.12	5.29	11.92	11.74	0.9	0.9
ATL=MAD	68.9%	4289	14	223052	964	4.29	4.07	4.34	4.56	12.28	12.07	0.7	0.7
LHR=MIA	69.9%	22682	76	1179442	5210	3.91	3.63	5.23	5.51	11.91	11.60	3.5	3.4
CAY-CDG	69.9%	4114	14	213905	946	3.77	3.77	4.77	4.77	11.76	11.76	0.6	0.6
MAD=MIA	69.9%	13898	46	722717	3191	3.80	3.80	5.19	5.19	11.79	11.79	2.1	2.1
CNS=HNL	73.0%	4085	14	212433	936	3.53	3.53	5.85	5.85	11.49	11.49	0.6	0.6
AKL=HNL	73.0%	9487	32	493306	2173	3.53	3.53	5.22	5.22	11.49	11.49	1.4	1.4
ATL=LGW	68.9%	12795	43	665327	2807	5.21	3.80	3.35	4.75	13.01	11.80	2.4	2.0
CDG-ORD	68.9%	5339	18	277618	1150	5.37	4.53	3.30	4.14	13.11	12.49	1.0	0.9
CDG=ORD	68.9%	3848	13	200077	828	5.37	4.53	3.59	4.43	13.11	12.49	0.7	0.7
ORD=ORY	68.9%	3507	12	182367	756	5.36	4.48	3.47	4.35	13.11	12.45	0.7	0.6
MAN=ORD	68.9%	6017	20	312902	1194	4.87	4.37	3.10	3.60	12.76	12.35	1.1	1.0
MUC=YYZ	68.9%	4576	15	237959	983	5.30	4.46	3.12	3.96	13.07	12.43	0.9	0.8
DTW=FRA	68.9%	5486	18	285277	1184	5.43	4.36	3.03	4.10	13.16	12.34	1.1	0.9
LGW=MCO	68.9%	3850	13	200213	870	3.91	3.65	4.80	5.06	11.91	11.62	0.6	0.6
AMS=DTW	68.9%	12482	42	649053	2550	4.75	3.96	3.12	3.92	12.67	11.96	2.2	2.0
CCS=MAD	69.9%	6637	22	345139	1502	3.75	3.75	4.72	4.72	11.74	11.74	1.0	1.0
BNE=SIN	72.0%	16508	55	858412	3287	5.16	3.49	2.54	4.21	12.97	11.44	3.1	2.4
FCO=JFK	68.9%	31949	106	1661334	7088	4.53	3.69	4.16	5.00	12.49	11.67	5.5	4.8

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
ATL=MAN	68.9%	4289	14	223052	912	5.28	4.05	2.85	4.08	13.05	12.05	0.8	0.7
LHR=ORD	68.9%	19993	67	1039633	4098	5.13	4.63	3.15	3.65	12.95	12.57	3.8	3.5
FRA=YYZ	68.9%	5602	19	291294	1148	4.37	4.00	3.63	4.00	12.35	12.00	0.9	0.9
FDF-ORY	69.9%	7614	25	395928	1686	3.75	3.75	4.62	4.62	11.74	11.74	1.2	1.2
HKG=PER	72.0%	6021	20	313094	1196	4.63	3.42	2.71	3.91	12.57	11.36	1.1	0.9
IAD=MXP	68.9%	6312	21	328219	1382	5.13	4.07	3.33	4.39	12.95	12.07	1.2	1.0
HNL=ORD	68.0%	12225	41	635700	2694	5.07	5.07	3.30	3.30	12.91	12.91	2.3	2.3
YMX=ZRH	68.9%	4345	14	225924	911	5.23	4.19	2.40	3.44	13.02	12.18	0.8	0.7
BOS=FCO	68.9%	3416	11	177648	725	4.91	4.04	3.21	4.08	12.79	12.04	0.6	0.5
CVG=LGW	68.9%	4289	14	223052	886	5.18	3.84	2.90	4.24	12.99	11.84	0.8	0.7
CDG-PTP	69.9%	5076	17	263952	1110	3.74	3.74	4.47	4.47	11.72	11.72	0.8	0.8
BGI=LGW	69.9%	5219	17	271366	1138	3.57	3.57	4.72	4.72	11.54	11.54	0.8	0.8
ORY-PTP	69.9%	10152	34	527904	2215	3.67	3.67	4.54	4.54	11.66	11.66	1.5	1.5
AMS=YYZ	68.9%	6265	21	325757	1212	4.76	3.84	2.83	3.74	12.67	11.84	1.1	1.0
FRA=IAD	68.9%	16182	54	841471	3424	4.81	3.75	3.47	4.52	12.71	11.74	2.9	2.5
MAD=SDQ	69.9%	16016	53	832820	3462	3.63	3.63	4.50	4.50	11.60	11.60	2.4	2.4
HNL=STL	68.0%	8961	30	465963	1921	4.89	4.89	3.27	3.27	12.78	12.78	1.6	1.6
CDG=DTW	68.9%	5486	18	285277	1127	5.12	4.02	3.05	4.14	12.94	12.02	1.0	0.9
HNL=OSA	73.0%	64315	214	3344383	13698	3.33	3.33	4.69	4.69	11.24	11.24	9.1	9.1
GLA=ORD	68.9%	3259	11	169443	621	4.49	3.97	3.38	3.91	12.46	11.97	0.6	0.5
JFK=MUC	68.9%	7051	24	366648	1478	4.75	3.92	3.71	4.54	12.66	11.92	1.3	1.1
ARN=JFK	68.9%	6117	20	318099	1239	4.65	3.72	3.74	4.67	12.59	11.71	1.1	0.9
ANU=LGW	69.9%	5219	17	271366	1104	3.49	3.49	4.59	4.59	11.45	11.45	0.8	0.8
CNS=OSA	72.0%	3446	11	179176	651	3.28	3.30	3.97	3.95	11.18	11.21	0.5	0.5
ORY=RDU	68.9%	3259	11	169443	685	3.85	3.56	4.70	4.98	11.84	11.53	0.5	0.5
CNS=NGO	72.0%	10836	36	563495	2056	3.29	3.29	4.36	4.36	11.19	11.20	1.5	1.5
CDG=YYZ	68.9%	5410	18	281311	1052	4.75	3.72	2.96	3.98	12.66	11.71	1.0	0.8
CDG-YYZ	68.9%	5291	18	275157	1029	4.75	3.72	2.95	3.98	12.66	11.71	0.9	0.8
JFK=MXP	68.9%	19091	64	992725	3955	4.37	3.77	3.94	4.54	12.35	11.76	3.2	2.9
ATL=SNN	68.9%	4289	14	223052	855	4.91	3.48	2.80	4.22	12.79	11.44	0.8	0.6
CPH=EWR	68.9%	4410	15	229343	885	3.93	3.43	4.17	4.68	11.93	11.37	0.7	0.6
HNL=NGO	73.0%	35709	119	1856892	7443	3.27	3.27	4.58	4.58	11.17	11.17	5.0	5.0
BRU=IAD	68.9%	3756	13	195290	758	4.92	3.41	3.21	4.71	12.80	11.35	0.7	0.5
BCN=JFK	68.9%	5486	18	285277	1090	3.64	3.48	4.46	4.61	11.61	11.43	0.8	0.8
CPH=JFK	68.9%	7282	24	378682	1456	4.00	3.43	3.94	4.52	12.00	11.37	1.2	1.0
JFK=ZRH	68.9%	12793	43	665258	2608	4.91	3.90	3.43	4.43	12.79	11.90	2.3	2.0
CNS=NRT	72.0%	34336	114	1785453	6526	3.28	3.24	3.93	3.97	11.18	11.12	4.8	4.8
EWR=FRA	68.9%	7879	26	409726	1582	4.96	3.50	3.24	4.70	12.83	11.46	1.5	1.1
FRA=YMX	68.9%	4529	15	235497	859	4.66	3.75	2.68	3.59	12.59	11.74	0.8	0.7
FRA=JFK	68.9%	29045	97	1510353	5809	4.29	3.49	3.80	4.60	12.28	11.44	4.8	4.2
ANC=SEL	73.0%	31635	105	1645018	6204	4.04	3.61	4.26	4.68	12.04	11.59	5.1	4.7
GVA=JFK	68.9%	5781	19	300594	1159	4.65	3.64	3.31	4.32	12.59	11.61	1.0	0.9
CDG=IAD	68.9%	12371	41	643309	2477	4.10	3.51	3.65	4.24	12.10	11.46	2.0	1.8
CDG-IAD	68.9%	4734	16	246164	948	4.10	3.51	3.95	4.54	12.10	11.46	0.8	0.7
EWR=HAM	68.9%	3866	13	201034	751	4.22	3.19	3.99	5.02	12.21	11.06	0.6	0.5
DUS=JFK	68.9%	3866	13	201034	752	4.74	3.41	3.14	4.47	12.66	11.34	0.7	0.6
AMS=JFK	68.9%	18815	63	978365	3556	3.89	3.21	3.76	4.44	11.89	11.09	2.9	2.6
ANC=OSA	73.0%	5350	18	278192	1014	4.42	3.53	3.04	3.93	12.39	11.49	0.9	0.8
LGW=YYZ	68.9%	5339	18	277618	990	4.57	3.86	2.97	3.68	12.52	11.85	0.9	0.8
LHR=YYZ	68.9%	7701	26	400427	1420	4.57	4.02	2.85	3.40	12.52	12.02	1.3	1.2
BRU=JFK	68.9%	14686	49	763656	2793	3.88	3.28	3.85	4.46	11.88	11.18	2.3	2.0
HNL=NRT	73.0%	185271	618	9634102	36765	3.15	3.15	4.45	4.45	11.00	11.00	25.2	25.2
BOS=FRA	68.9%	10015	33	520774	1906	4.05	3.42	3.55	4.18	12.05	11.36	1.6	1.4

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

	Supersonic Operation Circa 2015					M=2.4		Saved		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
AMS-YMX	68.9%	6838	23	355570	1220	4.31	3.41	2.56	3.46	12.30	11.35	1.1	1.0
IAD-MAD	68.9%	3756	13	195290	743	3.61	3.61	4.48	4.48	11.58	11.58	0.6	0.6
PPT-SYD	72.0%	5308	18	275998	1049	3.14	3.14	4.36	4.36	10.99	10.99	0.7	0.7
EWR-ORY	68.9%	5339	18	277618	1011	3.77	3.30	3.86	4.32	11.76	11.21	0.8	0.7
BOS-ZRH	68.9%	6262	21	325620	1216	4.44	3.49	3.31	4.26	12.41	11.45	1.1	0.9
DFW-FRA	68.9%	12453	42	647548	2447	4.19	4.19	6.05	6.05	12.18	12.18	2.0	2.0
IAD-LHR	68.9%	27717	92	1441291	5286	4.39	3.46	3.02	3.94	12.37	11.41	4.7	4.0
CTS-HNL	73.0%	4020	13	209024	783	3.10	3.10	4.36	4.36	10.94	10.94	0.5	0.5
BKK-PER	72.0%	8436	28	438666	1459	3.29	3.09	3.37	3.58	11.20	10.93	1.2	1.1
CDG-YMX	68.9%	6133	20	318919	1099	4.09	3.49	3.10	3.70	12.09	11.44	1.0	0.9
CDG-YMX	68.9%	6386	21	332048	1144	4.09	3.49	2.93	3.53	12.09	11.44	1.0	0.9
LHR-YMX	68.9%	7585	25	394410	1283	4.07	3.47	2.64	3.24	12.07	11.41	1.2	1.1
CDG-JFK	68.9%	12024	40	625257	2267	3.83	3.21	2.30	2.91	11.82	11.09	1.9	1.7
CDG-JFK	68.9%	15869	53	825197	2991	3.83	3.21	3.73	4.35	11.82	11.09	2.4	2.2
JFK-ORY	68.9%	10991	37	571511	2072	4.37	3.20	3.49	4.66	12.35	11.08	1.9	1.5
AKL-PER	72.0%	10016	33	520835	1727	3.52	3.04	3.33	3.82	11.48	10.86	1.5	1.3
LHR-PHL	68.9%	7585	25	394410	1394	4.51	3.23	2.95	4.23	12.47	11.12	1.3	1.0
AMS-BOS	68.9%	5486	18	285277	983	4.25	3.02	2.92	4.15	12.24	10.83	0.9	0.7
JFK-MAD	68.9%	15062	50	783212	2804	3.43	3.43	3.92	3.92	11.37	11.37	2.2	2.2
SDJ-SIN	72.0%	4045	13	210337	735	3.69	2.98	3.52	4.23	11.68	10.77	0.6	0.5
JFK-LGW	68.9%	4216	14	219223	759	3.80	3.22	3.54	4.12	11.79	11.10	0.6	0.6
JFK-LHR	68.9%	46567	155	2421502	8337	3.78	3.20	2.95	3.53	11.78	11.08	7.1	6.4
EWR-LHR	68.9%	13163	44	684473	2366	4.31	3.07	2.92	4.16	12.30	10.90	2.2	1.8
JFK-MAN	68.9%	6885	23	358032	1193	4.11	3.01	3.20	4.30	12.11	10.81	1.1	0.9
KHI-SIN	72.0%	4045	13	210337	620	3.85	2.93	2.31	3.23	11.85	10.70	0.6	0.5
BOS-CDG	68.9%	10494	35	545664	1864	3.55	3.11	3.63	4.08	11.52	10.95	1.5	1.4
BOS-LHR	68.9%	16066	54	835454	2720	3.41	2.96	3.53	3.99	11.35	10.74	2.3	2.1
JFK-LIS	68.9%	6827	23	355023	1193	2.85	2.85	4.25	4.25	10.58	10.58	0.9	0.9
KUL-NRT	72.0%	14282	48	742671	2480	3.00	3.00	3.79	3.79	10.80	10.80	1.9	1.9
NRT-SIN	72.0%	114735	382	5966227	19848	2.83	2.83	3.94	3.94	10.55	10.55	14.7	14.7
BOS-LGW	68.9%	7364	25	382922	1254	3.69	2.93	3.18	3.94	11.68	10.70	1.1	1.0
CGK-SEL	72.0%	5393	18	280449	922	2.86	2.81	4.09	4.15	10.60	10.52	0.7	0.7
HNL-NAN	73.0%	8791	29	457130	1450	2.73	2.73	3.54	3.54	10.39	10.39	1.1	1.1
NGO-SIN	72.0%	12599	42	655124	2067	2.72	2.72	3.68	3.68	10.37	10.37	1.6	1.6
BOS-GLA	68.9%	5486	18	285277	862	3.25	2.69	3.12	3.69	11.15	10.32	0.8	0.7
OSA-SIN	72.0%	27059	90	1407069	4321	2.67	2.67	3.52	3.52	10.28	10.28	3.3	3.3
LIM-MIA	63.0%	10561	35	549158	1440	3.47	2.83	2.26	2.90	11.41	10.54	1.5	1.3
SEL-SIN	72.0%	9731	32	505996	1464	3.15	2.57	2.94	3.52	11.01	10.12	1.3	1.2
HNL-YVR	68.0%	11851	40	616239	1798	2.57	2.57	3.02	3.02	10.12	10.12	1.4	1.4
FUK-SIN	72.0%	11448	38	595298	1673	2.65	2.50	3.63	3.78	10.26	10.00	1.4	1.4
HNL-SEA	68.0%	14283	48	742731	1969	2.41	2.41	3.18	3.18	9.84	9.84	1.7	1.7
DEL-SIN	72.0%	5686	19	295659	764	3.41	3.14	1.92	2.19	11.35	11.00	0.8	0.8
HNL-SAN	68.0%	6279	21	326499	852	2.37	2.37	3.00	3.00	9.76	9.76	0.7	0.7
MEL-NAN	72.0%	8275	28	430319	1034	2.57	2.36	2.64	2.85	10.11	9.75	1.0	1.0
HNL-LAX	68.0%	96425	321	5014088	12801	2.33	2.33	3.02	3.02	9.69	9.69	11.1	11.1
BOG-JFK	63.0%	4314	14	224335	557	2.29	2.29	3.13	3.13	9.61	9.61	0.5	0.5
LAX-OGG	68.0%	12246	41	636781	1581	2.29	2.29	2.83	2.83	9.61	9.61	1.4	1.4
HNL-SFO	68.0%	57415	191	2985595	7151	2.23	2.23	2.83	2.83	9.50	9.50	6.4	6.4
KOA-SFO	68.0%	5967	20	310282	735	2.22	2.22	2.77	2.77	9.46	9.46	0.7	0.7
OGG-SFO	68.0%	11934	40	620564	1450	2.20	2.20	2.70	2.70	9.42	9.42	1.3	1.3
DTW-LGW	68.9%	3185	11	165614	820	6.45	5.07	1.55	2.93	13.74	12.91	0.7	0.6
CVG-ORY	68.9%	3185	11	165614	687	4.86	4.12	4.02	4.76	12.75	12.11	0.6	0.5
JFK-TXL	68.9%	3185	11	165614	660	4.63	3.53	3.87	4.97	12.57	11.50	0.6	0.5

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
LHR=YVR	68.9%	3130	10	162742	766	6.43	5.52	2.90	3.81	13.73	13.21	0.7	0.6
MIA=MXP	69.9%	3087	10	160521	790	4.36	4.36	5.27	5.27	12.34	12.34	0.5	0.5
CCS-CDG	69.9%	3058	10	159038	754	4.04	4.04	5.13	5.13	12.04	12.04	0.5	0.5
AMS=MCO	68.9%	3053	10	158776	719	4.19	3.75	4.94	5.37	12.18	11.74	0.5	0.5
ORD=SEL	73.0%	3015	10	156768	1022	9.83	6.71	3.09	6.20	14.96	13.87	0.9	0.7
HNL=TPE	73.0%	2996	10	155818	786	3.94	3.94	5.22	5.22	11.94	11.94	0.5	0.5
CDG=GIG	70.0%	2979	10	154915	884	6.32	4.71	4.80	6.40	13.67	12.63	0.7	0.5
GIG=LHR	70.0%	2917	10	151675	872	6.36	4.56	4.67	6.47	13.69	12.52	0.6	0.5
CCS=FRA	69.9%	2887	10	150141	753	4.33	4.33	5.29	5.29	12.32	12.32	0.5	0.5
CNS=FUK	72.0%	2882	10	149870	544	3.42	3.36	4.24	4.31	11.36	11.28	0.4	0.4
CNS=SIN	72.0%	2882	10	149870	466	3.99	2.89	2.47	3.57	11.99	10.64	0.5	0.4
GIG=LIS	70.0%	2874	10	149466	717	4.92	3.86	4.79	5.85	12.80	11.86	0.5	0.4
BKK-CDG	79.0%	2869	10	149198	672	7.20	5.73	4.63	6.10	14.09	13.34	0.7	0.6
AMS=YVR	68.9%	2693	9	140040	671	7.11	5.27	2.14	3.98	14.05	13.05	0.6	0.5
BKK=BNE	72.0%	2682	9	139483	634	6.47	4.10	2.86	5.23	13.75	12.09	0.6	0.4
LAX=LIM	63.0%	2667	9	138693	579	4.87	3.41	3.33	4.80	12.76	11.34	0.5	0.4
CCS=LHR	69.9%	2609	9	135683	608	3.75	3.75	5.46	5.46	11.74	11.74	0.4	0.4
LAX=PPT	73.0%	2543	8	132259	544	3.34	3.34	4.66	4.66	11.25	11.25	0.4	0.4
AMS=CCS	69.9%	2504	8	130215	634	4.15	3.92	5.43	5.66	12.15	11.92	0.4	0.4
LAX=ZRH	68.9%	2483	8	129099	765	8.35	6.95	3.32	4.72	14.52	13.98	0.7	0.6
MCO=ORY	68.9%	2451	8	127458	573	3.73	3.73	5.27	5.27	11.72	11.72	0.4	0.4
DXB=LHR	60.7%	2428	8	126251	431	6.02	4.78	1.71	2.96	13.51	12.69	0.5	0.4
AMS=GIG	70.0%	2424	8	126052	749	6.55	4.69	4.99	6.85	13.79	12.62	0.5	0.4
AMS=KUL	79.0%	2416	8	125640	796	8.98	7.51	3.64	5.12	14.72	14.21	0.7	0.6
ATH=BKK	79.0%	2408	8	125204	616	8.30	6.17	1.66	3.79	14.51	13.59	0.7	0.5
FRA=GIG	70.0%	2407	8	125169	744	6.06	5.13	5.27	6.20	13.53	12.95	0.5	0.5
CPH=LAX	68.9%	2375	8	123492	693	8.31	6.50	3.02	4.83	14.51	13.77	0.6	0.5
CPH=SEA	68.9%	2375	8	123492	599	6.68	5.68	3.03	4.03	13.85	13.31	0.5	0.5
ARN=EWR	68.9%	2375	8	123492	484	4.74	3.60	3.42	4.57	12.66	11.57	0.4	0.4
EWR=FBU	68.9%	2375	8	123492	454	4.36	3.33	3.35	4.38	12.34	11.24	0.4	0.3
EZE=LHR	70.0%	2333	8	121340	839	7.48	5.55	5.57	7.49	14.20	13.23	0.6	0.5
GRU=MXP	70.0%	2333	8	121340	716	7.10	4.92	4.32	6.49	14.04	12.80	0.6	0.4
LGW=YYC	68.9%	2288	8	118979	520	5.63	4.60	3.28	4.32	13.28	12.54	0.5	0.4
MXP=YYZ	68.9%	2288	8	118979	489	5.14	4.43	3.31	4.03	12.96	12.40	0.4	0.4
CDG-KHI	79.0%	2282	8	118660	451	6.04	5.68	1.68	2.03	13.52	13.31	0.5	0.5
FCO=YMX	68.9%	2278	8	118432	487	5.05	4.60	3.07	3.52	12.89	12.55	0.4	0.4
HAM=JFK	68.9%	2275	8	118296	450	4.25	3.18	4.04	5.11	12.24	11.05	0.4	0.3
FBU=JFK	68.9%	2275	8	118296	434	4.37	3.30	3.59	4.66	12.35	11.21	0.4	0.3
CDG-GIG	70.0%	2164	7	112505	642	6.32	4.71	4.69	6.29	13.67	12.63	0.5	0.4
DKR=FCO	60.7%	2110	7	109731	283	4.72	2.51	0.95	3.16	12.64	10.02	0.4	0.3
MAD=YMX	68.9%	2099	7	109133	379	4.12	3.63	2.80	3.29	12.11	11.61	0.3	0.3
CPH=ORD	68.9%	2083	7	108312	461	5.12	4.68	3.59	4.03	12.94	12.61	0.4	0.4
ANC=LAX	68.0%	2076	7	107958	253	2.88	2.32	2.12	2.68	10.62	9.66	0.3	0.2
GRU=LIS	70.0%	2053	7	106762	527	5.20	4.03	4.75	5.92	13.00	12.03	0.4	0.3
SHA=SIN	72.0%	2022	7	105169	249	2.84	2.33	2.32	2.83	10.57	9.69	0.3	0.2
CDG-FDF	69.9%	2018	7	104913	448	3.76	3.76	4.54	4.54	11.75	11.75	0.3	0.3
NRT-PPT	72.0%	1940	6	100902	592	4.49	4.49	6.72	6.72	12.45	12.45	0.3	0.3
FRA=MRU	60.7%	1929	6	100307	573	8.13	5.29	3.35	6.19	14.45	13.06	0.5	0.4
ANC=LHR	68.9%	1925	6	100107	448	5.95	4.40	2.88	4.43	13.47	12.37	0.4	0.3
MRU=MUC	60.7%	1896	6	98578	544	7.27	4.83	3.56	6.01	14.12	12.73	0.5	0.3
CPH=SIN	79.0%	1892	6	98375	609	10.17	7.41	2.75	5.50	15.04	14.18	0.6	0.5
GVA=LAX	68.9%	1862	6	96825	572	8.01	6.78	3.57	4.80	14.40	13.90	0.5	0.4
CDG=GRU	70.0%	1862	6	96822	567	6.63	4.89	4.75	6.49	13.83	12.77	0.4	0.3

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 40%

	Supersonic Operation Circa 2015					M=2.4		Saved		Utilization		Required A/C	
AIRPORT	Load	Wkly	Wkly	Annual	Annual	Hours/Trip		Hours/Trip		Hrs/Day/Ac		Units	
PAIR	Factor	Seats	Depts	Seats	ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
CDG-DKR	60.7%	1845	6	95926	252	3.67	2.69	1.88	3.06	11.87	10.32	0.3	0.2
GIG-LAX	63.0%	1811	6	94152	593	10.33	7.38	1.67	4.62	15.08	14.16	0.6	0.4
FRA-GRU	70.0%	1770	6	92036	561	7.00	5.30	4.83	6.53	14.00	13.07	0.4	0.3
MIA-MUC	69.9%	1754	6	91197	456	4.61	4.32	5.39	5.68	12.56	12.30	0.3	0.3
HAM-MIA	69.9%	1754	6	91197	439	3.94	3.93	5.60	5.61	11.94	11.92	0.3	0.3
DUS-MIA	69.9%	1754	6	91197	431	4.35	3.95	4.90	5.30	12.33	11.95	0.3	0.3
DXB-FCO	60.7%	1737	6	90304	244	4.91	3.49	1.35	2.78	12.79	11.44	0.3	0.3
MLE-ZRH	79.0%	1737	6	90304	438	6.83	5.73	2.84	3.94	13.92	13.34	0.4	0.4
FCO-MLE	79.0%	1737	6	90304	412	6.40	5.48	2.56	3.48	13.72	13.19	0.4	0.3
BKK-LHR	79.0%	1699	6	88341	729	9.56	6.65	2.57	5.48	14.89	13.84	0.5	0.4
DXB-FRA	60.7%	1667	6	86692	261	5.40	4.11	1.23	2.51	13.13	12.11	0.3	0.3
FUK-SYD	72.0%	1662	6	86435	420	5.91	4.12	4.09	5.88	13.45	12.12	0.3	0.3
BNE-FUK	72.0%	1662	6	86435	389	3.93	3.70	5.16	5.39	11.92	11.68	0.3	0.3
EZE-FRA	70.0%	1642	5	85409	610	9.16	6.00	4.26	7.42	14.78	13.50	0.5	0.3
DXB-LGW	60.7%	1640	5	85294	290	6.00	4.64	1.17	2.53	13.50	12.57	0.3	0.3
BNE-HNL	73.0%	1634	5	84973	401	3.73	3.73	5.77	5.77	11.72	11.72	0.2	0.2
ORD-TXL	68.9%	1629	5	84721	373	5.08	4.94	3.84	3.98	12.91	12.81	0.3	0.3

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Dey/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
LHR=SIN	79.0%	64591	215	3358756	22711	10.99	7.81	2.38	5.56	15.23	14.33	22.2	16.8
HKG=LAX	73.0%	32410	108	1685303	12195	6.59	5.61	7.57	8.56	13.81	13.27	7.4	6.5
KUL=LHR	79.0%	6049	20	314537	2066	8.98	7.74	4.14	5.39	14.72	14.30	1.8	1.6
LAX=SYD	73.0%	42512	142	2210634	16567	5.57	5.57	8.45	8.45	13.24	13.24	8.5	8.5
AMS=SIN	79.0%	23828	79	1239064	8093	10.66	7.62	2.31	5.35	15.16	14.26	8.0	6.1
BRU=SIN	79.0%	9029	30	469516	3079	9.61	7.53	3.22	5.31	14.90	14.22	2.8	2.3
CDG=SIN	79.0%	12039	40	626021	4171	9.22	7.53	3.87	5.56	14.79	14.22	3.6	3.0
JFK=OSA	73.0%	15450	52	803412	5547	8.09	7.03	5.54	6.60	14.43	14.01	4.1	3.7
FRA=SIN	79.0%	34648	115	1801719	11506	10.45	6.32	2.08	6.21	15.11	13.67	11.4	7.6
DTW=SEL	73.0%	36170	121	1880835	12425	9.23	6.52	4.32	7.02	14.79	13.77	10.7	8.2
SIN=ZRH	79.0%	12039	40	626021	4008	10.47	7.08	2.03	5.42	15.11	14.04	4.0	2.9
HKG=SFO	73.0%	114777	383	5968393	41195	6.03	5.31	7.13	7.84	13.51	13.08	24.4	22.2
IAD=NRT	73.0%	8237	27	428309	2887	9.72	6.58	3.24	6.38	14.93	13.80	2.6	1.9
JFK=NRT	73.0%	123474	412	6420645	43215	9.27	6.40	3.88	6.76	14.81	13.71	36.8	27.4
EWR=NRT	73.0%	33471	112	1740504	11715	9.27	6.39	4.01	6.89	14.81	13.71	10.0	7.4
DTW=NRT	73.0%	35812	119	1862213	11888	8.19	6.13	4.14	6.20	14.47	13.57	9.7	7.7
LAX=TPE	73.0%	36477	122	1896797	12850	5.77	5.16	7.14	7.75	13.37	12.97	7.5	6.9
LHR=NRT	79.0%	80323	268	4176782	24755	8.44	5.85	3.69	6.28	14.55	13.41	22.2	16.7
HKG=YVR	73.0%	74130	247	3854781	24565	7.16	5.26	5.15	7.05	14.07	13.04	18.0	14.2
NRT=YYZ	73.0%	20451	68	1063457	6808	9.12	6.20	3.25	6.18	14.76	13.61	6.0	4.4
MXP=NRT	79.0%	13081	44	680225	4119	9.59	6.50	2.48	5.56	14.89	13.77	4.0	2.9
MSP=NRT	73.0%	15348	51	798091	4738	7.16	6.63	4.42	4.96	14.07	13.83	3.7	3.5
NRT=ZRH	79.0%	9925	33	516086	3114	9.57	6.14	2.70	6.13	14.89	13.58	3.0	2.1
AKL=LAX	73.0%	16479	55	856908	5583	4.91	4.91	7.40	7.40	12.79	12.79	3.0	3.0
EZE=MAD	70.0%	14917	50	775679	4856	7.19	5.17	4.47	6.50	14.08	12.98	3.6	2.8
SFO=TPE	73.0%	39035	130	2029812	13080	5.59	4.89	6.70	7.40	13.26	12.78	7.8	7.1
CDG=NRT	79.0%	16546	55	860397	5189	9.19	6.00	2.89	6.09	14.78	13.50	4.9	3.5
CDG-NRT	79.0%	18484	62	961171	5796	9.19	6.00	2.89	6.08	14.78	13.50	5.5	3.9
DFW=NRT	73.0%	22472	75	1168539	7495	6.56	6.43	5.86	5.98	13.79	13.73	5.1	5.0
LHR=SEL	79.0%	8611	29	447758	2474	8.24	5.69	4.88	7.44	14.48	13.32	2.3	1.8
NRT=ORD	73.0%	98099	327	5101134	31937	7.67	6.59	4.47	5.55	14.28	13.81	25.1	22.3
LAX=MXP	68.9%	7263	24	377657	2276	8.79	7.07	3.00	4.72	14.66	14.03	2.1	1.7
GRU=LAX	63.0%	15526	52	807351	4971	10.12	7.12	1.62	4.62	15.03	14.05	5.0	3.7
LHR=NGO	79.0%	6049	20	314537	1960	8.42	5.58	3.84	6.67	14.54	13.25	1.7	1.2
SFO=SHA	73.0%	9362	31	486836	2990	4.92	4.72	7.04	7.23	12.80	12.65	1.7	1.7
AMS=NRT	79.0%	20745	69	1078741	6243	9.58	5.54	2.08	6.12	14.89	13.23	6.4	4.1
GIG=ORD	63.0%	6288	21	326906	1735	7.27	5.38	3.69	5.58	14.12	13.12	1.5	1.2
FRA=MEX	69.9%	6737	22	350329	2080	7.46	5.10	3.79	6.15	14.20	12.93	1.7	1.3
SEA=TPE	73.0%	11012	37	572631	3466	4.88	4.67	6.87	7.08	12.76	12.60	2.0	1.9
GRU=LHR	70.0%	6125	20	318518	1875	5.90	4.76	5.39	6.53	13.44	12.67	1.3	1.1
FRA=LAX	68.9%	15584	52	810358	4695	8.15	6.67	2.98	4.46	14.45	13.85	4.2	3.6
GRU=YYZ	63.0%	10603	35	551331	2807	6.56	4.99	3.61	5.18	13.79	12.85	2.4	2.0
TPE=YVR	73.0%	13455	45	699660	4163	5.18	4.62	6.14	6.71	12.98	12.56	2.6	2.4
FCO=GIG	70.0%	6438	21	334753	1907	7.00	4.61	4.00	6.39	14.00	12.56	1.5	1.1
ATH=SIN	79.0%	6078	20	316084	1779	7.97	5.44	3.24	5.77	14.39	13.16	1.6	1.2
LAX=MAD	68.9%	5937	20	308731	1801	7.61	6.64	3.56	4.52	14.25	13.84	1.5	1.4
FRA=NRT	79.0%	31294	104	1627273	9469	8.62	5.51	2.99	6.10	14.61	13.20	8.8	6.2
FRA=SFO	68.9%	9619	32	500192	2844	8.23	6.50	2.60	4.34	14.48	13.76	2.6	2.2
JFK=TLV	68.9%	7935	26	412598	2338	7.17	4.60	4.07	6.64	14.07	12.55	1.9	1.4
LAX=SEL	73.0%	96705	322	5028640	29966	4.90	4.90	7.12	7.12	12.78	12.78	17.7	17.7
LAX=LHR	68.9%	53673	179	2791022	15192	7.05	6.54	3.76	4.28	14.02	13.78	12.9	12.1
MAD=MEX	69.9%	16094	54	836898	4715	4.50	4.51	6.04	6.03	12.46	12.47	2.8	2.8
AMS=LAX	68.9%	10461	35	543988	3027	7.40	5.98	3.50	4.92	14.17	13.49	2.6	2.2

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
NRT-PPT	72.0%	7091	24	368739	2165	4.49	4.49	6.72	6.72	12.45	12.45	1.2	1.2
CDG-LAX	68.9%	10052	34	522688	2956	7.29	6.37	3.70	4.63	14.13	13.70	2.5	2.2
CDG-LAX	68.9%	12684	42	659583	3731	7.29	6.37	4.10	5.02	14.13	13.70	3.1	2.8
AMS-IAH	68.9%	9960	33	517902	2590	6.68	4.46	3.03	5.25	13.85	12.42	2.3	1.7
LHR-SFO	68.9%	27094	90	1408913	7544	6.88	6.51	3.65	4.02	13.94	13.77	6.4	6.1
CDG-SFO	68.9%	6733	22	350134	1950	8.43	6.34	3.02	5.12	14.55	13.68	1.9	1.5
AKL-HKG	72.0%	10537	35	547915	3116	5.53	4.42	5.10	6.21	13.22	12.39	2.1	1.8
CDG-IAH	68.9%	8763	29	455677	2285	7.48	4.53	2.35	5.30	14.20	12.49	2.2	1.5
SEL-SYD	72.0%	10062	34	523246	2708	6.20	4.34	3.89	5.74	13.61	12.32	2.2	1.7
LAX-NGO	73.0%	9490	32	493486	2774	4.67	4.52	6.50	6.65	12.61	12.48	1.7	1.6
ATH-JFK	68.9%	9918	33	515748	2538	5.53	4.56	4.42	5.40	13.22	12.51	2.0	1.7
SEL-SFO	73.0%	21845	73	1135950	6387	4.32	4.32	7.05	7.05	12.31	12.31	3.7	3.7
AKL-SIN	72.0%	14819	49	770587	4043	6.04	4.31	4.06	5.79	13.52	12.30	3.2	2.5
IAH-LGW	68.9%	7378	25	383640	1860	6.32	4.54	3.35	5.12	13.67	12.50	1.6	1.3
AKL-NGO	72.0%	8727	29	453783	2520	4.28	4.28	7.10	7.09	12.27	12.27	1.4	1.5
GIG-JFK	63.0%	20187	67	1049747	5042	5.71	4.26	3.70	5.16	13.33	12.25	4.1	3.3
AKL-NRT	72.0%	12497	42	649838	3570	4.24	4.24	6.32	6.32	12.23	12.23	2.1	2.1
LHR-SEA	68.9%	15446	51	803179	3844	6.95	5.51	2.48	3.92	13.98	13.21	3.7	3.1
LAX-NRT	73.0%	245733	819	12778107	69554	4.21	4.21	6.42	6.42	12.20	12.20	40.3	40.3
ANC-HKG	73.0%	8940	30	464888	2354	6.89	4.62	3.19	5.46	13.95	12.56	2.1	1.6
FRA-YVR	68.9%	21206	71	1102815	5525	7.31	5.67	2.40	4.04	14.13	13.31	5.2	4.3
OSA-SFO	73.0%	31246	104	1624781	8737	4.54	4.54	5.96	5.96	12.50	12.50	5.4	5.4
CDG-SEZ	60.7%	7415	25	385577	1880	5.60	4.75	4.08	4.94	13.27	12.66	1.5	1.3
DFW-ORY	68.9%	8086	27	420496	2076	7.02	5.28	3.02	4.76	14.01	13.06	1.9	1.6
NRT-PER	72.0%	13383	45	695930	3436	4.54	4.13	5.54	5.96	12.50	12.12	2.3	2.2
PDX-SEL	73.0%	22382	75	1163883	6117	4.49	4.11	6.18	6.55	12.45	12.11	3.8	3.6
LAX-OSA	73.0%	25580	85	1330152	7041	4.45	4.45	6.71	6.71	12.42	12.42	4.4	4.4
CCS-FCO	69.9%	6753	23	351140	1818	5.00	4.11	5.01	5.91	12.86	12.10	1.3	1.1
HNL-SEL	73.0%	74816	249	3890054	17622	3.81	4.10	5.29	5.00	11.80	12.10	11.5	12.0
SEA-SEL	73.0%	35812	119	1862213	9652	4.97	4.08	5.74	6.62	12.83	12.08	6.6	5.8
DFW-MAD	68.9%	8086	27	420496	2082	6.45	5.07	3.76	5.13	13.74	12.91	1.8	1.5
SEL-YVR	73.0%	10245	34	532726	2705	5.73	4.29	4.77	6.21	13.34	12.28	2.1	1.7
SEL-YVR	73.0%	18021	60	937092	4758	5.73	4.29	4.72	6.16	13.34	12.28	3.7	3.0
FCO-MIA	69.9%	8147	27	423639	2187	4.39	4.29	5.77	5.88	12.37	12.27	1.4	1.4
HKG-SYD	72.0%	51685	172	2687640	12327	6.16	4.03	2.66	4.78	13.59	12.03	11.2	8.2
NRT-SJC	73.0%	19262	64	1001605	5154	4.01	4.01	6.11	6.11	12.01	12.01	3.1	3.1
NGO-PDX	73.0%	22382	75	1163883	5794	4.26	4.01	5.28	5.53	12.25	12.01	3.7	3.6
GIG-MAD	70.0%	16532	55	859689	4352	4.71	4.21	5.31	5.81	12.63	12.21	2.9	2.7
NRT-SFO	73.0%	187206	624	9734719	49782	3.99	3.99	5.99	5.99	11.99	11.99	29.7	29.7
OSA-SYD	72.0%	21111	70	1097778	5329	4.98	3.98	4.49	5.49	12.84	11.98	3.9	3.3
CDG-STL	68.9%	5928	20	308252	1352	5.81	4.71	3.23	4.33	13.39	12.64	1.2	1.1
HNL-SYD	73.0%	29817	99	1550492	7872	4.03	4.00	5.60	5.63	12.03	12.00	4.8	4.7
ORD-ZRH	68.9%	14132	47	734851	3518	6.34	5.51	2.83	3.66	13.68	13.21	3.1	2.8
NRT-SYD	72.0%	62166	207	3232633	15731	4.91	3.97	4.45	5.38	12.79	11.97	11.4	9.8
FRA-YYC	68.9%	9039	30	470037	2199	6.97	5.08	2.28	4.16	13.98	12.92	2.1	1.7
ATL-MUC	68.9%	7507	25	390341	1869	6.47	4.60	3.03	4.90	13.75	12.55	1.7	1.3
FCO-ORD	68.9%	6052	20	314714	1514	6.11	5.60	3.64	4.15	13.56	13.27	1.3	1.2
LGW-STL	68.9%	13886	46	722047	3040	5.51	4.46	2.99	4.04	13.21	12.42	2.8	2.4
CVG-FRA	68.9%	7023	23	365212	1589	5.65	4.61	3.27	4.31	13.29	12.55	1.4	1.2
ATL-ZRH	68.9%	7603	25	395367	1850	6.03	4.48	3.43	4.98	13.52	12.45	1.6	1.3
DFW-HNL	68.0%	30381	101	1579789	7497	6.26	5.45	1.28	2.10	13.64	13.17	6.6	6.0
DFW-LGW	68.9%	22004	73	1144218	5430	6.26	5.45	3.39	4.21	13.64	13.17	4.8	4.3
AMS-AUA	69.9%	6176	21	321135	1572	4.13	3.87	5.48	5.75	12.13	11.86	1.0	1.0

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
AMS=CUR	69.9%	14104	47	733421	3570	4.15	3.85	5.26	5.56	12.15	11.85	2.3	2.2
BOM-CDG	79.0%	5990	20	311484	1354	7.44	5.87	1.48	3.06	14.19	13.42	1.5	1.2
FRA=MIA	69.9%	19756	66	1027308	4954	4.55	4.10	5.01	5.46	12.51	12.10	3.4	3.2
NGO=YVR	73.0%	6267	21	325887	1572	4.15	4.15	5.10	5.10	12.15	12.15	1.0	1.0
NRT=PDX	73.0%	20860	70	1084739	5221	3.79	3.79	5.58	5.58	11.79	11.79	3.2	3.2
ATL=HAM	68.9%	7023	23	365212	1663	5.58	3.99	3.71	5.30	13.25	11.99	1.4	1.1
ATL=FRA	68.9%	22455	75	1167672	5376	5.65	4.30	3.64	4.99	13.30	12.28	4.5	3.7
MUC=ORD	68.9%	15045	50	782357	3539	5.96	5.36	3.59	4.18	13.47	13.11	3.2	2.9
NRT=SEA	73.0%	66520	222	3459061	16462	3.94	3.88	5.49	5.55	11.94	11.88	10.5	10.3
FRA=MCO	68.9%	7507	25	390341	1848	4.47	4.05	5.03	5.45	12.44	12.05	1.3	1.2
EZE=MIA	63.0%	33313	111	1732257	7642	6.65	4.48	2.30	4.47	13.84	12.45	7.6	5.7
MXP=ORD	68.9%	5702	19	296525	1337	5.98	5.07	3.69	4.60	13.49	12.91	1.2	1.1
AMS=ATL	68.9%	15183	51	789537	3466	4.98	3.94	3.86	4.89	12.84	11.94	2.8	2.4
NRT=YVR	73.0%	83154	277	4323992	20176	4.00	3.93	5.02	5.09	12.00	11.93	13.2	13.0
KIN=LGW	69.9%	5708	19	296807	1390	3.82	3.82	5.25	5.25	11.81	11.81	0.9	0.9
FRA=ORD	68.9%	22262	74	1157621	5014	5.37	4.83	3.78	4.32	13.12	12.73	4.3	4.0
BNE=HKG	72.0%	18040	60	938077	4063	5.46	3.68	2.83	4.60	13.17	11.66	3.6	2.7
HNL=YYZ	68.0%	8628	29	448666	2083	5.75	5.75	3.47	3.47	13.35	13.35	1.8	1.8
ATL=ORY	68.9%	7507	25	390341	1711	5.55	4.05	3.24	4.74	13.23	12.05	1.5	1.2
AMS=ORD	68.9%	8956	30	465729	1914	5.17	4.34	3.04	3.87	12.98	12.32	1.7	1.5
FCO=YYZ	68.9%	7336	24	381486	1680	5.46	5.01	3.47	3.91	13.17	12.86	1.4	1.4
HKG=MEL	72.0%	29825	99	1550911	7140	5.39	5.39	3.76	3.76	13.13	13.13	5.8	5.8
DUS=ORD	68.9%	13209	44	686866	2897	5.13	4.59	3.66	4.21	12.95	12.53	2.5	2.3
CDG-MIA	69.9%	8047	27	418449	1916	3.83	3.83	5.42	5.42	11.83	11.83	1.2	1.2
BNE=NGO	72.0%	6330	21	329138	1477	3.92	3.64	4.91	5.19	11.92	11.62	1.0	0.9
MIA=ORY	69.9%	7729	26	401906	1839	3.79	3.79	6.13	6.13	11.78	11.78	1.2	1.2
BRU=ORD	68.9%	5702	19	296525	1230	5.19	4.40	3.65	4.43	12.99	12.38	1.1	1.0
BOM=ZRH	79.0%	7429	25	386301	1570	7.01	5.41	1.24	2.84	14.01	13.14	1.8	1.5
MIA=SCL	63.0%	7550	25	392586	1629	5.25	3.81	3.51	4.96	13.04	11.80	1.4	1.2
ORD=STN	68.9%	5702	19	296525	1173	5.59	4.84	2.95	3.7[illegible]	13.25	12.74	1.1	1.0
ATL=HNL	68.0%	6627	22	344608	1549	5.30	5.30	3.36	3.36	13.07	13.07	1.3	1.3
GIG=MIA	63.0%	30558	102	1589037	6633	6.22	5.04	2.36	3.54	13.62	12.89	6.6	5.7
LGW=MSP	68.9%	12887	43	670113	2697	5.12	4.35	3.21	3.98	12.95	12.33	2.4	2.2
AMS=MSP	68.9%	9863	33	512876	2068	5.23	4.31	2.94	3.85	13.02	12.30	1.9	1.6
LGW=MIA	69.9%	10174	34	529062	2345	3.92	3.75	5.12	5.29	11.92	11.74	1.6	1.5
ATL=MAD	68.9%	7507	25	390341	1688	4.29	4.07	4.34	4.56	12.28	12.07	1.2	1.2
LHR=MIA	69.9%	39693	132	2064024	9117	3.91	3.63	5.23	5.51	11.91	11.60	6.2	5.9
CAY-CDG	69.9%	7199	24	374333	1656	3.77	3.77	4.77	4.77	11.76	11.76	1.1	1.1
MAD=MIA	69.9%	24322	81	1264754	5584	3.80	3.80	5.19	5.19	11.79	11.79	3.7	3.7
CNS=HNL	73.0%	7149	24	371757	1638	3.53	3.53	5.85	5.85	11.49	11.49	1.0	1.0
AKL=HNL	73.0%	16602	55	863286	3803	3.53	3.53	5.22	5.22	11.49	11.49	2.4	2.4
ATL=LGW	68.9%	22391	75	1164322	4912	5.21	3.80	3.35	4.75	13.01	11.80	4.3	3.4
CDG-ORD	68.9%	9343	31	485832	2012	5.37	4.53	3.30	4.14	13.11	12.49	1.8	1.6
CDG=ORD	68.9%	6733	22	350134	1450	5.37	4.53	3.59	4.43	13.11	12.49	1.3	1.2
ORD=ORY	68.9%	6137	20	319141	1323	5.36	4.48	3.47	4.35	13.11	12.45	1.2	1.1
MAN=ORD	68.9%	10530	35	547578	2089	4.87	4.37	3.10	3.60	12.76	12.35	1.9	1.8
MUC=YYZ	68.9%	8008	27	416428	1721	5.30	4.46	3.12	3.96	13.07	12.43	1.5	1.4
DTW=FRA	68.9%	9601	32	499234	2072	5.43	4.36	3.03	4.10	13.16	12.34	1.9	1.6
LGW=MCO	68.9%	6738	22	350374	1522	3.91	3.65	4.80	5.06	11.91	11.62	1.1	1.0
AMS=DTW	68.9%	21843	73	1135842	4463	4.75	3.96	3.12	3.92	12.67	11.96	3.9	3.4
CCS=MAD	69.9%	11615	39	603994	2628	3.75	3.75	4.72	4.72	11.74	11.74	1.8	1.8
BNE=SIN	72.0%	28889	96	1502222	5752	5.16	3.49	2.54	4.21	12.97	11.44	5.5	4.2
FCO=JFK	68.9%	55910	186	2907334	12404	4.53	3.69	4.16	5.00	12.49	11.67	9.7	8.4

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
AIRPORT PAIR	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
ATL=MAN	68.9%	7507	25	390341	1596	5.28	4.05	2.85	4.08	13.05	12.05	1.4	1.2
LHR=ORD	68.9%	34988	117	1819358	7171	5.13	4.63	3.15	3.65	12.95	12.57	6.6	6.1
FRA=YYZ	68.9%	9803	33	509765	2009	4.37	4.00	3.63	4.00	12.35	12.00	1.7	1.6
FDF-ORY	69.9%	13324	44	692874	2950	3.75	3.75	4.62	4.62	11.74	11.74	2.0	2.0
HKG=PER	72.0%	10537	35	547915	2093	4.63	3.42	2.71	3.91	12.57	11.36	1.8	1.5
IAD=MXP	68.9%	11046	37	574383	2419	5.13	4.07	3.33	4.39	12.95	12.07	2.1	1.8
HNL=ORD	68.0%	21394	71	1112474	4714	5.07	5.07	3.30	3.30	12.91	12.91	4.0	4.0
YMX=ZRH	68.9%	7603	25	395367	1595	5.23	4.19	2.40	3.44	13.02	12.18	1.5	1.2
BOS=FCO	68.9%	5979	20	310885	1269	4.91	4.04	3.21	4.08	12.79	12.04	1.1	1.0
CVG=LGW	68.9%	7507	25	390341	1551	5.18	3.84	2.90	4.24	12.99	11.84	1.4	1.2
CDG-PTP	69.9%	8883	30	461916	1943	3.74	3.74	4.47	4.47	11.72	11.72	1.3	1.3
BGI=LGW	69.9%	9133	30	474891	1992	3.57	3.57	4.72	4.72	11.54	11.54	1.3	1.3
ORY-PTP	69.9%	17766	59	923832	3875	3.67	3.67	4.54	4.54	11.66	11.66	2.7	2.7
AMS=YYZ	68.9%	10963	37	570075	2122	4.76	3.84	2.83	3.74	12.67	11.84	2.0	1.7
FRA=IAD	68.9%	28319	94	1472574	5993	4.81	3.75	3.47	4.52	12.71	11.74	5.1	4.3
MAD=SDQ	69.9%	28028	93	1457435	6059	3.63	3.63	4.50	4.50	11.60	11.60	4.2	4.2
HNL=STL	68.0%	15681	52	815436	3362	4.89	4.89	3.27	3.27	12.78	12.78	2.9	2.9
CDG=DTW	68.9%	9601	32	499234	1972	5.12	4.02	3.05	4.14	12.94	12.02	1.8	1.5
HNL=OSA	73.0%	112551	375	5852670	23972	3.33	3.33	4.69	4.69	11.24	11.24	15.9	15.9
GLA=ORD	68.9%	5702	19	296525	1087	4.49	3.97	3.38	3.91	12.46	11.97	1.0	0.9
JFK=MUC	68.9%	12339	41	641633	2587	4.75	3.92	3.71	4.54	12.66	11.92	2.2	1.9
ARN=JFK	68.9%	10705	36	556673	2188	4.65	3.72	3.74	4.67	12.59	11.71	1.9	1.6
ANU=LGW	69.9%	9133	30	474891	1931	3.49	3.49	4.59	4.59	11.45	11.45	1.3	1.3
CNS=OSA	72.0%	6030	20	313558	1139	3.28	3.30	3.97	3.95	11.18	11.21	0.8	0.8
ORY=RDU	68.9%	5702	19	296525	1199	3.85	3.56	4.70	4.98	11.84	11.53	0.9	0.8
CNS=NGO	72.0%	18964	63	986117	3597	3.29	3.29	4.36	4.36	11.19	11.20	2.7	2.7
CDG=YYZ	68.9%	9467	32	492294	1841	4.75	3.72	2.96	3.98	12.66	11.71	1.7	1.4
CDG-YYZ	68.9%	9260	31	481524	1801	4.75	3.72	2.95	3.98	12.66	11.71	1.7	1.4
JFK=MXP	68.9%	33409	111	1737269	6922	4.37	3.77	3.94	4.54	12.35	11.76	5.6	5.1
ATL=SNN	68.9%	7507	25	390341	1496	4.91	3.48	2.80	4.22	12.79	11.44	1.4	1.1
CPH=EWR	68.9%	7718	26	401350	1548	3.93	3.43	4.17	4.68	11.93	11.37	1.2	1.1
HNL=NGO	73.0%	62492	208	3249562	13026	3.27	3.27	4.58	4.58	11.17	11.17	8.7	8.7
BRU=IAD	68.9%	6572	22	341758	1326	4.92	3.41	3.21	4.71	12.80	11.35	1.2	0.9
BCN=JFK	68.9%	9601	32	499234	1908	3.64	3.48	4.46	4.61	11.61	11.43	1.4	1.4
CPH=JFK	68.9%	12744	42	662684	2549	4.00	3.43	3.94	4.52	12.00	11.37	2.0	1.8
JFK=ZRH	68.9%	22389	75	1164202	4565	4.91	3.90	3.43	4.43	12.79	11.90	4.1	3.5
CNS=NRT	72.0%	60087	200	3124544	11420	3.28	3.24	3.93	3.97	11.18	11.12	8.4	8.3
EWR=FRA	68.9%	13789	46	717021	2768	4.96	3.50	3.24	4.70	12.83	11.46	2.5	2.0
FRA=YMX	68.9%	7925	26	412120	1504	4.66	3.75	2.68	3.59	12.59	11.74	1.4	1.2
FRA=JFK	68.9%	50829	169	2643118	10166	4.29	3.49	3.80	4.60	12.28	11.44	8.5	7.4
ANC=SEL	73.0%	55361	185	2878782	10857	4.04	3.61	4.26	4.68	12.04	11.59	8.8	8.2
GVA=JFK	68.9%	10116	34	526039	2027	4.65	3.64	3.31	4.32	12.59	11.61	1.8	1.5
CDG=IAD	68.9%	21650	72	1125790	4335	4.10	3.51	3.65	4.24	12.10	11.46	3.5	3.2
CDG-IAD	68.9%	8284	28	430787	1659	4.10	3.51	3.95	4.54	12.10	11.46	1.3	1.2
EWR=HAM	68.9%	6766	23	351809	1314	4.22	3.19	3.99	5.02	12.21	11.06	1.1	0.9
DUS=JFK	68.9%	6766	23	351809	1315	4.74	3.41	3.14	4.47	12.66	11.34	1.2	1.0
AMS=JFK	68.9%	32926	110	1712140	6222	3.89	3.21	3.76	4.44	11.89	11.09	5.1	4.5
ANC=OSA	73.0%	9362	31	486836	1775	4.42	3.53	3.04	3.93	12.39	11.49	1.6	1.4
LGW=YYZ	68.9%	9343	31	485832	1733	4.57	3.86	2.97	3.68	12.52	11.85	1.6	1.4
LHR=YYZ	68.9%	13476	45	700747	2485	4.57	4.02	2.85	3.40	12.52	12.02	2.3	2.1
BRU=JFK	68.9%	25700	86	1336397	4888	3.88	3.28	3.85	4.46	11.88	11.18	4.0	3.6
HNL=NRT	73.0%	324225	1081	16859679	64339	3.15	3.15	4.45	4.45	11.00	11.00	44.1	44.1
BOS=FRA	68.9%	17526	58	911354	3335	4.05	3.42	3.55	4.18	12.05	11.36	2.8	2.5

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
AMS=YMX	68.9%	11966	40	622248	2135	4.31	3.41	2.56	3.46	12.30	11.35	2.0	1.7
IAD=MAD	68.9%	6572	22	341758	1301	3.61	3.61	4.48	4.48	11.58	11.58	1.0	1.0
PPT=SYD	72.0%	9288	31	482996	1837	3.14	3.14	4.36	4.36	10.99	10.99	1.3	1.3
EWR-ORY	68.9%	9343	31	485832	1768	3.77	3.30	3.86	4.32	11.76	11.21	1.4	1.3
BOS=ZRH	68.9%	10958	37	569836	2128	4.44	3.49	3.31	4.26	12.41	11.45	1.9	1.6
DFW=FRA	68.9%	21792	73	1133209	4281	4.19	4.19	6.05	6.05	12.18	12.18	3.6	3.6
IAD=LHR	68.9%	48505	162	2522259	9251	4.39	3.46	3.02	3.94	12.37	11.41	8.2	7.0
CTS=HNL	73.0%	7034	23	365792	1370	3.10	3.10	4.36	4.36	10.94	10.94	0.9	0.9
BKK=PER	72.0%	14763	49	767665	2554	3.29	3.09	3.37	3.58	11.20	10.93	2.1	2.0
CDG-YMX	68.9%	10733	36	558109	1924	4.09	3.49	3.10	3.70	12.09	11.44	1.7	1.6
CDG=YMX	68.9%	11175	37	581084	2003	4.09	3.49	2.93	3.53	12.09	11.44	1.8	1.6
LHR=YMX	68.9%	13273	44	690217	2245	4.07	3.47	2.64	3.24	12.07	11.41	2.1	1.9
CDG-JFK	68.9%	21042	70	1094199	3966	3.83	3.21	2.30	2.91	11.82	11.09	3.2	2.9
CDG=JFK	68.9%	27771	93	1444094	5235	3.83	3.21	3.73	4.35	11.82	11.09	4.3	3.8
JFK=ORY	68.9%	19234	64	1000144	3626	4.37	3.20	3.49	4.66	12.35	11.08	3.2	2.6
AKL=PER	72.0%	17528	58	911460	3023	3.52	3.04	3.33	3.82	11.48	10.86	2.6	2.3
LHR=PHL	68.9%	13273	44	690217	2440	4.51	3.23	2.95	4.23	12.47	11.12	2.3	1.8
AMS=BOS	68.9%	9601	32	499234	1721	4.25	3.02	2.92	4.15	12.24	10.83	1.6	1.3
JFK=MAD	68.9%	26358	88	1370621	4907	3.43	3.43	3.92	3.92	11.37	11.37	3.8	3.8
SDJ=SIN	72.0%	7079	24	368090	1287	3.69	2.98	3.52	4.23	11.68	10.77	1.1	0.9
JFK=LGW	68.9%	7378	25	383640	1328	3.80	3.22	3.54	4.12	11.79	11.10	1.1	1.0
JFK=LHR	68.9%	81493	272	4237629	14590	3.78	3.20	2.95	3.53	11.78	11.08	12.5	11.2
EWR=LHR	68.9%	23035	77	1197828	4141	4.31	3.07	2.92	4.16	12.30	10.90	3.8	3.1
JFK=MAN	68.9%	12049	40	626556	2088	4.11	3.01	3.20	4.30	12.11	10.81	1.9	1.6
KHI=SIN	72.0%	7079	24	368090	1084	3.85	2.93	2.31	3.23	11.85	10.70	1.1	0.9
BOS=CDG	68.9%	18364	61	954911	3263	3.55	3.11	3.63	4.08	11.52	10.95	2.7	2.5
BOS=LHR	68.9%	28116	94	1462044	4759	3.41	2.96	3.53	3.99	11.35	10.74	4.0	3.7
JFK=LIS	68.9%	11948	40	621291	2067	2.85	2.85	4.25	4.25	10.58	10.58	1.5	1.5
KUL=NRT	72.0%	24994	83	1299675	4340	3.00	3.00	3.79	3.79	10.80	10.80	3.3	3.3
NRT=SIN	72.0%	200786	669	10440896	34734	2.83	2.83	3.94	3.94	10.55	10.55	25.7	25.7
BOS=LGW	68.9%	12887	43	670113	2194	3.69	2.93	3.18	3.94	11.68	10.70	1.9	1.7
CGK=SEL	72.0%	9438	31	490786	1613	2.86	2.81	4.09	4.15	10.60	10.52	1.2	1.2
HNL=NAN	73.0%	15384	51	799978	2538	2.73	2.73	3.54	3.54	10.39	10.39	1.9	1.9
NGO=SIN	72.0%	22047	73	1146467	3617	2.72	2.72	3.68	3.68	10.37	10.37	2.8	2.8
BOS=GLA	68.9%	9601	32	499234	1508	3.25	2.69	3.12	3.69	11.15	10.32	1.3	1.2
OSA=SIN	72.0%	47353	158	2462371	7562	2.67	2.67	3.52	3.52	10.28	10.28	5.8	5.8
LIM=MIA	63.0%	18481	62	961027	2520	3.47	2.83	2.26	2.90	11.41	10.54	2.7	2.4
SEL=SIN	72.0%	17029	57	885493	2562	3.15	2.57	2.94	3.52	11.01	10.12	2.3	2.1
HNL=YVR	68.0%	20739	69	1078419	3147	2.57	2.57	3.02	3.02	10.12	10.12	2.5	2.5
FUK=SIN	72.0%	20034	67	1041772	2927	2.65	2.50	3.63	3.78	10.26	10.00	2.5	2.4
HNL=SEA	68.0%	24996	83	1299779	3480	2.41	2.41	3.18	3.18	9.84	9.84	2.9	2.9
DEL=SIN	72.0%	9950	33	517403	1336	3.41	3.14	1.92	2.19	11.35	11.00	1.4	1.4
HNL=SAN	68.0%	10988	37	571373	1492	2.37	2.37	3.00	3.00	9.76	9.76	1.3	1.3
MEL=NAN	72.0%	14482	48	753058	1809	2.57	2.36	2.64	2.85	10.11	9.75	1.7	1.7
HNL=LAX	68.0%	168743	562	8774655	22401	2.33	2.33	3.02	3.02	9.69	9.69	19.3	19.3
BOG=JFK	63.0%	7550	25	392586	975	2.29	2.29	3.13	3.13	9.61	9.61	0.9	0.9
LAX=OGG	68.0%	21430	71	1114366	2767	2.29	2.29	2.83	2.83	9.61	9.61	2.4	2.4
HNL=SFO	68.0%	100477	335	5224791	12514	2.23	2.23	2.83	2.83	9.50	9.50	11.3	11.3
KOA=SFO	68.0%	10442	35	542993	1286	2.22	2.22	2.77	2.77	9.46	9.46	1.2	1.2
OGG=SFO	68.0%	20884	70	1085987	2537	2.20	2.20	2.70	2.70	9.42	9.42	2.3	2.3
DTW=LGW	68.9%	5574	19	289824	1435	6.45	5.07	1.55	2.93	13.74	12.91	1.2	1.0
CVG=ORY	68.9%	5574	19	289824	1202	4.86	4.12	4.02	4.76	12.75	12.11	1.0	0.9
JFK=TXL	68.9%	5574	19	289824	1156	4.63	3.53	3.87	4.97	12.57	11.50	1.0	0.8

HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
LHR=YVR	68.9%	5477	18	284798	1341	6.43	5.52	2.90	3.81	13.73	13.21	1.2	1.1
MIA=MXP	69.9%	5402	18	280912	1382	4.36	4.36	5.27	5.27	12.34	12.34	0.9	0.9
CCS-CDG	69.9%	5352	18	278317	1320	4.04	4.04	5.13	5.13	12.04	12.04	0.9	0.9
AMS=MCO	68.9%	5343	18	277858	1259	4.19	3.75	4.94	5.37	12.18	11.74	0.9	0.8
ORD=SEL	73.0%	5276	18	274344	1789	9.83	6.71	3.09	6.20	14.96	13.87	1.7	1.2
HNL=TPE	73.0%	5244	17	272681	1375	3.94	3.94	5.22	5.22	11.94	11.94	0.8	0.8
CDG=GIG	70.0%	5213	17	271101	1547	6.32	4.71	4.80	6.40	13.67	12.63	1.1	0.9
GIG=LHR	70.0%	5104	17	265432	1526	6.36	4.56	4.67	6.47	13.69	12.52	1.1	0.9
CCS=FRA	69.9%	5053	17	262747	1318	4.33	4.33	5.29	5.29	12.32	12.32	0.8	0.8
CNS=FUK	72.0%	5044	17	262272	952	3.42	3.36	4.24	4.31	11.36	11.28	0.7	0.7
CNS=SIN	72.0%	5044	17	262272	816	3.99	2.89	2.47	3.57	11.99	10.64	0.8	0.7
GIG=LIS	70.0%	5030	17	261566	1254	4.92	3.86	4.79	5.85	12.80	11.86	0.9	0.8
BKK-CDG	79.0%	5021	17	261097	1177	7.20	5.73	4.63	6.10	14.09	13.34	1.2	1.0
AMS=YVR	68.9%	4713	16	245070	1174	7.11	5.27	2.14	3.98	14.05	13.05	1.1	0.9
BKK=BNE	72.0%	4694	16	244095	1109	6.47	4.10	2.86	5.23	13.75	12.09	1.1	0.8
LAX=LIM	63.0%	4668	16	242712	1013	4.87	3.41	3.33	4.80	12.76	11.34	0.8	0.7
CCS=LHR	69.9%	4566	15	237445	1064	3.75	3.75	5.46	5.46	11.74	11.74	0.7	0.7
LAX=PPT	73.0%	4451	15	231454	951	3.34	3.34	4.66	4.66	11.25	11.25	0.6	0.6
AMS=CCS	69.9%	4382	15	227876	1110	4.15	3.92	5.43	5.66	12.15	11.92	0.7	0.7
LAX=ZRH	68.9%	4345	14	225924	1339	8.35	6.95	3.32	4.72	14.52	13.98	1.2	1.0
MCO=ORY	68.9%	4289	14	223052	1003	3.73	3.73	5.27	5.27	11.72	11.72	0.7	0.7
DXB=LHR	60.7%	4249	14	220940	754	6.02	4.78	1.71	2.96	13.51	12.69	0.9	0.8
AMS=GIG	70.0%	4242	14	220592	1311	6.55	4.69	4.99	6.85	13.79	12.62	1.0	0.8
AMS=KUL	79.0%	4228	14	219871	1394	8.98	7.51	3.64	5.12	14.72	14.21	1.2	1.1
ATH=BKK	79.0%	4214	14	219107	1078	8.30	6.17	1.86	3.79	14.51	13.59	1.1	0.9
FRA=GIG	70.0%	4212	14	219046	1302	6.06	5.13	5.27	6.20	13.53	12.95	0.9	0.8
CPH=LAX	68.9%	4156	14	216112	1212	8.31	6.50	3.02	4.83	14.51	13.77	1.1	0.9
CPH=SEA	68.9%	4156	14	216112	1049	6.68	5.68	3.03	4.03	13.85	13.31	1.0	0.8
ARN=EWR	68.9%	4156	14	216112	847	4.74	3.60	3.42	4.57	12.66	11.57	0.7	0.6
EWR=FBU	68.9%	4156	14	216112	795	4.36	3.33	3.35	4.38	12.34	11.24	0.7	0.6
EZE=LHR	70.0%	4084	14	212345	1468	7.48	5.55	5.57	7.49	14.20	13.23	1.0	0.8
GRU=MXP	70.0%	4084	14	212345	1253	7.10	4.92	4.32	6.49	14.04	12.80	1.0	0.7
LGW=YYC	68.9%	4004	13	208214	910	5.63	4.60	3.28	4.32	13.28	12.54	0.8	0.7
MXP=YYZ	68.9%	4004	13	208214	855	5.14	4.43	3.31	4.03	12.96	12.40	0.8	0.7
CDG-KHI	79.0%	3993	13	207656	790	6.04	5.68	1.68	2.03	13.52	13.31	0.8	0.8
FCO=YMX	68.9%	3986	13	207256	852	5.05	4.60	3.07	3.52	12.89	12.55	0.7	0.7
HAM=JFK	68.9%	3981	13	207017	787	4.25	3.18	4.04	5.11	12.24	11.05	0.7	0.5
FBU=JFK	68.9%	3981	13	207017	759	4.37	3.30	3.59	4.66	12.35	11.21	0.7	0.6
CDG-GIG	70.0%	3786	13	196883	1124	6.32	4.71	4.69	6.29	13.67	12.63	0.8	0.7
DKR=FCO	60.7%	3693	12	192029	494	4.72	2.51	0.95	3.16	12.64	10.02	0.7	0.4
MAD=YMX	68.9%	3673	12	190982	863	4.12	3.63	2.80	3.29	12.11	11.61	0.6	0.5
CPH=ORD	68.9%	3645	12	189546	807	5.12	4.68	3.59	4.03	12.94	12.61	0.7	0.6
ANC=LAX	68.0%	3633	12	188926	443	2.88	2.32	2.12	2.68	10.62	9.66	0.5	0.4
GRU=LIS	70.0%	3593	12	186833	923	5.20	4.03	4.75	5.92	13.00	12.03	0.7	0.6
SHA=SIN	72.0%	3539	12	184045	436	2.84	2.33	2.32	2.83	10.57	9.69	0.5	0.4
CDG-FDF	69.9%	3531	12	183599	784	3.76	3.76	4.54	4.54	11.75	11.75	0.5	0.5
NRT-PPT	72.0%	3396	11	176579	1037	4.49	4.49	6.72	6.72	12.45	12.45	0.6	0.6
FRA=MRU	60.7%	3376	11	175538	1003	8.13	5.29	3.35	6.19	14.45	13.06	0.9	0.7
ANC=LHR	68.9%	3369	11	175187	784	5.95	4.40	2.88	4.43	13.47	12.37	0.7	0.6
MRU=MUC	60.7%	3318	11	172511	953	7.27	4.83	3.56	6.01	14.12	12.73	0.8	0.6
CPH=SIN	79.0%	3311	11	172156	1066	10.17	7.41	2.75	5.50	15.04	14.18	1.1	0.8
GVA=LAX	68.9%	3259	11	169443	1001	8.01	6.78	3.57	4.80	14.40	13.90	0.9	0.8
CDG=GRU	70.0%	3258	11	169438	992	6.63	4.89	4.75	6.49	13.83	12.77	0.7	0.6

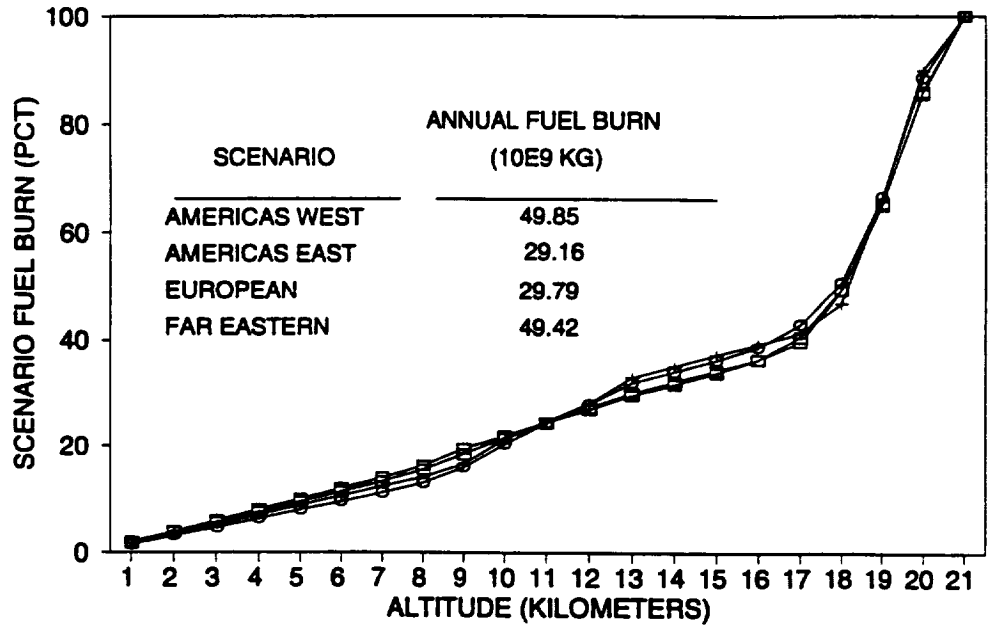
HSCT Simulated Airlines Network - World Airline Model Development, Market Share 70%

AIRPORT PAIR	Supersonic Operation Circa 2015					M=2.4 Hours/Trip		Saved Hours/Trip		Utilization Hrs/Day/Ac		Required A/C Units	
	Load Factor	Wkly Seats	Wkly Depts	Annual Seats	Annual ASM(M)	GC	DVRT	GC	DVRT	GC	DVRTD	GC	DVRTD
CDG-DKR	60.7%	3228	11	167870	441	3.87	2.69	1.88	3.06	11.87	10.32	0.5	0.4
GIG=LAX	63.0%	3169	11	164766	1038	10.33	7.38	1.67	4.62	15.08	14.16	1.0	0.8
FRA=GRU	70.0%	3097	10	161063	982	7.00	5.30	4.83	6.53	14.00	13.07	0.7	0.6
MIA=MUC	69.9%	3069	10	159594	798	4.61	4.32	5.39	5.68	12.56	12.30	0.5	0.5
HAM=MIA	69.9%	3069	10	159594	767	3.94	3.93	5.60	5.61	11.94	11.92	0.5	0.5
DUS=MIA	69.9%	3069	10	159594	754	4.35	3.95	4.90	5.30	12.33	11.95	0.5	0.5
DXB=FCO	60.7%	3039	10	158033	426	4.91	3.49	1.35	2.78	12.79	11.44	0.6	0.4
MLE=ZRH	79.0%	3039	10	158032	766	6.83	5.73	2.84	3.94	13.92	13.34	0.7	0.6
FCO=MLE	79.0%	3039	10	158032	721	6.40	5.48	2.56	3.48	13.72	13.19	0.7	0.6
BKK=LHR	79.0%	2973	10	154597	1276	9.56	6.65	2.57	5.48	14.89	13.84	0.9	0.7
DXB=FRA	60.7%	2918	10	151711	456	5.40	4.11	1.23	2.51	13.13	12.11	0.6	0.5
FUK=SYD	72.0%	2909	10	151261	734	5.91	4.12	4.09	5.88	13.45	12.12	0.6	0.5
BNE=FUK	72.0%	2909	10	151261	680	3.93	3.70	5.16	5.39	11.92	11.68	0.5	0.4
EZE=FRA	70.0%	2874	10	149466	1067	9.16	6.00	4.26	7.42	14.78	13.50	0.8	0.6
DXB=LGW	60.7%	2870	10	149264	507	6.00	4.64	1.17	2.53	13.50	12.57	0.6	0.5
BNE=HNL	73.0%	2860	10	148703	701	3.73	3.73	5.77	5.77	11.72	11.72	0.4	0.4
ORD=TXL	68.9%	2851	10	148263	652	5.08	4.94	3.84	3.98	12.91	12.81	0.5	0.5

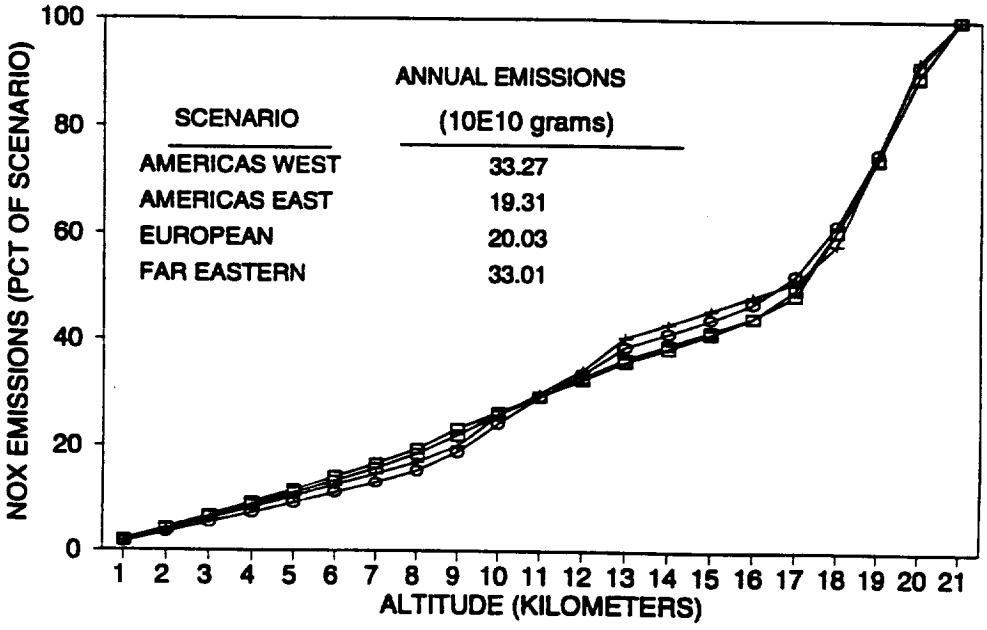
APPENDIX E

HSCT NETWORK EMISSIONS

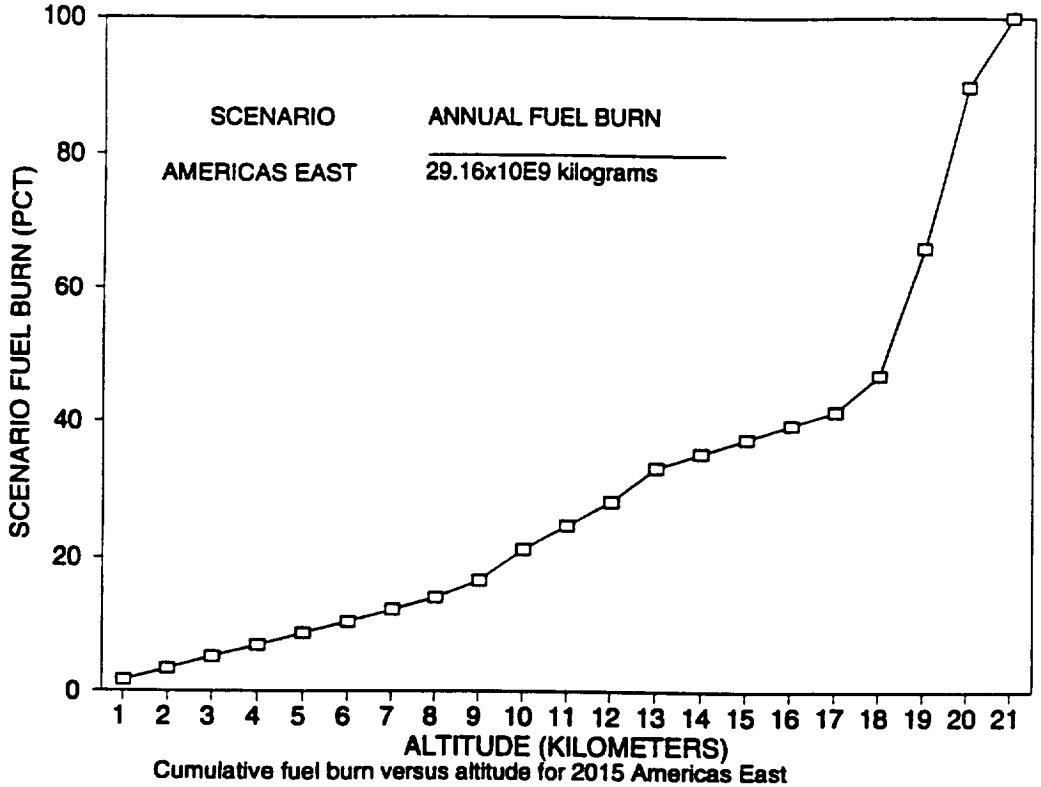
This appendix contains descriptions of estimated fuel burns and emissions from both individual Regional and total HSCT simulated airlines operating at Mach 2.4 .



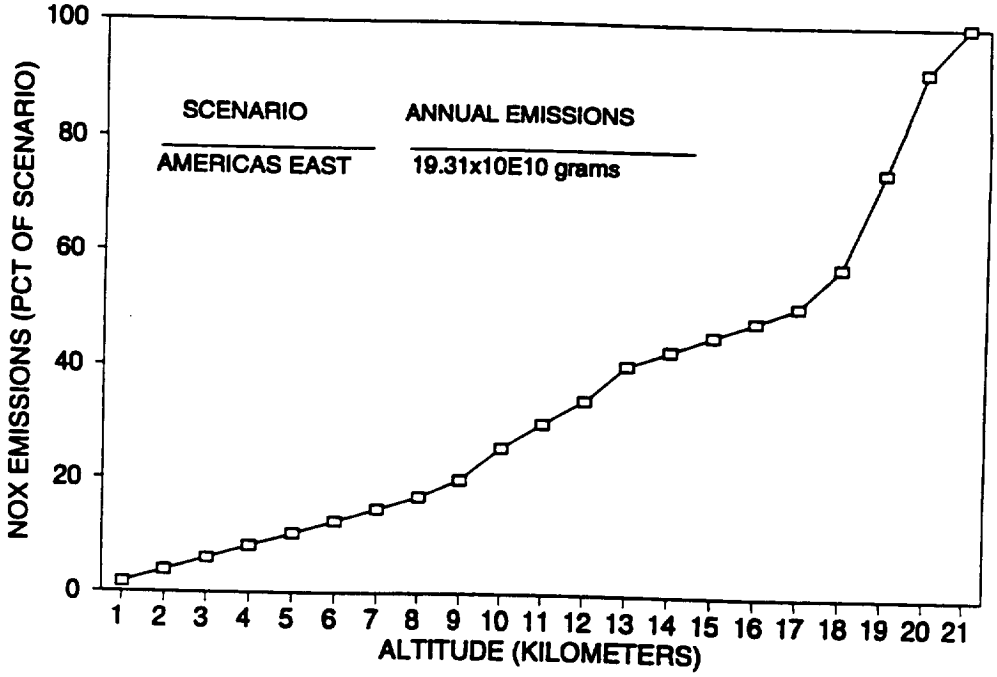
Cumulative fuel burn versus altitude for 2015 Americas West, Americas East, European, and Far Eastern M2.4 HSCT upper limit producible scenarios.



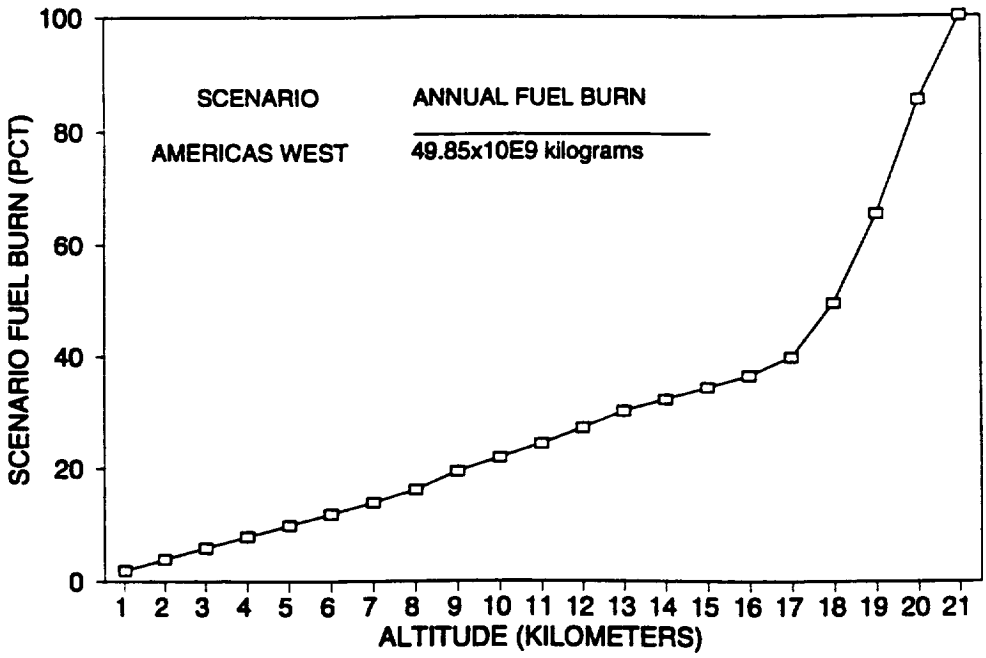
Cumulative NOx emission versus altitude for 2015 Americas West, Americas East, European, and Far Eastern M2.4 HSCT scenarios.



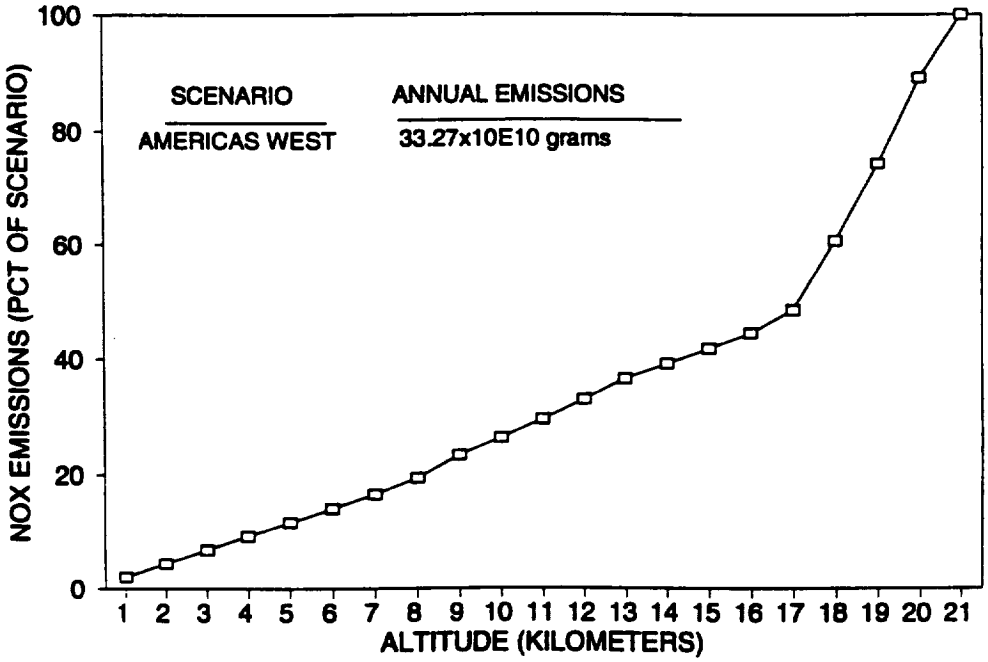
Cumulative fuel burn versus altitude for 2015 Americas East M2.4 HSCT producible upper limit scenario.



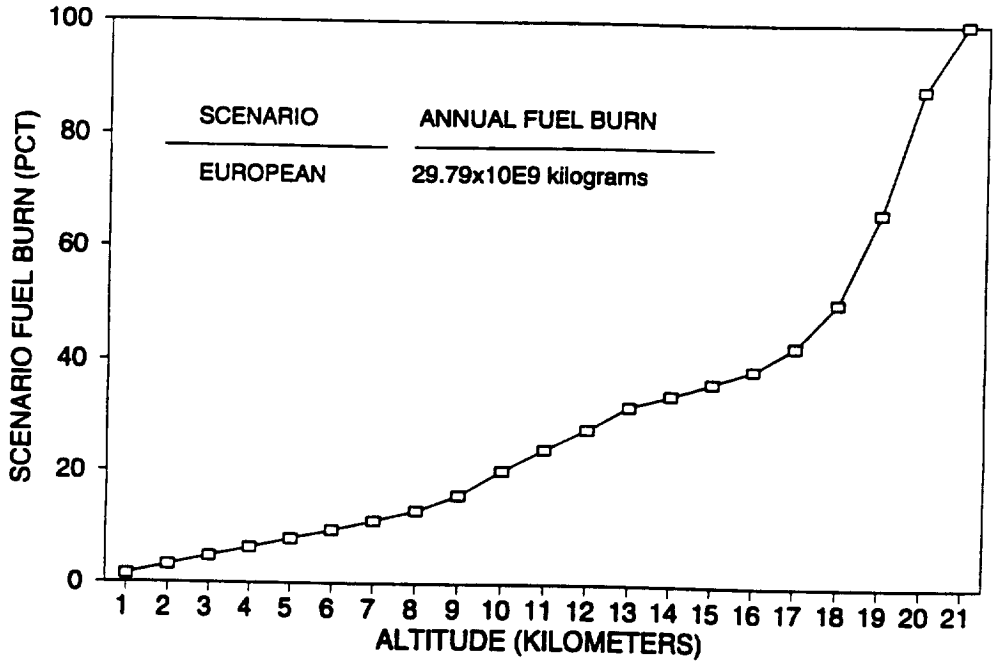
Cumulative NOx emission versus altitude for 2015 Americas East M2.4 HSCT upper limit producible scenario.



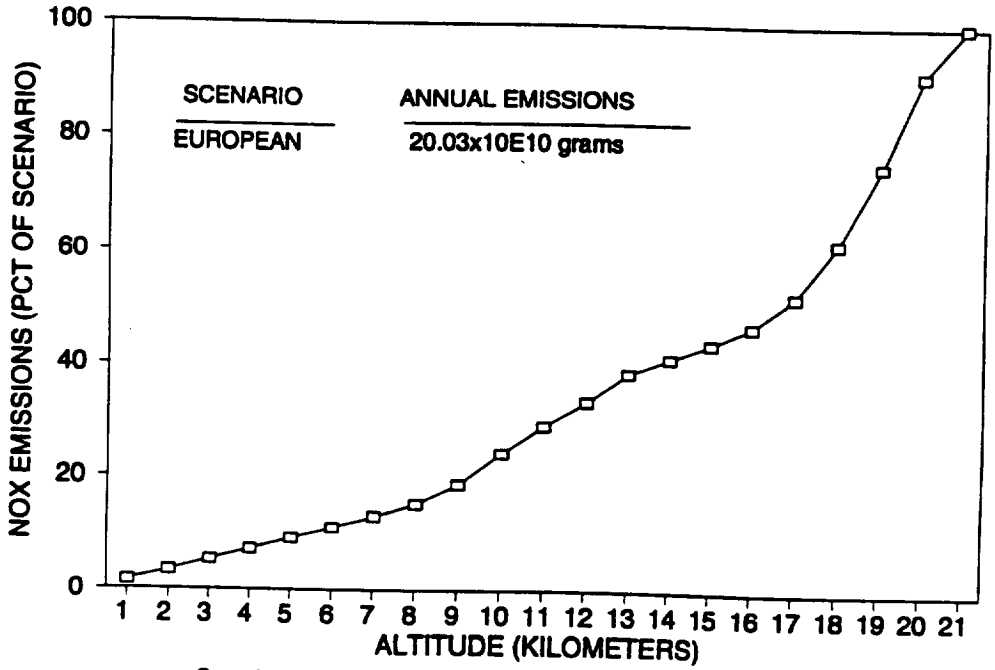
Cumulative fuel burn versus altitude for 2015 Americas West M2.4 HSCT upper limit producible scenario.



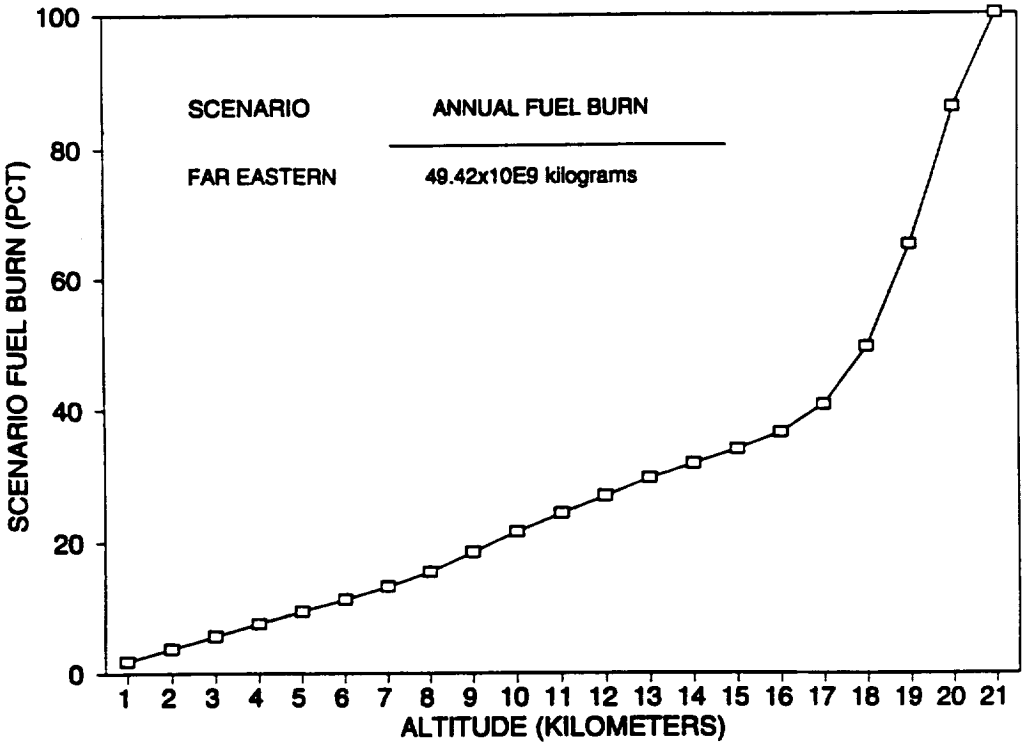
Cumulative NOx emission versus altitude for 2015 Americas West M2.4 HSCT scenario.



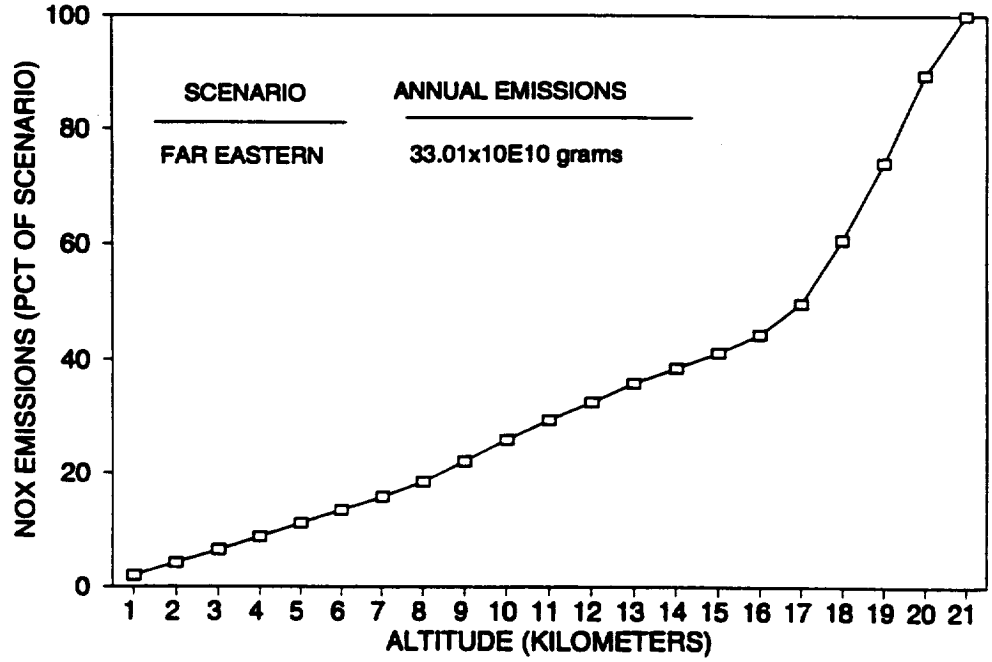
Cumulative fuel burn versus altitude for 2015 European M2.4 HSCT upper limit producible scenario.



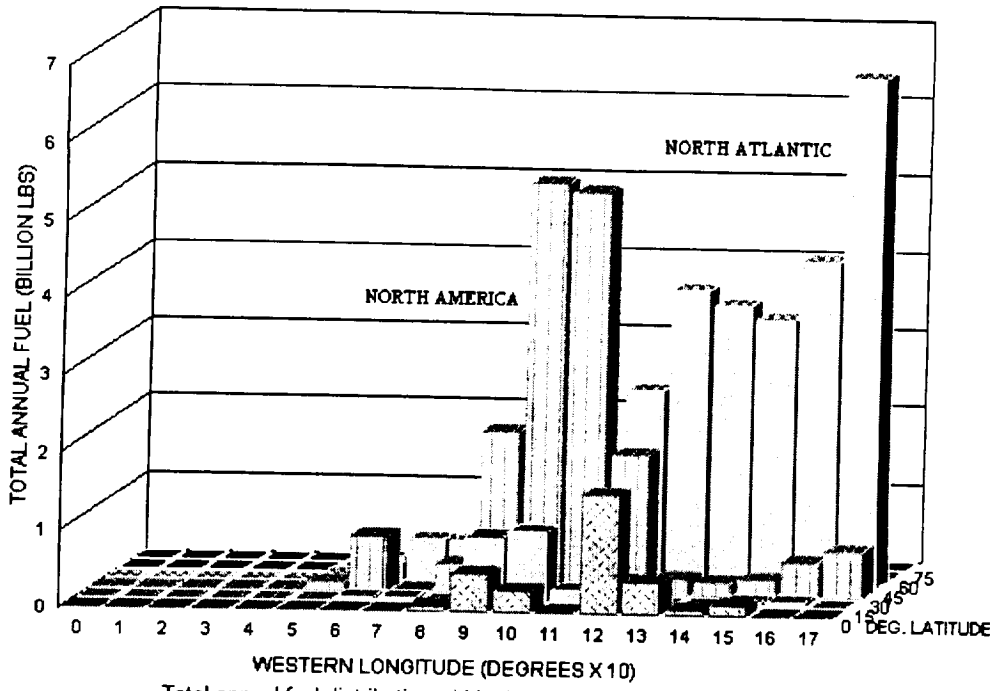
Cumulative NOx emission versus altitude for 2015 European M2.4 HSCT upper limit producible scenario.



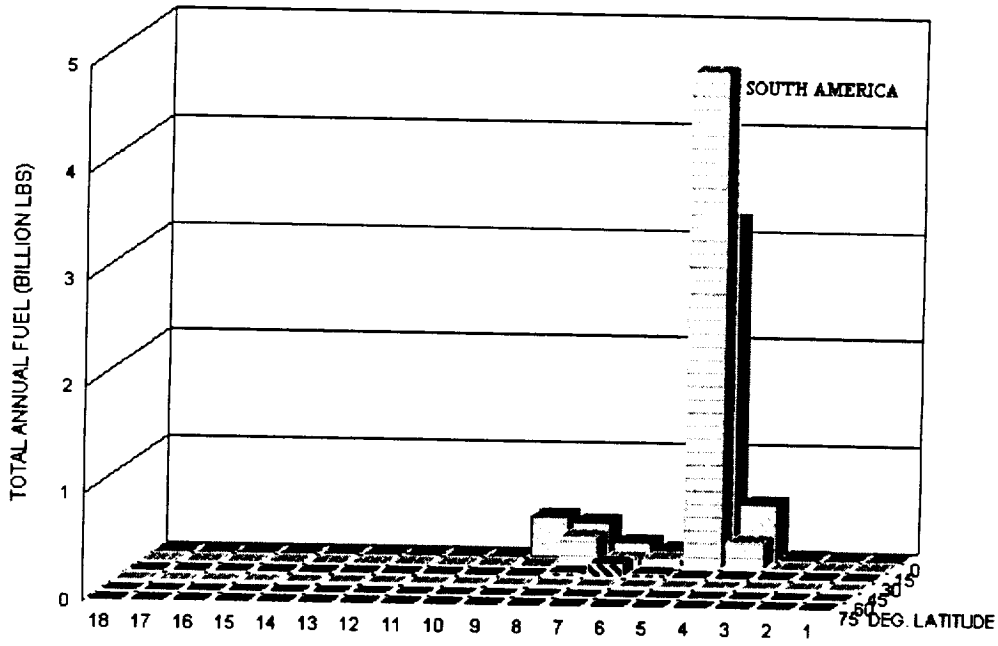
Cumulative fuel burn versus altitude for 2015 Far Eastern M2.4 HSCT upper limit producible fleet scenario.



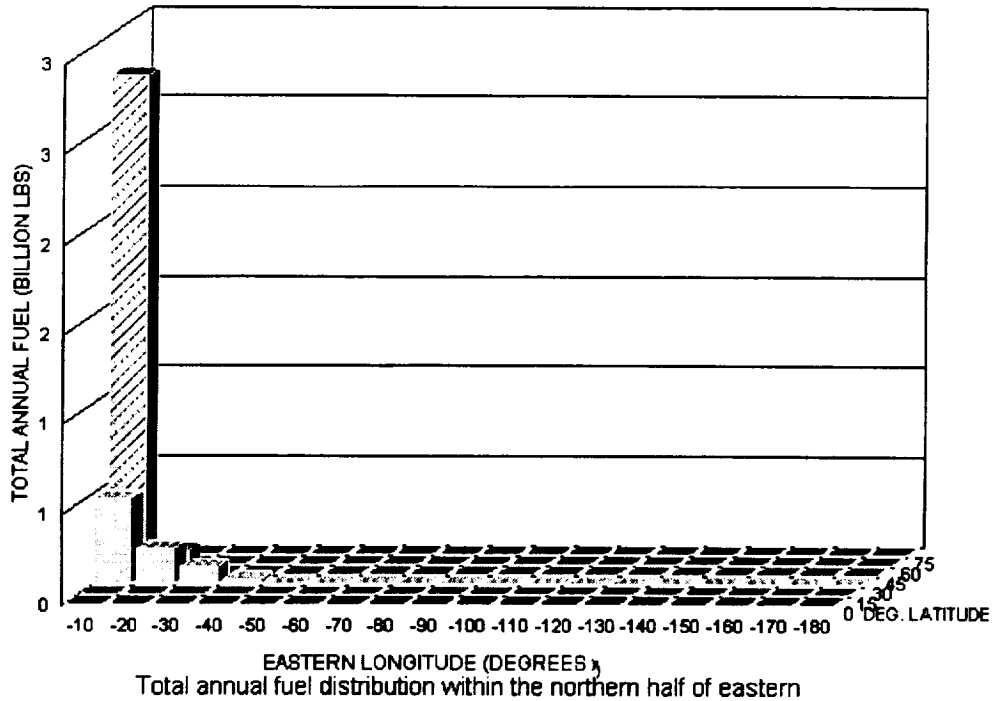
Cumulative NOx emission versus altitude for 2015 Far Eastern M2.4 HSCT upper limit producible scenario.



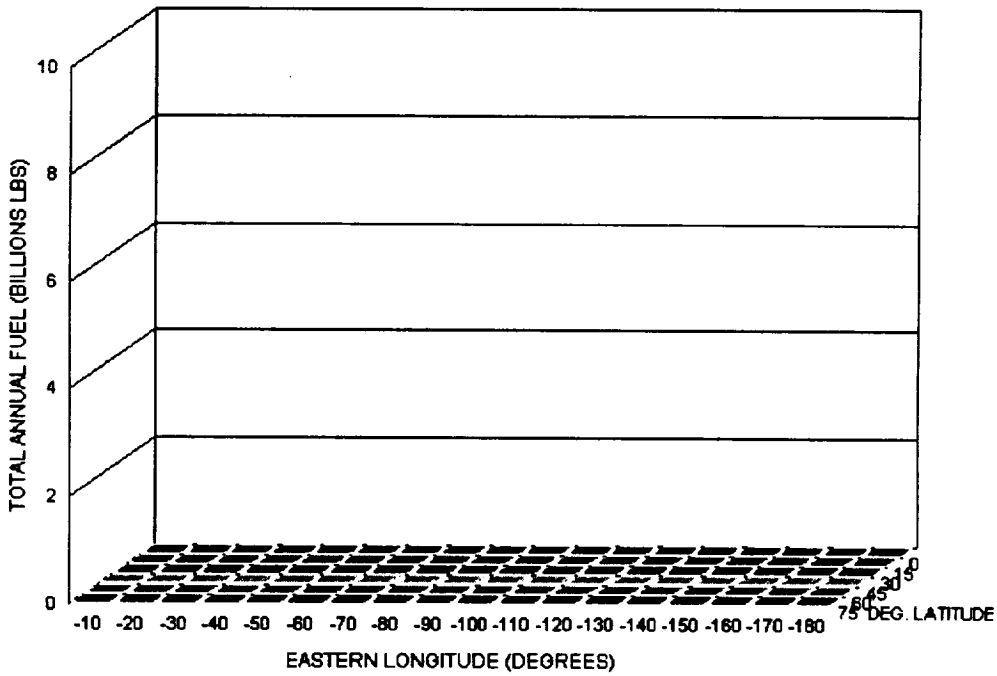
Total annual fuel distribution within the northern half of the western hemisphere in 2015 for the Americas East M2.4 HSCT scenario.



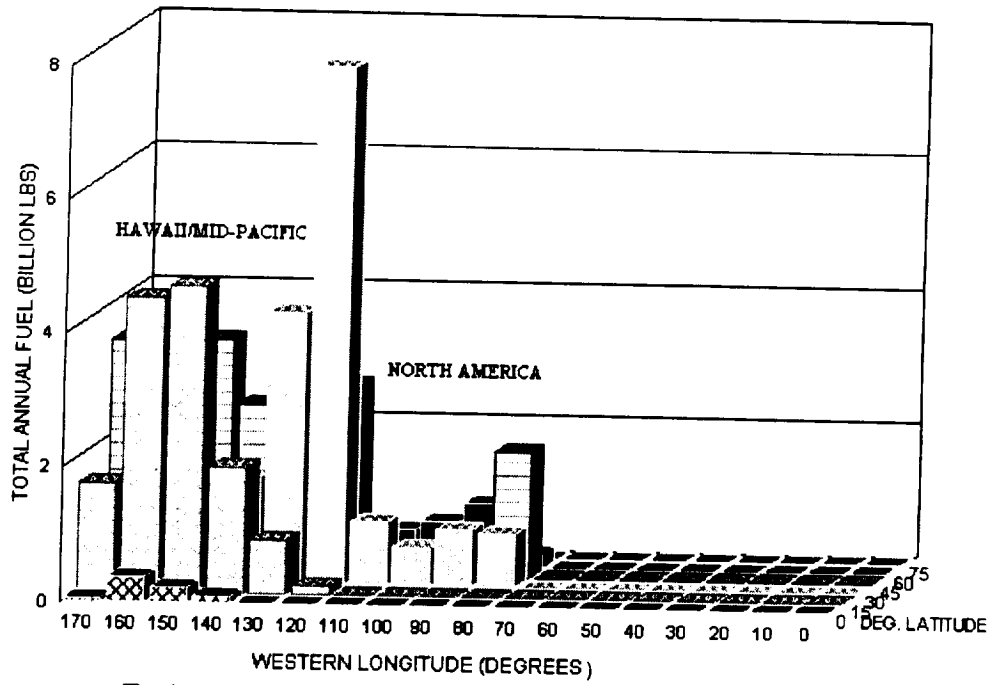
Total annual fuel distribution within the southern half of the western hemisphere in 2015 for the Americas East M2.4 HSCT scenario.



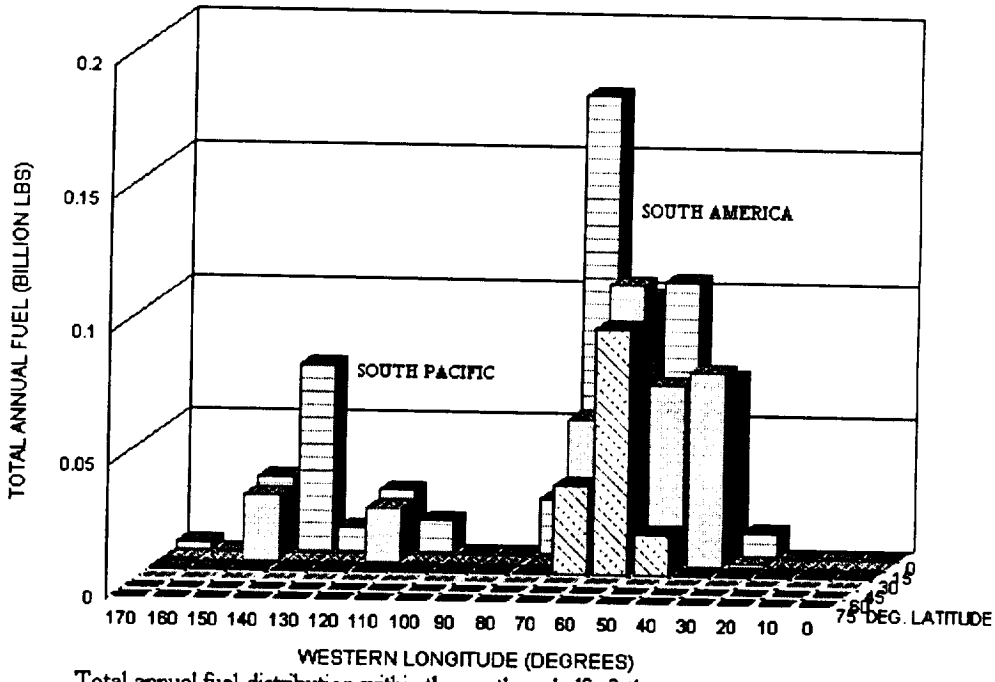
Total annual fuel distribution within the northern half of eastern hemisphere in 2015 for the America East M2.4 HSCT scenario.



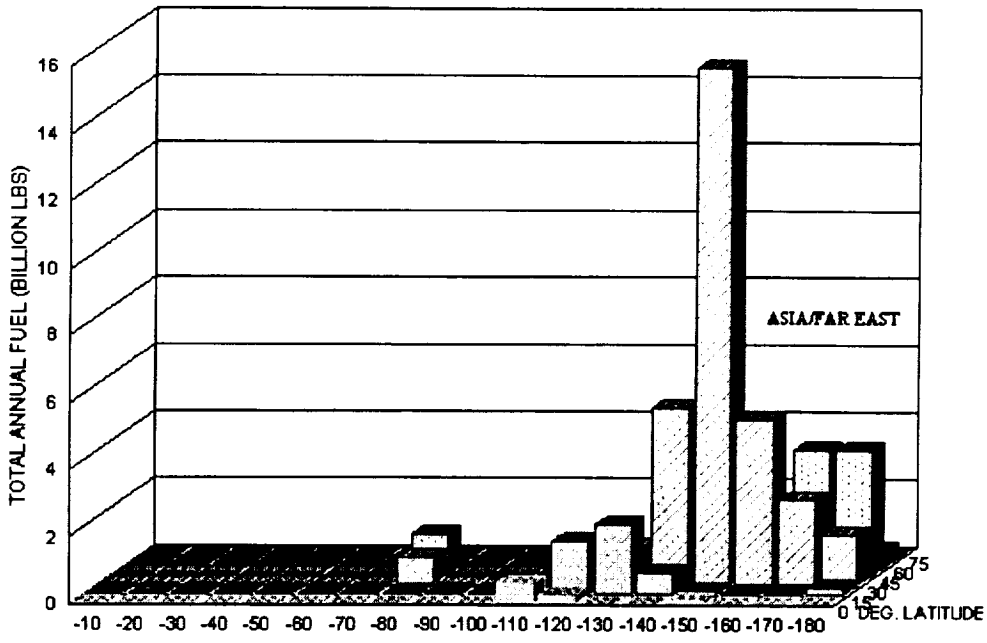
Total annual fuel distribution within the southern half of the eastern hemisphere in 2015 for the Americas East M2.4 HSCT scenario.



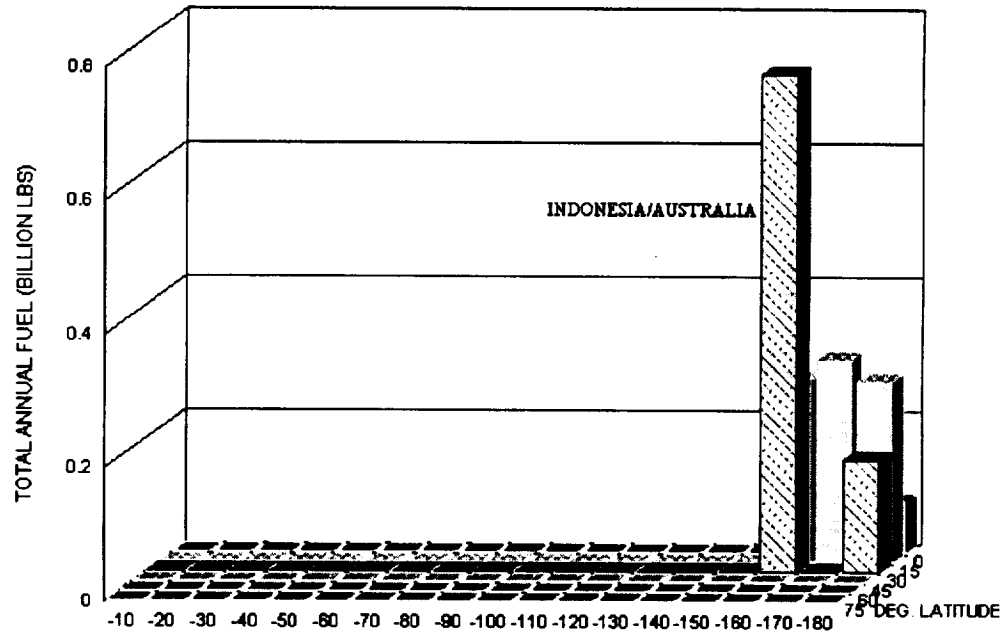
Total annual fuel distribution within the northern half of the western hemisphere in 2015 for the Americas West M2.4 HSCT scenario.



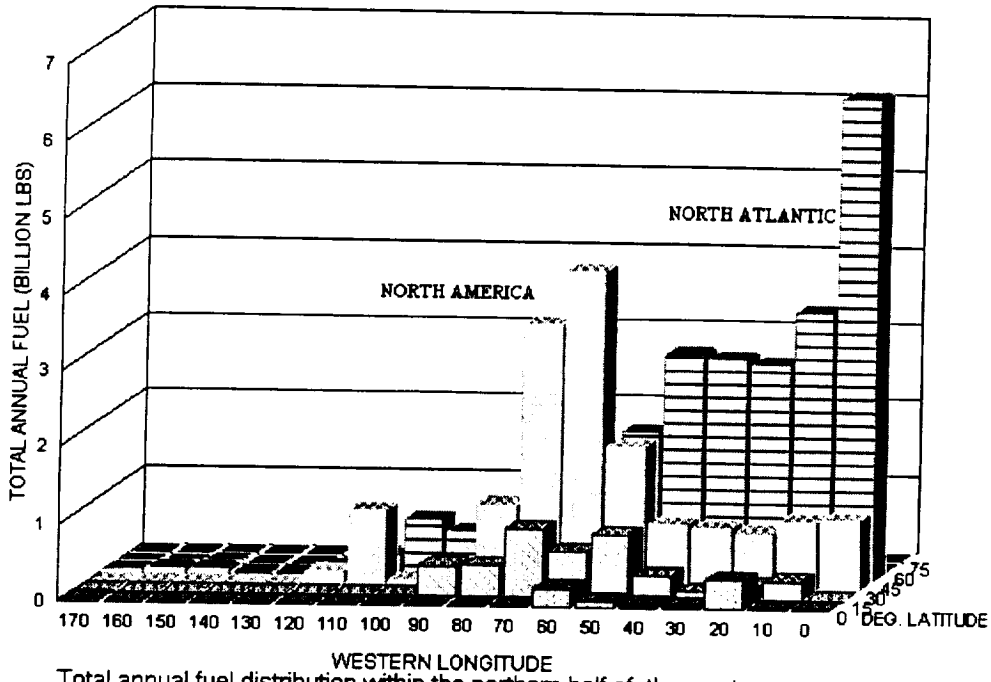
Total annual fuel distribution within the southern half of the western hemisphere in 2015 for the Americas West M2.4 HSCT scenario.



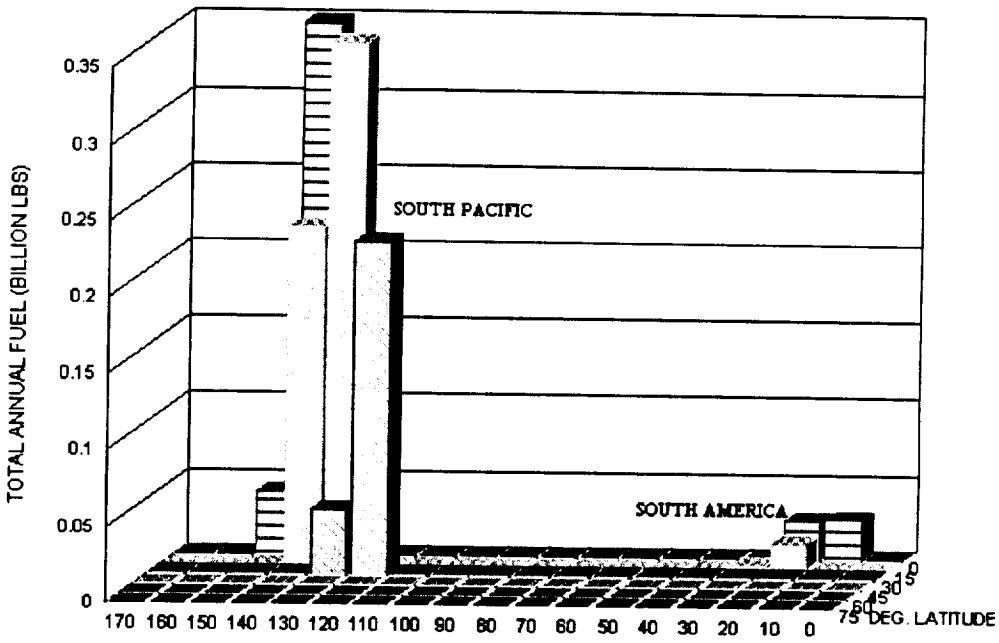
Total annual fuel distribution within the northern half of eastern hemisphere in 2015 for the Americas West M2.4 HSCT scenario.



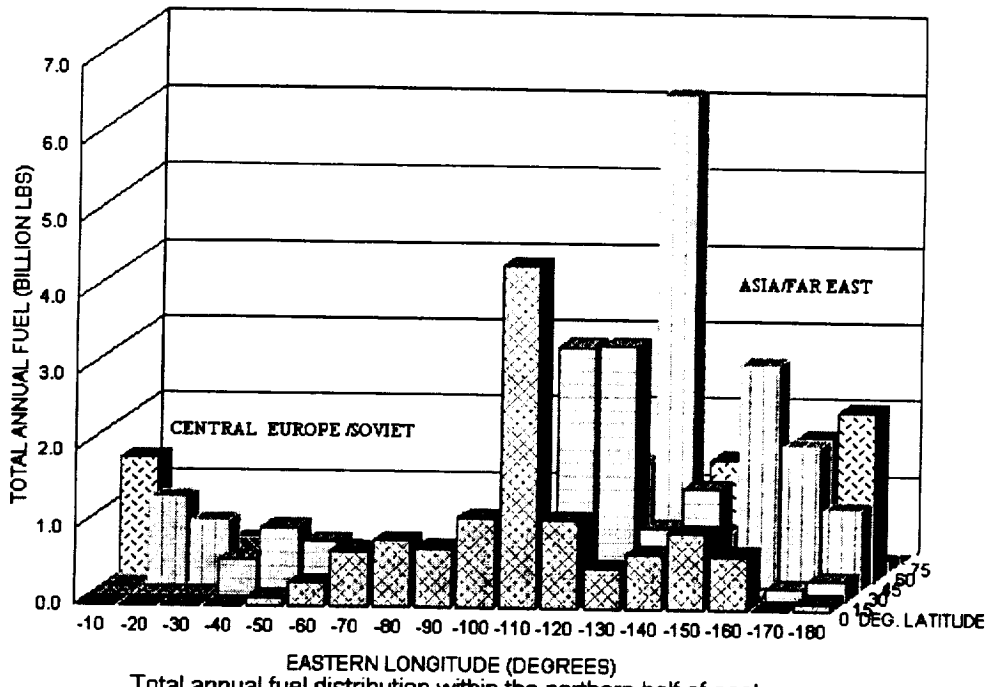
Total annual fuel distribution within the southern half of the eastern hemisphere in 2015 for the Americas West M2.4 HSCT scenario.



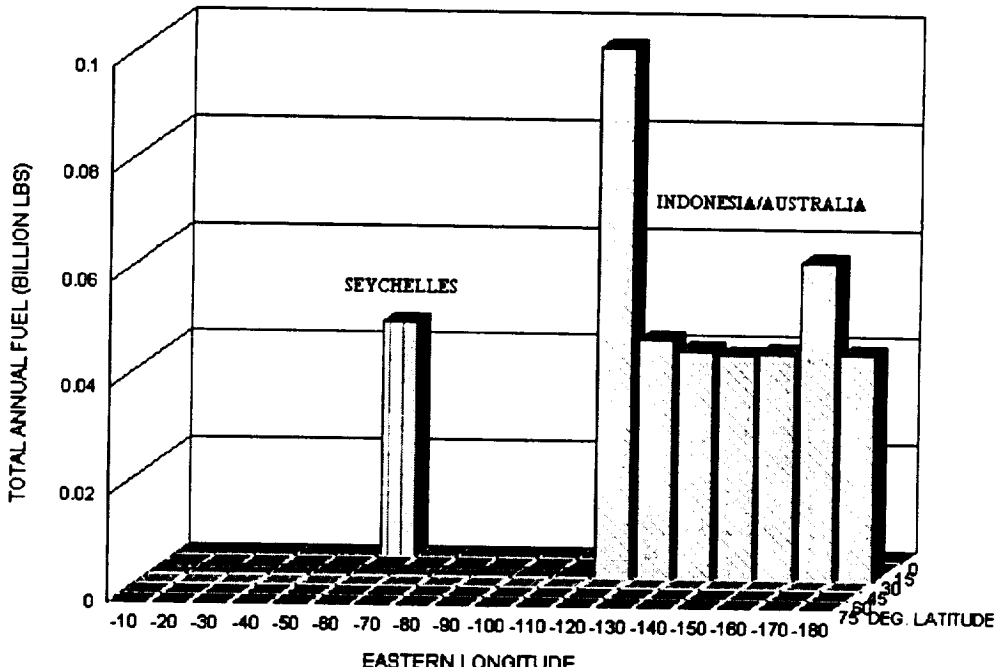
Total annual fuel distribution within the northern half of the western hemisphere in 2015 for the European M2.4 HSCT scenario.



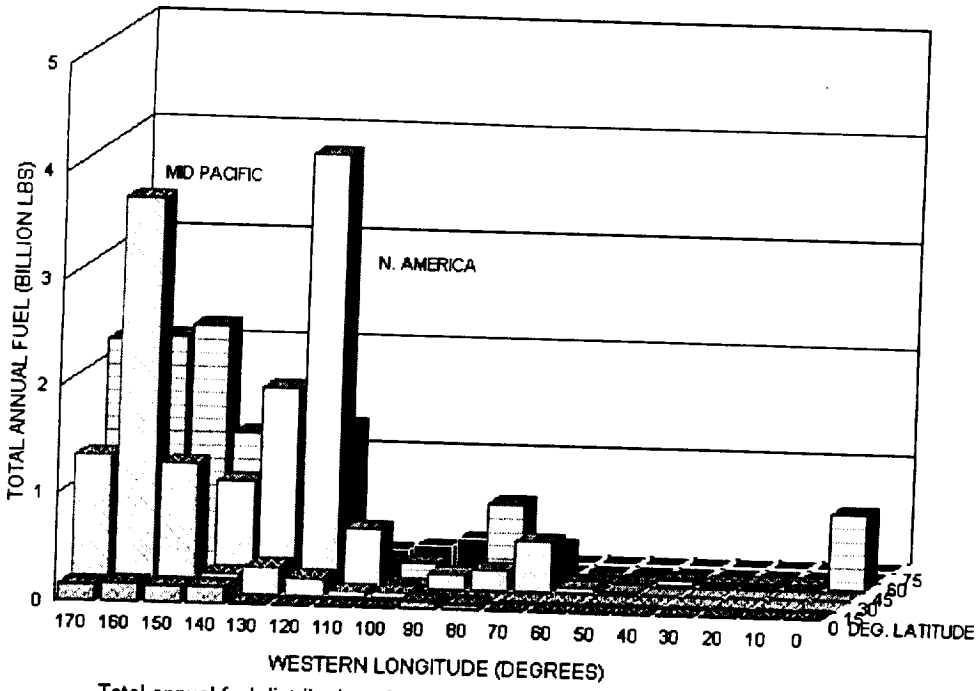
Total annual fuel distribution within the southern half of the western hemisphere in 2015 for the European scenario



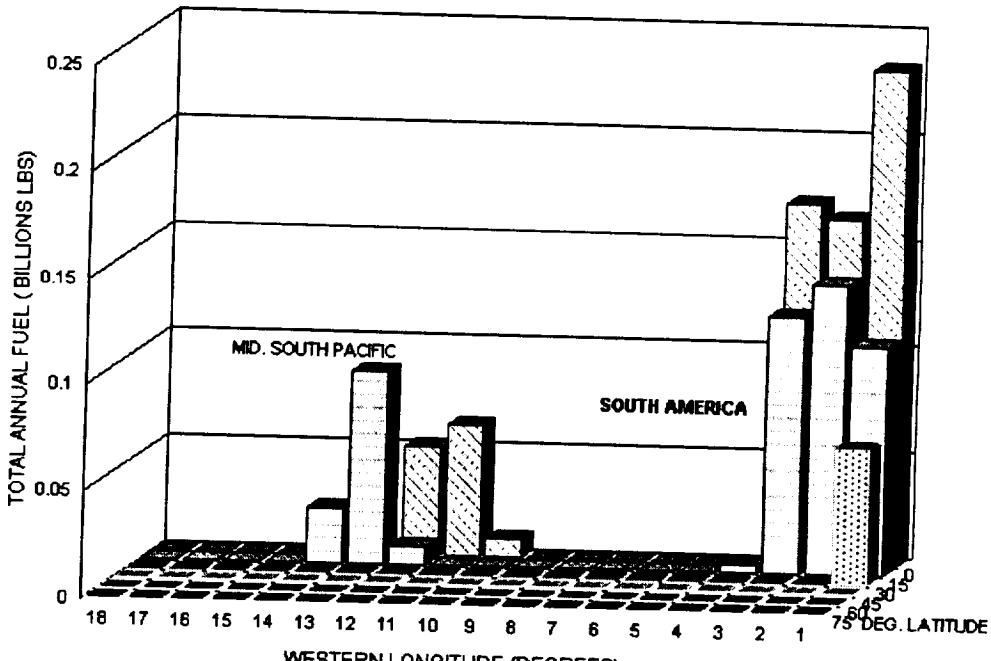
Total annual fuel distribution within the northern half of eastern hemisphere in 2015 for the European M2.4 HSCT scenario.



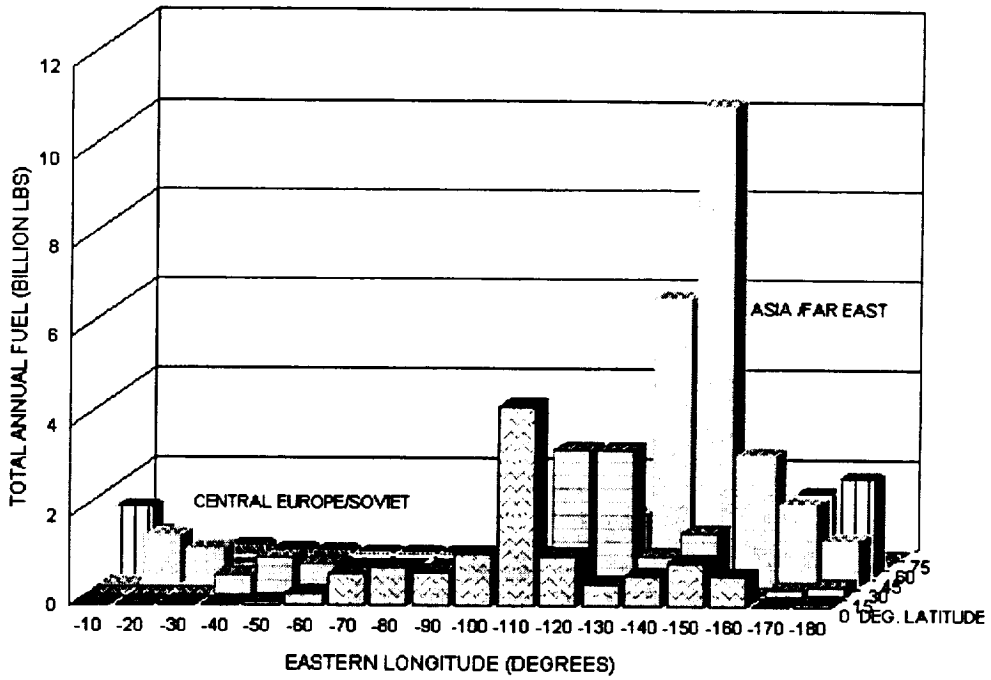
Total annual fuel distribution within the southern half of the eastern hemisphere in 2015 for the European M2.4 HSCT scenario.



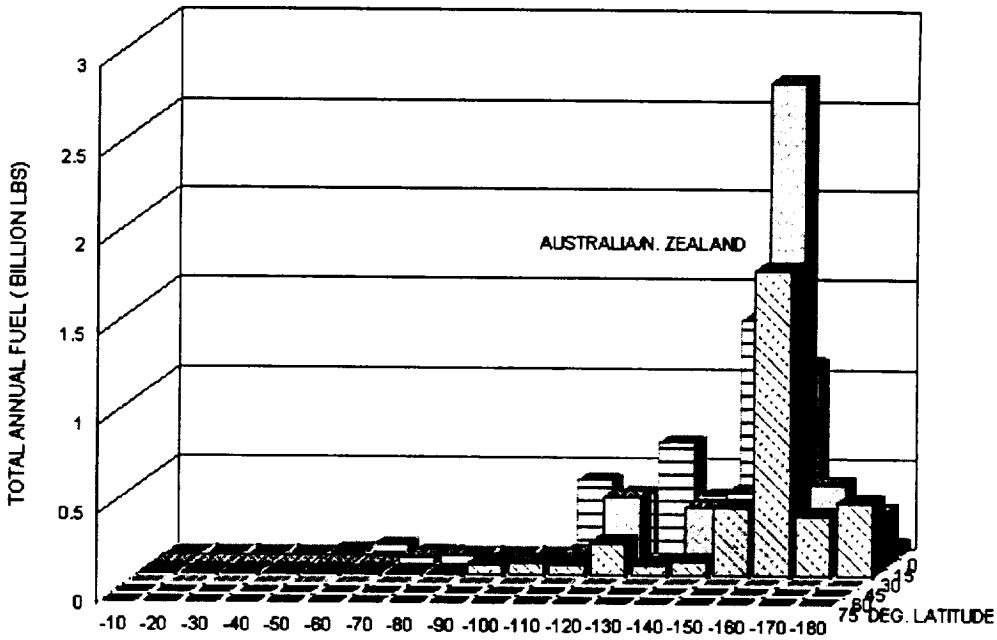
Total annual fuel distribution within the northern half of the western hemisphere in 2015 for the Far Eastern M2.4 HSCT scenario.



Total annual fuel distribution within the southern half of the western hemisphere in 2015 for the Far Eastern M2.4 HSCT scenario



Total annual fuel distribution within the northern half of the eastern hemisphere in 2015 for the Far Eastern M2.4 HSCT scenario.

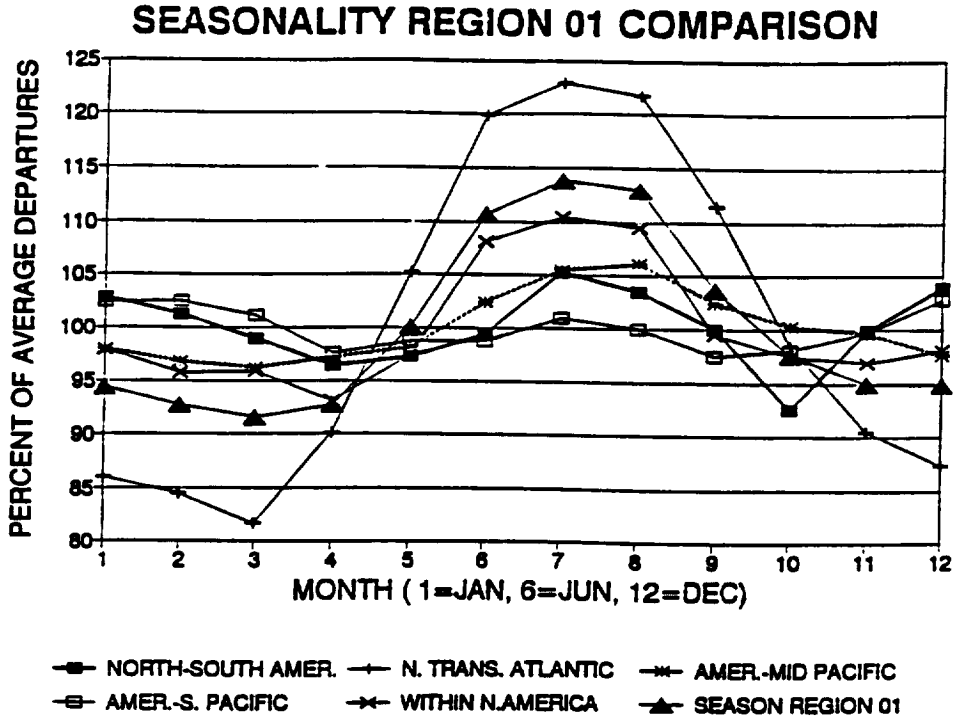


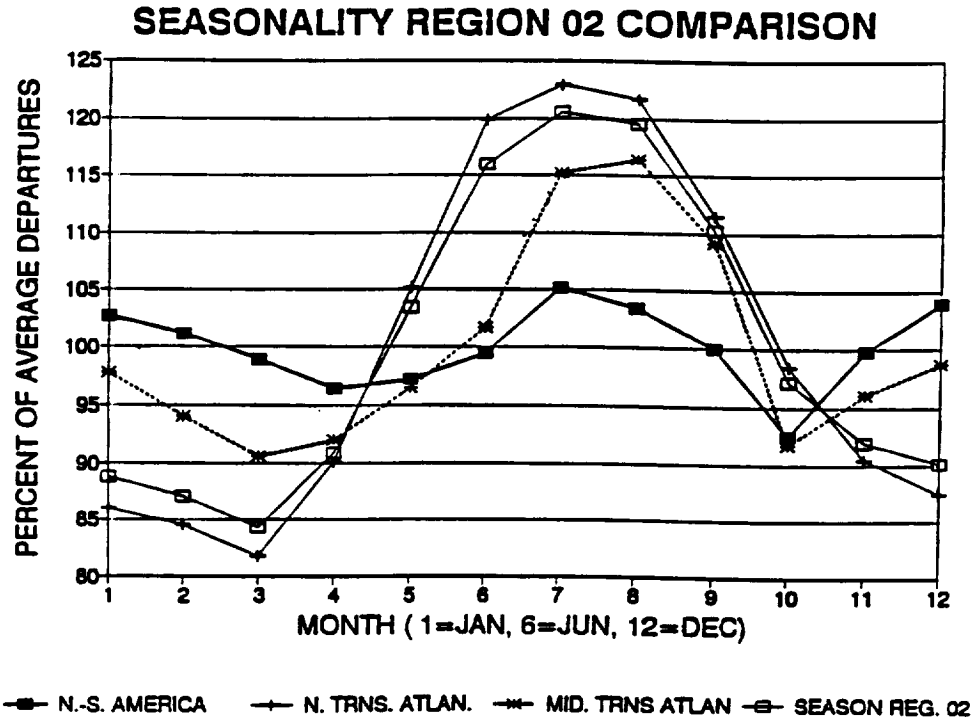
Total annual fuel distribution within the southern half of the eastern hemisphere in 2015 for the Far Eastern M2.4 HSCT scenario

APPENDIX F

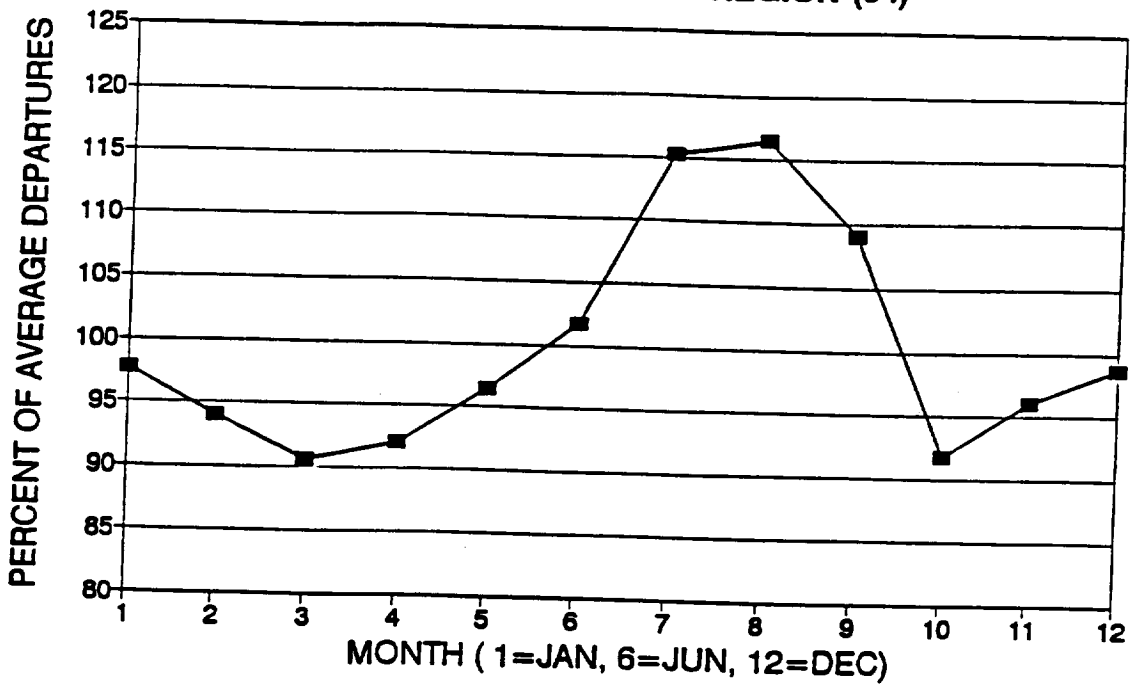
HSCT SEASONAL EFFECTS ON EMISSIONS

This appendix contains additional figures representing results of the seasonality factor development process. Both the component and composite monthly seasonality factors for individual Seasonality Regions are presented in the following 16 figures.

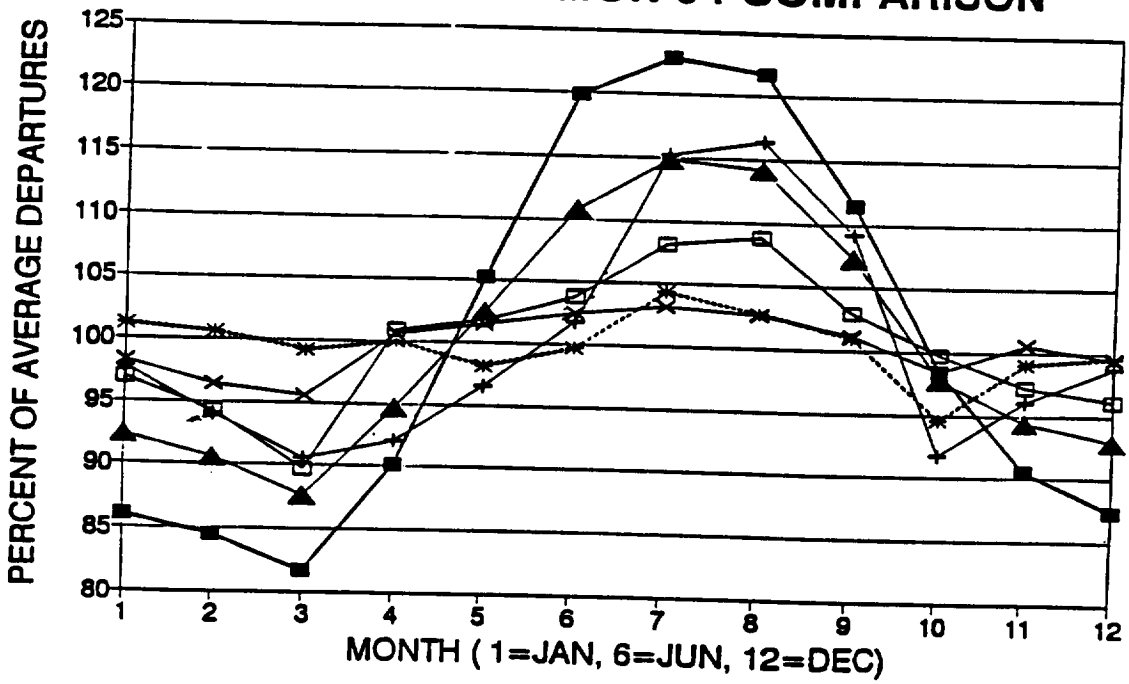




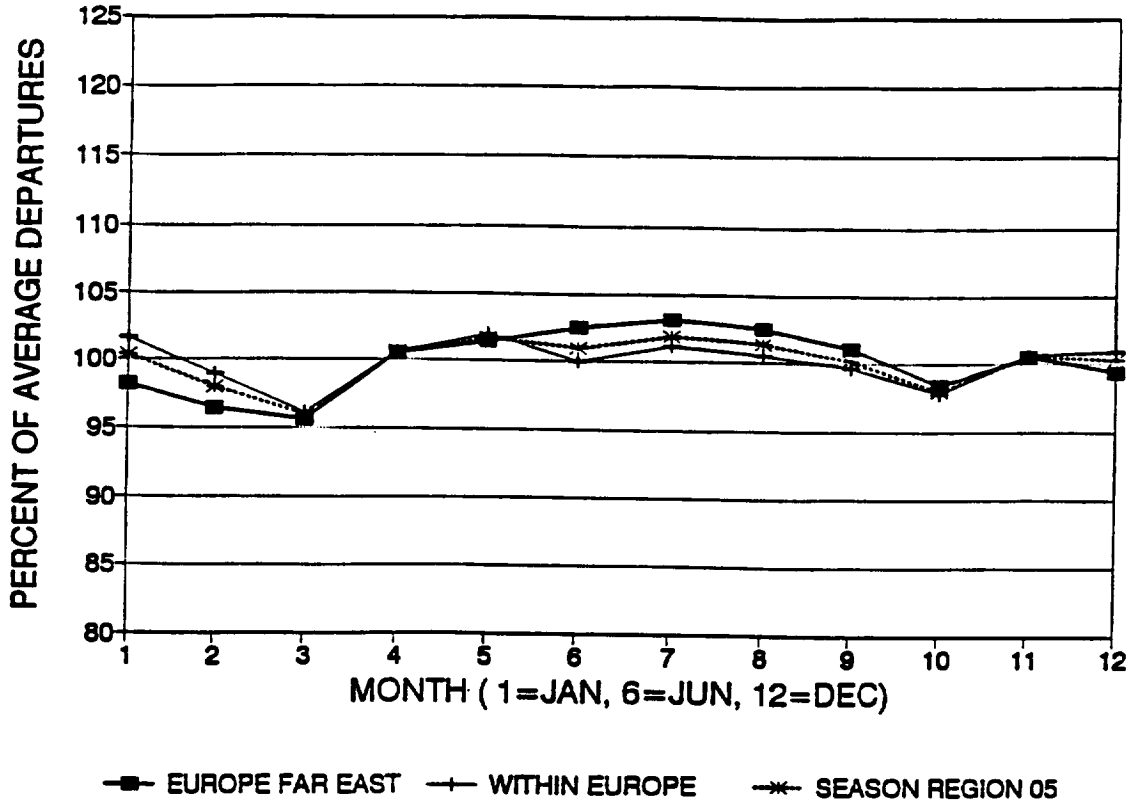
SEASONALITY REGION 03 COMPARISON
SUPPORTS SINGLE IATA REGION (04)



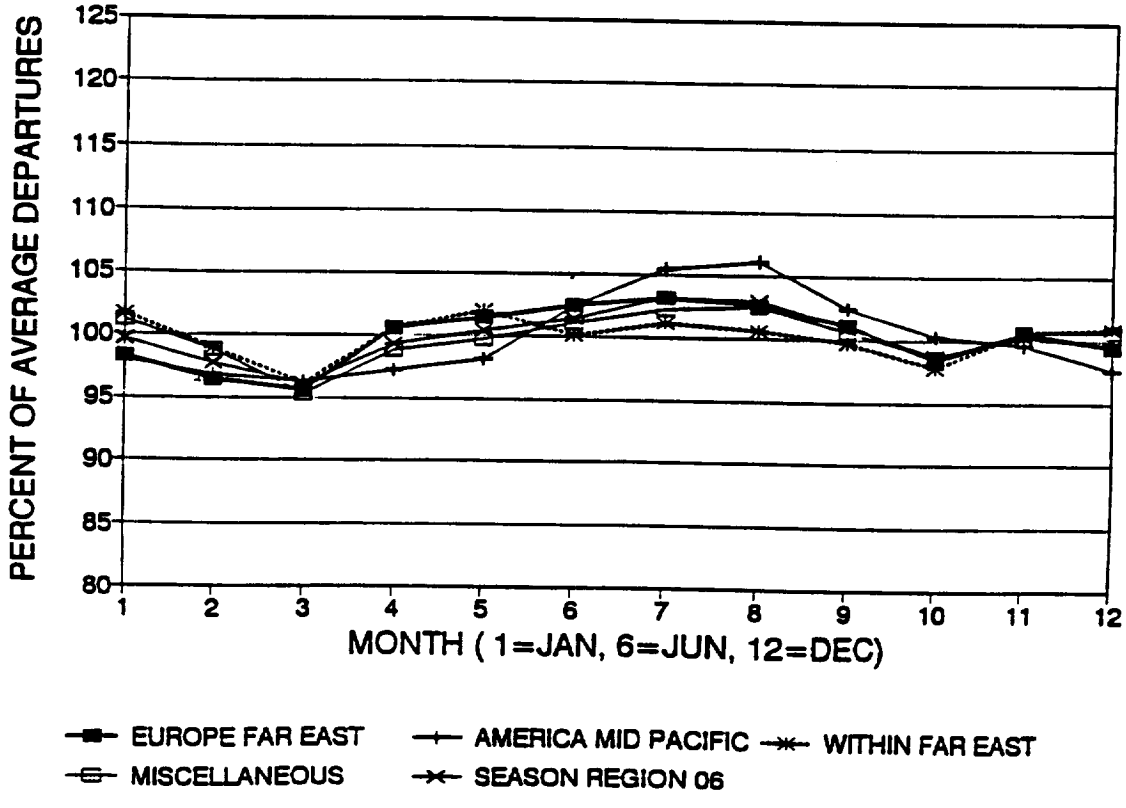
SEASONALITY REGION 04 COMPARISON



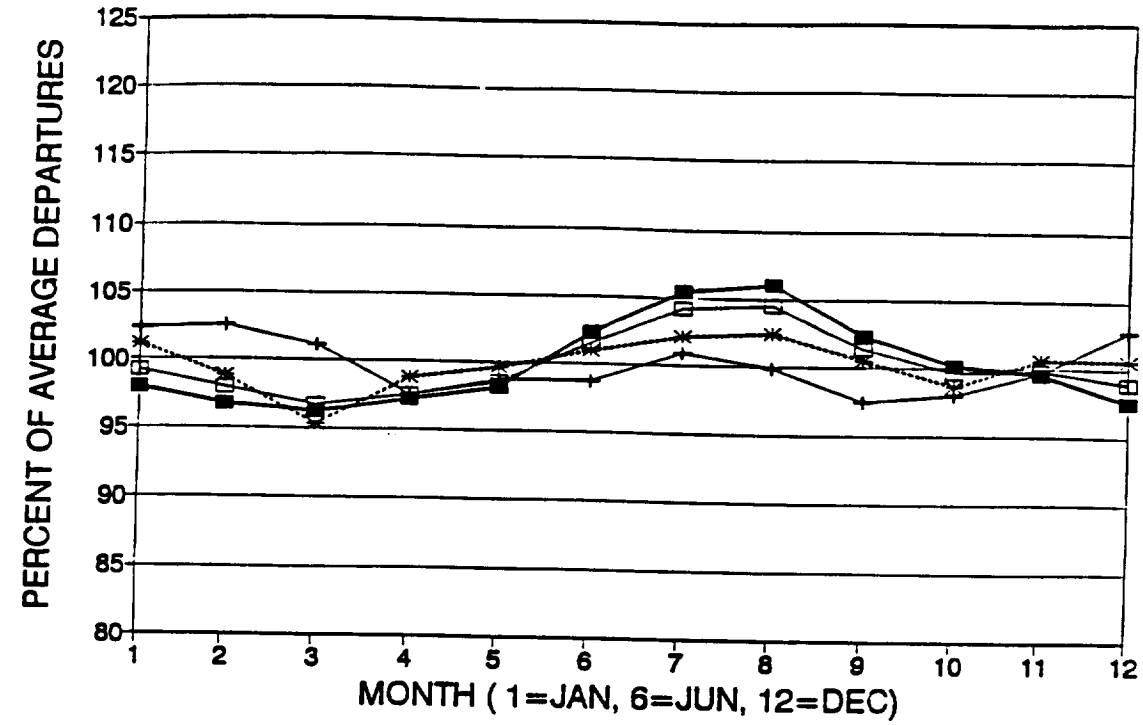
SEASONALITY REGION 05 COMPARISON



SEASONALITY REGION 06 COMPARISON

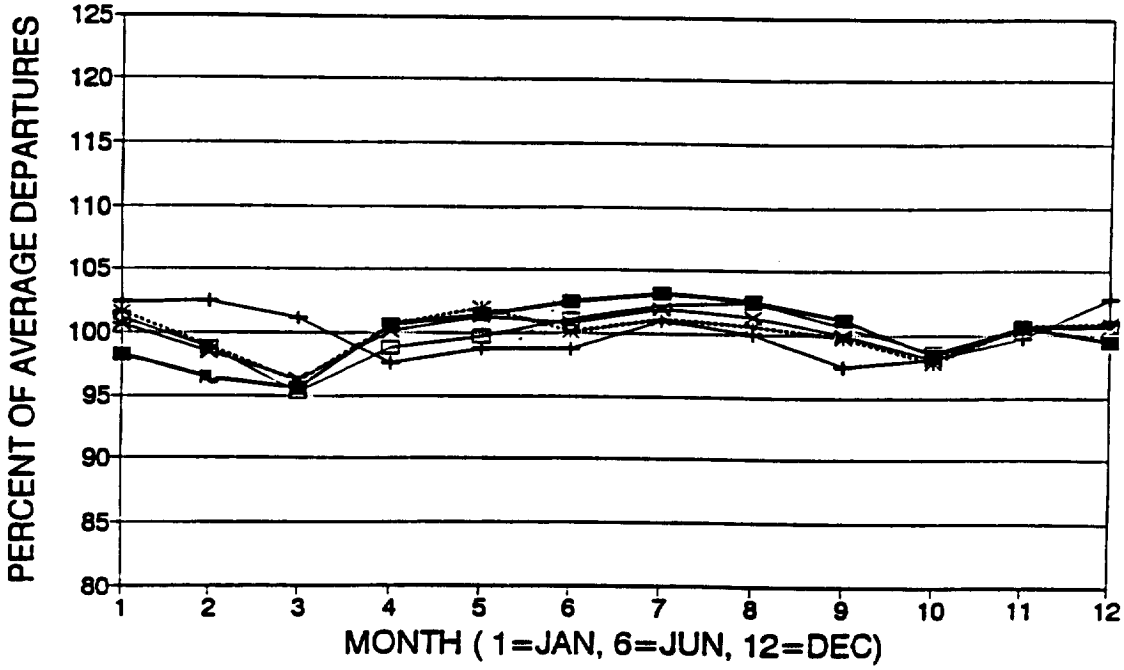


SEASONALITY REGION 07 COMPARISON



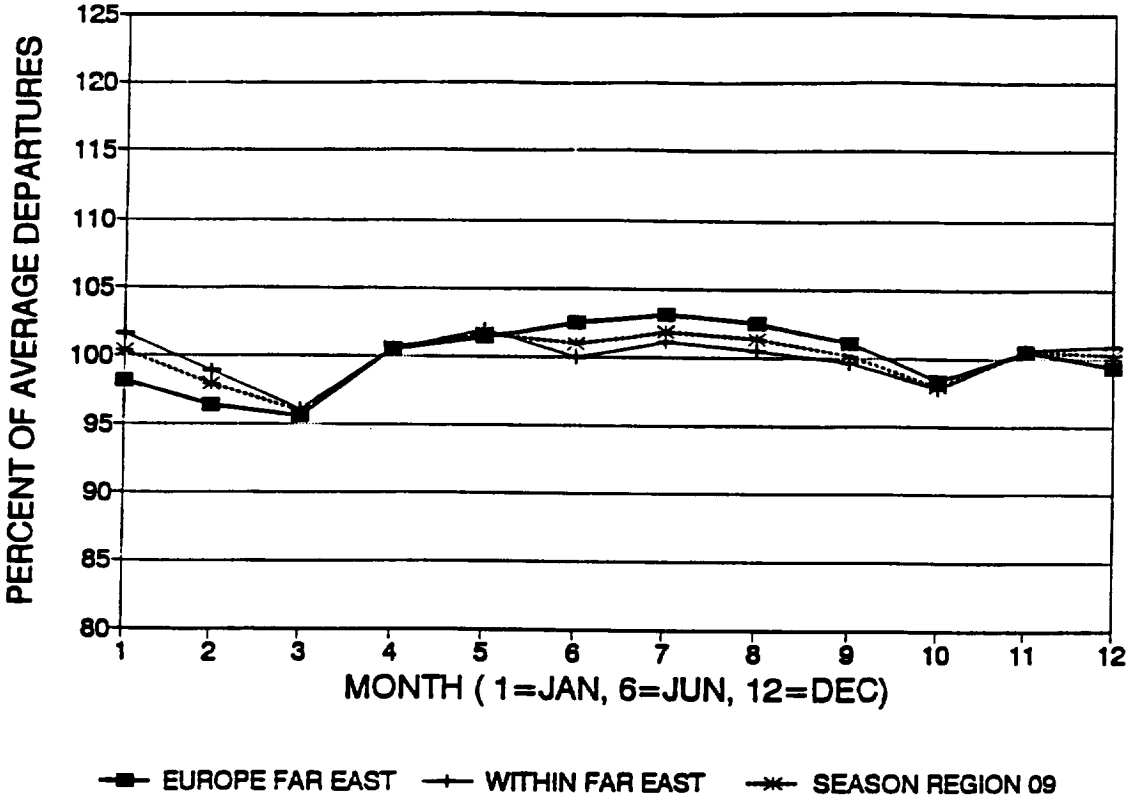
AMER MID PACIF. — AMERICAS S.PAC. — MISCELLANEOUS — SEASON REG 07

SEASONALITY REGION 08 COMPARISON



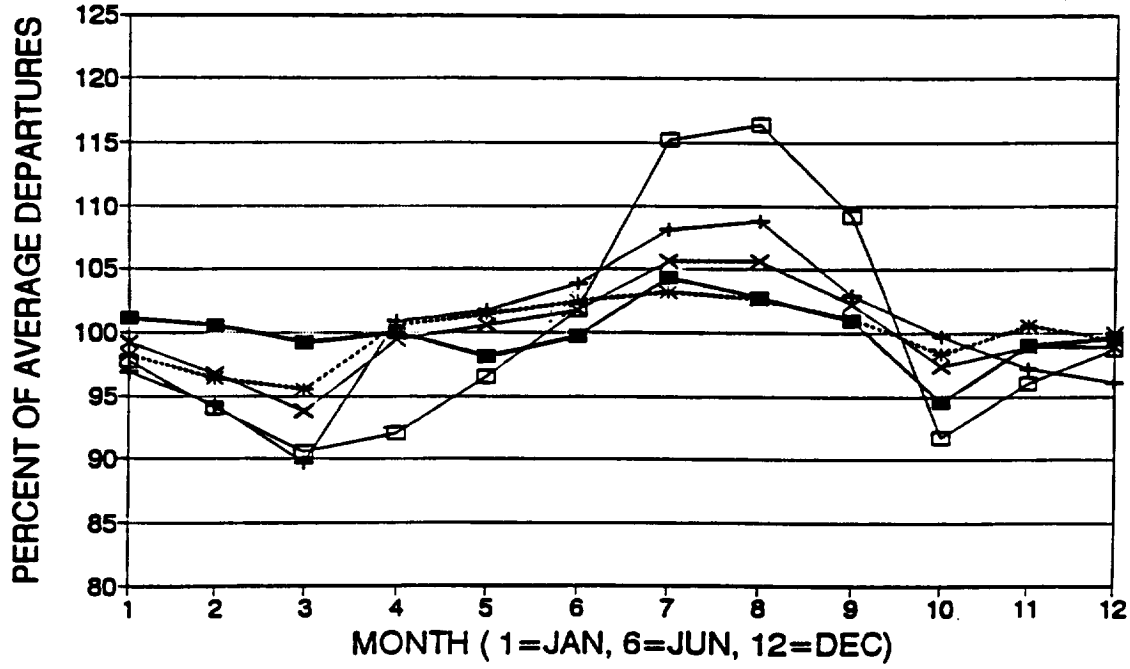
EUROPE FAR EAST — AMERICAS S. PACIFIC — WITHIN FAR EAST
MISCELLANEOUS — SEASON REGION 08

SEASONALITY REGION 09 COMPARISON



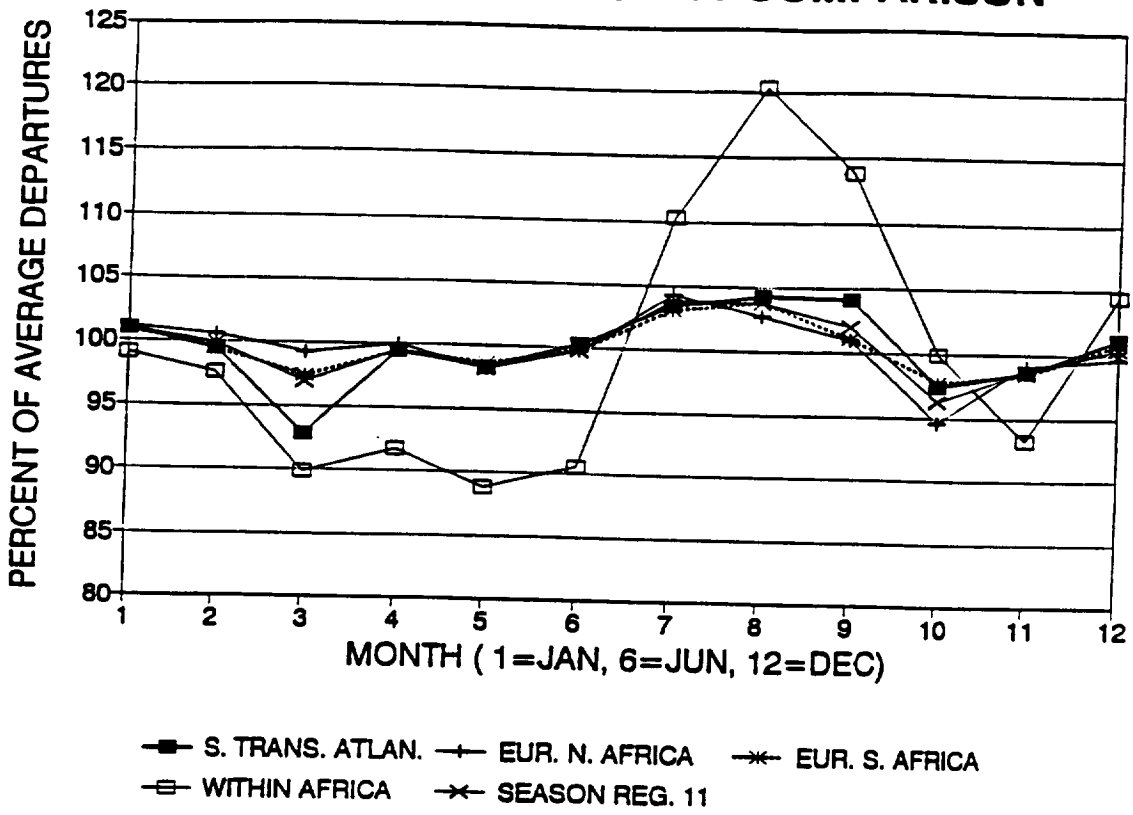
EUROPE FAR EAST — WITHIN FAR EAST — SEASON REGION 09

SEASONALITY REGION 10 COMPARISON

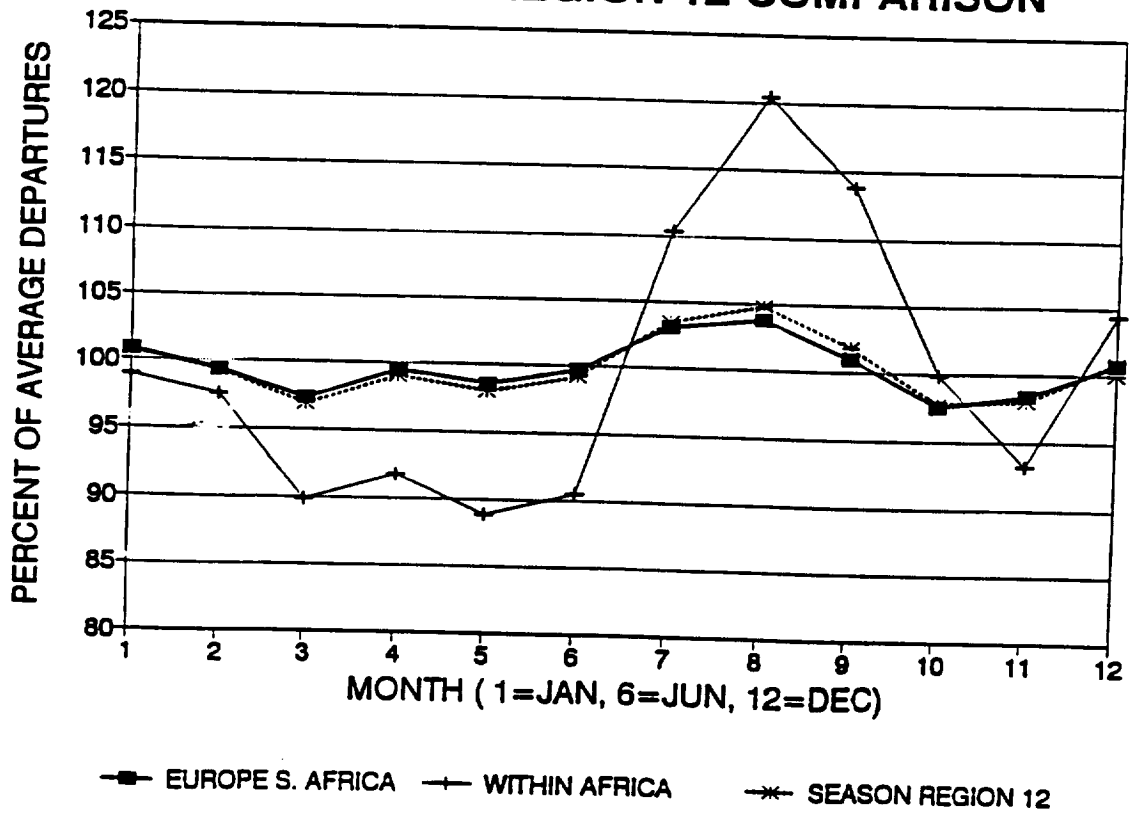


EUR. N.AFRICA — EUR. MID.EAST — EUR.FAR EAST
MID. TRNS. ATL. — SEASON REG 10

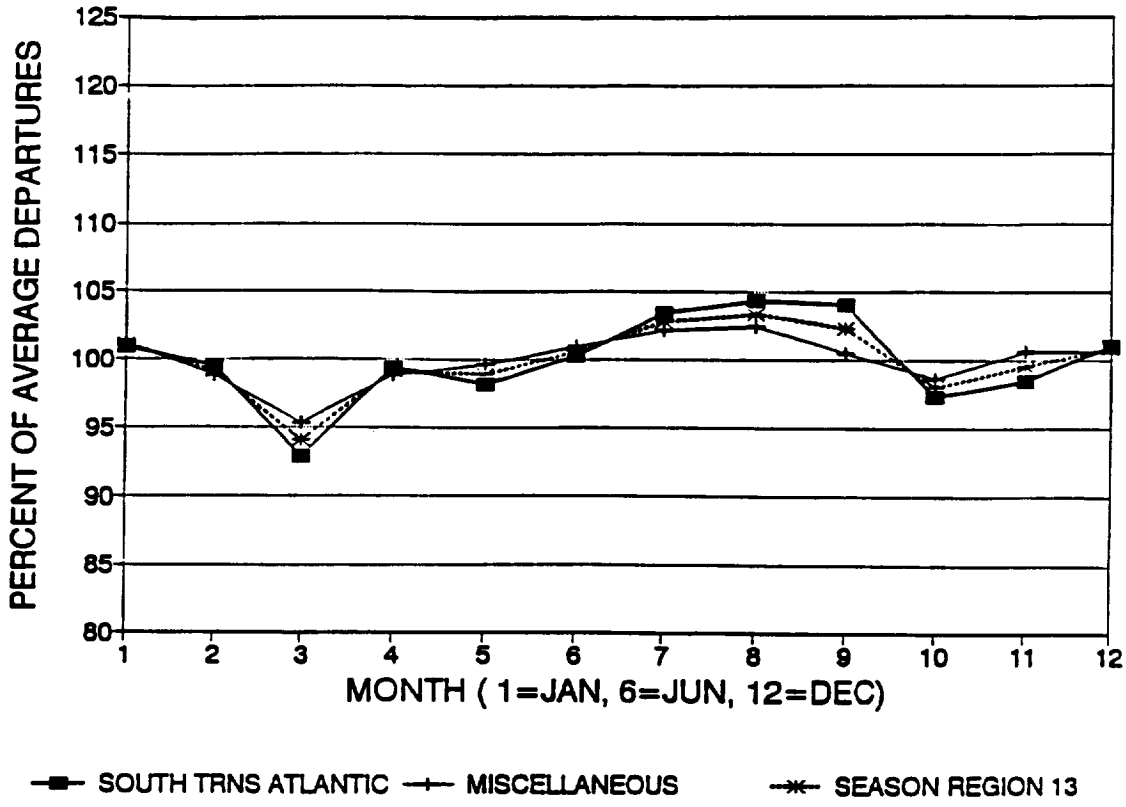
SEASONALITY REGION 11 COMPARISON



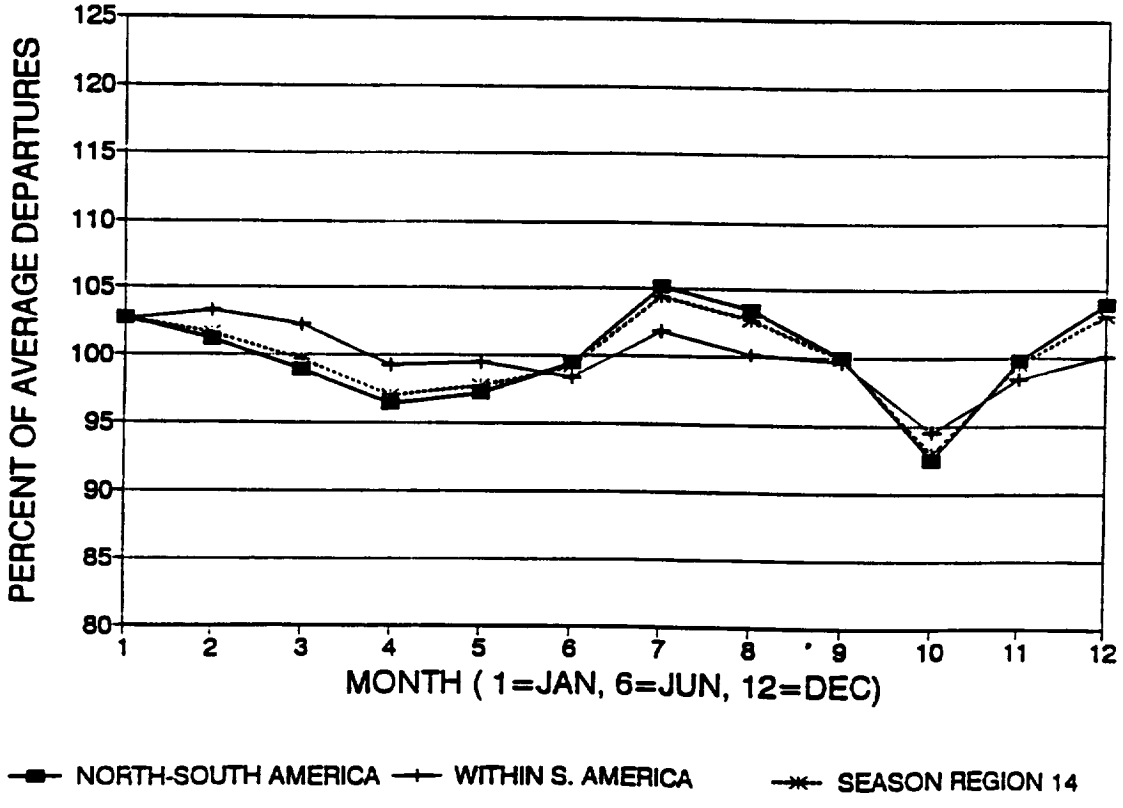
SEASONALITY REGION 12 COMPARISON



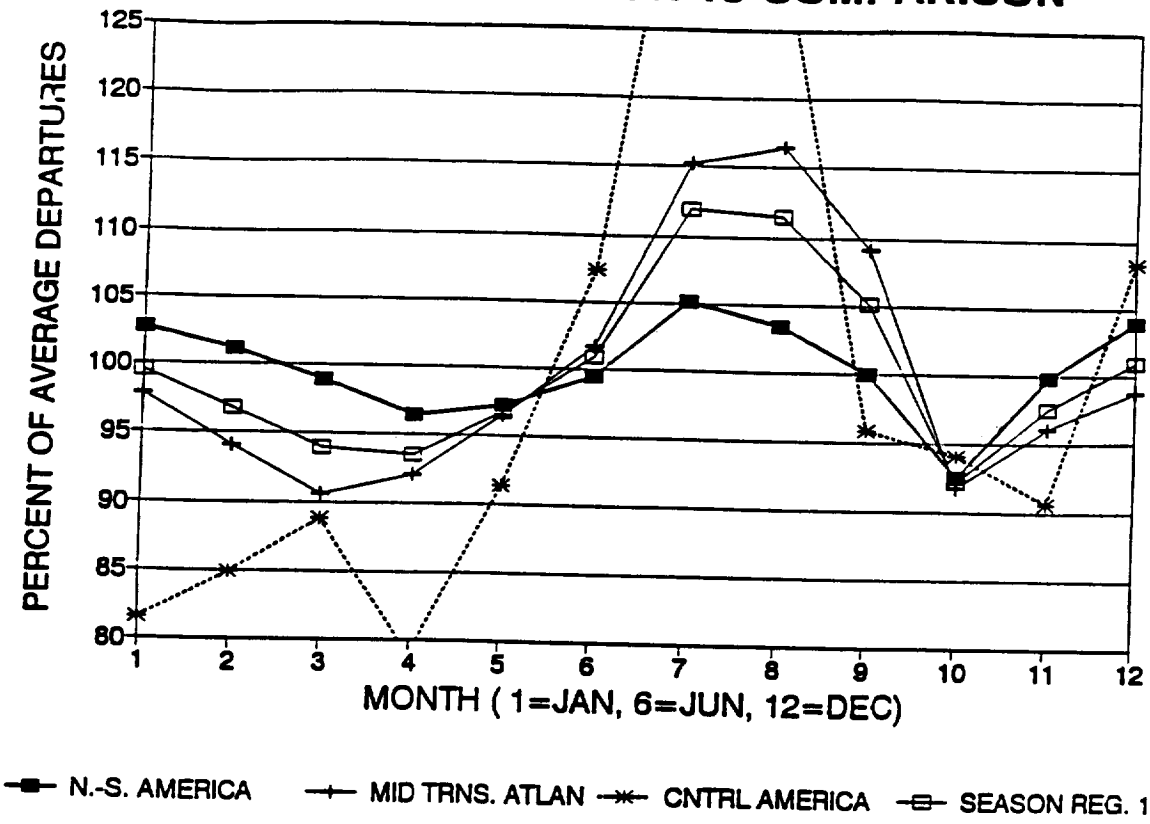
SEASONALITY REGION 13 COMPARISON



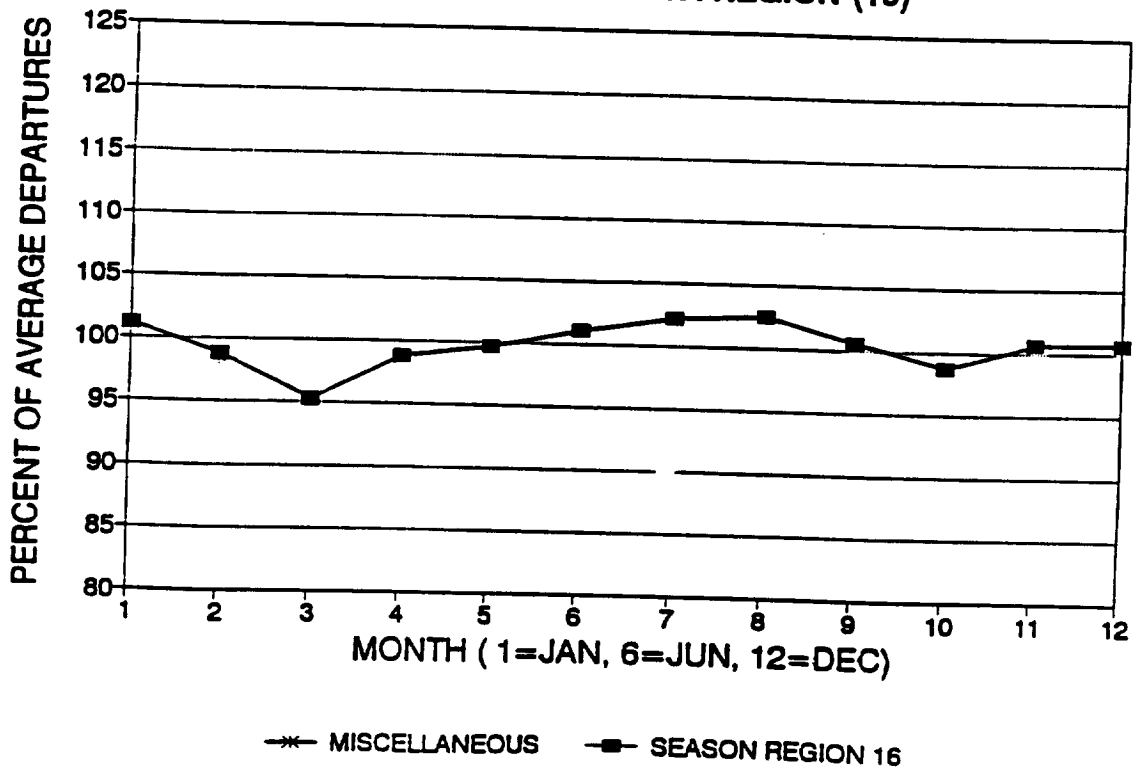
SEASONALITY REGION 14 COMPARISON



SEASONALITY REGION 15 COMPARISON

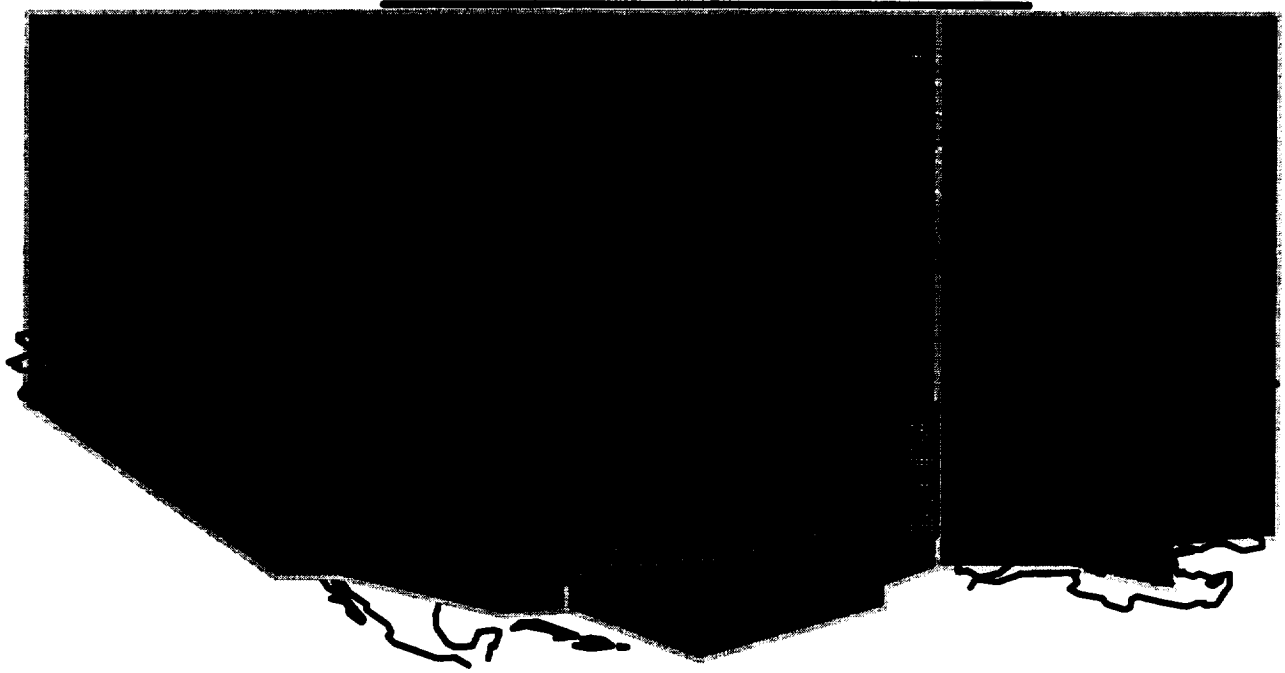


SEASONALITY REGION 16 COMPARISON
SUPPORTS SINGLE IATA REGION (19)

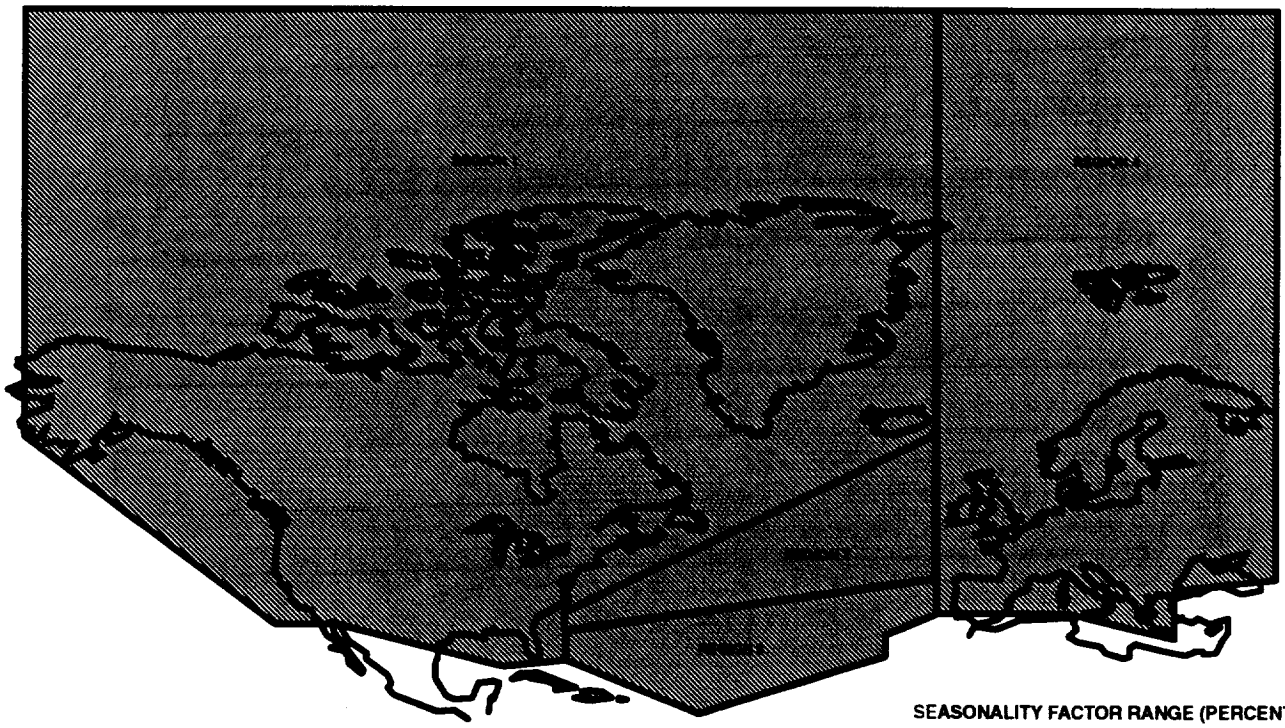


The next four figures graphically depict regional traffic variations on a quarterly basis. The first figure below group regions 1 thru 4 (North America/Europe) for two quarters: June, July and August (Global maximum traffic) and September, October and November.

SEASONALITY FACTORS - REGIONS 1 THRU 4



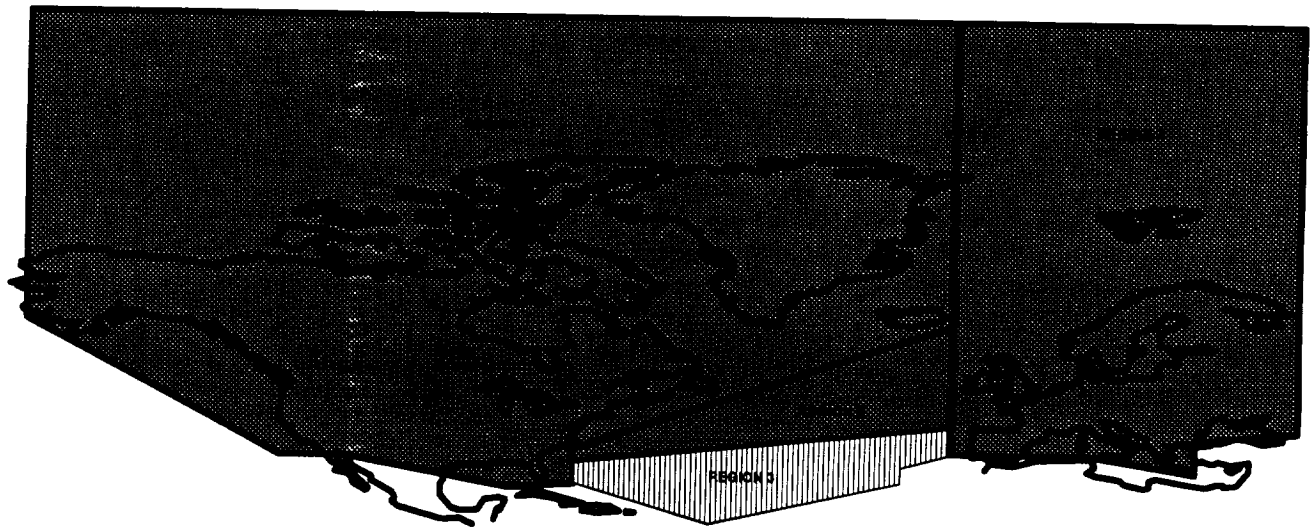
QUARTER 1: JUNE/JULY/AUGUST (WORLD MAX.)



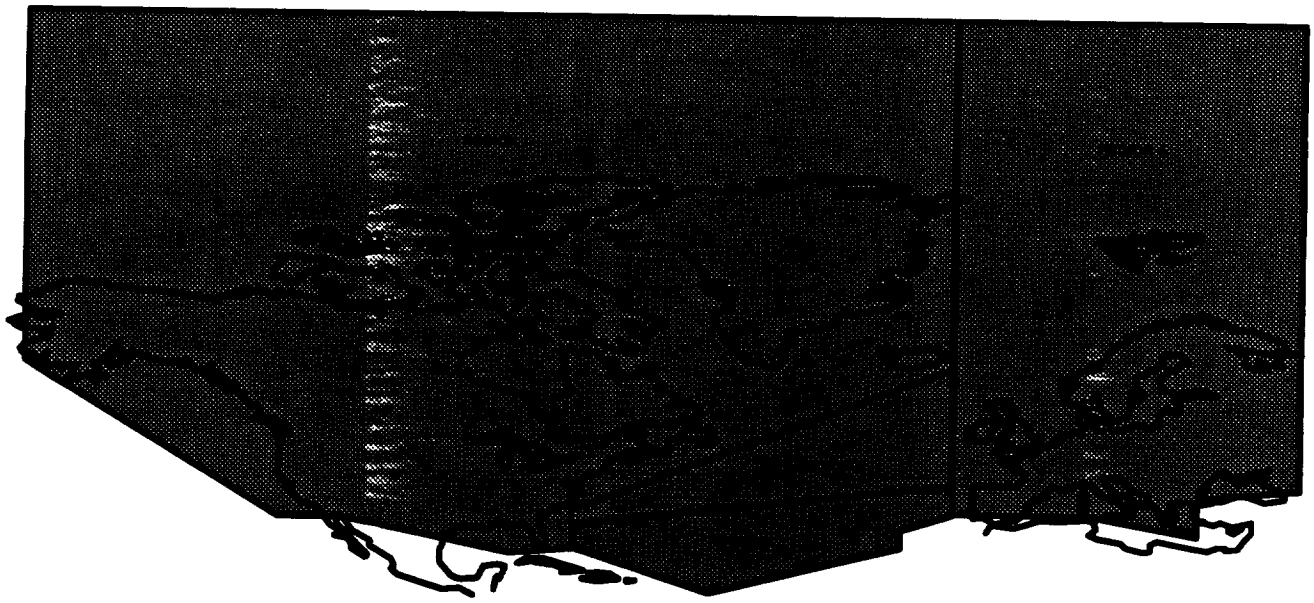
QUARTER 2: SEP/OCT/NOV

The following figure depicts regions 1 thru 4 seasonal variations for the two remaining quarters: December, January, and February (Global minimum traffic) and March, April, and May.

SEASONALITY FACTORS - REGIONS 1 THRU 4



QUARTER 3: DEC/JAN/FEB (WORLD MIN.)



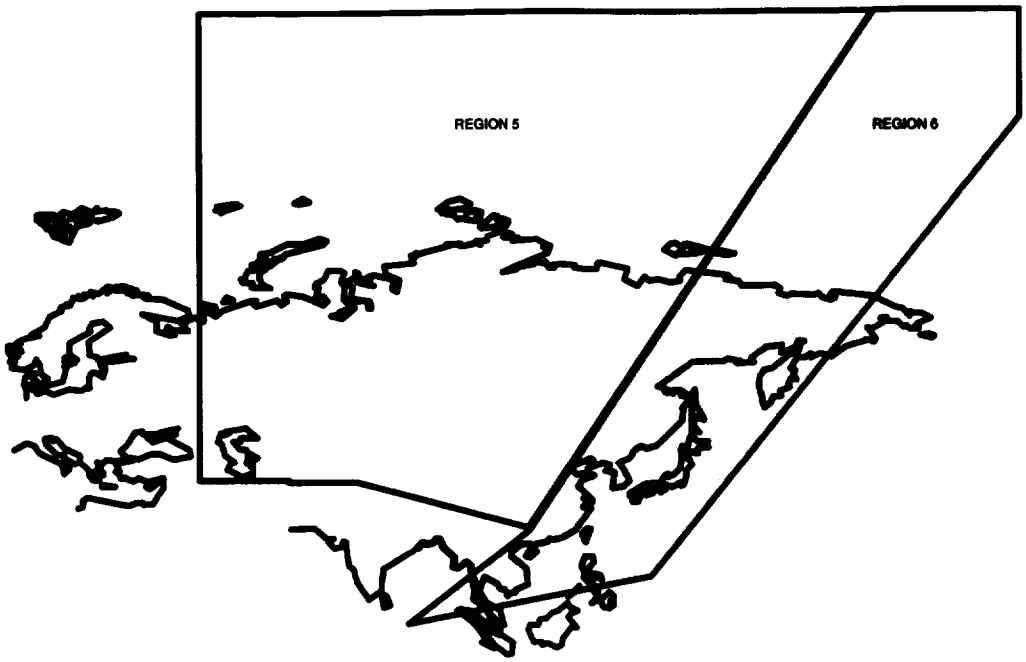
QUARTER 4: MAR/APR/MAY

SEASONALITY FACTOR RANGE (PERCENT)

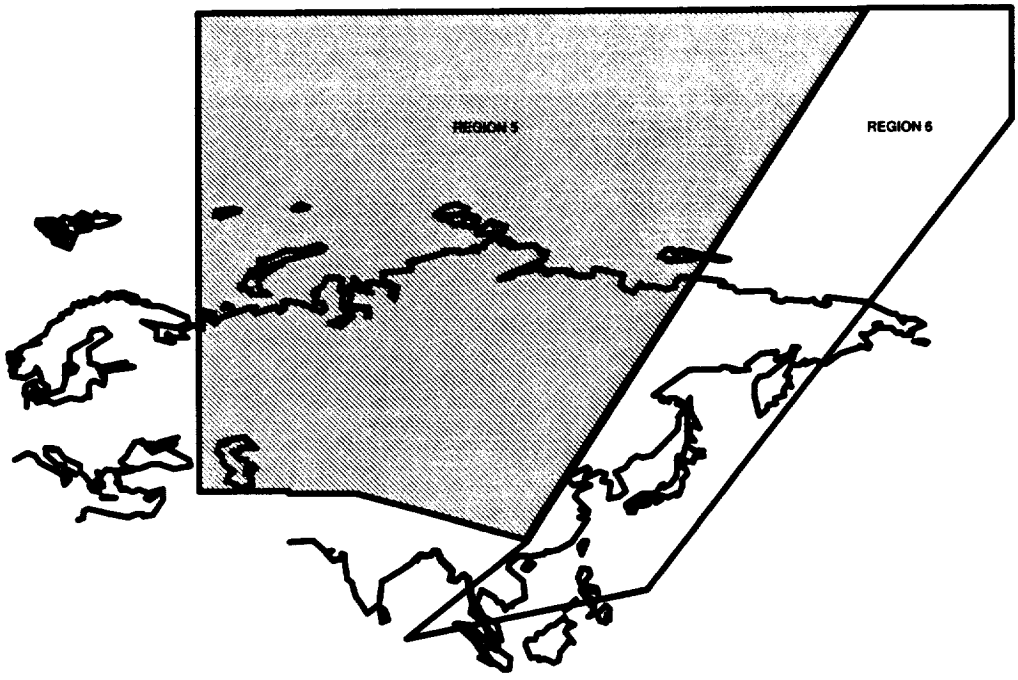
> 100	> 102
> 98	> 104
> 96	> 106
> 90	> 110
	> 115

The next four figures graphically depict regional traffic variations on a quarterly basis. The first figure below group regions 5 and 6 (northern Asia/Far East) for two quarters: June, July and August (Global maximum traffic) and September, October and November.

SEASONALITY FACTORS - REGIONS 5 AND 6



QUARTER 1: JUNE/JULY/AUGUST (WORLD MAX.)



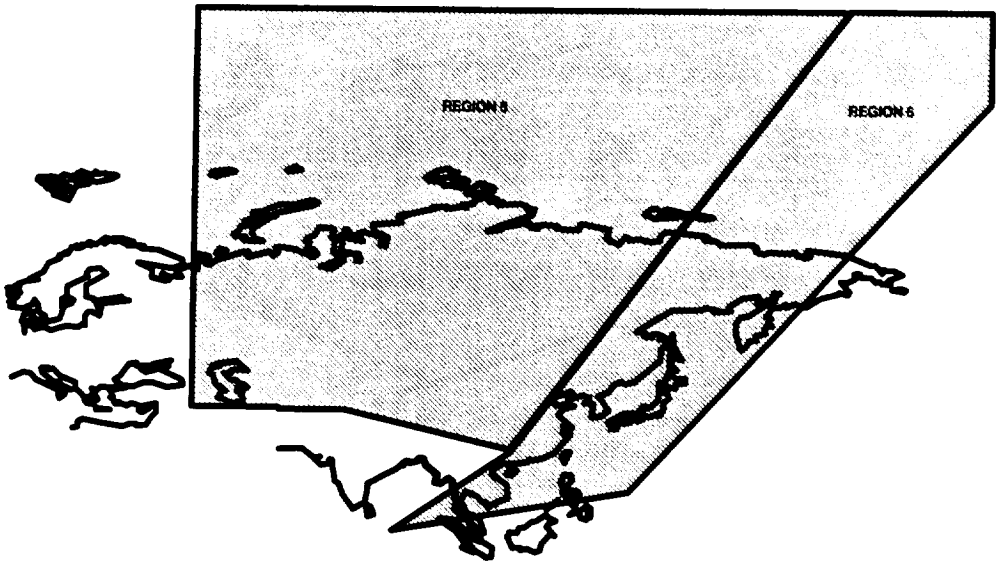
QUARTER 2: SEP/OCT/NOV

SEASONALITY FACTOR RANGE (PERCENT)

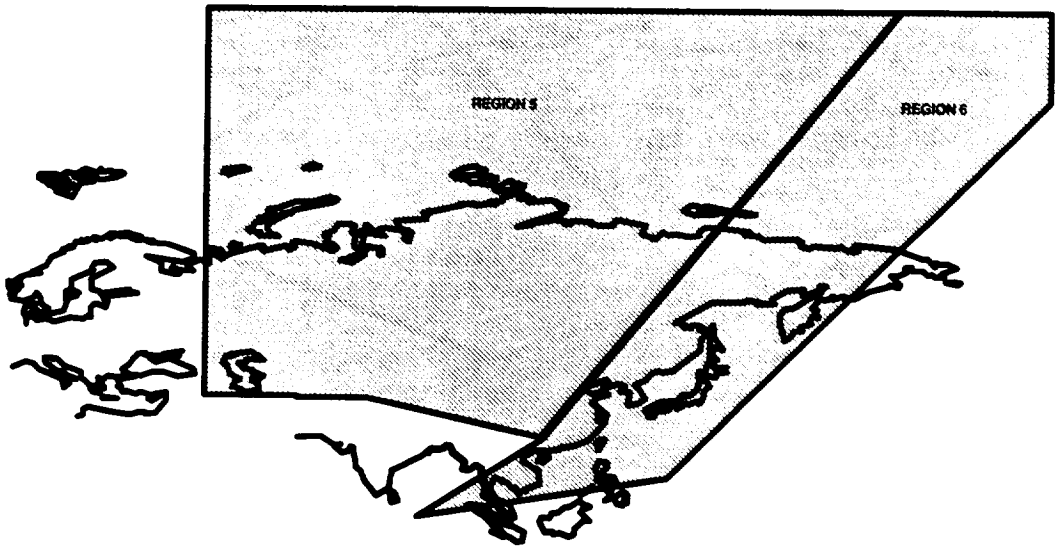
> 100	> 102
> 98	> 104
> 96	> 106
> 90	> 110
	> 115

The following figure depicts regions 5 and 6seasonal variations for the two remaining quarters: December, January, and February (Global minimum traffic) and March, April, and May.

SEASONALITY FACTORS - REGIONS 5 AND 6



QUARTER 3: DEC/JAN/FEB (WORLD MIN.)



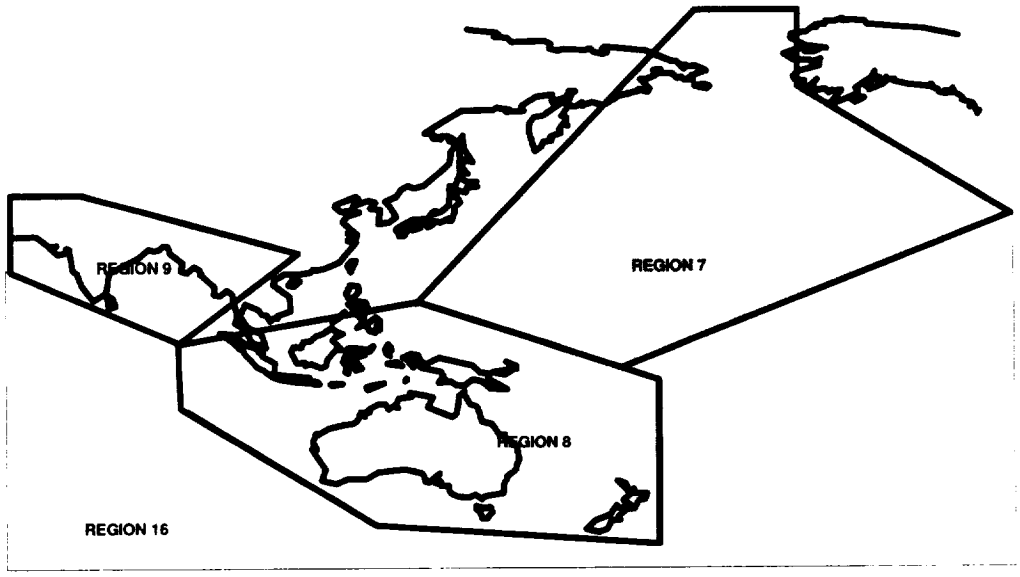
QUARTER 4: MAR/APR/MAY

SEASONALITY FACTOR RANGE (PERCENT)

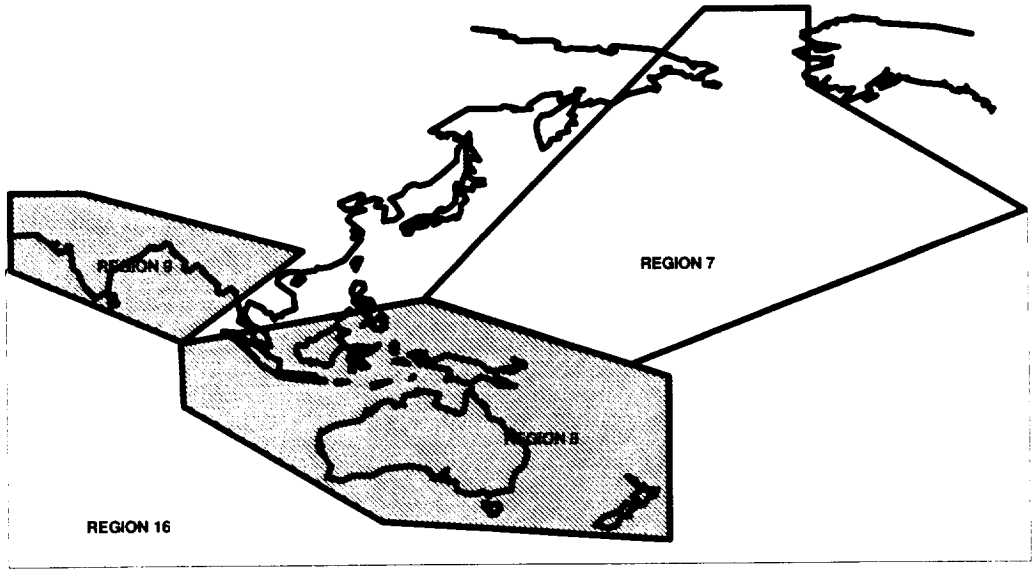
> 100	> 102
> 98	> 104
> 96	> 106
> 90	> 110
	> 115

The next four figures graphically depict regional traffic variations on a quarterly basis. The first figure below group regions 7 thru 9 (Southern Asia Oceana) for two quarters: June, July and August (Global maximum traffic) and September, October and November.

SEASONALITY FACTORS - REGIONS 7 THRU 9



QUARTER 1: JUNE/JULY/AUGUST (WORLD MAX.)



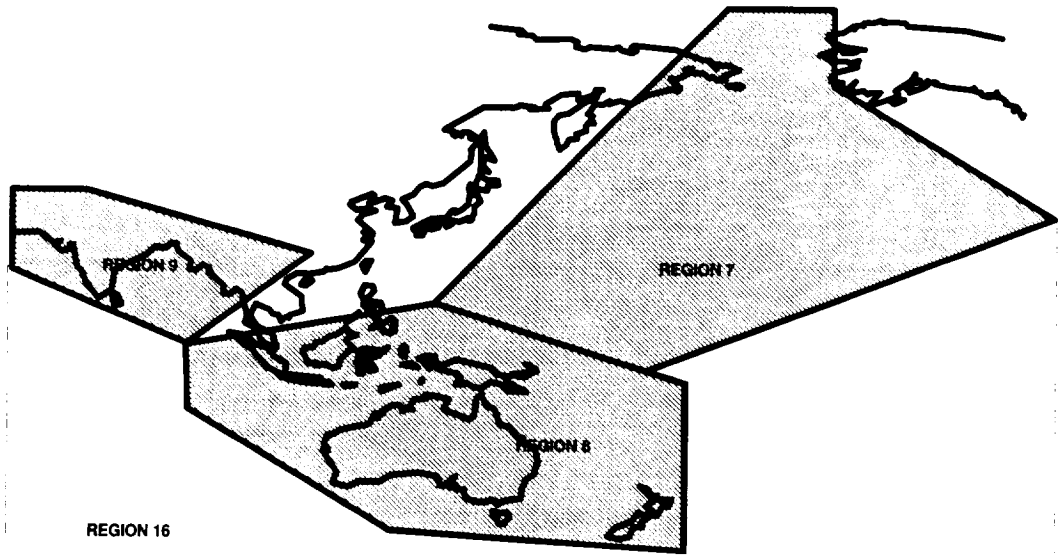
QUARTER 2: SEP/OCT/NOV

SEASONALITY FACTOR RANGE (PERCENT)

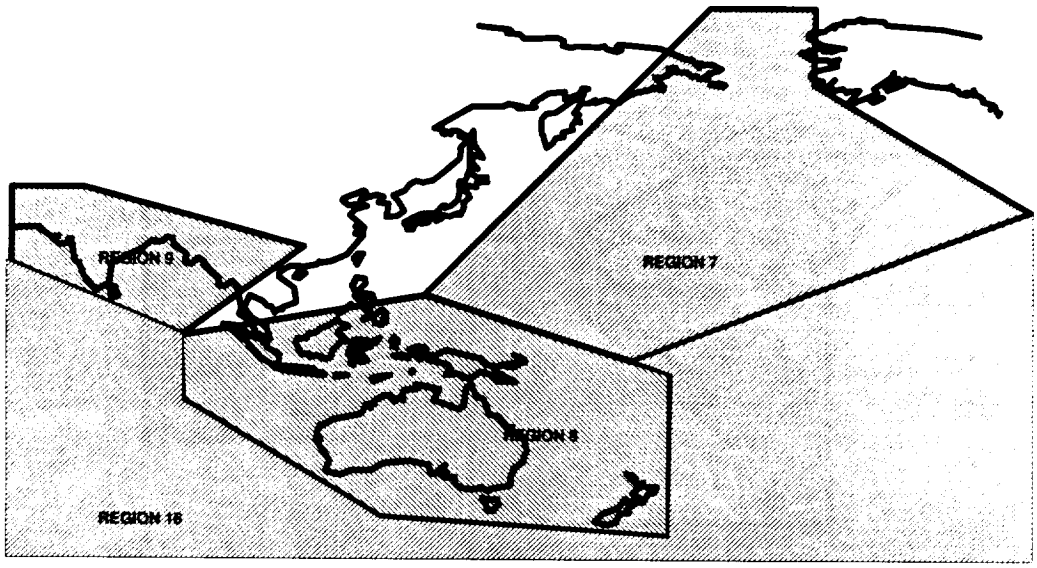
> 100	> 102
> 98	> 104
> 96	> 106
> 90	> 110
	> 115

The following figure depicts regions 7 thru 9 seasonal variations for the two remaining quarters: December, January, and February (Global minimum traffic) and March, April, and May.

SEASONALITY FACTORS - REGIONS 7 THRU 9



QUARTER 3: DEC/JAN/FEB (WORLD MIN.)



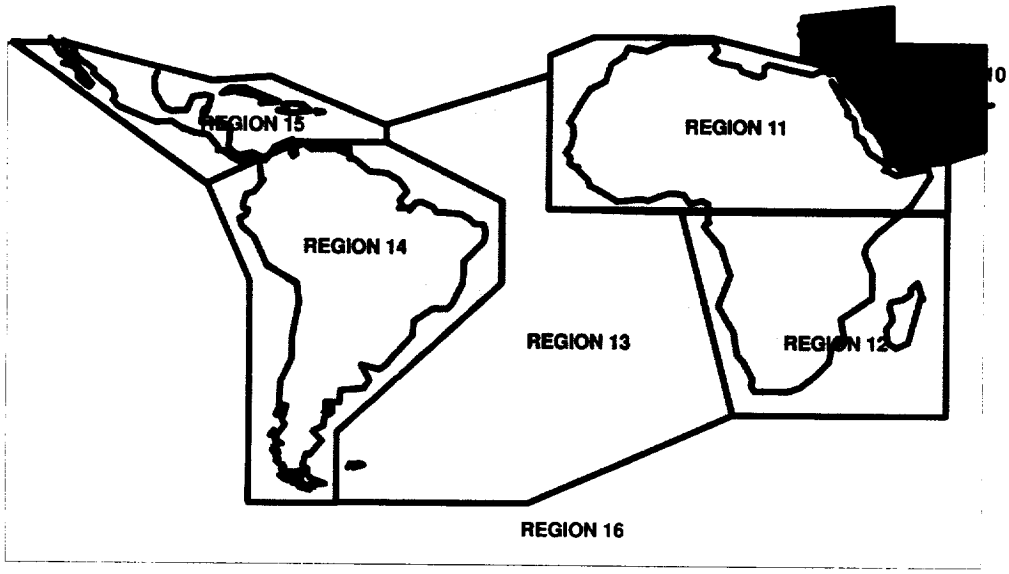
QUARTER 4: MAR/APR/MAY

SEASONALITY FACTOR RANGE (PERCENT)

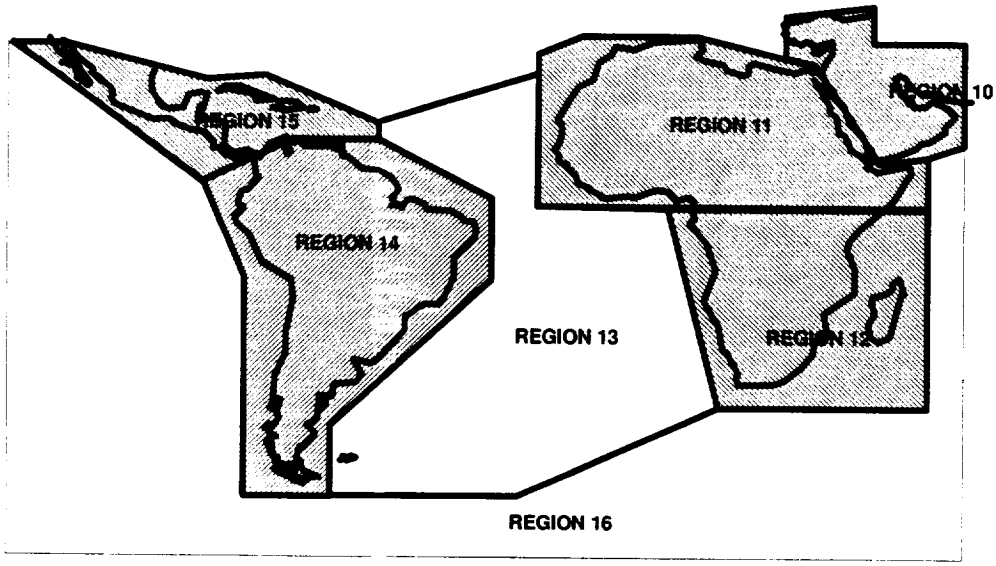
> 100	> 102
> 98	> 104
> 96	> 106
> 90	> 110
	> 115

The next four figures graphically depict regional traffic variations on a quarterly basis. The first figure below group regions 10 thru 16 (Africa/South America) for two quarters: June, July and August (Global maximum traffic) and September, October and November.

SEASONALITY FACTORS - REGIONS 10 THRU 16



QUARTER 1: JUNE/JULY/AUGUST (WORLD MAX.)



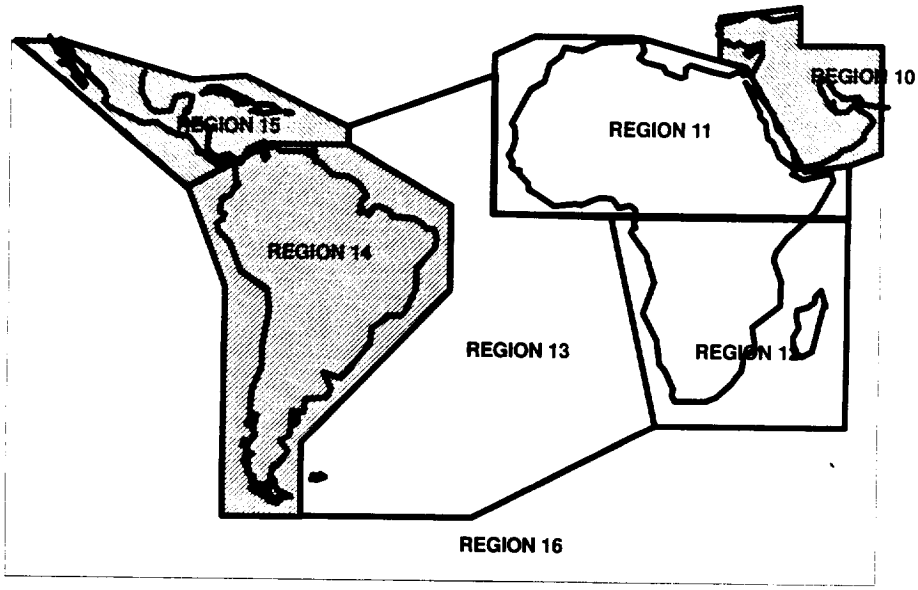
QUARTER 2: SEP/OCT/NOV

SEASONALITY FACTOR RANGE (PERCENT)

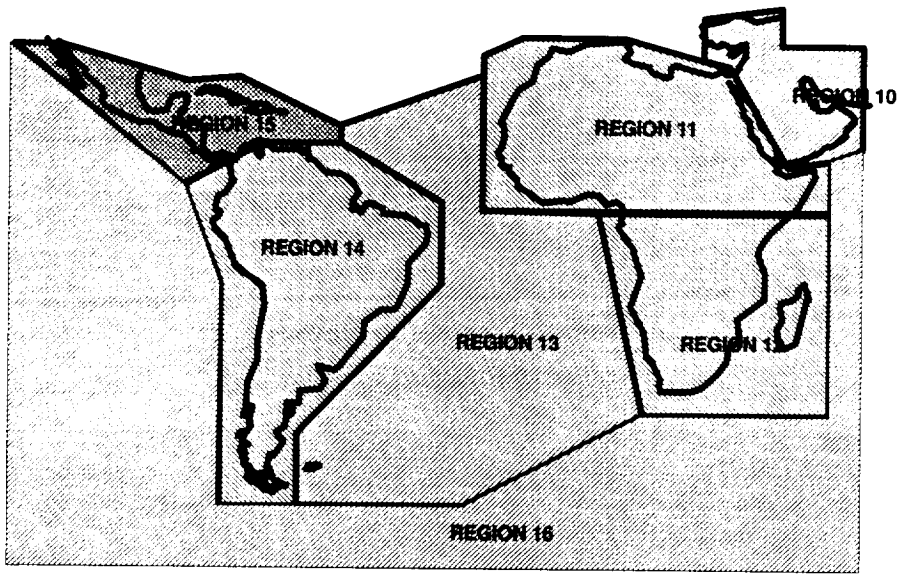
> 100	> 102
> 98	> 104
> 96	> 106
> 90	> 110
	> 115

The following figure depicts regions 10 thru 16 seasonal variations for the two remaining quarters: December, January, and February (Global minimum traffic) and March, April, and May.

SEASONALITY FACTORS - REGIONS 10 THRU 16



QUARTER 3: DEC/JAN/FEB (WORLD MIN.)

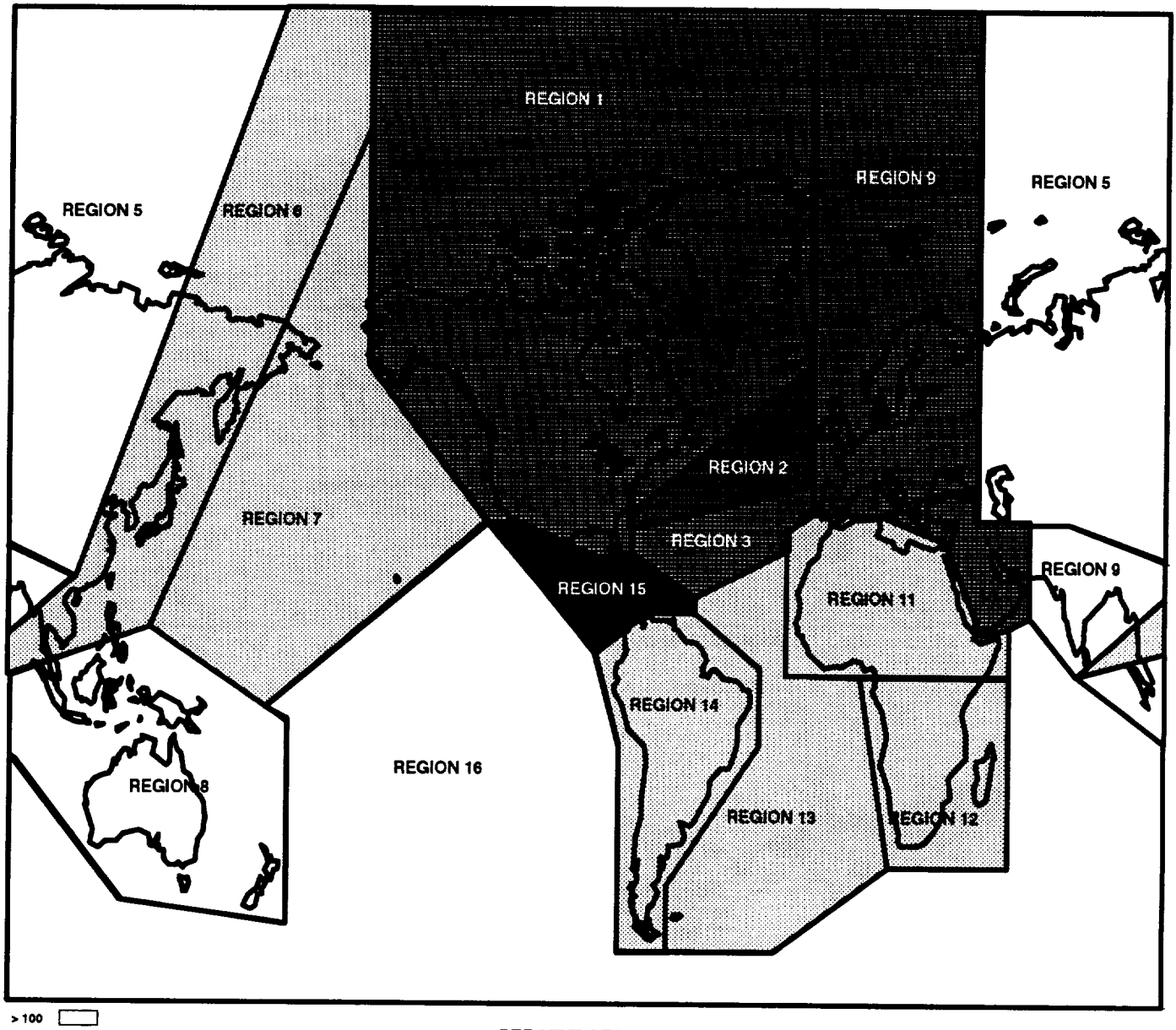


QUARTER 4: MAR/APR/MAY

SEASONALITY FACTOR RANGE (PERCENT)

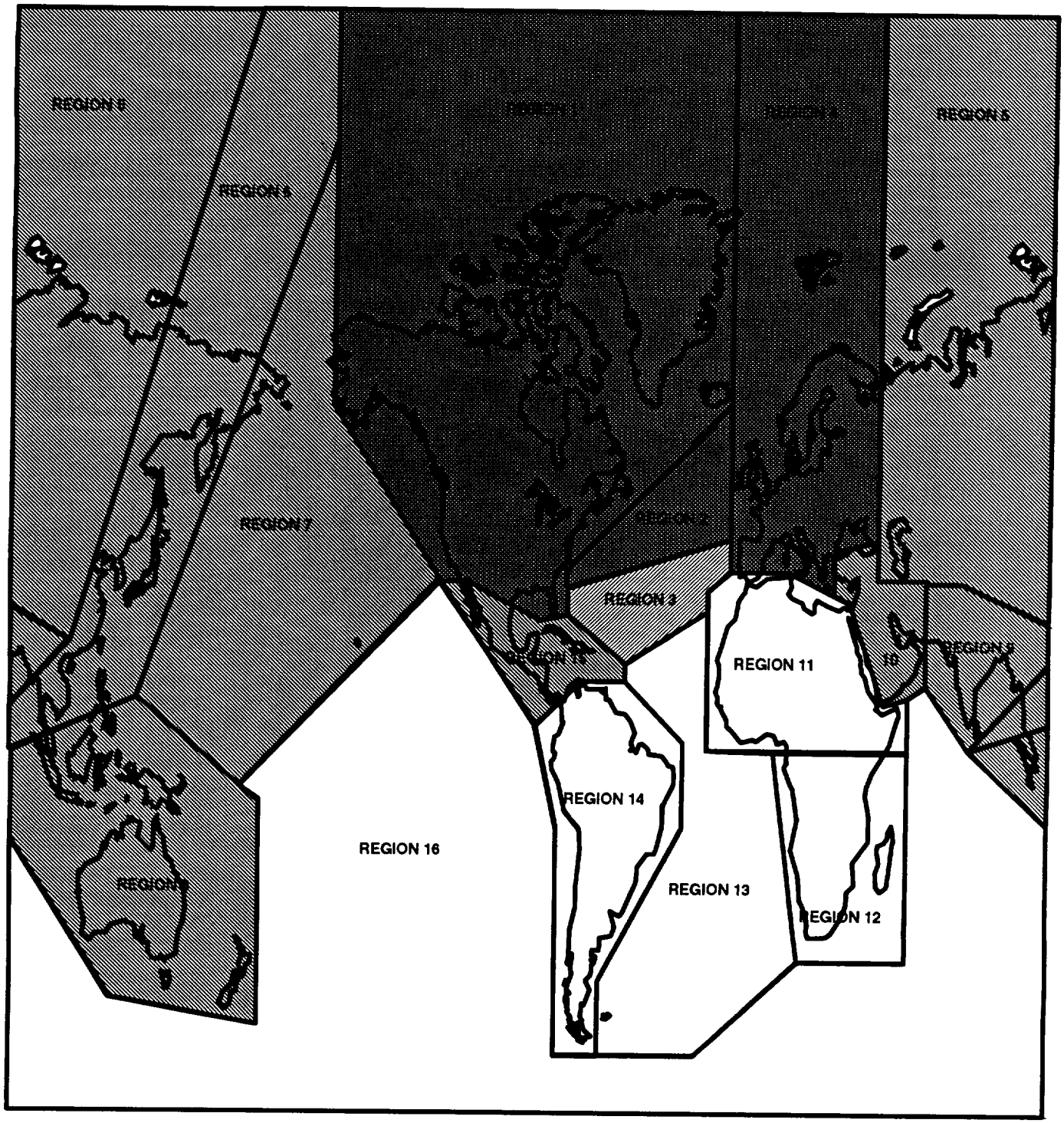
> 100	> 102
> 98	> 104
> 96	> 106
> 90	> 110
	> 115

The next three figures present global regional variations for global maximum (Quarter 1), global minimum (Quarter 3) and the maximum individual regional percent variations.



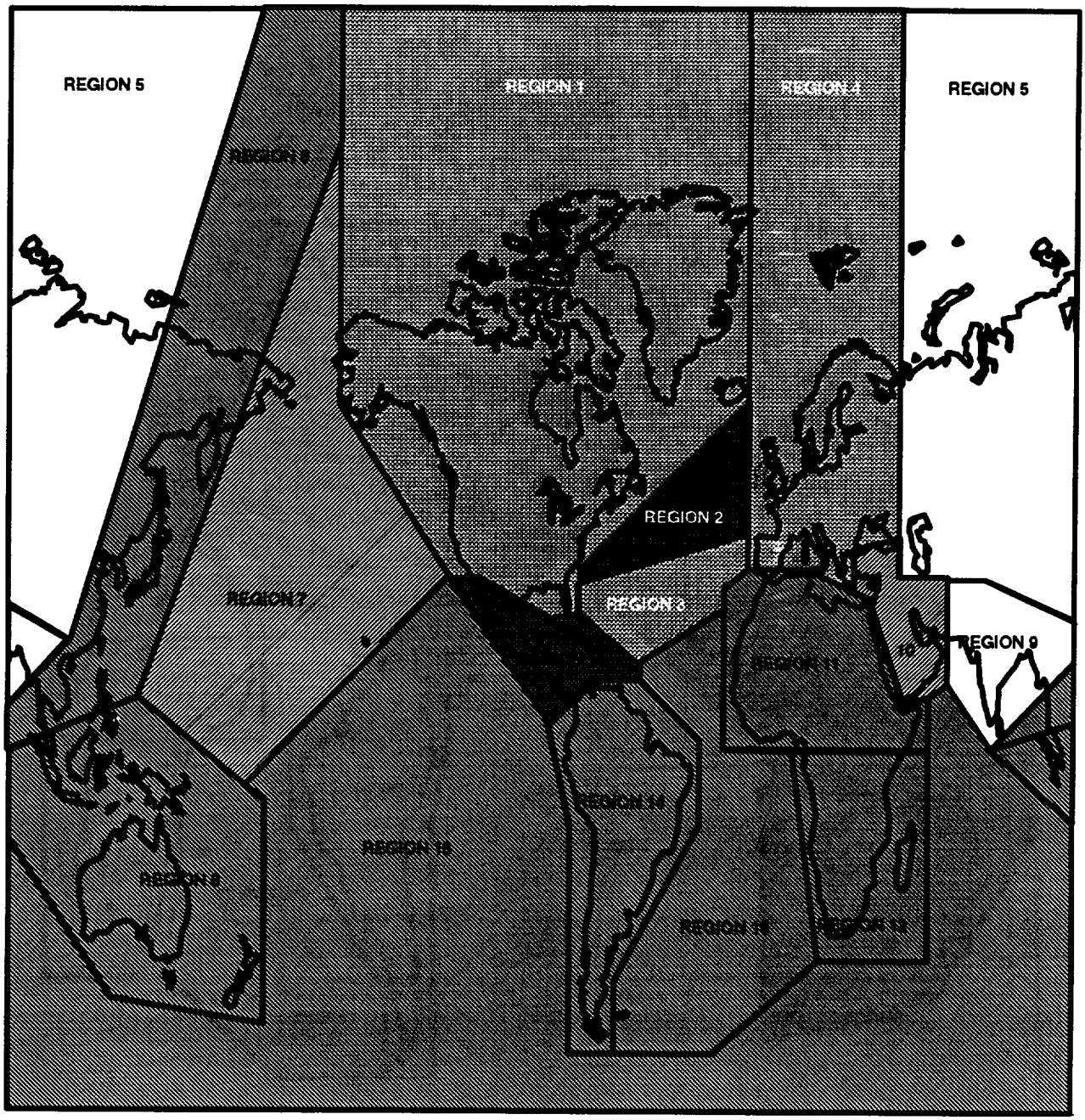
PERCENT SEASONALITY FACTORS

QUARTER 1: JUNE/JULY/AUGUST



PERCENT SEASONALITY FACTORS

QUARTER 3: DECEMBER/JANUARY/FEBRUARY



SEASONALITY FACTOR MAXIMUM ANNUAL VARIATION (PERCENT)

(PER REGION)

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13. ABSTRACT *(Maximum 200 words)*

The report describes the development of a database of fuel burn and emissions from projected HSCT fleets that reflect actual airlines' networks, operational requirement, and traffic flow as operated by simulated world wide airlines for Mach 1.6, 2.0, and 2.4 HSCT configurations. For the year 2015, McDonnell Douglas Corporation created two supersonic commercial air traffic networks consisting of origin-destination city pair routes and associated traffic levels. The first scenario represented a manufacturing upper limit producible HSCT fleet availability by year 2015. The fleet projection of the Mach 2.4 configuration for this scenario was 1059 units with a traffic capture of 70 percent. The second scenario focused on the number of units that can minimally be produced by the year 2015. Using realistic production rates, the HSCT fleet projection amounts to 565 units. The traffic capture associated with this fleet was estimated at 40 percent. The airlines network was extracted from the actual networks of 21 major world airlines. All the routes were screened for suitability for HSCT operations. The route selection criteria included great circle distance, difference between flight path distance and great circle distance to avoid overland operations, and potential flight frequency.

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