

**AN EXAMINATION OF RANGE AND FUEL-BURN PENALTIES
ASSOCIATED WITH OPERATING BUSINESS JET TYPE
AIRCRAFT BENEATH PROPOSED U.S. DOMESTIC REDUCED
VERTICAL SEPARATION MINIMUM (DRVSM) AIRSPACE**

August 28, 2003

Summary

This paper presents a projection of range and fuel burn penalties incurred by operating business jet type aircraft below FL 290. It includes a study of such aircraft operated under part 135. The results of this analysis show that operating these aircraft below RVSM airspace will not lead to significant, additional fuel costs or decreased range capabilities.

I. Introduction.

This paper presents the findings of three studies conducted to assess the impact on operators of business jet type aircraft that may be limited to operating beneath the DRVSM stratum. Appendices A and B show the results of studies for five early production business jet types. Appendix C provides a summary analysis for business jet type aircraft operated under part 135. It shows the average potential fuel penalties incurred through operating beneath FL 290 for those aircraft types.

The first study was conducted by ACB-330 of the FAA Technical Center using a fuel-burn model. The second study was conducted by CSSI, Inc. using information from the “type certificate data sheets” and flight manuals for the aircraft types under consideration. The following aircraft types were evaluated in these studies:

- **Cessna Citation 1 (C500)**, first produced in 1971,
- **Hawker Siddeley DH-125-100-600 series (H25A)**, first produced in 1964
- **Lear 24 and 25 (LJ24, LJ25)**, first produced in 1966 and 1967
- **IAI Westwind 1124 (WW24)**, first produced in 1964.

For the third study, fuel-burn modeling was conducted by FAA ACB-330 to examine the potential fuel penalty for all turbojet aircraft types operating under Part 135 and flying below FL 290. This section presents the estimated average yearly cost per aircraft, per type, and the entire U.S. population for the respective aircraft types operating on Part 135.

II. Background.

Operators with non-approved aircraft may be limited to flying beneath the DRVSM stratum with resultant loss in fuel efficiency and optimal range performance. Table 1 presents the estimated RVSM upgrade costs for five early-production aircraft. Appendix C provides projections of aircraft upgrade costs for business jet type aircraft operated under part 135.

Table 1. Upgrade Costs For Five Early Production Aircraft.

| A/C Type | U.S. Registry | RVSM Approved | Cost Per A/C |
|----------|---------------|---------------|---------------|
| C500 | 218 | 1 | \$ 101,259.00 |
| H25A | 153 | 0 | \$ 150,000.00 |
| LJ24 | 181 | 0 | \$ 149,000.00 |
| LJ25 | 257 | 0 | \$ 149,000.00 |
| WW24 | 219 | 0 | \$ 140,000.00 |

III. Range Penalties Beneath DRVSM.

Using ETMS data from 5/02/02, the actual range performance for these aircraft types in CVSM was compared against probable range performance beneath FL290 to identify city-pairs that might no longer be flyable. This analysis examined all operations between city-pairs within the continental United States for the aircraft types under consideration. The distance between the city-pairs was calculated using the Great Circle Method and the maximum range values were estimated using excerpts from each aircraft's "Operational Planning Manual" and their respective "Type Certificate Data Sheets". The analysis assumed that the aircraft would:

- not cut into their reserve fuel
- take off at maximum takeoff weight
- carry maximum amount of fuel
- fly in International Civil Aviation Organization (ICAO) Standard Atmosphere (ISA) with no head/tail winds.

Aircraft ranges were calculated by determining the fuel burn and distance covered both during the climb to and descent from each observed cruising flight level. The remaining fuel, minus reserves, was then assumed to burn at the rate specified in the long-range cruise tables. Using this method, the maximum range at each flight level was calculated separately for all five aircraft types in the study. If no operations occurred at FL 280, this process was repeated for FL280 to determine the maximum range for that aircraft type below RVSM airspace.

The maximum range for FL280 was compared against the actual distances flown in the sample. Operations with actual flight distances greater than the projected maximum range at FL280 were highlighted as fuel stop will be required. The complete results of this analysis are presented in Appendix A.

A. Results.

Table 2 summarizes current average leg-length for each aircraft type and the projected average leg-length below FL290 and the percentage of operations that would no longer be flyable.

Table 2. Percentage of Operations Requiring a Fuel Stop after DRVSM Implementation.

| Aircraft Type | # of Operations | Current Average Leg (nm) | Post-RVSM Average Leg (nm) | # Daily Operations No Longer Flyable | % Daily Operations No Longer Flyable |
|---------------|-----------------|--------------------------|----------------------------|--------------------------------------|--------------------------------------|
| C500 | 30 | 597 | 475 | 7 | 23.3% |
| H25A | 29 | 724 | 724 | 0 | 0.0% |
| LJ24 | 67 | 562 | 448 | 7 | 10.4% |
| LJ25 | 97 | 560 | 521 | 7 | 7.2% |
| WW24 | 84 | 714 | 664 | 4 | 4.8% |
| Total | 307 | 631 | 566 | 25 | 8.1% |

Table 3 shows the city-pairs that would no longer be flyable after implementation of RVSM. It should be noted that the highlighted city-pairs indicate leg distances that, even before RVSM, are greater than the maximum range for that aircraft. Possible explanations for this observation are as follows: the aircraft were operated below maximum gross weight, the aircraft burned reserve fuel to reach their destinations, or the aircraft benefited from tailwinds or other favorable atmospheric conditions. This should also be noted when considering Table 2.

Table 3. City-pairs Requiring a Fuel Stop.

| Aircraft Type | City-Pair | Distance (nm) | % Current Max Range | % Post-RVSM Max Range |
|---------------|-----------|---------------|---------------------|-----------------------|
| C500 | APF-BED | 1108.6 | 127% | 140% |
| | " BRO-RST | 1099.5 | 126% | 139% |
| | " BED-PGD | 1072.5 | 117% | 136% |
| | " FMY-HVN | 987.9 | 113% | 125% |
| | " HVN-PGD | 972.8 | 106% | 123% |
| | " AAO-CRG | 898.4 | 98% | 114% |
| | " GXY-SJC | 828.3 | 91% | 105% |
| LJ24 | VGT-NEW | 1315.9 | 118% | 144% |
| | " LAS-MSN | 1262.7 | 111% | 138% |
| | " LRD-YIP | 1179.7 | 103% | 129% |
| | " ADS-MTN | 1060.6 | 93% | 116% |
| | " FRG-LIT | 961.4 | 86% | 105% |
| | " TUL-LAS | 938.8 | 83% | 102% |
| | LJ25 | 1144.3 | 102% | 119% |
| LJ25 | SNA-OMA | 1144.3 | 102% | 119% |
| | " MIA-BOS | 1096.4 | 97% | 114% |
| | " SLN-TEB | 1090.3 | 98% | 113% |
| | " CNM-GVL | 1030.5 | 92% | 107% |
| | " DEN-CMH | 1010.9 | 91% | 105% |
| | " MFE-IND | 1011.5 | 90% | 105% |
| | WW24 | 2163.0 | 144% | 151% |
| WW24 | SMO-CLT | 1845.7 | 121% | 129% |
| | " BED-AUS | 1467.0 | 99% | 103% |
| | " STL-SBA | 1429.5 | 93% | 100% |

The following bar graphs (Figures 1 and 2) depict an estimation of maximum range and endurance before and after RVSM implementation based on data taken from the operations planning sections of the respective aircraft flight manuals.

Figure 1. Aircraft Range by Type (Pre- and Post-RVSM).

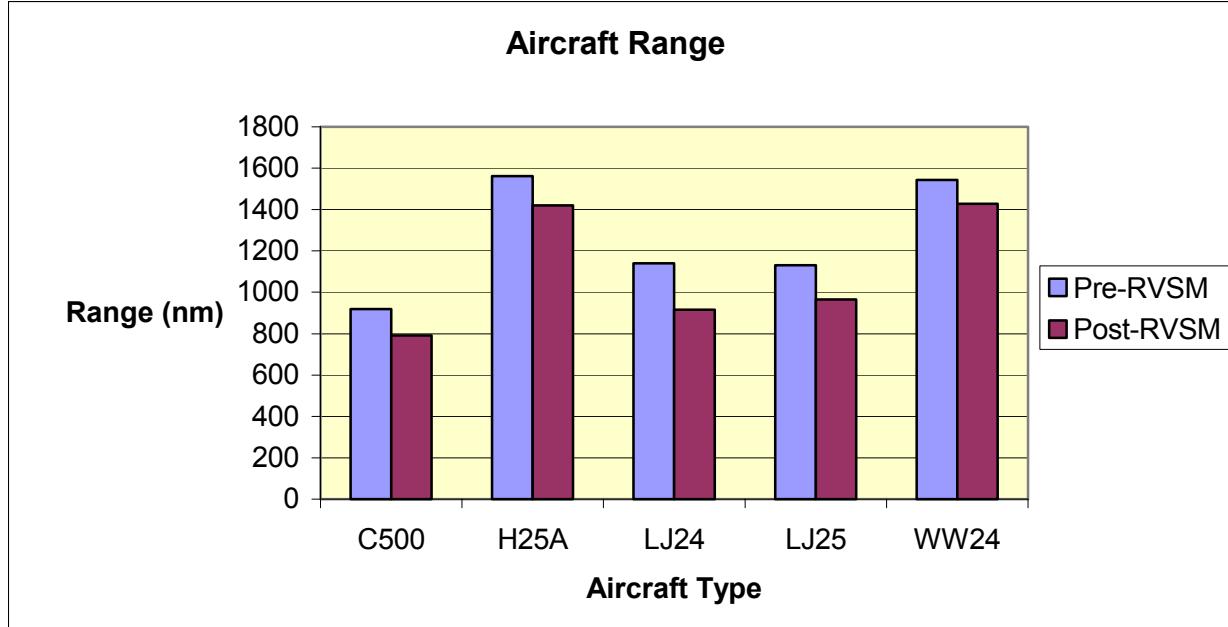
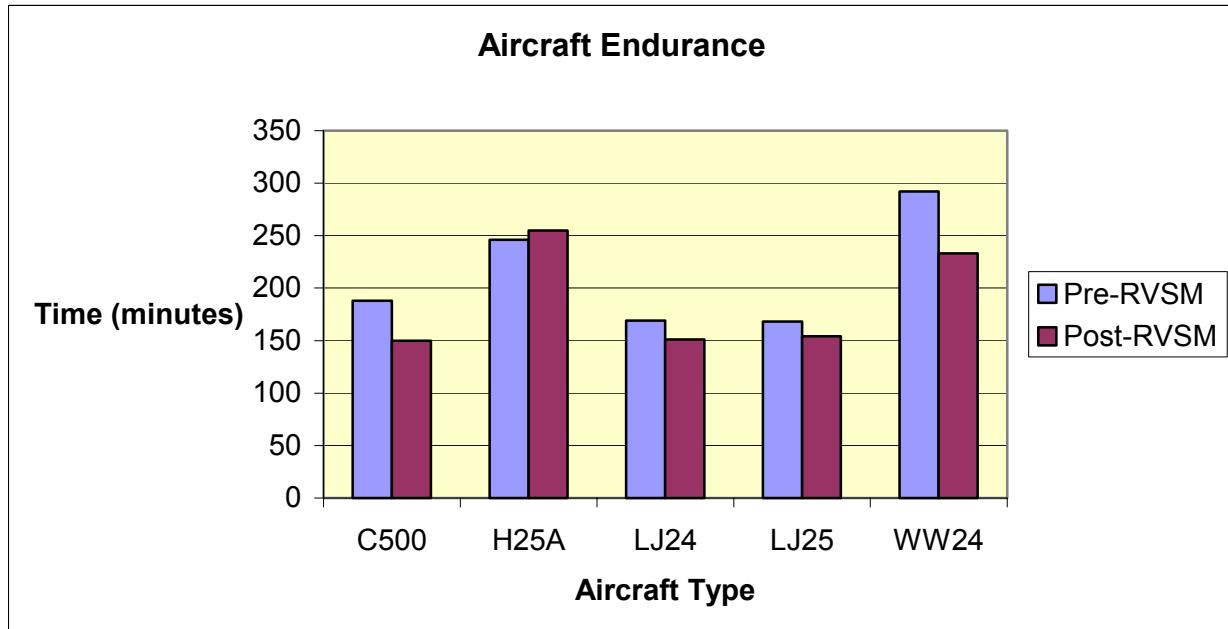


Figure 2. Aircraft Endurance by Type (Pre- and Post-RVSM).



IV. Fuel-burn Penalties Below RVSM For Five Early Production Aircraft

Another goal of this study was to determine the severity of increased fuel costs associated with flying below FL 290 as opposed to more efficient altitudes within the RVSM stratum. This study presents the estimated average yearly cost per aircraft, per type, and for the entire U.S. population for the respective aircraft types.

A. Methodology.

The examination of fuel-burn penalties was approached using two different methods and, where possible, the data from both methods is provided to give a range of possible values. In the first method, an analysis was conducted using the results of fuel-burn modeling provided by FAA ACB-330 using ETMS data from July 25, 2001 (Appendix B). From this one-day sample, an average increased fuel-burn by type was calculated and, using the number of operations observed over a 6-day period, extrapolated to estimate an annual cost per airframe, per type, and for all types involved in this study. Due to the methods involved in the modeling, this estimate is assumed to give a more accurate picture of the actual penalties, while the next was conducted using a more conservative approach.

The second method involved the same set of ETMS data from May 2, 2002 (Appendix A) that was previously used to calculate the range penalties below RVSM. Using the “Operational Planning Manuals”, the fuel-burn rates during climb, cruise, and descent were used to determine the total amount of fuel used during each observed operation and also during a hypothetical operation of the same distance below FL290. The same assumptions relating to the flight conditions and aircraft weights were used in this analysis. In addition, It was assumed that aircraft engaged in cruise climbs, maintained cruise at power levels indicated for long range cruise, and for ease of calculation, descended without any delays prior to landing. The costs were estimated using the factors of 6.2 lbs and \$0.67 per gallon of fuel as used in the DRVSM NPRM. As with the first method, the average increased fuel-burn by type was calculated and used to estimate the average annual cost per airframe, type, and for the total population for the aircraft types under consideration.

B. Results.

The following table (Table 4) shows a comparison of the averages arrived at using the two different methods mentioned above. The table presents values for the average fuel waste per flight for each type of aircraft, the average extra cost per flight, and also the estimated annual extra cost for the total population of each type of aircraft.

Table 4. Comparison of DRVSM Fuel-burn Studies

| Aircraft Type | Category | FAAACB-330 Fuel Burn Modeling | Estimates from Operations Planning |
|---------------|-----------------------------------|-------------------------------|------------------------------------|
| C500 | Avg. Additional Fuel (lbs) | 143 | 161 |
| " | Avg. Extra Cost | \$ 15.46 | \$ 17.44 |
| " | Est. Annual Cost | \$ 141,986.21 | \$ 160,200.93 |
| H25A | Avg. Additional Fuel (lbs) | 210 | 155 |
| " | Avg. Extra Cost | \$ 2273 | \$ 16.75 |
| " | Est. Annual Cost | \$ 178,370.30 | \$ 131,445.63 |
| LJ24 | Avg. Additional Fuel (lbs) | 165 | 300 |
| " | Avg. Extra Cost | \$ 11.33 | \$ 3242 |
| " | Est. Annual Cost | \$ 194,377.81 | \$ 556,165.10 |
| LJ25 | Avg. Additional Fuel (lbs) | 163 | 238 |
| " | Avg. Extra Cost | \$ 15.49 | \$ 25.77 |
| " | Est. Annual Cost | \$ 429,612.06 | \$ 714,859.80 |
| WW24 | Avg. Additional Fuel (lbs) | 177 | 126 |
| " | Avg. Extra Cost | \$ 19.12 | \$ 13.64 |
| " | Est. Annual Cost | \$ 340,712.25 | \$ 243,121.63 |
| TOTAL | Avg. Additional Fuel (lbs) | 172 | 196 |
| " | Avg. Extra Cost | \$ 16.83 | \$ 21.20 |
| " | Est. Annual Extra Cost | \$ 1,285,058.63 | \$ 1,805,793.09 |

Table 5 presents a final comparison of the estimated extra fuel costs per airframe of a given type. The first table is an estimation of additional fuel costs arrived at by using data from the ACB-330 fuel modeling. The second table presents the conservative values obtained through using the aircraft “Operational Planning Manuals”

Table 5. Increased Fuel Costs Below RVSM.

| Fuel Costs from Fuel Burn Modeling | | | | | | | |
|------------------------------------|--|--------------------------|-----------------|---------------------------|----------------------------------|---------------------------|-----------------------------------|
| Type | Avg. Extra Cost Per Flight (Per ACB-320) | Count in 6-Day NPrM ETMS | U.S. Population | Total Operations Per Year | Avg. Annual Flights Per Airframe | Annual cost by Population | Avg. Additional Cost Per Airframe |
| C500 | \$ 15.46 | 151 | 218 | 9,186 | 42.14 | \$ 141,986.21 | \$ 651.31 |
| H25A | \$ 22.73 | 129 | 153 | 7,848 | 51.29 | \$ 178,370.30 | \$ 1,165.82 |
| LJ24 | \$ 11.33 | 282 | 181 | 17,155 | 94.78 | \$ 194,377.81 | \$ 1,073.91 |
| LJ25 | \$ 15.49 | 456 | 257 | 27,740 | 107.94 | \$ 429,612.06 | \$ 1,671.64 |
| VN24 | \$ 19.12 | 293 | 219 | 17,824 | 81.39 | \$ 340,712.25 | \$ 1,555.76 |
| Total | \$ 16.82 | 1,311 | 1,028 | 79,753 | 77.58 | \$ 1,285,058.63 | \$ 1,250.06 |

| Fuel Costs from Operations Planning | | | | | | | |
|-------------------------------------|--|--------------------------|-----------------|---------------------------|----------------------------------|---------------------------|-----------------------------------|
| Type | Avg. Extra Cost Per Flight (Per Operations Planning) | Count in 6-Day NPrM ETMS | U.S. Population | Total Operations Per Year | Avg. Annual Flights Per Airframe | Annual cost by Population | Avg. Additional Cost Per Airframe |
| C500 | \$ 17.44 | 151 | 218 | 9,186 | 42.14 | \$ 160,200.93 | \$ 734.87 |
| H25A | \$ 16.75 | 129 | 153 | 7,848 | 51.29 | \$ 131,445.63 | \$ 859.12 |
| LJ24 | \$ 32.42 | 282 | 181 | 17,155 | 94.78 | \$ 556,165.10 | \$ 3,072.74 |
| LJ25 | \$ 25.77 | 456 | 257 | 27,740 | 107.94 | \$ 714,859.80 | \$ 2,781.56 |
| VN24 | \$ 13.64 | 293 | 219 | 17,824 | 81.39 | \$ 243,121.63 | \$ 1,110.14 |
| Total | \$ 21.20 | 1,311 | 1,028 | 79,753 | 77.58 | \$ 1,805,793.09 | \$ 1,756.61 |

V. Fuel-burn Penalties Below RVSM for Business Jet Aircraft Types Operating Under Part 135.

In addition to the studies described in section IV, fuel-burn modeling was also conducted by FAA ACB-330 to examine the potential fuel penalty for all turbojet aircraft types operating under Part 135 from not upgrading for RVSM and operating beneath FL 290. This section presents the estimated average yearly cost per aircraft, per type, and the entire U.S. population for the respective aircraft types operating on Part 135.

A. Methodology.

Part 135 turbojet fleet data was provided by FAA AFS-260 and summarized by the populations for each specific aircraft type. Analysis was conducted using the results of fuel-burn modeling provided by FAA ACB-330 using ETMS data from April 7, 2003. From this one-day sample, the average increased fuel-burn by type was calculated and, using the number of operations observed over a 6-day period, extrapolated to estimate an annual cost per airframe, per type, and for all types involved in this study.

B. Results.

The analysis of the aircraft types operating on Part 135 found that the average potential fuel-burn penalty from operating beneath FL 290 was approximately 7.15%. Appendix C shows the average pre-RVSM fuel-burn for flights above FL 290 versus the potential fuel-burn for operations beneath FL 290 due to not upgrading for DRVSM. The table presents values for the average increased fuel-burn per flight for each type of aircraft, the average extra cost per flight, and also the estimated annual extra cost for the total population of each type of aircraft. The average annual potential fuel penalty per Part 135 turbojet airframe from operating beneath FL 290 is estimated to be \$1,146.69, or \$3.1 million for the population.

V. Conclusion.

The results of FAA modeling and an independent study both conclude that operating these early-production GA aircraft types below FL290 does not result in a significant increase in operating costs. Furthermore, a maximum of 8% of observed city-pairs will require a fuel stop due to decreased range. In addition, fuel-burn modeling for the Part 135 turbojet fleet has found that the average estimated fuel penalty per airframe from operating beneath FL 290 is 7.15% or \$1,146.69. The total estimated fuel-burn increase for this population is \$3.1 million. Based on these findings, we conclude that DRVSM does not impose a significant operational limitation or cost burden on the operators of these aircraft types.

VI. References.

- Fuel Modeling by FAA ACB-330 (Appendices B and C).
- Type Certificate Data Sheets (C500, H25A, LJ24, LJ25, WW24).
- Excerpts from flight manuals (C500, H25A, LJ24, LJ25, WW24).
- ETMS traffic data (5/2/02)
- ETMS traffic data (22-28 July 2002)
- ETMS traffic data (4/7/03)

VII. Appendix A. Data based on Operations Planning Manuals.

A. C500

| Date | Flight ID | Type | Origin | Destination | Actual FL | Cruise Burn Rate (nm/lb) | Distance (nm) | Max Range at FL (nm) | Current % Max Range | < 290 Max Range (nm) | % Max Range < 290 | Fuel Wasted (lbs) | Extra Cost (\$) |
|------|-----------|------|--------|-------------|-----------|--------------------------|---------------|----------------------|---------------------|----------------------|-------------------|-------------------|-----------------|
| 502 | N112EB | C500 | FTY | LBO | 390 | 0.376 | 459.7 | 890 | 52% | 791 | 58% | 121.7 | \$13.16 |
| 502 | N511AT | C500 | BED | PGD | 370 | 0.393 | 1072.5 | 918 | 117% | 791 | 136% | 474.9 | \$51.32 |
| 502 | N633AT | C500 | HVN | PGD | 370 | 0.393 | 972.8 | 918 | 106% | 791 | 123% | 420.9 | \$45.49 |
| 502 | N110AB | C500 | AAO | CRG | 370 | 0.393 | 898.4 | 918 | 98% | 791 | 114% | 380.6 | \$41.13 |
| 502 | N11HJ | C500 | SPS | PDK | 370 | 0.393 | 712.2 | 918 | 78% | 791 | 90% | 279.7 | \$30.23 |
| 502 | N409S | C500 | SKX | DAL | 370 | 0.393 | 486.9 | 918 | 53% | 791 | 62% | 157.6 | \$17.03 |
| 502 | N501JF | C500 | GXY | SJC | 350 | 0.386 | 828.3 | 908 | 91% | 791 | 105% | 321.2 | \$34.71 |
| 502 | N989SC | C500 | MOP | JBR | 350 | 0.386 | 538.1 | 908 | 59% | 791 | 68% | 177.4 | \$19.17 |
| 502 | N504D | C500 | FLL | DTS | 350 | 0.386 | 423.6 | 908 | 47% | 791 | 54% | 120.6 | \$13.03 |
| 502 | N511AT | C500 | APF | BED | 330 | 0.368 | 1108.6 | 876 | 127% | 791 | 140% | 345.9 | \$37.38 |
| 502 | N837MA | C500 | BRO | RST | 330 | 0.368 | 1099.5 | 876 | 126% | 791 | 139% | 342.6 | \$37.02 |
| 502 | N633AT | C500 | FMY | HVN | 330 | 0.368 | 987.9 | 876 | 113% | 791 | 125% | 301.4 | \$32.57 |
| 502 | N771HR | C500 | T47 | LOU | 330 | 0.368 | 675.7 | 876 | 77% | 791 | 85% | 186.2 | \$20.12 |
| 502 | N409S | C500 | DAL | LOU | 330 | 0.368 | 635.0 | 876 | 73% | 791 | 80% | 171.2 | \$18.50 |
| 502 | N501KG | C500 | TUL | PFN | 330 | 0.368 | 622.0 | 876 | 71% | 791 | 79% | 166.4 | \$17.98 |
| 502 | N504D | C500 | NEW | OPF | 330 | 0.368 | 573.6 | 876 | 66% | 791 | 72% | 148.5 | \$16.05 |
| 502 | N713SA | C500 | TRK | SDL | 330 | 0.368 | 524.5 | 876 | 60% | 791 | 66% | 130.4 | \$14.09 |
| 502 | N112EB | C500 | LBO | FTY | 330 | 0.368 | 459.7 | 876 | 53% | 791 | 58% | 106.5 | \$11.51 |
| 502 | N194TS | C500 | DTS | TY5 | 330 | 0.368 | 355.3 | 876 | 41% | 791 | 45% | 68.0 | \$7.34 |
| 502 | N65SSA | C500 | GBG | BNA | 330 | 0.368 | 338.4 | 876 | 39% | 791 | 43% | 61.7 | \$6.67 |
| 502 | N943LL | C500 | ICT | SUX | 330 | 0.368 | 282.5 | 876 | 32% | 791 | 36% | 41.1 | \$4.44 |
| 502 | N837MA | C500 | RST | FTW | 310 | 0.349 | 696.0 | 841 | 83% | 791 | 88% | 119.8 | \$12.95 |
| 502 | N501LH | C500 | TY5 | MKC | 310 | 0.349 | 547.9 | 841 | 65% | 791 | 69% | 87.1 | \$9.41 |
| 502 | N837MA | C500 | FTW | BRO | 310 | 0.349 | 414.9 | 841 | 49% | 791 | 52% | 57.7 | \$6.23 |
| 502 | N70TS | C500 | ORL | CLT | 290 | 0.334 | 400.8 | 811 | 49% | 791 | 51% | 22.8 | \$2.46 |
| 502 | N12CV | C500 | SGF | RST | 290 | 0.334 | 387.8 | 811 | 48% | 791 | 49% | 21.6 | \$2.33 |
| 502 | N271AC | C500 | LKU | TEB | 290 | 0.334 | 249.1 | 811 | 31% | 791 | 31% | 8.8 | \$0.95 |
| 502 | N482RJ | C500 | DAL | SEM | 280 | 0.324 | 500.3 | 791 | 63% | 791 | 63% | 0.0 | \$0.00 |
| 502 | N65SSA | C500 | BNA | GBG | 280 | 0.324 | 338.4 | 791 | 43% | 791 | 43% | 0.0 | \$0.00 |
| 502 | PCJ911 | C500 | VNY | SMF | 280 | 0.324 | 307.9 | 791 | 39% | 791 | 39% | 0.0 | \$0.00 |

| Max Fuel (gal) | Max Fuel (lbs) | NON RVSM nm/lb | Reserve Fuel (lbs) | Current Avg. Leg | Post RVSM Avg. Leg | % OPS Un-Flyable | Avg. Wasted Fuel (lbs) | Total Fuel Waste (lbs) | Total Fuel Waste (gal) | Total \$ Loss | Avg. \$ Loss |
|----------------|----------------|----------------|--------------------|------------------|--------------------|------------------|------------------------|------------------------|------------------------|---------------|--------------|
| 536 | 3323.2 | 0.324 | 700.0 | 596.6 | 475.2 | 23.3% | 161 | 4842 | 781 | \$523.28 | \$17.44 |

B. H25A.

| Date | Flight ID | Type | Origin | Destination | Actual FL | Cruise Burn Rate (nm/lb) | Distance (nm) | Max Range at FL (nm) | Current % Max Range | < 290 Max Range (nm) | % Max Range < 290 | Fuel Wasted (lbs) | Extra Cost (\$) |
|----------|-----------|------|--------|-------------|-----------|--------------------------|---------------|----------------------|---------------------|----------------------|-------------------|-------------------|-----------------|
| 502 | N500XY | H25A | TEB | SLN | 390 | 0.273 | 1090.3 | 1561 | 70% | 1421 | 77% | 365 | \$39.47 |
| 502 | N62TW | H25A | TEB | STP | 390 | 0.273 | 869.7 | 1561 | 56% | 1421 | 61% | 265 | \$28.69 |
| 502 | N702HC | H25A | MTN | PGD | 390 | 0.273 | 795.8 | 1561 | 51% | 1421 | 56% | 232 | \$25.08 |
| 502 | N55RF | H25A | MHR | BFI | 390 | 0.273 | 541.9 | 1561 | 35% | 1421 | 38% | 117 | \$12.67 |
| 502 | PKW700 | H25A | VNY | CID | 370 | 0.269 | 1338.7 | 1548 | 86% | 1421 | 94% | 441 | \$47.65 |
| 502 | OPT811 | H25A | PWK | VRB | 370 | 0.269 | 940.5 | 1548 | 61% | 1421 | 66% | 283 | \$30.54 |
| 502 | N456WH | H25A | FPR | YIP | 370 | 0.269 | 899.6 | 1548 | 58% | 1421 | 63% | 266 | \$28.77 |
| 502 | N4WC | H25A | SMO | BJC | 370 | 0.269 | 730.9 | 1548 | 47% | 1421 | 51% | 199 | \$21.52 |
| 502 | N514AJ | H25A | HOU | SDF | 370 | 0.269 | 699.5 | 1548 | 45% | 1421 | 49% | 187 | \$20.17 |
| 502 | N942DS | H25A | CLT | ALB | 370 | 0.269 | 562.9 | 1548 | 36% | 1421 | 40% | 132 | \$14.30 |
| 502 | N10TN | H25A | TEB | SLN | 350 | 0.264 | 1090.3 | 1527 | 71% | 1421 | 77% | 297 | \$32.06 |
| 502 | OPT811 | H25A | VRB | UIN | 350 | 0.264 | 907.2 | 1527 | 59% | 1421 | 64% | 237 | \$25.58 |
| 502 | N500XY | H25A | SLN | LAS | 350 | 0.264 | 851.7 | 1527 | 56% | 1421 | 60% | 219 | \$23.62 |
| 502 | N545GM | H25A | CPS | DRO | 350 | 0.264 | 837.8 | 1527 | 55% | 1421 | 59% | 214 | \$23.13 |
| 502 | N299GS | H25A | LEX | DAL | 350 | 0.264 | 675.7 | 1527 | 44% | 1421 | 48% | 161 | \$17.39 |
| 502 | N333DP | H25A | LSE | I23 | 350 | 0.264 | 436.2 | 1527 | 29% | 1421 | 31% | 83 | \$8.92 |
| 502 | N82CA | H25A | VNC | CAK | 330 | 0.261 | 834.6 | 1504 | 55% | 1421 | 59% | 155 | \$16.70 |
| 502 | OPT845 | H25A | SMO | SAF | 330 | 0.261 | 618.3 | 1504 | 41% | 1421 | 44% | 93 | \$10.06 |
| 502 | N42TS | H25A | ORL | RDU | 330 | 0.261 | 459.2 | 1504 | 31% | 1421 | 32% | 48 | \$5.18 |
| 502 | CGTTS | H25A | GVL | CMH | 330 | 0.261 | 346.8 | 1504 | 23% | 1421 | 24% | 16 | \$1.73 |
| 502 | N483FG | H25A | FXE | MDW | 310 | 0.253 | 1008.8 | 1470 | 69% | 1421 | 71% | 129 | \$13.99 |
| 502 | N62TW | H25A | TEB | STP | 310 | 0.253 | 869.7 | 1470 | 59% | 1421 | 61% | 107 | \$11.54 |
| 502 | N10TN | H25A | SLN | LAS | 310 | 0.253 | 851.7 | 1470 | 58% | 1421 | 60% | 104 | \$11.22 |
| 502 | TAG562 | H25A | HPN | MDW | 310 | 0.253 | 633.4 | 1470 | 43% | 1421 | 45% | 68 | \$7.39 |
| 502 | N219EC | H25A | LAS | APC | 310 | 0.253 | 364.3 | 1470 | 25% | 1421 | 26% | 25 | \$2.66 |
| 502 | N42TS | H25A | IAD | PTK | 310 | 0.253 | 356.9 | 1470 | 24% | 1421 | 25% | 23 | \$2.53 |
| 502 | N731DL | H25A | FXE | TLH | 310 | 0.253 | 343.6 | 1470 | 23% | 1421 | 24% | 21 | \$2.29 |
| 502 | N125SF | H25A | BTR | SGR | 310 | 0.253 | 232.8 | 1470 | 16% | 1421 | 16% | 3 | \$0.35 |
| 502 | N411PA | H25A | MQY | BED | 290 | 0.244 | 807.6 | 1426 | 57% | 1421 | 57% | 13 | \$1.38 |
| NON RVSM | | | | | 280 | 0.243 | 1421 | | | | | | |

| Max Fuel (gal) | Max Fuel (lbs) | NON RVSM nm/lb | Reserve Fuel (lbs) | Current Avg. Leg | Post RVSM Avg. Leg | % OPS Un-Flyable | Avg. Wasted Fuel (lbs) | Total Fuel Waste (lbs) | Total Fuel Waste (gal) | Total \$ Loss | Avg. \$ Loss |
|----------------|----------------|----------------|--------------------|------------------|--------------------|------------------|------------------------|------------------------|------------------------|---------------|--------------|
| 1231.5 | 8210 | 0.243 | 2000 | 724.0 | 724.0 | 0.00% | 155 | 4503 | 726 | \$486.58 | \$16.78 |

C. LJ24.

| Date | Flight ID | Type | Origin | Destination | Actual FL | Cruise Burn Rate (nm/lb) | Distance (nm) | Max Range at FL (nm) | Current % Max Range | < 290 Max Range (nm) | % Max Range < 290 | Fuel Wasted (lbs) | Extra Cost (\$) |
|----------|-----------|------|--------|-------------|-----------|--------------------------|---------------|----------------------|---------------------|----------------------|-------------------|-------------------|-----------------|
| 502 | N39EL | LJ24 | VGT | NEW | 450 | 0.341 | 1315.9 | 1120 | 118% | 916 | 144% | 968.0 | \$104.61 |
| 502 | N56MM | LJ24 | FRG | LIT | 450 | 0.341 | 961.4 | 1120 | 86% | 916 | 105% | 638.9 | \$69.04 |
| 502 | N39EL | LJ24 | NEW | HOB | 450 | 0.341 | 697.0 | 1120 | 62% | 916 | 76% | 393.4 | \$42.52 |
| 502 | AJ384 | LJ24 | SOP | MDW | 450 | 0.341 | 555.3 | 1120 | 50% | 916 | 61% | 261.9 | \$28.30 |
| 502 | OAE453 | LJ24 | TUL | LAS | 430 | 0.345 | 938.8 | 1135 | 83% | 916 | 102% | 656.5 | \$70.95 |
| 502 | N169US | LJ24 | MQY | TMB | 430 | 0.345 | 698.0 | 1135 | 61% | 916 | 76% | 424.7 | \$45.90 |
| 502 | N169US | LJ24 | TMB | MQY | 430 | 0.345 | 698.0 | 1135 | 61% | 916 | 76% | 424.7 | \$45.90 |
| 502 | N169US | LJ24 | MQY | MIA | 430 | 0.345 | 693.5 | 1135 | 61% | 916 | 76% | 420.4 | \$45.43 |
| 502 | AJ375 | LJ24 | DAY | OKC | 430 | 0.345 | 691.3 | 1135 | 61% | 916 | 75% | 418.3 | \$45.20 |
| 502 | AJ367 | LJ24 | MCI | ABQ | 430 | 0.345 | 632.8 | 1135 | 56% | 916 | 69% | 362.0 | \$39.12 |
| 502 | RAX821 | LJ24 | EWB | DAY | 430 | 0.345 | 612.4 | 1135 | 54% | 916 | 67% | 342.3 | \$36.99 |
| 502 | AJ371 | LJ24 | DPA | SHV | 430 | 0.345 | 606.7 | 1135 | 53% | 916 | 66% | 336.9 | \$36.41 |
| 502 | N169US | LJ24 | MQY | RST | 430 | 0.345 | 543.7 | 1135 | 48% | 916 | 59% | 276.2 | \$29.85 |
| 502 | N169US | LJ24 | RST | MQY | 430 | 0.345 | 543.7 | 1135 | 48% | 916 | 59% | 276.2 | \$29.85 |
| 502 | TDG713 | LJ24 | GMU | BWI | varies | 0.344 | 376.1 | 1140 | 33% | 916 | 41% | 135.4 | \$14.63 |
| 502 | AJ349 | LJ24 | 5T9 | ADS | varies | 0.344 | 311.4 | 1140 | 27% | 916 | 34% | 73.6 | \$7.96 |
| 502 | N723JW | LJ24 | LAS | MSN | 410 | 0.344 | 1262.7 | 1140 | 111% | 916 | 138% | 981.2 | \$106.03 |
| 502 | RAX698 | LJ24 | LRD | YIP | 410 | 0.344 | 1179.7 | 1140 | 103% | 916 | 129% | 902.0 | \$97.48 |
| 502 | AJ349 | LJ24 | ADS | MTN | 410 | 0.344 | 1060.6 | 1140 | 93% | 916 | 116% | 788.4 | \$85.20 |
| 502 | OAE453 | LJ24 | LAS | TUL | 410 | 0.344 | 938.8 | 1140 | 82% | 916 | 102% | 672.2 | \$72.64 |
| 502 | AJ362 | LJ24 | 5T9 | LZU | 410 | 0.344 | 901.7 | 1140 | 79% | 916 | 98% | 636.8 | \$68.82 |
| 502 | N900NA | LJ24 | FTW | INT | 410 | 0.344 | 870.8 | 1140 | 76% | 916 | 95% | 607.3 | \$65.63 |
| 502 | N483DM | LJ24 | BED | LZU | 410 | 0.344 | 785.7 | 1140 | 69% | 916 | 86% | 526.1 | \$56.86 |
| 502 | N483DM | LJ24 | BED | LZU | 410 | 0.344 | 785.7 | 1140 | 69% | 916 | 86% | 526.1 | \$56.86 |
| 502 | SKZ856 | LJ24 | DCU | LRD | 410 | 0.344 | 772.8 | 1140 | 68% | 916 | 84% | 513.8 | \$55.52 |
| 502 | N25LJ | LJ24 | PDX | VNY | 410 | 0.344 | 708.6 | 1140 | 62% | 916 | 77% | 452.6 | \$48.91 |
| 502 | AJ367 | LJ24 | LAX | ELP | 410 | 0.344 | 626.0 | 1140 | 55% | 916 | 68% | 373.8 | \$40.39 |
| 502 | N8AE | LJ24 | SJC | FLG | 410 | 0.344 | 514.4 | 1140 | 45% | 916 | 56% | 267.3 | \$28.88 |
| 502 | TDG713 | LJ24 | MDW | GMU | 410 | 0.344 | 487.4 | 1140 | 43% | 916 | 53% | 241.6 | \$26.10 |
| 502 | N140DM | LJ24 | SUA | WDR | 410 | 0.344 | 445.8 | 1140 | 39% | 916 | 49% | 201.9 | \$21.81 |
| 502 | N140RC | LJ24 | TAZ | 4A7 | 410 | 0.344 | 440.8 | 1140 | 39% | 916 | 48% | 197.1 | \$21.30 |
| 502 | RAX698 | LJ24 | SUS | SHV | 410 | 0.344 | 386.1 | 1140 | 34% | 916 | 42% | 144.9 | \$15.66 |
| 502 | N98WJ | LJ24 | PDK | VDF | 410 | 0.344 | 366.2 | 1140 | 32% | 916 | 40% | 125.9 | \$13.60 |
| 502 | N98WJ | LJ24 | VDF | PDK | 410 | 0.344 | 366.2 | 1140 | 32% | 916 | 40% | 125.9 | \$13.60 |
| 502 | AJ371 | LJ24 | MCI | DPA | 410 | 0.344 | 329.6 | 1140 | 29% | 916 | 36% | 91.0 | \$9.83 |
| 502 | N352MD | LJ24 | TUL | UOX | 410 | 0.344 | 325.3 | 1140 | 29% | 916 | 36% | 86.9 | \$9.39 |
| 502 | AJ380 | LJ24 | PTK | ADS | 390 | 0.336 | 858.9 | 1120 | 77% | 916 | 94% | 555.1 | \$59.99 |
| 502 | N900NA | LJ24 | 4A7 | FTW | 390 | 0.336 | 656.4 | 1120 | 59% | 916 | 72% | 375.9 | \$40.62 |
| 502 | KFS63 | LJ24 | PTK | LIT | 390 | 0.336 | 629.5 | 1120 | 56% | 916 | 69% | 352.1 | \$38.05 |
| 502 | N25LJ | LJ24 | PSP | MFR | 390 | 0.336 | 594.5 | 1120 | 53% | 916 | 65% | 321.2 | \$34.71 |
| 502 | AJ380 | LJ24 | LIT | BRO | 390 | 0.336 | 592.4 | 1120 | 53% | 916 | 65% | 319.3 | \$34.51 |
| 502 | AJ369 | LJ24 | ABQ | LAX | 390 | 0.336 | 579.0 | 1120 | 52% | 916 | 63% | 307.5 | \$33.22 |
| 502 | AJ367 | LJ24 | ABQ | LAX | 390 | 0.336 | 579.0 | 1120 | 52% | 916 | 63% | 307.5 | \$33.22 |
| 502 | N129ME | LJ24 | DAL | OMA | 390 | 0.336 | 503.0 | 1120 | 45% | 916 | 55% | 240.2 | \$25.95 |
| 502 | N140RC | LJ24 | 4A7 | TAZ | 390 | 0.336 | 440.8 | 1120 | 39% | 916 | 48% | 185.2 | \$20.01 |
| 502 | RAX698 | LJ24 | SHV | LRD | 390 | 0.336 | 431.4 | 1120 | 39% | 916 | 47% | 176.8 | \$19.11 |
| 502 | N123DG | LJ24 | TUL | MAF | 390 | 0.336 | 405.9 | 1120 | 36% | 916 | 44% | 154.3 | \$16.67 |
| 502 | AJ1380 | LJ24 | MTN | PTK | 390 | 0.336 | 383.2 | 1120 | 34% | 916 | 42% | 134.2 | \$14.50 |
| 502 | RAX698 | LJ24 | YIP | STL | 390 | 0.336 | 376.8 | 1120 | 34% | 916 | 41% | 128.6 | \$13.89 |
| 502 | AJ383 | LJ24 | SRB | AZO | 390 | 0.336 | 371.5 | 1120 | 33% | 916 | 41% | 123.9 | \$13.39 |
| 502 | AJ1529 | LJ24 | LZU | MGY | 390 | 0.336 | 337.5 | 1120 | 30% | 916 | 37% | 93.8 | \$10.13 |
| 502 | N105GA | LJ24 | HOT | HOI | 390 | 0.336 | 311.2 | 1120 | 28% | 916 | 34% | 70.4 | \$7.61 |
| 502 | RAX821 | LJ24 | PTK | EWB | 370 | 0.324 | 563.1 | 1096 | 51% | 916 | 61% | 282.1 | \$30.49 |
| 502 | AJ1299 | LJ24 | LBB | IXD | 370 | 0.324 | 458.7 | 1096 | 42% | 916 | 50% | 201.3 | \$21.75 |
| 502 | N900NA | LJ24 | FTW | INT | 350 | 0.31 | 870.8 | 1058 | 82% | 916 | 95% | 429.7 | \$46.44 |
| 502 | N680CJ | LJ24 | GMU | RVS | 350 | 0.31 | 671.0 | 1058 | 63% | 916 | 73% | 302.8 | \$32.72 |
| 502 | N457GM | LJ24 | AUS | MDD | 350 | 0.31 | 253.5 | 1058 | 24% | 916 | 28% | 37.6 | \$4.07 |
| 502 | TDG696 | LJ24 | GYY | YNG | varies | 0.295 | 304.3 | 1018 | 30% | 916 | 33% | 57.5 | \$6.21 |
| 502 | N105GA | LJ24 | HOT | TUP | varies | 0.295 | 213.6 | 1018 | 21% | 916 | 23% | 14.7 | \$1.59 |
| 502 | N39EL | LJ24 | CNO | VGT | 330 | 0.295 | 180.6 | 1018 | 18% | 916 | 20% | 0.0 | \$0.00 |
| 502 | N723JW | LJ24 | TUS | LAS | 310 | 0.28 | 319.3 | 977 | 33% | 916 | 35% | 44.2 | \$4.78 |
| 502 | N105GA | LJ24 | TUP | HOT | 310 | 0.28 | 213.6 | 977 | 22% | 916 | 23% | 13.6 | \$1.47 |
| 502 | N457GM | LJ24 | MDD | AUS | 270 | 0.253 | 253.5 | 899 | 28% | 916 | 28% | 0.0 | \$0.00 |
| 502 | N900NA | LJ24 | INT | 4A7 | 260 | 0.247 | 261.5 | 881 | 30% | 916 | 29% | 0.0 | \$0.00 |
| 502 | TDG713 | LJ24 | BWI | ILM | 240 | 0.235 | 295.6 | 843 | 35% | 916 | 32% | 0.0 | \$0.00 |
| 502 | N169US | LJ24 | TMB | LEE | 240 | 0.235 | 204.4 | 843 | 24% | 916 | 22% | 0.0 | \$0.00 |
| 502 | AJ389 | LJ24 | MTN | EWR | 150 | 0.05 | 131.8 | 224 | 59% | 916 | 14% | 0.0 | \$0.00 |
| NON RVSM | | | | | 280 | 0.259 | | 916 | | 916 | | 0.0 | \$0.00 |

| Max Fuel (gal) | Max Fuel (lbs) | NON RVSM nm/lb | Reserve Fuel (lbs) | Current Avg. Leg | Post RVSM Avg. Leg | % OPS Unflyable | Avg. Wasted Fuel (lbs) | Total Fuel Waste (lbs) | Total Fuel Waste (gal) | Total \$ Loss | Avg. \$ Loss |
|----------------|----------------|----------------|--------------------|------------------|--------------------|-----------------|------------------------|------------------------|------------------------|---------------|--------------|
| 789 | 4892 | 0.259 | 1200 | 562.3 | 448.0 | 10.4% | 300 | 20101 | 3242 | \$2,172.25 | \$32.42 |

D. LJ25.

| Date | Flight ID | Type | Origin | Destination | Actual FL | Cruise Burn Rate (nm/lb) | Distance (nm) | Max Range at FL (nm) | Current % Max Range | < 290 Max Range (nm) | % Max Range < 290 | Fuel Wasted (lbs) | Extra Cost (\$) |
|------|-----------|------|--------|-------------|-----------|--------------------------|---------------|----------------------|---------------------|----------------------|-------------------|-------------------|-----------------|
| 502 | N425RA | LJ25 | MCI | ACY | 450 | 0.273 | 933.8 | 1069 | 87% | 965 | 97% | 363.3 | \$39.26 |
| 502 | N425RA | LJ25 | ACY | MCI | 430 | 0.283 | 933.8 | 1099 | 85% | 965 | 97% | 452.6 | \$48.91 |
| 502 | N8MF | LJ25 | TEB | SRQ | 430 | 0.283 | 911.2 | 1099 | 83% | 965 | 94% | 437.8 | \$47.31 |
| 502 | N5NC | LJ25 | PHF | HRO | 430 | 0.283 | 806.9 | 1099 | 73% | 965 | 84% | 370.0 | \$39.98 |
| 502 | N764KF | LJ25 | PNE | X80 | 430 | 0.283 | 742.1 | 1099 | 68% | 965 | 77% | 327.8 | \$35.43 |
| 502 | N999MF | LJ25 | SAT | APA | 430 | 0.283 | 675.6 | 1099 | 61% | 965 | 70% | 284.6 | \$30.75 |
| 502 | N711WD | LJ25 | PDK | ATW | 430 | 0.283 | 654.7 | 1099 | 60% | 965 | 68% | 271.0 | \$29.28 |
| 502 | VRT75 | LJ25 | SRQ | BNA | 430 | 0.283 | 565.0 | 1099 | 51% | 965 | 59% | 212.6 | \$22.97 |
| 502 | N606SM | LJ25 | RDU | BOS | 430 | 0.283 | 532.4 | 1099 | 48% | 965 | 55% | 191.4 | \$20.69 |
| 502 | N831H | LJ25 | CHO | BHM | 430 | 0.283 | 488.1 | 1099 | 44% | 965 | 51% | 162.6 | \$17.57 |
| 502 | AJ1369 | LJ25 | YIP | STP | 430 | 0.283 | 445.5 | 1099 | 41% | 965 | 46% | 134.9 | \$14.58 |
| 502 | N198JA | LJ25 | MFE | IND | varies | 0.291 | 1011.5 | 1125 | 90% | 965 | 105% | 583.9 | \$63.10 |
| 502 | CYO102 | LJ25 | SNA | OMA | 410 | 0.291 | 1144.3 | 1125 | 102% | 965 | 119% | 683.2 | \$73.83 |
| 502 | N254SC | LJ25 | MIA | BOS | 410 | 0.291 | 1096.4 | 1125 | 97% | 965 | 114% | 647.3 | \$69.95 |
| 502 | AJ11265 | LJ25 | CNM | GVL | 410 | 0.291 | 1030.5 | 1125 | 92% | 965 | 107% | 598.1 | \$64.63 |
| 502 | N198JA | LJ25 | MFE | IND | 410 | 0.291 | 1011.5 | 1125 | 90% | 965 | 105% | 583.9 | \$63.10 |
| 502 | N511AJ | LJ25 | PIE | ROC | 410 | 0.291 | 946.3 | 1125 | 84% | 965 | 98% | 535.7 | \$57.83 |
| 502 | KFS66 | LJ25 | YIP | LEE | 410 | 0.291 | 810.7 | 1125 | 72% | 965 | 84% | 433.8 | \$46.88 |
| 502 | N831LH | LJ25 | BHM | FRG | 410 | 0.291 | 768.7 | 1125 | 68% | 965 | 80% | 402.3 | \$43.48 |
| 502 | KFS31 | LJ25 | AZO | CYOB | 410 | 0.291 | 664.5 | 1125 | 59% | 965 | 69% | 324.4 | \$35.06 |
| 502 | N804PH | LJ25 | LWT | FET | 410 | 0.291 | 649.9 | 1125 | 58% | 965 | 67% | 313.6 | \$33.89 |
| 502 | N531CW | LJ25 | LZU | DAL | 410 | 0.291 | 649.8 | 1125 | 58% | 965 | 67% | 313.5 | \$33.88 |
| 502 | N254SC | LJ25 | ILM | BOS | 410 | 0.291 | 579.9 | 1125 | 52% | 965 | 60% | 261.2 | \$28.22 |
| 502 | CCY064 | LJ25 | LRD | LIT | 410 | 0.291 | 570.6 | 1125 | 51% | 965 | 59% | 254.3 | \$27.48 |
| 502 | N107RM | LJ25 | LNN | HDX | 410 | 0.291 | 569.9 | 1125 | 51% | 965 | 59% | 253.7 | \$27.42 |
| 502 | N229WJ | LJ25 | FXE | GMU | 410 | 0.291 | 532.6 | 1125 | 47% | 965 | 55% | 225.9 | \$24.41 |
| 502 | KFS38 | LJ25 | YIP | ORH | 410 | 0.291 | 517.9 | 1125 | 46% | 965 | 54% | 214.8 | \$23.22 |
| 502 | VRT75 | LJ25 | TYS | SRQ | 410 | 0.291 | 515.9 | 1125 | 46% | 965 | 53% | 213.3 | \$23.06 |
| 502 | N804PH | LJ25 | FET | EKM | 410 | 0.291 | 472.1 | 1125 | 42% | 965 | 49% | 180.6 | \$19.51 |
| 502 | AJ1369 | LJ25 | STP | YIP | 410 | 0.291 | 445.5 | 1125 | 40% | 965 | 46% | 160.7 | \$17.36 |
| 502 | KFS38 | LJ25 | MOR | YIP | varies | 0.292 | 364.2 | 1131 | 32% | 965 | 38% | 110.8 | \$11.97 |
| 502 | N198JA | LJ25 | HOU | MFE | varies | 0.292 | 261.3 | 1131 | 23% | 965 | 27% | 32.6 | \$3.53 |
| 502 | XBGHE | LJ25 | SRQ | BRO | 390 | 0.292 | 803.0 | 1131 | 71% | 965 | 83% | 444.0 | \$47.98 |
| 502 | N254CL | LJ25 | IKK | PUB | 390 | 0.292 | 787.9 | 1131 | 70% | 965 | 82% | 432.6 | \$46.74 |
| 502 | N34TN | LJ25 | ADS | RKS | 390 | 0.292 | 781.0 | 1131 | 69% | 965 | 81% | 427.3 | \$46.18 |
| 502 | N198JA | LJ25 | IND | HOU | 390 | 0.292 | 750.7 | 1131 | 66% | 965 | 78% | 404.3 | \$43.69 |
| 502 | N20NW | LJ25 | BFI | SIT | 390 | 0.292 | 744.4 | 1131 | 66% | 965 | 77% | 399.5 | \$43.17 |
| 502 | CYO103 | LJ25 | LIT | ELP | 390 | 0.292 | 728.8 | 1131 | 64% | 965 | 76% | 387.6 | \$41.89 |
| 502 | N254CL | LJ25 | PUB | VNY | 390 | 0.292 | 718.9 | 1131 | 64% | 965 | 74% | 380.1 | \$41.08 |
| 502 | KFS38 | LJ25 | ORH | TYS | 390 | 0.292 | 677.7 | 1131 | 60% | 965 | 70% | 348.9 | \$37.70 |
| 502 | KFS76 | LJ25 | SLN | YIP | 390 | 0.292 | 673.9 | 1131 | 60% | 965 | 70% | 346.0 | \$37.39 |
| 502 | N34TN | LJ25 | RKS | BFI | 390 | 0.292 | 667.5 | 1131 | 59% | 965 | 69% | 341.1 | \$36.86 |
| 502 | N34TN | LJ25 | RKS | BFI | 390 | 0.292 | 667.5 | 1131 | 59% | 965 | 69% | 341.1 | \$36.86 |
| 502 | N23RZ | LJ25 | AHN | DSM | 390 | 0.292 | 665.3 | 1131 | 59% | 965 | 69% | 339.4 | \$36.68 |
| 502 | N254CL | LJ25 | TEB | IKK | 390 | 0.292 | 625.4 | 1131 | 55% | 965 | 65% | 309.1 | \$33.41 |
| 502 | KFS66 | LJ25 | LEE | EVV | 390 | 0.292 | 623.3 | 1131 | 55% | 965 | 65% | 307.5 | \$33.23 |
| 502 | CYO102 | LJ25 | ELP | SNA | 390 | 0.292 | 596.0 | 1131 | 53% | 965 | 62% | 286.8 | \$30.99 |
| 502 | CCY063 | LJ25 | MDW | MLU | 390 | 0.292 | 593.3 | 1131 | 52% | 965 | 61% | 284.7 | \$30.77 |
| 502 | CCY068 | LJ25 | BVO | ELP | 390 | 0.292 | 591.6 | 1131 | 52% | 965 | 61% | 283.4 | \$30.63 |
| 502 | VR118 | LJ25 | BNA | CLL | 390 | 0.292 | 590.2 | 1131 | 52% | 965 | 61% | 282.4 | \$30.52 |
| 502 | N254SC | LJ25 | BOS | ILM | 390 | 0.292 | 579.9 | 1131 | 51% | 965 | 60% | 274.6 | \$29.67 |
| 502 | N606SM | LJ25 | BOS | RDU | 390 | 0.292 | 532.4 | 1131 | 47% | 965 | 55% | 238.5 | \$25.77 |
| 502 | N20NW | LJ25 | SIT | ANC | 390 | 0.292 | 518.8 | 1131 | 46% | 965 | 54% | 228.2 | \$24.66 |
| 502 | CCY068 | LJ25 | GYY | BVO | 390 | 0.292 | 492.6 | 1131 | 44% | 965 | 51% | 208.3 | \$22.50 |
| 502 | KFS66 | LJ25 | EVV | STR | 390 | 0.292 | 483.7 | 1131 | 43% | 965 | 50% | 201.6 | \$21.78 |
| 502 | AJ1369 | LJ25 | YIP | STP | 390 | 0.292 | 445.5 | 1131 | 39% | 965 | 46% | 172.5 | \$18.64 |
| 502 | N7810W | LJ25 | CGF | BRL | 390 | 0.292 | 429.6 | 1131 | 38% | 965 | 45% | 160.4 | \$17.34 |
| 502 | KFS18 | LJ25 | ORH | PTB | 390 | 0.292 | 401.2 | 1131 | 35% | 965 | 42% | 138.9 | \$15.01 |
| 502 | N254CL | LJ25 | SLN | TEB | 370 | 0.286 | 1090.3 | 1111 | 98% | 965 | 113% | 596.7 | \$64.48 |
| 502 | USC236 | LJ25 | DEN | CMH | 370 | 0.286 | 1010.9 | 1111 | 91% | 965 | 105% | 542.1 | \$58.58 |
| 502 | N22NJ | LJ25 | VRB | SBN | 370 | 0.286 | 894.0 | 1111 | 80% | 965 | 93% | 461.7 | \$49.90 |
| 502 | VR171 | LJ25 | PDK | FLL | 370 | 0.286 | 516.1 | 1111 | 46% | 965 | 53% | 201.9 | \$21.82 |
| 502 | GHP373 | LJ25 | MDW | ATL | 370 | 0.286 | 514.4 | 1111 | 46% | 965 | 53% | 200.7 | \$21.69 |
| 502 | CYO102 | LJ25 | OMA | TCV | 370 | 0.286 | 494.9 | 1111 | 45% | 965 | 51% | 187.3 | \$20.24 |
| 502 | KFS66 | LJ25 | STP | YIP | 370 | 0.286 | 445.5 | 1111 | 40% | 965 | 46% | 153.3 | \$16.57 |
| 502 | KFS18 | LJ25 | PTB | ORH | 370 | 0.286 | 401.2 | 1111 | 36% | 965 | 42% | 122.9 | \$13.28 |
| 502 | N299MW | LJ25 | EKY | IND | 370 | 0.286 | 386.8 | 1111 | 35% | 965 | 40% | 113.0 | \$12.21 |
| 502 | CEP305 | LJ25 | CVG | MCN | 370 | 0.286 | 383.6 | 1111 | 35% | 965 | 40% | 110.8 | \$11.97 |
| 502 | CEP306 | LJ25 | MSY | ATL | 370 | 0.286 | 364.1 | 1111 | 33% | 965 | 38% | 97.4 | \$10.52 |
| 502 | CEP306 | LJ25 | MSY | ATL | 370 | 0.286 | 364.1 | 1111 | 33% | 965 | 38% | 97.4 | \$10.52 |
| 502 | N30LJ | LJ25 | SDF | MCN | 370 | 0.286 | 345.9 | 1111 | 31% | 965 | 36% | 84.8 | \$9.17 |
| 502 | N30LJ | LJ25 | SDF | MCN | 370 | 0.286 | 345.9 | 1111 | 31% | 965 | 36% | 84.8 | \$9.17 |
| 502 | N299MW | LJ25 | LEX | MCN | 370 | 0.286 | 325.1 | 1111 | 29% | 965 | 34% | 70.5 | \$7.62 |
| 502 | CEP305 | LJ25 | JAX | ATL | 370 | 0.277 | 247.7 | 1085 | 23% | 965 | 26% | 21.2 | \$2.29 |
| 502 | N74RD | LJ25 | MGM | OKC | 350 | 0.277 | 594.3 | 1085 | 55% | 965 | 62% | 220.2 | \$23.79 |
| 502 | CEP306 | LJ25 | ATL | MSY | 350 | 0.277 | 364.1 | 1085 | 34% | 965 | 38% | 88.0 | \$9.51 |
| 502 | CEP306 | LJ25 | ATL | MSY | 350 | 0.277 | 364.1 | 1085 | 34% | 965 | 38% | 88.0 | \$9.51 |
| 502 | N700FC | LJ25 | GRR | MSP | 350 | 0.277 | 357.4 | 1085 | 33% | 965 | 37% | 84.2 | \$9.10 |
| 502 | N30LJ | LJ25 | SDF | MCN | 350 | 0.277 | 345.9 | 1085 | 32% | 965 | 36% | 77.6 | \$8.38 |
| 502 | CEP305 | LJ25 | ATL | CVG | 350 | 0.277 | 324.1 | 1085 | 30% | 965 | 34% | 65.0 | \$7.03 |
| 502 | VR175 | LJ25 | LCK | BNA | 350 | 0.277 | 284.2 | 1085 | 26% | 965 | 29% | 42.2 | \$4.56 |
| 502 | CEP305 | LJ25 | ATL | JAX | varies | 0.266 | 247.7 | 1051 | 24% | 965 | 26% | 18.5 | \$2.00 |
| 502 | N19JM | LJ25 | SVH | RIC | varies | 0.266 | 204.1 | 1051 | 19% | 965 | 21% | 0.0 | \$0.00 |
| 502 | N7810W | LJ25 | BRL | CGF | 330 | 0.266 | 429.6 | 1051 | 41% | 965 | 45% | 95.8 | \$10.35 |
| 502 | N99NJ | LJ25 | FLL | BQK | 330 | 0.266 | 319.4 | 1051 | 30% | 965 | 33% | 49.0 | \$5.29 |
| 502 | N74RD | LJ25 | HKS | HSV | 330 | 0.266 | 220.8 | 1051 | 21% | 965 | 23% | 7.1 | \$0.77 |
| 502 | GHP373 | LJ25 | ATL | CVG | 310 | 0.254 | 324.1 | 1012 | 32% | 965 | 34% | 26.8 | \$2.90 |
| 502 | GHP373 | LJ25 | JAX | ATL | 310 | 0.254 | 247.7 | 1012 | 24% | 965 | 26% | 8.0 | \$0.86 |
| 502 | XAACX | LJ25 | LAS | LAX | 310 | 0.254 | 206.4 | 1012 | 20% | 965 | 21% | 0.0 | \$0.00 |
| 502 | USC481 | LJ25 | BNA | CMH | 290 | 0.244 | 293.4 | 981 | 30% | 965 | 30% | 9.0 | \$0.98 |
| 502 | KFS18 | LJ25 | | | | | | | | | | | |

E. WW24.

| Date | Flight ID | Type | Origin | Destination | Actual FL | Cruise Burn Rate (nm/lb) | Distance (nm) | Max Range at FL (nm) | Current % Max Range | < 290 Max Range (nm) | % Max Range < 290 | Fuel Wasted (lbs) | Extra Cost (\$) |
|-----------------------|-----------------------|-----------------------|---------------------------|-------------------------|---------------------------|--------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------|---------------------|-------------------|-----------------|
| 502 | N95JK | WW24 | PIA | BHM | 410 | 0.284 | 451.5 | 1543 | 29% | 1429 | 32% | 0.0 | \$0.00 |
| 502 | TN140VJ | WW24 | BED | AUS | 390 | 0.255 | 1467.0 | 1485 | 99% | 1429 | 103% | 224.8 | \$24.30 |
| 502 | N10MV | WW24 | SLN | PSP | 390 | 0.255 | 956.4 | 1485 | 64% | 1429 | 67% | 134.6 | \$14.54 |
| 502 | N303TS | WW24 | STL | 5T6 | 390 | 0.255 | 897.1 | 1485 | 60% | 1429 | 63% | 124.1 | \$13.41 |
| 502 | N24KL | WW24 | TEB | LEE | 390 | 0.255 | 817.0 | 1485 | 55% | 1429 | 57% | 109.9 | \$11.88 |
| 502 | N900H | WW24 | DAL | SDL | 390 | 0.255 | 757.9 | 1485 | 51% | 1429 | 53% | 99.5 | \$10.75 |
| 502 | N41C | WW24 | EVW | PPA | 390 | 0.255 | 581.6 | 1485 | 39% | 1429 | 41% | 68.3 | \$7.38 |
| 502 | N35LH | WW24 | LBT | GSH | 390 | 0.255 | 523.4 | 1485 | 35% | 1429 | 37% | 58.0 | \$6.27 |
| 502 | N97HW | WW24 | EWY | PFN | 390 | 0.255 | 396.7 | 1485 | 27% | 1429 | 28% | 35.6 | \$3.85 |
| 502 | TN787RP | WW24 | MCE | HPN | 370 | 0.259 | 2163.0 | 1499 | 144% | 1429 | 151% | 444.8 | \$48.07 |
| 502 | N161X | WW24 | IAH | PNE | 370 | 0.259 | 1167.3 | 1499 | 78% | 1429 | 82% | 208.5 | \$22.53 |
| 502 | N67TJ | WW24 | BIL | SDF | 370 | 0.259 | 1115.3 | 1499 | 74% | 1429 | 78% | 196.1 | \$21.20 |
| 502 | N46BK | WW24 | HOU | IAD | 370 | 0.259 | 1045.1 | 1499 | 70% | 1429 | 73% | 179.5 | \$19.39 |
| 502 | N78GJ | WW24 | DPA | APF | 370 | 0.259 | 1000.1 | 1499 | 67% | 1429 | 70% | 168.8 | \$18.24 |
| 502 | N328PC | WW24 | PEA | BED | 370 | 0.259 | 968.8 | 1499 | 65% | 1429 | 68% | 161.4 | \$17.44 |
| 502 | N274K | WW24 | PWA | CGF | 370 | 0.259 | 839.5 | 1499 | 56% | 1429 | 59% | 130.7 | \$14.12 |
| 502 | N2HZ | WW24 | STJ | RIC | 370 | 0.259 | 837.2 | 1499 | 56% | 1429 | 59% | 130.1 | \$14.06 |
| 502 | N35LH | WW24 | GSH | OCF | 370 | 0.259 | 762.6 | 1499 | 51% | 1429 | 53% | 112.4 | \$12.15 |
| 502 | N428JF | WW24 | ASE | SHV | 370 | 0.259 | 743.0 | 1499 | 50% | 1429 | 52% | 107.8 | \$11.65 |
| 502 | N75BC | WW24 | SAN | BJC | 370 | 0.259 | 725.3 | 1499 | 48% | 1429 | 51% | 103.6 | \$11.19 |
| 502 | N204TM | WW24 | AUS | DSM | 370 | 0.259 | 703.4 | 1499 | 47% | 1429 | 49% | 98.4 | \$10.63 |
| 502 | N37BE | WW24 | ELP | FSM | 370 | 0.259 | 638.0 | 1499 | 43% | 1429 | 45% | 82.8 | \$8.95 |
| 502 | N347GA | WW24 | DAL | PDK | 370 | 0.259 | 632.7 | 1499 | 42% | 1429 | 44% | 81.6 | \$8.82 |
| 502 | N223WA | WW24 | ELP | HOU | 370 | 0.259 | 583.0 | 1499 | 39% | 1429 | 41% | 69.8 | \$7.54 |
| 502 | N524RH | WW24 | MCW | CKM | 370 | 0.259 | 544.8 | 1499 | 36% | 1429 | 38% | 60.7 | \$6.56 |
| 502 | N1WS | WW24 | VNY | PVU | 370 | 0.259 | 484.2 | 1499 | 32% | 1429 | 34% | 46.3 | \$5.01 |
| 502 | N666K | WW24 | SAV | GAI | 370 | 0.259 | 463.1 | 1499 | 31% | 1429 | 32% | 41.3 | \$4.47 |
| 502 | N325LW | WW24 | STL | SBA | 350 | 0.266 | 1429.5 | 1536 | 93% | 1429 | 100% | 400.1 | \$43.24 |
| 502 | N161X | WW24 | PNE | HOU | 350 | 0.266 | 1175.8 | 1536 | 77% | 1429 | 82% | 314.1 | \$33.95 |
| 502 | N10MV | WW24 | TEB | SLN | 350 | 0.266 | 1090.3 | 1536 | 71% | 1429 | 76% | 285.1 | \$30.81 |
| 502 | N41C | WW24 | HOU | EVW | 350 | 0.266 | 1037.8 | 1536 | 68% | 1429 | 73% | 267.3 | \$28.89 |
| 502 | N80FD | WW24 | TEB | NEW | 350 | 0.266 | 1014.0 | 1536 | 66% | 1429 | 71% | 259.3 | \$28.02 |
| 502 | N46BK | WW24 | IAD | DAL | 350 | 0.266 | 1011.7 | 1536 | 66% | 1429 | 71% | 258.5 | \$27.93 |
| 502 | N123RC | WW24 | PTK | APA | 350 | 0.266 | 980.3 | 1536 | 64% | 1429 | 69% | 247.8 | \$26.78 |
| 502 | N50FD | WW24 | TUL | LAS | 350 | 0.266 | 938.8 | 1536 | 61% | 1429 | 66% | 233.8 | \$25.26 |
| 502 | N730CA | WW24 | DAL | LAS | 350 | 0.266 | 926.4 | 1536 | 60% | 1429 | 65% | 229.6 | \$24.81 |
| 502 | CSK41 | WW24 | RDU | HOU | 350 | 0.266 | 912.4 | 1536 | 59% | 1429 | 64% | 224.8 | \$24.30 |
| 502 | N76ER | WW24 | PNE | FXE | 350 | 0.266 | 873.7 | 1536 | 57% | 1429 | 61% | 211.7 | \$22.88 |
| 502 | N274K | WW24 | CGF | PWA | 350 | 0.266 | 839.5 | 1536 | 55% | 1429 | 59% | 200.1 | \$21.62 |
| 502 | N93KE | WW24 | STL | GCC | 350 | 0.266 | 751.5 | 1536 | 49% | 1429 | 53% | 170.3 | \$18.40 |
| 502 | N420CE | WW24 | 1A5 | MSP | 350 | 0.266 | 734.0 | 1536 | 48% | 1429 | 51% | 164.3 | \$17.76 |
| 502 | N343RD | WW24 | APA | SAN | 350 | 0.266 | 725.7 | 1536 | 47% | 1429 | 51% | 161.5 | \$17.46 |
| 502 | N75BC | WW24 | BJC | SAN | 350 | 0.266 | 725.3 | 1536 | 47% | 1429 | 51% | 161.4 | \$17.44 |
| 502 | N204TM | WW24 | DSM | AUS | 350 | 0.266 | 703.4 | 1536 | 46% | 1429 | 49% | 154.0 | \$16.64 |
| 502 | N328PC | WW24 | BED | HLB | 350 | 0.266 | 661.8 | 1536 | 43% | 1429 | 46% | 139.9 | \$15.12 |
| 502 | N37BE | WW24 | FSM | ELP | 350 | 0.266 | 638.0 | 1536 | 42% | 1429 | 45% | 131.8 | \$14.24 |
| 502 | N37BE | WW24 | FSM | ELP | 350 | 0.266 | 638.0 | 1536 | 42% | 1429 | 45% | 131.8 | \$14.24 |
| 502 | N347GA | WW24 | PDK | DAL | 350 | 0.266 | 632.7 | 1536 | 41% | 1429 | 44% | 130.0 | \$14.05 |
| 502 | N155ME | WW24 | TYS | BTR | 350 | 0.266 | 494.3 | 1536 | 32% | 1429 | 35% | 83.1 | \$8.98 |
| 502 | N301PC | WW24 | CCO | FSM | 350 | 0.266 | 487.5 | 1536 | 32% | 1429 | 34% | 80.8 | \$8.73 |
| 502 | N95JK | WW24 | BHM | PIA | 350 | 0.266 | 451.5 | 1536 | 29% | 1429 | 32% | 68.6 | \$7.41 |
| 502 | N155ME | WW24 | FDK | TYS | 350 | 0.266 | 375.1 | 1536 | 24% | 1429 | 26% | 42.7 | \$4.62 |
| 502 | N46BK | WW24 | DAL | 5T9 | 350 | 0.266 | 305.2 | 1536 | 20% | 1429 | 21% | 19.0 | \$2.06 |
| 502 | N72787 | WW24 | SMO | CCR | 350 | 0.266 | 298.7 | 1536 | 19% | 1429 | 21% | 16.8 | \$1.82 |
| 502 | N26T | WW24 | BHM | GMU | varies | 0.263 | 231.7 | 1518 | 15% | 1429 | 16% | 0.0 | \$0.00 |
| 502 | TN491AN | WW24 | SMO | CLT | 330 | 0.263 | 1845.7 | 1521 | 121% | 1429 | 129% | 472.4 | \$51.05 |
| 502 | N161X | WW24 | IAH | PNE | 330 | 0.263 | 1167.3 | 1521 | 77% | 1429 | 82% | 271.5 | \$29.34 |
| 502 | N303TS | WW24 | 5T6 | STL | 330 | 0.263 | 897.1 | 1521 | 59% | 1429 | 63% | 191.5 | \$20.70 |
| 502 | N722AZ | WW24 | VNY | HOB | 330 | 0.263 | 768.8 | 1521 | 51% | 1429 | 54% | 153.5 | \$16.59 |
| 502 | N22LZ | WW24 | MFR | CRQ | 330 | 0.263 | 615.5 | 1521 | 40% | 1429 | 43% | 108.2 | \$11.69 |
| 502 | N97HW | WW24 | BHM | EYW | 330 | 0.263 | 599.0 | 1521 | 39% | 1429 | 42% | 103.3 | \$11.16 |
| 502 | N62ND | WW24 | BTR | AVL | 330 | 0.263 | 532.1 | 1521 | 35% | 1429 | 37% | 83.5 | \$9.02 |
| 502 | N628KM | WW24 | SIY | VNY | 330 | 0.263 | 491.8 | 1521 | 32% | 1429 | 34% | 71.5 | \$7.73 |
| 502 | N300XL | WW24 | LBB | HOU | 330 | 0.263 | 417.9 | 1521 | 27% | 1429 | 29% | 49.6 | \$5.37 |
| 502 | N55FG | WW24 | BRO | FTW | 330 | 0.263 | 414.9 | 1521 | 27% | 1429 | 29% | 48.8 | \$5.27 |
| 502 | N376BE | WW24 | MLI | CMH | 330 | 0.263 | 355.9 | 1524 | 23% | 1429 | 25% | 31.3 | \$3.38 |
| 502 | N41C | WW24 | DUC | HOU | 330 | 0.263 | 320.6 | 1521 | 21% | 1429 | 22% | 20.8 | \$2.25 |
| 502 | N72787 | WW24 | CCR | SMO | 330 | 0.263 | 298.7 | 1521 | 20% | 1429 | 21% | 14.4 | \$1.55 |
| 502 | N161X | WW24 | PNE | HOU | 310 | 0.263 | 1175.8 | 1524 | 77% | 1429 | 82% | 284.8 | \$30.78 |
| 502 | N274HM | WW24 | TEB | SLN | 310 | 0.263 | 1090.3 | 1524 | 72% | 1429 | 76% | 259.5 | \$28.04 |
| 502 | N428JF | WW24 | SHV | ASE | 310 | 0.263 | 743.0 | 1524 | 49% | 1429 | 52% | 156.7 | \$16.93 |
| 502 | N37BE | WW24 | ELP | BJC | 310 | 0.263 | 490.0 | 1524 | 32% | 1429 | 34% | 81.8 | \$8.84 |
| 502 | N376BE | WW24 | MLI | DTS | 290 | 0.25 | 264.0 | 1459 | 18% | 1429 | 18% | 4.9 | \$0.53 |
| 502 | N140DR | WW24 | SDL | VNY | 280 | 0.244 | 330.2 | 1524 | 22% | 1429 | 23% | 34.4 | \$3.72 |
| 502 | N830 | WW24 | 40N | GSO | 310 | 0.263 | 306.2 | 1524 | 20% | 1429 | 21% | 27.3 | \$2.95 |
| 502 | N26T | WW24 | GMU | BHM | 310 | 0.263 | 231.7 | 1524 | 15% | 1429 | 16% | 5.3 | \$0.57 |
| 502 | N900VP | WW24 | BWG | CAE | 290 | 0.25 | 322.1 | 1459 | 22% | 1429 | 23% | 10.6 | \$1.15 |
| 502 | N722AZ | WW24 | APC | VNY | 290 | 0.25 | 302.0 | 1459 | 21% | 1429 | 21% | 8.6 | \$0.93 |
| 502 | N606MA | WW24 | MSL | DTS | 290 | 0.25 | 264.0 | 1459 | 18% | 1429 | 18% | 4.9 | \$0.53 |
| 502 | N274HM | WW24 | SLN | PSP | 280 | 0.244 | 956.4 | 1429 | 67% | 1429 | 67% | 0.0 | \$0.00 |
| 502 | N328PC | WW24 | HLB | PEA | 280 | 0.244 | 372.9 | 1429 | 26% | 1429 | 26% | 0.0 | \$0.00 |
| 502 | N900VP | WW24 | CAE | BWG | 280 | 0.244 | 322.1 | 1429 | 23% | 1429 | 23% | 0.0 | \$0.00 |
| 502 | N328SA | WW24 | BUR | OAK | 280 | 0.244 | 283.3 | 1429 | 20% | 1429 | 20% | 0.0 | \$0.00 |
| 502 | N71WF | WW24 | BNA | RDU | 270 | 0.237 | 384.3 | 1392 | 28% | 1429 | 27% | 0.0 | \$0.00 |
| Max Fuel (gal) | Max Fuel (lbs) | NON RVSM nm/lb | Reserve Fuel (lbs) | Current Avg. Leg | Post RVSM Avg. Leg | % OPS Un-flyable | Avg. Wasted Fuel (lbs) | Total Fuel Waste (lbs) | Total Fuel Waste (gal) | Total \$ Loss | Avg. \$ Loss | | |
| 1300 | 8060 | 0.244 | 2000 | 714.3 | 663.7 | 4.8% | 13 | 126 | 10604 | 1710 | \$1,145.93 | \$13.64 | |

VIII. Appendix B. FAA ACB-330 Fuel Burn Modeling.

| Origin | Dest | Actyp | Flight_id | Cruise ft | Fuel Base | Fuel RVSM | % save | Fuel < 290 | % penalty | Fuel Waste |
|--------|------|-------|-----------|-----------|-----------|-----------|--------|------------|-----------|------------|
| CYGP | CYUL | C500 | CFG9408 | 35200 | 3092 | 3047 | 1.46% | 3318 | -7.31% | 226 |
| CER4 | CYXD | C500 | CFK9423 | 29100 | 1160 | 1142 | 1.55% | 1216 | -4.83% | 56 |
| CYYZ | CYWG | C500 | CGQ9601 | 39200 | 3760 | 3705 | 1.46% | 3932 | -4.57% | 172 |
| BHM | GSO | C500 | LN19641 | 33000 | 1675 | 1649 | 1.55% | 1794 | -7.10% | 119 |
| FWS | PDK | C500 | LN89745 | 33000 | 2860 | 2824 | 1.26% | 3018 | -5.52% | 158 |
| FTW | MKC | C500 | LN89746 | 33000 | 2058 | 2035 | 1.12% | 2184 | -6.12% | 126 |
| MKC | MAF | C500 | LN89747 | 31000 | 2293 | 2264 | 1.26% | 2411 | -5.15% | 118 |
| IWS | SPS | C500 | N111968 | 31000 | 1279 | 1259 | 1.56% | 1375 | -7.51% | 96 |
| CAE | ERI | C500 | N132224 | 37000 | 2046 | 2017 | 1.42% | 2197 | -7.38% | 151 |
| ERI | CAE | C500 | N132225 | 31000 | 1929 | 1903 | 1.35% | 2022 | -4.82% | 93 |
| FLL | DTS | C500 | N203132 | 31000 | 1671 | 1647 | 1.44% | 1741 | -4.19% | 70 |
| CRE | MGW | C500 | N253725 | 31000 | 1603 | 1583 | 1.25% | 1717 | -7.11% | 114 |
| MQI | RYY | C500 | N304346 | 31000 | 5597 | 5514 | 1.48% | 5971 | -6.68% | 374 |
| FNL | MEM | C500 | N405323 | 33000 | 2650 | 2610 | 1.51% | 2845 | -7.36% | 195 |
| LBL | ASE | C500 | N486271 | 31000 | 1850 | 1821 | 1.57% | 1928 | -4.22% | 78 |
| P19 | APA | C500 | N506473 | 33000 | 1964 | 1941 | 1.17% | 2114 | -7.64% | 150 |
| PIR | ATW | C500 | N506492 | 33000 | 1968 | 1946 | 1.12% | 2094 | -6.40% | 126 |
| MSL | DCA | C500 | N516632 | 37000 | 2498 | 2465 | 1.32% | 2675 | -7.09% | 177 |
| AMA | CRP | C500 | N526837 | 33000 | 1937 | 1914 | 1.19% | 2048 | -5.73% | 111 |
| HOU | AMA | C500 | N526838 | 31000 | 3924 | 3877 | 1.20% | 4107 | -4.66% | 183 |
| TYS | BTL | C500 | N587406 | 31000 | 2023 | 2000 | 1.14% | 2105 | -4.05% | 82 |
| ADS | PHX | C500 | N627834 | 31000 | 2942 | 2898 | 1.50% | 3164 | -7.55% | 222 |
| UCA | GYY | C500 | N627841 | 33000 | 2691 | 2659 | 1.19% | 2828 | -5.09% | 137 |
| SPI | CYS | C500 | N658076 | 35000 | 2434 | 2406 | 1.15% | 2536 | -4.19% | 102 |
| 4TA2 | MSY | C500 | N708439 | 33000 | 1838 | 1811 | 1.47% | 1966 | -6.96% | 128 |
| FWS | 2V2 | C500 | N718608 | 35000 | 2368 | 2337 | 1.31% | 2532 | -6.93% | 164 |
| ERV | OUN | C500 | N991004 | 33000 | 1814 | 1788 | 1.43% | 1926 | -6.17% | 112 |
| TPL | LNK | C500 | SLH5980 | 31000 | 2081 | 2048 | 1.59% | 2246 | -7.93% | 165 |
| FLL | TEB | H25A | N111870 | 35000 | 4012 | 3957 | 1.37% | 4201 | -4.71% | 189 |
| TEB | FLL | H25A | N111871 | 35000 | 6226 | 6142 | 1.35% | 6665 | -7.05% | 439 |
| GRI | BFI | H25A | N122068 | 35000 | 4396 | 4339 | 1.30% | 4655 | -5.89% | 259 |
| AUS | TIW | H25A | N172604 | 39000 | 4555 | 4496 | 1.30% | 4900 | -7.57% | 345 |
| SAT | BOI | H25A | N192830 | 39000 | 3329 | 3281 | 1.44% | 3542 | -6.40% | 213 |
| LBE | CYYZ | H25A | N253767 | 33000 | 1731 | 1704 | 1.56% | 1831 | -5.78% | 100 |
| LAX | FTY | H25A | N284096 | 41000 | 5492 | 5412 | 1.46% | 5828 | -6.12% | 336 |
| HYA | CMH | H25A | N294163 | 39000 | 5899 | 5831 | 1.15% | 6286 | -6.56% | 387 |
| CMH | HYA | H25A | N294164 | 37000 | 2874 | 2839 | 1.22% | 3023 | -5.18% | 149 |
| BRW | ANC | H25A | N334611 | 37100 | 1936 | 1909 | 1.39% | 2020 | -4.34% | 84 |
| MKE | TIW | H25A | N334621 | 35000 | 2571 | 2398 | 6.73% | 2662 | -3.54% | 91 |
| JLN | BNA | H25A | N334642 | 33000 | 2265 | 2232 | 1.46% | 2374 | -4.81% | 109 |
| SAT | HPN | H25A | N354942 | 33000 | 5159 | 5090 | 1.34% | 5549 | -7.56% | 390 |
| BNA | BOS | H25A | N415496 | 33000 | 3487 | 3439 | 1.38% | 3638 | -4.33% | 151 |
| SUS | DTW | H25A | N425772 | 33000 | 2133 | 2105 | 1.31% | 2251 | -5.53% | 118 |
| SLN | GNV | H25A | N456078 | 41000 | 3061 | 3019 | 1.37% | 3274 | -6.96% | 213 |
| BDR | ERI | H25A | N4Q6415 | 31000 | 1978 | 1956 | 1.11% | 2103 | -6.32% | 125 |
| APA | IAD | H25A | N546998 | 37000 | 4273 | 4221 | 1.22% | 4612 | -7.93% | 339 |
| SDL | LAS | H25A | N607568 | 31000 | 1872 | 1849 | 1.23% | 1961 | -4.75% | 89 |
| DAL | ISM | H25A | N708431 | 33000 | 3377 | 3339 | 1.13% | 3601 | -6.63% | 224 |
| PIE | SDL | H25A | N708479 | 39000 | 4587 | 4524 | 1.37% | 4789 | -4.40% | 202 |
| MFR | MSP | H25A | N738889 | 37000 | 3639 | 3586 | 1.46% | 3824 | -5.08% | 185 |

| Origin | Dest | Actyp | Flight_id | Cruise ft | Fuel Base | Fuel RVSM | % save | Fuel < 290 | % penalty | Fuel Waste |
|--------|------|-------|-----------|-----------|-----------|-----------|--------|------------|-----------|------------|
| GSP | CYHZ | H25A | N759044 | 37000 | 3236 | 3185 | 1.58% | 3452 | -6.67% | 216 |
| CYHZ | GSP | H25A | N759045 | 35000 | 4112 | 4064 | 1.17% | 4306 | -4.72% | 194 |
| TEB | ADS | H25A | N809384 | 35000 | 4058 | 4000 | 1.43% | 4254 | -4.83% | 196 |
| RDM | SFO | H25A | OPT2970 | 33000 | 2937 | 2891 | 1.57% | 3088 | -5.14% | 151 |
| TEB | BTR | H25A | TAG8940 | 39000 | 3763 | 3705 | 1.54% | 3948 | -4.92% | 185 |
| SFO | OLS | LJ24 | AJI3049 | 41000 | 2624 | 2591 | 1.26% | 2752 | -4.88% | 128 |
| OLS | SFO | LJ24 | AJI3050 | 39000 | 2979 | 2932 | 1.58% | 3208 | -7.69% | 229 |
| MCI | TYS | LJ24 | AJI3059 | 41000 | 1878 | 1850 | 1.49% | 1980 | -5.43% | 102 |
| MSP | FSM | LJ24 | AJI3060 | 43000 | 2682 | 2682 | 0.00% | 2682 | 0.00% | 215 |
| MRC | MSP | LJ24 | AJI3061 | 43000 | 4366 | 4366 | 0.00% | 4366 | 0.00% | 349 |
| HOU | DAL | LJ24 | CCY9100 | 31000 | 2375 | 2345 | 1.26% | 2538 | -6.86% | 163 |
| MOR | AKR | LJ24 | KHA9237 | 41000 | 2053 | 2030 | 1.12% | 2182 | -6.28% | 129 |
| JFK | MOR | LJ24 | KHA9238 | 39000 | 1880 | 1851 | 1.54% | 1962 | -4.36% | 82 |
| AKR | FLO | LJ24 | KHA9239 | 41000 | 1919 | 1894 | 1.30% | 2022 | -5.37% | 103 |
| FLO | MOR | LJ24 | KHA9240 | 31000 | 1420 | 1403 | 1.20% | 1515 | -6.69% | 95 |
| MDT | YIP | LJ24 | KHA9272 | 35000 | 2258 | 2222 | 1.59% | 2369 | -4.92% | 111 |
| MEM | YNG | LJ24 | N101744 | 41000 | 1920 | 1898 | 1.15% | 2021 | -5.26% | 101 |
| VNY | SJC | LJ24 | N122118 | 35000 | 1982 | 1958 | 1.21% | 2075 | -4.69% | 93 |
| RNT | GTF | LJ24 | N203063 | 41000 | 2022 | 1991 | 1.53% | 2107 | -4.20% | 85 |
| GOK | PUB | LJ24 | N284016 | 39000 | 3056 | 3010 | 1.51% | 3268 | -6.94% | 212 |
| PUB | CPR | LJ24 | N284017 | 39000 | 1516 | 1499 | 1.12% | 1631 | -7.59% | 115 |
| TEB | FSD | LJ24 | N284084 | 45000 | 3826 | 3826 | 0.00% | 3826 | 0.00% | 306 |
| FSD | RNO | LJ24 | N284085 | 45000 | 3123 | 3123 | 0.00% | 3123 | 0.00% | 250 |
| APA | OSH | LJ24 | N294122 | 41000 | 2480 | 2443 | 1.49% | 2674 | -7.82% | 194 |
| MSN | PUB | LJ24 | N395262 | 39000 | 2806 | 2770 | 1.28% | 2958 | -5.42% | 152 |
| PUB | CNO | LJ24 | N395263 | 43000 | 5684 | 5684 | 0.00% | 5684 | 0.00% | 455 |
| HOU | UES | LJ24 | N486305 | 43000 | 3286 | 3286 | 0.00% | 3286 | 0.00% | 263 |
| EYE | SVH | LJ24 | N506463 | 41000 | 1783 | 1755 | 1.57% | 1857 | -4.15% | 74 |
| JQF | ENW | LJ24 | N506464 | 45000 | 2519 | 2519 | 0.00% | 2519 | 0.00% | 202 |
| FRG | PWM | LJ24 | N567264 | 43000 | 2041 | 2041 | 0.00% | 2041 | 0.00% | 163 |
| GLD | ADS | LJ24 | N567265 | 33300 | 2760 | 2725 | 1.27% | 2889 | -4.67% | 129 |
| SBA | SMF | LJ24 | N607520 | 35000 | 2314 | 2288 | 1.12% | 2449 | -5.83% | 135 |
| EWR | PTK | LJ24 | N718567 | 41000 | 2068 | 2036 | 1.55% | 2213 | -7.01% | 145 |
| PTK | TUL | LJ24 | N718568 | 41000 | 2692 | 2654 | 1.41% | 2905 | -7.91% | 213 |
| SBM | TYS | LJ24 | N839735 | 37400 | 2847 | 2808 | 1.37% | 3060 | -7.48% | 213 |
| FLG | SJC | LJ24 | N8A0162 | 43000 | 2042 | 2042 | 0.00% | 2042 | 0.00% | 163 |
| HLN | GKY | LJ24 | N950689 | 43000 | 3500 | 3500 | 0.00% | 3500 | 0.00% | 280 |
| TVC | MGY | LJ24 | N990981 | 35000 | 2244 | 2212 | 1.43% | 2359 | -5.12% | 115 |
| YIP | EWR | LJ24 | N990983 | 41000 | 3074 | 3035 | 1.27% | 3310 | -7.68% | 236 |
| FWA | TVC | LJ24 | N990984 | 33000 | 1129 | 1116 | 1.15% | 1175 | -4.07% | 46 |
| MCI | FWA | LJ24 | N991008 | 41000 | 1892 | 1867 | 1.32% | 2031 | -7.35% | 139 |
| FWA | MDT | LJ24 | N991009 | 37000 | 2284 | 2258 | 1.14% | 2418 | -5.87% | 134 |
| MDT | OKK | LJ24 | N991010 | 39000 | 2068 | 2043 | 1.21% | 2214 | -7.06% | 146 |
| OKK | MDT | LJ24 | N991011 | 37000 | 2043 | 2018 | 1.22% | 2169 | -6.17% | 126 |
| MDT | FWA | LJ24 | N991012 | 39000 | 2043 | 2019 | 1.17% | 2141 | -4.80% | 98 |
| LZU | PTK | LJ24 | RAX4492 | 41000 | 2508 | 2479 | 1.16% | 2696 | -7.50% | 188 |
| TOL | LZU | LJ24 | RAX4494 | 41000 | 2988 | 2942 | 1.54% | 3169 | -6.06% | 181 |
| DCU | PTK | LJ24 | RAX4495 | 41000 | 2437 | 2403 | 1.40% | 2564 | -5.21% | 127 |
| PTK | MMI | LJ24 | RAX4506 | 41000 | 2401 | 2374 | 1.12% | 2501 | -4.16% | 100 |
| MMI | BDL | LJ24 | RAX4507 | 41000 | 3472 | 3425 | 1.35% | 3617 | -4.18% | 145 |
| MFE | PDK | LJ24 | RAX4511 | 41000 | 3496 | 3446 | 1.43% | 3640 | -4.12% | 144 |
| PDK | PTK | LJ24 | RAX4512 | 45000 | 2343 | 2343 | 0.00% | 2343 | 0.00% | 187 |
| LRD | TUL | LJ25 | AJI3064 | 41000 | 1975 | 1951 | 1.22% | 2088 | -5.72% | 113 |
| ADS | ELP | LJ25 | CCY9099 | 39000 | 1828 | 1802 | 1.42% | 1947 | -6.51% | 119 |
| BUR | ICT | LJ25 | CCY9109 | 41000 | 3224 | 3173 | 1.58% | 3463 | -7.41% | 239 |

| Origin | Dest | Actyp | Flight_id | Cruise ft | Fuel Base | Fuel RVSM | % save | Fuel < 290 | % penalty | Fuel Waste |
|--------|------|-------|-----------|-----------|-----------|-----------|--------|------------|-----------|------------|
| ICT | ADS | LJ25 | CCY9110 | 33000 | 1847 | 1822 | 1.35% | 1930 | -4.49% | 83 |
| ELP | GKY | LJ25 | CCY9111 | 41000 | 1907 | 1880 | 1.42% | 2008 | -5.30% | 101 |
| MCI | TTN | LJ25 | CCY9113 | 41000 | 4305 | 4255 | 1.16% | 4530 | -5.23% | 225 |
| ADS | MMCS | LJ25 | CCY9114 | 39000 | 1772 | 1744 | 1.58% | 1849 | -4.35% | 77 |
| MMCS | MCI | LJ25 | CCY9115 | 41000 | 3114 | 3077 | 1.19% | 3287 | -5.56% | 173 |
| MSY | ATL | LJ25 | CEP9356 | 37000 | 2118 | 2088 | 1.42% | 2244 | -5.95% | 126 |
| MSY | ATL | LJ25 | CEP9357 | 37000 | 2073 | 2047 | 1.25% | 2235 | -7.81% | 162 |
| ATL | MSY | LJ25 | CEP9358 | 35000 | 1592 | 1574 | 1.13% | 1677 | -5.34% | 85 |
| ELP | DKB | LJ25 | CYO1977 | 43000 | 3396 | 3396 | 0.00% | 3396 | 0.00% | 272 |
| OPF | MSY | LJ25 | JUD8857 | 41000 | 2326 | 2295 | 1.33% | 2435 | -4.69% | 109 |
| MSY | FTW | LJ25 | JUD8858 | 39000 | 2074 | 2046 | 1.35% | 2221 | -7.09% | 147 |
| AKR | FLO | LJ25 | KHA9191 | 41000 | 1787 | 1763 | 1.34% | 1890 | -5.76% | 103 |
| CSG | MIA | LJ25 | LN19642 | 43000 | 2129 | 2129 | 0.00% | 2129 | 0.00% | 170 |
| SAT | DVT | LJ25 | LN19660 | 41000 | 3225 | 3174 | 1.58% | 3419 | -6.02% | 194 |
| GNV | TMB | LJ25 | LN59707 | 33000 | 1633 | 1612 | 1.29% | 1714 | -4.96% | 81 |
| RDU | MIA | LJ25 | LN69717 | 41000 | 2297 | 2267 | 1.31% | 2450 | -6.66% | 153 |
| MIA | RDU | LJ25 | LN69718 | 37000 | 2318 | 2285 | 1.42% | 2432 | -4.92% | 114 |
| PDK | MIA | LJ25 | LN69722 | 41000 | 2755 | 2721 | 1.23% | 2974 | -7.95% | 219 |
| CRQ | MIK | LJ25 | LN69728 | 41000 | 3841 | 3784 | 1.48% | 4070 | -5.96% | 229 |
| BED | GRR | LJ25 | LN79729 | 39300 | 2652 | 2615 | 1.40% | 2818 | -6.26% | 166 |
| BOS | FWA | LJ25 | LN89748 | 43000 | 2817 | 2817 | 0.00% | 2817 | 0.00% | 225 |
| FWA | ABQ | LJ25 | LN89749 | 43000 | 3125 | 3125 | 0.00% | 3125 | 0.00% | 250 |
| SDL | ELP | LJ25 | LN89752 | 37000 | 1415 | 1393 | 1.55% | 1519 | -7.35% | 104 |
| TNCC | TNCM | LJ25 | LN99781 | 41000 | 5739 | 5650 | 1.55% | 6034 | -5.14% | 295 |
| IND | GSO | LJ25 | N182752 | 37000 | 1939 | 1914 | 1.29% | 2069 | -6.70% | 130 |
| CNY | SLC | LJ25 | N253729 | 31000 | 1425 | 1406 | 1.33% | 1504 | -5.54% | 79 |
| PDX | SLC | LJ25 | N253730 | 41000 | 2813 | 2777 | 1.28% | 3022 | -7.43% | 209 |
| SLC | DAL | LJ25 | N253731 | 41000 | 3699 | 3654 | 1.22% | 3865 | -4.49% | 166 |
| DAL | MAF | LJ25 | N253732 | 39000 | 1654 | 1633 | 1.27% | 1780 | -7.62% | 126 |
| FNT | MWO | LJ25 | N294126 | 31000 | 2001 | 1972 | 1.45% | 2100 | -4.95% | 99 |
| FXE | DTS | LJ25 | N294159 | 35000 | 1897 | 1871 | 1.37% | 2031 | -7.06% | 134 |
| PDK | JYO | LJ25 | N304349 | 33000 | 2926 | 2883 | 1.47% | 3148 | -7.59% | 222 |
| JYO | MCN | LJ25 | N304350 | 35000 | 2205 | 2172 | 1.50% | 2334 | -5.85% | 129 |
| PVU | VNY | LJ25 | N344776 | 39000 | 2928 | 2888 | 1.37% | 3117 | -6.45% | 189 |
| TYS | CYYZ | LJ25 | N385171 | 41000 | 2640 | 2602 | 1.44% | 2773 | -5.04% | 133 |
| CYYZ | TYS | LJ25 | N385172 | 41000 | 2122 | 2093 | 1.37% | 2266 | -6.79% | 144 |
| EYW | BVI | LJ25 | N415629 | 41000 | 3171 | 3120 | 1.61% | 3409 | -7.51% | 238 |
| MYAM | TPA | LJ25 | N445945 | 43000 | 2226 | 2226 | 0.00% | 2226 | 0.00% | 178 |
| EUG | SLC | LJ25 | N456097 | 41000 | 2950 | 2904 | 1.56% | 3143 | -6.54% | 193 |
| CRP | INT | LJ25 | N506465 | 41000 | 8428 | 8330 | 1.16% | 9011 | -6.92% | 583 |
| FRG | CYMX | LJ25 | N617707 | 41000 | 3296 | 3249 | 1.43% | 3547 | -7.62% | 251 |
| SBM | ILG | LJ25 | N627802 | 41000 | 2628 | 2596 | 1.22% | 2790 | -6.16% | 162 |
| CRW | MDW | LJ25 | N658053 | 31000 | 2804 | 2761 | 1.53% | 2952 | -5.28% | 148 |
| LYH | SGJ | LJ25 | N708531 | 39000 | 1816 | 1791 | 1.38% | 1934 | -6.50% | 118 |
| MSY | HOU | LJ25 | N718613 | 35000 | 1880 | 1859 | 1.12% | 1965 | -4.52% | 85 |
| TIX | Y15 | LJ25 | N759049 | 41000 | 3247 | 3206 | 1.26% | 3493 | -7.58% | 246 |
| SLN | MEM | LJ25 | N769076 | 33000 | 2086 | 2055 | 1.49% | 2225 | -6.66% | 139 |
| BTV | IAD | LJ25 | N809390 | 39000 | 2318 | 2282 | 1.55% | 2450 | -5.69% | 132 |
| EKM | TUL | LJ25 | N809437 | 43000 | 2575 | 2575 | 0.00% | 2575 | 0.00% | 206 |
| SRQ | TEB | LJ25 | N8M0172 | 41300 | 3758 | 3758 | 0.00% | 3758 | 0.00% | 301 |
| OMA | TUS | LJ25 | N910430 | 39000 | 4439 | 4384 | 1.24% | 4666 | -5.11% | 227 |
| CMH | CSG | LJ25 | N970812 | 37000 | 2681 | 2640 | 1.53% | 2892 | -7.87% | 211 |
| CSG | CMH | LJ25 | N970814 | 35000 | 3802 | 3747 | 1.45% | 4021 | -5.76% | 219 |
| ILM | TTN | LJ25 | N980933 | 37000 | 2514 | 2475 | 1.55% | 2667 | -6.09% | 153 |
| IKK | TEB | LJ25 | N991040 | 37000 | 3187 | 3147 | 1.26% | 3405 | -6.84% | 218 |

| Origin | Dest | Actyp | Flight_id | Cruise ft | Fuel Base | Fuel RVSM | % save | Fuel < 290 | % penalty | Fuel Waste |
|--------|------|-------|-----------|-----------|-----------|-----------|--------|------------|-----------|------------|
| SZY | PTK | LJ25 | RAX4491 | 41000 | 3045 | 3008 | 1.22% | 3196 | -4.96% | 151 |
| BED | CMH | LJ25 | USC4846 | 39000 | 2297 | 2266 | 1.35% | 2427 | -5.66% | 130 |
| CMH | CPS | LJ25 | USC4847 | 39000 | 2041 | 2015 | 1.27% | 2182 | -6.91% | 141 |
| CMH | BED | LJ25 | USC4848 | 41000 | 2382 | 2350 | 1.34% | 2548 | -6.97% | 166 |
| CMH | BUF | LJ25 | USC5189 | 41000 | 1923 | 1893 | 1.56% | 2035 | -5.82% | 112 |
| BUF | CMH | LJ25 | USC5190 | 39000 | 996 | 983 | 1.31% | 1065 | -6.93% | 69 |
| BMC | PHX | LJ25 | VRT5361 | 41000 | 2273 | 2241 | 1.41% | 2412 | -6.12% | 139 |
| BNA | OSU | LJ25 | VRT5363 | 41000 | 1731 | 1709 | 1.27% | 1838 | -6.18% | 107 |
| LAS | ELP | LJ25 | XAT5919 | 41000 | 1887 | 1864 | 1.22% | 1974 | -4.61% | 87 |
| PUB | VNY | LJ28 | N284092 | 43000 | 2939 | 2939 | 0.00% | 2939 | 0.00% | 235 |
| CYYZ | FOK | WW24 | CFG9411 | 33000 | 1880 | 1857 | 1.22% | 1998 | -6.28% | 118 |
| FOK | CYSN | WW24 | CFG9412 | 35000 | 1755 | 1735 | 1.14% | 1849 | -5.36% | 94 |
| CR3 | CYYZ | WW24 | CGR9604 | 35000 | 2748 | 2711 | 1.35% | 2938 | -6.91% | 190 |
| CYYZ | CR3 | WW24 | CGR9605 | 37000 | 1062 | 1047 | 1.41% | 1123 | -5.74% | 61 |
| MSP | CYSN | WW24 | CGR9607 | 35000 | 6418 | 6338 | 1.25% | 6737 | -4.97% | 319 |
| CHS | ORL | WW24 | LN49698 | 31000 | 1927 | 1905 | 1.14% | 2064 | -7.11% | 137 |
| GRI | TVC | WW24 | N101644 | 33000 | 2369 | 2341 | 1.18% | 2473 | -4.39% | 104 |
| BJC | GRI | WW24 | N101646 | 33000 | 1588 | 1568 | 1.26% | 1662 | -4.66% | 74 |
| MEV | TUL | WW24 | N101842 | 37000 | 3910 | 3854 | 1.43% | 4112 | -5.17% | 202 |
| TUL | FLO | WW24 | N101844 | 33000 | 6528 | 6434 | 1.44% | 7018 | -7.51% | 490 |
| CRP | CRQ | WW24 | N203055 | 39000 | 3730 | 3675 | 1.47% | 3989 | -6.94% | 259 |
| BHM | TKI | WW24 | N203078 | 35000 | 2340 | 2310 | 1.28% | 2464 | -5.30% | 124 |
| TKI | BHM | WW24 | N203079 | 37000 | 2228 | 2203 | 1.12% | 2400 | -7.72% | 172 |
| HOU | TPA | WW24 | N304246 | 41000 | 3052 | 3014 | 1.25% | 3292 | -7.86% | 240 |
| SLC | TPA | WW24 | N304277 | 41000 | 5142 | 5083 | 1.15% | 5487 | -6.71% | 345 |
| SRQ | CLT | WW24 | N324571 | 35000 | 2330 | 2300 | 1.29% | 2484 | -6.61% | 154 |
| CLT | EVB | WW24 | N324572 | 33000 | 2119 | 2085 | 1.60% | 2238 | -5.62% | 119 |
| RDM | PEA | WW24 | N324587 | 37000 | 3320 | 3273 | 1.42% | 3467 | -4.43% | 147 |
| RDG | FXE | WW24 | N334704 | 39000 | 3194 | 3147 | 1.47% | 3335 | -4.41% | 141 |
| HPN | LFT | WW24 | N344768 | 39000 | 8601 | 8491 | 1.28% | 8950 | -4.06% | 349 |
| LBE | MQY | WW24 | N354834 | 35000 | 2251 | 2217 | 1.51% | 2366 | -5.11% | 115 |
| FSM | HSV | WW24 | N375107 | 31000 | 1849 | 1823 | 1.41% | 1989 | -7.57% | 140 |
| COS | MRY | WW24 | N3A5276 | 35000 | 3412 | 3374 | 1.11% | 3625 | -6.24% | 213 |
| MIA | PNS | WW24 | N405329 | 39000 | 2788 | 2744 | 1.58% | 2900 | -4.02% | 112 |
| BCT | ILG | WW24 | N415556 | 37000 | 3588 | 3544 | 1.23% | 3749 | -4.49% | 161 |
| LFT | MDD | WW24 | N415619 | 35000 | 2303 | 2274 | 1.26% | 2405 | -4.43% | 102 |
| TEB | GYY | WW24 | N425649 | 31000 | 2723 | 2685 | 1.40% | 2928 | -7.53% | 205 |
| BHM | ORL | WW24 | N435815 | 33000 | 1987 | 1955 | 1.61% | 2113 | -6.34% | 126 |
| TEB | DTW | WW24 | N435824 | 31000 | 2527 | 2488 | 1.54% | 2638 | -4.39% | 111 |
| IAH | APA | WW24 | N435852 | 35000 | 7820 | 7705 | 1.47% | 8253 | -5.54% | 433 |
| DAL | PDK | WW24 | N435869 | 37000 | 2763 | 2723 | 1.45% | 2904 | -5.10% | 141 |
| SAF | APA | WW24 | N445950 | 33000 | 1711 | 1688 | 1.34% | 1802 | -5.32% | 91 |
| APA | SYR | WW24 | N445951 | 37000 | 4185 | 4124 | 1.46% | 4497 | -7.46% | 312 |
| TEB | MWO | WW24 | N445980 | 35000 | 2261 | 2227 | 1.50% | 2392 | -5.79% | 131 |
| PGD | CHS | WW24 | N476204 | 33000 | 1915 | 1885 | 1.57% | 1992 | -4.02% | 77 |
| CYUL | ILG | WW24 | N4M6406 | 31000 | 1901 | 1873 | 1.47% | 1997 | -5.05% | 96 |
| IND | DCA | WW24 | N526731 | 33000 | 2170 | 2146 | 1.11% | 2320 | -6.91% | 150 |
| SHR | MDW | WW24 | N526836 | 37000 | 3360 | 3322 | 1.13% | 3502 | -4.23% | 142 |
| CMI | BUF | WW24 | N557155 | 37000 | 1950 | 1922 | 1.44% | 2076 | -6.46% | 126 |
| TEB | BHM | WW24 | N607618 | 31000 | 3127 | 3087 | 1.28% | 3258 | -4.19% | 131 |
| BHM | SDF | WW24 | N607619 | 33000 | 1640 | 1619 | 1.28% | 1712 | -4.39% | 72 |
| DAL | MKY | WW24 | N678233 | 37000 | 3354 | 3307 | 1.40% | 3561 | -6.17% | 207 |
| HPN | BHM | WW24 | N6T8389 | 39000 | 2858 | 2823 | 1.22% | 3056 | -6.93% | 198 |
| DAL | CRP | WW24 | N718630 | 35000 | 1454 | 1437 | 1.17% | 1567 | -7.77% | 113 |
| CRP | DAL | WW24 | N718631 | 33000 | 1706 | 1685 | 1.23% | 1805 | -5.80% | 99 |

| Origin | Dest | Actyp | Flight_id | Cruise ft | Fuel Base | Fuel RVSM | % save | Fuel < 290 | % penalty | Fuel Waste |
|---------------|-------------|--------------|------------------|------------------|------------------|------------------|---------------|----------------------|------------------|-------------------|
| GRI | TEB | WW24 | N759033 | 37000 | 3934 | 3875 | 1.50% | 4211 | -7.04% | 277 |
| BUR | SAC | WW24 | N789241 | 31000 | 1854 | 1828 | 1.40% | 1992 | -7.44% | 138 |
| SAF | DCA | WW24 | N809472 | 37000 | 4484 | 4434 | 1.12% | 4786 | -6.74% | 302 |
| HEZ | HRL | WW24 | N900230 | 31000 | 2186 | 2162 | 1.10% | 2354 | -7.69% | 168 |
| BLM | SGJ | WW24 | N910419 | 39000 | 5397 | 5324 | 1.35% | 5646 | -4.61% | 249 |
| PIE | DVK | WW24 | N940628 | 39000 | 2251 | 2223 | 1.24% | 2369 | -5.24% | 118 |
| ASL | PDK | WW24 | N940643 | 33000 | 2785 | 2746 | 1.40% | 2990 | -7.36% | 205 |
| DAL | FTY | WW24 | N950712 | 37000 | 4841 | 4782 | 1.22% | 5116 | -5.68% | 275 |

X. Appendix C - Fuel-burn Penalties Below RVSM for Turbojet Aircraft Types Operating Under Part 135

| ICAO Code | US Population | 135 Population | % of Fleet on 135 | Airworthiness Approved | % of 135 Fleet Approved | 135 to Approve | Upgrade Cost | 135 Fleet Approval Cost | Ops During 22-28 July 2002 | Estimated # of 135 Ops. In 22-28 July 2002 Sample |
|-----------|---------------|----------------|-------------------|------------------------|-------------------------|----------------|--------------|-------------------------|----------------------------|---|
| ASTR | 109 | 22 | 20.18% | 4 | 18.18% | 18 | \$110,000.00 | \$ 1,980,000.00 | 358 | 72 |
| BE40 | 350 | 147 | 42.00% | 6 | 4.08% | 141 | \$25,000.00 | \$ 3,525,000.00 | 1,634 | 686 |
| C501 | 263 | 23 | 8.75% | | 0.00% | 23 | \$101,259.00 | \$ 2,328,957.00 | 272 | 24 |
| C525 | 352 | 60 | 17.05% | 2 | 3.33% | 58 | \$58,000.00 | \$ 3,364,000.00 | 860 | 147 |
| C550 | 599 | 188 | 31.39% | 2 | 1.06% | 186 | \$111,500.00 | \$ 20,739,000.00 | 1,693 | 531 |
| C560 | 530 | 182 | 34.34% | 5 | 2.75% | 177 | \$42,953.00 | \$ 7,602,681.00 | 2,161 | 742 |
| C56X | 167 | 74 | 44.31% | 34 | 45.95% | 40 | \$0.00 | \$ - | 839 | 372 |
| C650 | 290 | 79 | 27.24% | 6 | 7.59% | 73 | \$74,918.00 | \$ 5,469,014.00 | 1,034 | 282 |
| C750 | 184 | 96 | 52.17% | 73 | 76.04% | 23 | \$7,680.00 | \$ 176,640.00 | 623 | 325 |
| C500 | 218 | 45 | 20.64% | | 0.00% | 45 | \$101,259.00 | \$ 4,556,655.00 | 225 | 46 |
| F2TH | 135 | 45 | 33.33% | 26 | 57.78% | 19 | \$15,000.00 | \$ 285,000.00 | 451 | 150 |
| F900 | 179 | 11 | 6.15% | 9 | 81.82% | 2 | \$15,000.00 | \$ 30,000.00 | 488 | 30 |
| FA10 | 167 | 67 | 40.12% | 1 | 1.49% | 66 | \$150,000.00 | \$ 9,900,000.00 | 351 | 141 |
| FA20 | 110 | 34 | 30.91% | 4 | 11.76% | 30 | \$15,000.00 | \$ 450,000.00 | 682 | 211 |
| FA50 | 225 | 63 | 28.00% | 48 | 76.19% | 15 | \$15,000.00 | \$ 225,000.00 | 785 | 220 |
| GALX | 65 | 11 | 16.92% | 8 | 72.73% | 3 | \$0.00 | \$ - | 108 | 18 |
| GLEX | 80 | 9 | 11.25% | 7 | 77.78% | 2 | \$0.00 | \$ - | 68 | 8 |
| GLF2 | 137 | 89 | 64.96% | 13 | 14.61% | 76 | \$235,000.00 | \$ 17,860,000.00 | 378 | 246 |
| GLF3 | 83 | 77 | 92.77% | 48 | 62.34% | 29 | 88270 | \$ 2,559,830.00 | 335 | 311 |
| GLF4 | 424 | 130 | 30.66% | 100 | 76.92% | 30 | \$14,000.00 | \$ 420,000.00 | 863 | 265 |
| GLF5 | 201 | 38 | 18.91% | 33 | 86.84% | 5 | \$0.00 | \$ - | 180 | 34 |
| H25A | 153 | 32 | 20.92% | | 0.00% | 32 | \$150,000.00 | \$ 4,800,000.00 | 247 | 52 |
| H25B | 594 | 275 | 46.30% | 84 | 30.55% | 191 | \$32,500.00 | \$ 6,207,500.00 | 2,258 | 1,045 |
| H25C | 28 | 28 | 100.00% | 2 | 7.14% | 26 | \$32,500.00 | \$ 845,000.00 | 309 | 309 |
| LJ23 | 48 | 9 | 18.75% | | 0.00% | 9 | 149000 | \$ 1,341,000.00 | 6 | 1 |
| LJ24 | 181 | 74 | 40.88% | | 0.00% | 74 | 149000 | \$ 11,026,000.00 | 281 | 115 |
| LJ25 | 257 | 133 | 51.75% | 2 | 1.50% | 131 | 149000 | \$ 19,519,000.00 | 606 | 314 |
| LJ31 | 190 | 53 | 27.89% | 5 | 9.43% | 48 | \$46,000.00 | \$ 2,208,000.00 | 632 | 176 |
| LJ35 | 476 | 279 | 58.61% | 3 | 1.08% | 276 | \$145,000.00 | \$ 40,020,000.00 | 2,322 | 1,361 |
| LJ45 | 157 | 30 | 19.11% | 7 | 23.33% | 23 | \$0.00 | \$ - | 762 | 146 |
| LJ55 | 113 | 74 | 65.49% | 4 | 5.41% | 70 | \$155,000.00 | \$ 10,850,000.00 | 397 | 260 |
| LJ60 | 193 | 81 | 41.97% | 25 | 30.86% | 56 | \$20,000.00 | \$ 1,120,000.00 | 842 | 353 |
| MU30 | 81 | 31 | 38.27% | | 0.00% | 31 | \$110,000.00 | \$ 3,410,000.00 | 141 | 54 |
| PRM1 | 58 | 3 | 5.17% | | 0.00% | 3 | \$0.00 | \$ - | 61 | 3 |
| SBR1 | 95 | 20 | 21.05% | | 0.00% | 20 | \$139,000.00 | \$ 2,780,000.00 | 391 | 82 |
| SBR2 | 37 | 6 | 16.22% | | 0.00% | 6 | \$175,000.00 | \$ 1,050,000.00 | 32 | 5 |
| WW24 | 219 | 54 | 24.66% | | 0.00% | 54 | \$140,000.00 | \$ 7,560,000.00 | 564 | 139 |

7,748

2,672

561

21.00%

2,111

\$ 194,208,277.00

24,239

9,276

| Estimated Number of Approved Operations | Estimated Number of Non-approved Ops. 22-28 July 2002 | Estimated Number of Annual Non-approved Ops. By Type | Avg Lbs. Per Flight Pre-RVSM | Avg Cost Flt Pre-RVSM | Avg Lbs. Per Flight Post RVSM | Avg Cost Flt Post-RVSM | Average Additional Cost Per Flight by Type | Average Annual Additional Cost Per Airframe by Type | Estimated Annual Cost Per Fleet Type |
|---|---|--|------------------------------|-----------------------|-------------------------------|------------------------|--|---|--------------------------------------|
| 13 | 59 | 3,074.20 | 1295.541667 | \$ 129.55 | 1386.833333 | \$ 138.68 | \$ 9.13 | \$ 1,559.16 | \$ 28,064.90 |
| 28 | 658 | 34,229.97 | 907.5 | \$ 90.75 | 974.1769231 | \$ 97.42 | \$ 6.67 | \$ 1,618.69 | \$ 228,234.88 |
| - | 24 | 1,236.93 | 739.1666667 | \$ 73.92 | 787.6666667 | \$ 78.77 | \$ 4.85 | \$ 260.83 | \$ 5,999.10 |
| 5 | 142 | 7,368.64 | 792.4098361 | \$ 79.24 | 850.4098361 | \$ 85.04 | \$ 5.80 | \$ 736.86 | \$ 42,738.09 |
| 6 | 526 | 27,336.72 | 1967.72093 | \$ 196.77 | 2105.899225 | \$ 210.59 | \$ 13.82 | \$ 2,030.83 | \$ 377,734.15 |
| 20 | 722 | 37,528.01 | 1063.471429 | \$ 106.35 | 1140.552381 | \$ 114.06 | \$ 7.71 | \$ 1,634.29 | \$ 289,269.46 |
| 171 | 201 | 10,449.82 | 611.34375 | \$ 61.13 | 656.46875 | \$ 65.65 | \$ 4.51 | \$ 1,178.87 | \$ 47,154.81 |
| 21 | 260 | 13,534.70 | 1525.123457 | \$ 152.51 | 1641.358025 | \$ 164.14 | \$ 11.62 | \$ 2,155.07 | \$ 157,320.04 |
| 247 | 78 | 4,049.50 | 2507.041667 | \$ 250.70 | 2691.166667 | \$ 269.12 | \$ 18.41 | \$ 3,241.80 | \$ 74,561.42 |
| - | 46 | 2,415.14 | 851.3333333 | \$ 85.13 | 909.9047619 | \$ 90.99 | \$ 5.86 | \$ 314.35 | \$ 14,145.81 |
| 87 | 63 | 3,300.65 | 924.4166667 | \$ 92.44 | 991.6666667 | \$ 99.17 | \$ 6.72 | \$ 1,168.26 | \$ 22,196.88 |
| 25 | 5 | 283.53 | 1190.2 | \$ 119.02 | 1277.228571 | \$ 127.72 | \$ 8.70 | \$ 1,233.76 | \$ 2,467.53 |
| 2 | 139 | 7,213.37 | 2190.652174 | \$ 219.07 | 2330.826087 | \$ 233.08 | \$ 14.02 | \$ 1,532.01 | \$ 101,112.56 |
| 25 | 186 | 9,672.00 | 2280.5 | \$ 228.05 | 2442.115385 | \$ 244.21 | \$ 16.16 | \$ 5,210.48 | \$ 156,314.40 |
| 167 | 52 | 2,721.33 | 957 | \$ 95.70 | 1027.044776 | \$ 102.70 | \$ 7.00 | \$ 1,270.77 | \$ 19,061.52 |
| 13 | 5 | 259.20 | 1167.222222 | \$ 116.72 | 1253.777778 | \$ 125.38 | \$ 8.66 | \$ 747.84 | \$ 2,243.52 |
| 6 | 2 | 88.40 | 1342.111111 | \$ 134.21 | 1426.888889 | \$ 142.69 | \$ 8.48 | \$ 374.72 | \$ 749.44 |
| 36 | 210 | 10,904.06 | 1063.6 | \$ 106.36 | 1141.066667 | \$ 114.11 | \$ 7.75 | \$ 1,111.45 | \$ 84,470.11 |
| 194 | 117 | 6,086.51 | 691.1904762 | \$ 69.12 | 743.6190476 | \$ 74.36 | \$ 5.24 | \$ 1,100.37 | \$ 31,910.68 |
| 204 | 61 | 3,175.19 | 1066.277778 | \$ 106.63 | 1146.2 | \$ 114.62 | \$ 7.99 | \$ 845.89 | \$ 25,376.81 |
| 30 | 4 | 232.84 | 869.1935484 | \$ 86.92 | 931.3870968 | \$ 93.14 | \$ 6.22 | \$ 289.62 | \$ 1,448.09 |
| - | 52 | 2,686.33 | 875.7222222 | \$ 87.57 | 933.7222222 | \$ 93.37 | \$ 5.80 | \$ 486.90 | \$ 15,580.70 |
| 319 | 726 | 37,754.98 | 851.4868421 | \$ 85.15 | 916.1513158 | \$ 91.62 | \$ 6.47 | \$ 1,278.22 | \$ 244,140.57 |
| 22 | 287 | 14,920.29 | 697 | \$ 69.70 | 744.2727273 | \$ 74.43 | \$ 4.73 | \$ 2,712.78 | \$ 70,532.26 |
| - | 1 | 58.50 | 1800.5 | \$ 180.05 | 1929 | \$ 192.90 | \$ 12.85 | \$ 83.53 | \$ 751.73 |
| - | 115 | 5,973.97 | 2476.692308 | \$ 247.67 | 2663.884615 | \$ 266.39 | \$ 18.72 | \$ 1,511.19 | \$ 111,828.06 |
| 5 | 309 | 16,062.54 | 622.9565217 | \$ 62.30 | 666.6521739 | \$ 66.67 | \$ 4.37 | \$ 535.77 | \$ 70,186.30 |
| 17 | 160 | 8,302.48 | 813.796875 | \$ 81.38 | 873.390625 | \$ 87.34 | \$ 5.96 | \$ 1,030.78 | \$ 49,477.62 |
| 15 | 1,346 | 70,011.23 | 801.4242424 | \$ 80.14 | 860.0151515 | \$ 86.00 | \$ 5.86 | \$ 1,486.24 | \$ 410,202.14 |
| 34 | 112 | 5,804.79 | 682.0357143 | \$ 68.20 | 730.4107143 | \$ 73.04 | \$ 4.84 | \$ 1,220.90 | \$ 28,080.67 |
| 14 | 246 | 12,788.32 | 1025.407407 | \$ 102.54 | 1103.814815 | \$ 110.38 | \$ 7.84 | \$ 1,432.43 | \$ 100,269.89 |
| 109 | 244 | 12,704.17 | 815.0566038 | \$ 81.51 | 875.3018868 | \$ 87.53 | \$ 6.02 | \$ 1,366.73 | \$ 76,536.61 |
| - | 54 | 2,806.07 | 737.7142857 | \$ 73.77 | 784.2857143 | \$ 78.43 | \$ 4.66 | \$ 421.56 | \$ 13,068.29 |
| - | 3 | 164.07 | 1411.5 | \$ 141.15 | 1504 | \$ 150.40 | \$ 9.25 | \$ 505.88 | \$ 1,517.64 |
| - | 82 | 4,280.42 | 1008.714286 | \$ 100.87 | 1082.464286 | \$ 108.25 | \$ 7.38 | \$ 1,578.41 | \$ 31,568.11 |
| - | 5 | 269.84 | 173 | \$ 17.30 | 184 | \$ 18.40 | \$ 1.10 | \$ 49.47 | \$ 296.82 |
| - | 139 | 7,231.56 | 2371.022727 | \$ 237.10 | 2547.113636 | \$ 254.71 | \$ 17.61 | \$ 2,358.17 | \$ 127,341.23 |

1,834

7,442

386,980.23

\$ 3,063,952.82