

EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION



EUROCONTROL EXPERIMENTAL CENTRE

**MODEL ACCURACY REPORT FOR
THE BASE OF AIRCRAFT DATA (BADA)
REVISION 2.5**

EEC Note No. 29/96

EEC Task D09
EATCHIP Task SPT

Issued: December 1996

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REPORT DOCUMENTATION PAGE

Reference: EEC Note 29/96	Security Classification: Unclassified					
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TITLE: Model Accuracy Report for the Base of Aircraft Data (BADA) Revision 2.5						
Author A.Bos	Date 12/96	Pages vi + 4	Figures 0	Tables 1	Appendix 1	References 1
EATCHIP Task Specification SPT	EEC Task No. D09		Task No. Sponsor		Period 7/94 to 12/96	
Distribution Statement: (a) Controlled by: Head of APO (b) Special Limitations: None (c) Copy to NTIS: YES / NO						
Descriptors (keywords): aircraft model, total-energy model, BADA, accuracy						
Abstract: An overview is given of the accuracy of 30 aircraft models that have been developed for the Base of Aircraft Data (BADA) over the last 2.5 years. The accuracy for both the aircraft trajectories and the fuel consumption is presented in relation to the reference data that was used.						

This document has been collated by mechanical means. Should there be missing pages, please report to:

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**Accuracy Report
for the
Base of Aircraft Data (BADA)
Revision 2.5**

EUROCONTROL Experimental Centre

Summary

An overview is given of the accuracy of 30 aircraft models that have been developed for the Base of Aircraft Data (BADA) over the last 2.5 years. The accuracy for both the aircraft trajectories and the fuel consumption is presented in relation to the reference data that was used.

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1. Introduction

1.1 Identification and Scope

This document gives an overview of the accuracy of BADA models that have been (re-) developed over the last 2.5 years. The accuracy is given in relation to the reference data that was used. These accuracy reports give the BADA user insight in the trajectory and fuel consumption accuracy that can be expected from a particular model under given conditions.

1.2 Organisation

Section 1 of this document is the introduction containing among others a list of referenced documents and a glossary of acronyms. Section 2 gives an overview of those aircraft models for which a modelling report is made. Section 3 describes the format of the accuracy reports and explains the data that is presented. Appendix A contains the accuracy reports.

1.3 Referenced Documents

RD1 User Manual for BADA Revision 2.4, EEC Note 5/96, February 1996

1.4 Glossary of Acronyms

BADA	Base of Aircraft Data
CAS	Calibrated Air Speed
ICAO	International Civil Aviation Organisation
ISA	International Standard Atmosphere
N/A	Not Available
RD	Reference Document
rms	root mean square

2. Aircraft Types

For BADA 2.5, 69 aircraft models will be available. Out of these 69 models, 30 have been (re-) developed in the past 2.5 years and for those models a modelling report has been written. The models are listed below. The aircraft code corresponds to the ICAO code, with one exception. This exception is the generic military fighter with the code FGTR.

Table 2-1: List of Aircraft Models with Modelling Report

Aircraft Code	Aircraft Name
AT42	ATR-42
B727	Boeing 727 (All Series)
B737	Boeing 737-100/200
B73S	Boeing 737-300
B73V	Boeing 737-500
B767	Boeing 767 (All Series)
BA31	BAe Jetstream 31
BA41	BAe Jetstream 41
BA46	BAe 146
BATP	BAe ATP
BE90	Beech 90 (3)
C421	Cessna 421 Golden Eagle
CL60	Canadair CL-600 Challenger (3)
CL65	Canadair Regional Jet
D228	Dornier 228
D328	Dornier 328
DC9	McDonnell Douglas DC-9 (All Series)
DH83	De Havilland Dash 8 -300
EA32	Airbus A-320
EA33	Airbus A-330 (3)
FGTR	Generic Fighter Model (2)
FK10	Fokker 100
FK50	Fokker 50
FK70	Fokker 70
HS25	BAe 125 (1)
MD11	McDonnell Douglas MD-11
MD80	McDonnell Douglas MD-80
SH36	Shorts 360
TU34	Tupolev Tu-134
TU54	Tupolev Tu-154

Note (1): For this aircraft model a modelling report has been written and is available. However, it was developed using an unidentified version of BADA and the accuracy with regard to the reference information was never determined. It was therefore not possible to publish an accuracy summary report for this model.

Note (2): The FGTR model has been developed using average performance data from several fighter aircraft. It was not developed in the traditional way (using climb and descent trajectories) and it is therefore not possible to give an accuracy summary report for this model.

Note (3): These models have been developed with an unidentified version of BADA and the errors that are presented will not always give a good representation of the accuracy of these models when used with BADA 2.5.

3. Model Accuracy Reports

The data for the model accuracy reports is taken from the respective modelling reports. The modelling reports can not be distributed to BADA users since they contain confidential information from operators and/or manufacturers. The format of the various summary reports may differ slightly, since they were directly taken from modelling reports that were produced by different persons, over a period of 2.5 years. A typical accuracy summary report however consists of 4 tables:

The first table gives an overview of the reference data that has been used for the development of the model. Typically this would consist of 7-10 climb trajectories and 1-3 descent trajectories. The pages of the reference documents (Flight Manual) that are used are given in the last column. These documents are most of the time indicated with RD followed by a number. The number relates to the internal document numbering scheme of the modelling report.

The second table gives the maximum and root-mean-square (rms) error for distance and altitude in absolute units, between the model and the reference data.

The third table gives the same error as the second table only this time expressed in percentage plus the so-called figure-of-merit, which is the measure of the goodness of fit between the calculated trajectory and the reference trajectory; calculated as the average of the maximum and rms distance errors (normalised) and the maximum and rms altitude errors (normalised):

$$f_M = [(\Delta d)_{rms}^* + (\Delta d)_{max}^* + (\Delta h)_{rms}^* + (\Delta h)_{max}^*] / 4 \quad (3-1)$$

The fourth table gives the maximum and root-mean-square error between the reference data and the model for the fuel consumption in absolute units and as a percentage.

The accuracy reports are presented in Appendix A and are given in alphabetical order.

The BADA Configuration Manager (Arjan Bos), may be contacted if additional information concerning model accuracy is required.

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Appendix A:
BADA Accuracy Summary Reports

AT42: ATR-42

Table 1: AT42 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	11000	160/.42	ISA	min. mass	[RD3] pg. 4.5 p 14
CL2	climb	15000	160/.42	ISA	nom. mass	[RD3] pg. 4.5 p 15
CL3	climb	16500	160/.42	ISA	max. mass	[RD3] pg. 4.5 p 15
DES1	descent	15000	240/.55	ISA	nom. mass	[RD3] pg. 4.5 p 34

Table 2: AT42 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	160 / ISA / min. mass	6.3	2.7	1722	956
CL2	160 / ISA / nom. mass	2.1	1.2	341	225
CL3	160 / ISA / max. mass	9.7	6.0	893	639
	max. (ISA)	9.7	6.0	1722	956
	mean (ISA)	6.0	3.3	985	712

Table 3: AT42 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	160 / ISA / min. mass	12.8	5.6	6.9	3.8	7.3
CL2	160 / ISA / nom. mass	2.4	1.4	1.4	0.9	1.5
CL3	160 / ISA / max. mass	8.8	5.5	3.6	2.6	5.1
	max. (ISA)	12.8	5.6	6.9	3.8	7.3
	mean (ISA)	8.0	4.2	4.0	2.4	4.6

Table 4: AT42 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	160 / ISA / min. mass	15	8	12.2	6.6
CL2	160 / ISA / nom. mass	4	3	1.6	1.1
CL3	160 / ISA / max. mass	34	16	10.1	4.7
	maximum (all profiles)	34	16	12.2	6.6
	mean (all profiles)	18	9	8.0	4.1

B727: Boeing 727 (All Series)

Table 1: B727 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	74000	300/.78	ISA	nom. mass	[RD3] pg 72.32.11
CL2	climb	58000	300/.78	ISA	min. mass	[RD3] pg 72.32.11
CL3	climb	86000	300/.78	ISA	max. mass	[RD3] pg 72.32.11
CL4	climb	74000	280/.75	ISA	nom. mass	[RD3] pg 72.32.13
CL5	climb	58000	280/.75	ISA	min. mass	[RD3] pg 72.32.13
CL6	climb	86000	280/.75	ISA	max. mass	[RD3] pg 72.32.13
CL7	climb	74000	300/.78	ISA+10	nom. mass	[RD3] pg 72.32.12
CL8	climb	58000	300/.78	ISA+10	min. mass	[RD3] pg 72.32.12
CL9	climb	86000	300/.78	ISA+10	max. mass	[RD3] pg 72.32.12
CL10	climb	74000	280/.75	ISA+10	nom. mass	[RD3] pg 72.32.14
CL11	climb	58000	280/.75	ISA+10	min. mass	[RD3] pg 72.32.14
CL12	climb	86000	280/.75	ISA+10	max. mass	[RD3] pg 72.32.14
DES1	descent	60000	280/.78	ISA	nominal speed	[RD3] pg. 72.34.01
DES2	descent	60000	300/.78	ISA	low speed	[RD3] pg. 72.34.01
DES3	descent	60000	250/.78	ISA	high speed	[RD3] pg. 72.34.01

Table 2: B727 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	300 / ISA / nom. mass	4.2	2.6	997	561
CL2	300 / ISA / min. mass	4.3	2.9	1442	835
CL3	300 / ISA / max. mass	3.9	2.5	862	437
CL4	280 / ISA / nom. mass	5.9	2.8	853	529
CL5	280 / ISA / min. mass	3.0	1.7	749	393
CL6	280 / ISA / max. mass	5.9	3.1	762	458
CL7	300 / ISA+10/ nom. mass	16.2	10.3	2428	1679
CL8	300 / ISA+10/ min. mass	11.7	7.4	2750	1934
CL9	300 / ISA+10/ max. mass	20.4	12.9	2273	1580
CL10	280 / ISA+10/ nom. mass	12.9	8.1	2232	1519
CL11	280 / ISA+10/ min. mass	6.3	3.8	1596	1009
CL12	280 / ISA+10/ max. mass	16.8	11.1	2090	1470
	maximum (all profiles)	20.4	12.9	2750	1934
	mean (all profiles)	9.3	6.0	1586	1034
	max (ISA)	5.9	3.1	1442	835
	mean (ISA)	4.5	2.6	944	536

Table 3: B727 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	300 / ISA / nom. mass	2.3	1.5	2.7	1.6	2.0
CL2	300 / ISA / min. mass	3.4	2.2	3.6	2.1	2.8
CL3	300 / ISA / max. mass	1.9	1.2	2.5	1.3	1.7
CL4	280 / ISA / nom. mass	3.4	1.6	2.3	1.4	2.2
CL5	280 / ISA / min. mass	2.5	1.4	1.9	1.0	1.7
CL6	280 / ISA / max. mass	2.9	1.5	2.2	1.3	2.0
CL7	300 / ISA+10/ nom. mass	7.0	4.5	6.6	4.5	5.7
CL8	300 / ISA+10/ min. mass	7.7	4.9	6.9	4.8	6.1
CL9	300 / ISA+10/ max. mass	6.6	4.2	6.7	4.6	5.8
CL10	280 / ISA+10/ nom. mass	5.8	3.6	6.0	4.1	4.9
CL11	280 / ISA+10/ min. mass	4.4	2.7	4.0	2.5	3.4
CL12	280 / ISA+10/ max. mass	7.6	5.0	6.3	4.5	5.9
	maximum (all profiles)	7.7	4.9	6.9	4.8	6.1
	mean (all profiles)	4.6	2.9	4.3	2.8	3.7
	max (ISA)	3.4	2.2	3.6	2.1	2.8
	mean (ISA)	2.7	1.6	2.5	2.9	2.1

Table 4: B727 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	300 / ISA / nom. mass	64	29	2.3	1.1
CL2	300 / ISA / min. mass	36	20	1.9	1.0
CL3	300 / ISA / max. mass	82	36	2.4	1.1
CL4	280 / ISA / nom. mass	87	52	3.3	2.0
CL5	280 / ISA / min. mass	97	32	5.2	1.7
CL6	280 / ISA / max. mass	111	52	3.4	1.6
CL7	300 / ISA+10/ nom. mass	165	106	4.9	3.1
CL8	300 / ISA+10/ min. mass	127	65	6.0	3.1
CL9	300 / ISA+10/ max. mass	238	137	5.5	3.2
CL10	280 / ISA+10/ nom. mass	204	114	6.5	3.6
CL11	280 / ISA+10/ min. mass	80	47	3.9	2.3
CL12	280 / ISA+10/ max. mass	256	169	7.2	4.8
	maximum (all profiles)	256	169	7.2	4.8
	mean (all profiles)	129	72	4.4	2.4

B737: Boeing 737-100/200

Table 1: B737 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	34000	300/.72	ISA	min. mass	[RD3] pg. 05-50-03
CL2	climb	46000	300/.72	ISA	nom. mass	[RD3] pg. 05-50-03
CL3	climb	52000	300/.72	ISA	max. mass	[RD3] pg. 05-50-03
CL4	climb	34000	300.72	ISA+10	min. mass	[RD3] pg. 05-50-04
CL5	climb	46000	300/.72	ISA+10	nom. mass	[RD3] pg. 05-50-04
CL6	climb	52000	300/.72	ISA+10	max. mass	[RD3] pg. 05-50-04
DES1	descent	45000	280/.72	ISA	ref. speed	[RD3] pg.05-80-01/02

Table 2: B737 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	300 / ISA / min. mass	1.8	1.0	1356	505
CL2	300 / ISA / nom. mass	3.8	3.0	1265	778
CL3	300 / ISA / max. mass	9.9	4.9	1591	905
CL4	300 / ISA+10 / min. mass	3.3	2.3	998	696
CL5	300 / ISA+10 / nom. mass	3.9	2.2	791	382
CL6	300 / ISA+10 / max. mass	7.1	3.0	641	300
	maximum (all profiles)	9.9	4.9	1591	905
	mean (all profiles)	5.0	2.7	1107	594
	max. (ISA)	9.9	4.9	1591	905
	mean (ISA)	5.2	3.0	1404	729

Table 3: B737 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	300 / ISA / min. mass	2.4	1.4	3.7	1.4	2.2
CL2	300 / ISA / nom. mass	3.0	2.3	3.4	2.1	2.7
CL3	300 / ISA / max. mass	6.0	3.0	4.4	2.5	4.0
CL4	300 / ISA+10 / min. mass	3.5	2.5	2.7	1.9	2.6
CL5	300 / ISA+10 / nom. mass	2.4	1.4	2.1	1.0	1.7
CL6	300 / ISA+10 / max. mass	3.3	1.4	1.8	0.8	1.8
	maximum (all profiles)	6.0	3.0	4.4	2.5	4.0
	mean (all profiles)	3.4	2.0	3.0	1.6	2.5
	max. (ISA)	6.0	3.0	4.4	2.5	4.0
	mean (ISA)	3.8	2.2	3.8	2.0	3.0

Table 4: B737 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	300 / ISA / min. mass	55	27	6.6	3.2
CL2	300 / ISA / nom. mass	85	40	6.5	3.1
CL3	300 / ISA / max. mass	192	62	12.0	3.9
CL4	300 / ISA+10 / min. mass	100	63	11.1	7.0
CL5	300 / ISA+10 / nom. mass	98	62	6.5	4.2
CL6	300 / ISA+10 / max. mass	227	93	11.8	4.8
	maximum (all profiles)	227	93	12.0	7.0
	mean (all profiles)	126	58	8.1	4.4

B73S: Boeing 737-300

Table 1: B73S Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	40000	310/.76	ISA	min. mass	[RD4] pg. 4-3-6
CL2	climb	54000	310/.76	ISA	nom. mass	[RD4] pg. 4-3-6
CL3	climb	62000	310/.76	ISA	max. mass	[RD4] pg. 4-3-5
CL4	climb	40000	280/.74	ISA	min. mass	[RD4] pg. 4-3-4
CL5	climb	54000	280/.74	ISA	nom. mass	[RD4] pg. 4-3-3
CL6	climb	62000	280/.74	ISA	max. mass	[RD4] pg. 4-3-3
CL7	climb	54000	310/.76	ISA+20	nom. mass	[RD4] pg. 4-3-6
CL8	climb	54000	280/.74	ISA+20	nom. mass	[RD4] pg. 4-3-3
DES1	descent	55000	280/.70	ISA	ref. speed	[RD4] pg. 4-10-141

Table 2: B73S Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	310 / ISA / min. mass	3.3	1.9	875	528
CL2	310 / ISA / nom. mass	6.8	3.9	923	581
CL3	310 / ISA / max. mass	8.0	4.7	1190	596
CL4	280 / ISA / min. mass	2.0	1.4	900	528
CL5	280 / ISA / nom. mass	3.4	2.1	909	507
CL6	280 / ISA / max. mass	6.1	3.2	958	536
CL7	310 / ISA+20 / mass	18.8	11.2	2884	1421
CL8	280 / ISA+20 / mass	16.0	10.6	2782	1779
	maximum (all profiles)	18.8	11.2	2884	1779
	mean (all profiles)	8.1	4.8	1428	810
	max. (ISA)	6.8	4.7	1190	596
	mean (ISA)	4.8	2.9	959	546

Table 3: B73S Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	310 / ISA / min. mass	4.2	2.4	2.4	1.4	2.6
CL2	310 / ISA / nom. mass	5.1	2.9	2.5	1.6	3.0
CL3	310 / ISA / max. mass	4.9	2.9	3.4	1.7	3.2
CL4	280 / ISA / min. mass	2.6	1.9	2.4	1.4	2.1
CL5	280 / ISA / nom. mass	2.5	1.6	2.5	1.4	2.0
CL6	280 / ISA / max. mass	3.7	1.9	2.7	1.5	2.5
CL7	310 / ISA+20 / nom. mass	8.9	5.8	7.8	3.8	6.8
CL8	280 / ISA+20 / nom. mass	8.3	5.5	7.5	4.8	6.5
	maximum (all profiles)	8.9	5.8	7.8	4.8	6.8
	mean (all profiles)	5.0	3.1	3.9	2.2	3.6
	max. (ISA)	5.1	2.9	3.4	1.7	3.2
	mean (ISA)	3.8	2.3	2.7	1.5	2.6

Table 4: B73S Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	310 / ISA / min. mass	90	55	10.4	6.3
CL2	310 / ISA / nom. mass	56	37	4.1	2.7
CL3	310 / ISA / max. mass	137	70	8.5	4.4
CL4	280 / ISA / min. mass	81	42	9.7	5.1
CL5	280 / ISA / nom. mass	96	56	7.4	4.3
CL6	280 / ISA / max. mass	243	95	15.6	6.1
CL7	310 / ISA+20 / nom. mass	202	145	12.5	9.0
CL8	280 / ISA+20 / nom. mass	297	156	19.8	10.4
	maximum (all profiles)	297	156	19.8	10.4
	mean (all profiles)	150	78	11.0	6.0

B73V: Boeing 737-500

Table 1: B73V Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	52000	280/.74	ISA	nom. mass	[RD3] pg 04.30.02,04
CL2	climb	40000	280/.74	ISA	min. mass	[RD3] pg 04.30.02,04
CL3	climb	64000	280/.74	ISA	max. mass	[RD3] pg 04.30.02,04
CL4	climb	52000	280/.74	ISA+10	nom. mass	[RD3] pg 04.30.04
CL5	climb	40000	280/.74	ISA+10	min. mass	[RD3] pg 04.30.04
CL6	climb	64000	280/.74	ISA+10	max. mass	[RD3] pg 04.30.04
CL7	climb	52000	280/.74	ISA+20	nom. mass	[RD3] pg 04.30.05
DES1	descent	50000	250/.74	ISA	nominal mass	[RD3] pg. 04.50.01
DES2	descent	35000	250/.74	ISA	min. mass	[RD3] pg. 04.50.01

Table 2: B73V Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	280 / ISA / nom. mass	1.5	0.8	790	316
CL2	280 / ISA / min. mass	2.4	1.3	1099	464
CL3	280 / ISA / max. mass	3.5	1.2	879	331
CL4	280 / ISA+10 / nom. mass	2.8	1.4	752	382
CL5	280 / ISA+10 / min. mass	3.1	1.7	1190	624
CL6	280 / ISA+10 / max. mass	6.8	2.2	701	289
CL7	280 / ISA+20/ nom. mass	8.5	4.6	1440	924
	maximum (all profiles)	8.5	4.6	1440	924
	mean (all profiles)	4.1	1.9	979	475
	max (ISA,ISA+10)	6.8	2.2	1190	624
	mean (ISA,ISA+10)	3.4	1.4	902	401

Table 3: B73V Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	280 / ISA / nom. mass	1.2	0.7	2.1	0.9	1.2
CL2	280 / ISA / min. mass	3.2	1.7	3.0	1.3	2.3
CL3	280 / ISA+10 / max. mass	1.8	0.6	2.5	0.9	1.5
CL4	280 / ISA+10 / nom. mass	2.2	1.1	2.0	1.0	1.6
CL5	280 / ISA+10 / min. mass	3.8	2.1	3.2	1.7	2.7
CL6	280 / ISA+10 / max. mass	3.4	1.1	2.0	0.8	1.8
CL7	280 / ISA+20/ nom. mass	5.1	2.7	3.9	2.5	3.6
	maximum (all profiles)	5.1	2.7	3.9	2.5	3.6
	mean (all profiles)	3.0	1.4	2.7	1.3	2.1
	max (ISA, ISA+10)	3.8	2.1	3.2	1.7	2.7
	mean (ISA, ISA+10)	2.6	1.2	2.5	1.1	1.9

Table 4: B73V Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	280 / ISA / nom. mass	28	14	2.2	1.1
CL2	280 / ISA / min. mass	50	24	6.1	2.9
CL3	280 / ISA / max. mass	57	30	3.0	1.6
CL4	280 / ISA+10 / nom. mass	57	28	4.4	2.2
CL5	280 / ISA+10 / min. mass	73	39	8.7	4.7
CL6	280 / ISA+10/ max. mass	49	23	2.5	1.1
CL7	280 / ISA+20/ nom. mass	122	71	7.9	4.6
	maximum (all profiles)	122	71	8.7	4.7
	mean (all profiles)	62	33	5.0	2.6

B767: Boeing 767 (All Series)

Table 1: B767 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	90000	290/.78	ISA	min. mass	[RD3] pg. 223-03
CL2	climb	150000	290/.78	ISA	nom. mass	[RD3] pg. 223-03
CL3	climb	180000	290/.78	ISA	max. mass	[RD3] pg. 223-03
CL4	climb	90000	290/.78	ISA+10	min. mass	[RD3] pg. 233-04
CL5	climb	150000	290/.78	ISA+10	nom. mass	[RD3] pg. 223-04
CL6	climb	180000	290/.78	ISA+10	max. mass	[RD3] pg. 223-04
CL7	climb	150000	290/.78	ISA+20	nom. mass	[RD3] pg. 223-06
DES1	descent	140000	290/.78	ISA	ref. speed	[RD3] pg. 225-03

Table 2: B767 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m.]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	290 / ISA / min. mass	3.5	2.0	1331	841
CL2	290 / ISA / nom. mass	2.2	1.0	1411	385
CL3	290 / ISA / max. mass	6.5	2.7	1234	519
CL4	290 / ISA+10 / min. mass	4.9	2.6	1505	980
CL5	290 / ISA+10 / nom. mass	2.6	1.6	1068	397
CL6	290 / ISA+10 / max. mass	11.6	4.0	1122	438
CL7	290 / ISA+20 / nom. mass	6.5	3.7	1019	614
	maximum (all profiles)	11.6	4.0	1505	980
	mean (all profiles)	5.4	2.5	1241	596
	max. (ISA)	6.5	2.7	1411	841
	mean (ISA)	4.1	1.9	1325	582

Table 3: B767 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	290 / ISA / min. mass	4.5	2.7	3.1	1.9	3.0
CL2	290 / ISA / nom. mass	1.5	0.7	3.6	1.0	1.7
CL3	290 / ISA / max. mass	4.4	1.9	3.5	1.5	2.8
CL4	290 / ISA+10 / min. mass	6.0	3.2	3.5	2.3	3.7
CL5	290 / ISA+10 / nom. mass	1.7	1.1	2.7	1.0	1.6
CL6	290 / ISA+10 / max. mass	6.3	2.1	3.1	1.2	3.2
CL7	290 / ISA+20 / nom. mass	3.4	1.9	2.6	1.6	2.4
	maximum (all profiles)	6.3	3.2	3.6	2.3	3.7
	mean (all profiles)	4.0	1.9	3.2	1.5	2.6
	max. (ISA)	4.5	2.7	3.6	1.9	3.0
	mean (ISA)	3.5	1.8	3.4	1.5	2.5

Table 4: B767 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	290 / ISA / min. mass	109	58	7.0	3.7
CL2	290 / ISA / nom. mass	135	68	4.4	2.2
CL3	290 / ISA / max. mass	211	93	5.8	2.6
CL4	290 / ISA+10 / min. mass	174	101	11.0	6.4
CL5	290 / ISA+10 / nom. mass	274	123	8.8	3.9
CL6	290 / ISA+10 / max. mass	257	97	6.3	2.4
CL7	290 / ISA+20 / nom. mass	360	202	10.2	5.7
	maximum (all profiles)	360	202	11.0	6.4
	mean (all profiles)	217	106	7.6	3.8

BA31: BAe Jetstream 31

Table 1: BA31 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	6200	160/.323	ISA	ref. mass	[RD4] pg 9-5-4
CL2	climb	5000	160/.323	ISA	min. mass	[RD4] pg 9-5-4
CL3	climb	7000	160/.323	ISA	max. mass	[RD4] pg 9-5-4
CL4	climb	6200	160/.323	+ 10	ref. mass	[RD4] pg 9-5-6
CL5	climb	6200	160/.323	+20	ref. mass	[RD4] pg 9-5-8
CL6	climb	7000	160/.323	+20	min mass	[RD4] pg 9-5-8
CL7	climb	5000	160/.323	+20	max mass	[RD4] pg 9-5-8
DES1	descent	6200	180/0.37	ISA	reference descent	[RD4] pg 9-5-34

Table 2: BA31 Reference Trajectory Error Summary

Profile Id	Description	Maximum Absolute Error [n. miles]	Average Absolute Error [n. miles]	Maximum Relative Error [%]	Average Relative Error [%]
CL1	reference climb ref. mass @ ISA	0.9	0.4	2.4	0.9
CL2	climb at ISA minimum mass	1.7	0.8	3.6	2.9
CL3	climb at ISA maximum mass	2.1	0.7	2.1	1.3
CL4	climb at +10 ISA reference mass	4.8	2.6	8.9	5.9
CL5	climb at +20 ISA reference mass	7.1	4.1	14.7	8.3
CL6	climb at +20 ISA minimum mass	7.6	5.0	18.3	12.6
CL7	climb at +20 ISA maximum mass	8.3	4.4	11.7	7.9
DES1	reference descent	1.9	1.2	14.0	4.8

BA41: BAe Jetstream 41

Table 1: BA41 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	9000	170/.35	ISA	ref. mass	[RD3] pg 2-3-2
CL2	climb	7000	170/.35	ISA	min. mass	[RD3] pg 2-3-2
CL3	climb	10500	170/.35	ISA	max. mass	[RD3] pg 2-3-2
CL4	climb	9000	170/.35	+ 10	ref. mass	[RD3] pg 2-3-3
CL5	climb	9000	170/.35	+20	ref. mass	[RD3] pg 2-3-4
CL6	climb	7000	170/.35	+20	min mass	[RD3] pg 2-3-4
CL7	climb	10500	170/.35	+20	max mass	[RD3] pg 2-3-4
DES1	descent	6200	180/0.37	ISA	reference descent	[RD4] pg 9-5-34
DES2	descent	6200	250/0.52	ISA	descent at V_{MO}	[RD4] pg 9-5-34

Table 2: BA41 Reference Trajectory Error Summary

Profile Id	Description	Maximum Absolute Error [n. miles]	Average Absolute Error [n. miles]	Maximum Relative Error [%]	Average Relative Error [%]
CL1	reference climb ref. mass @ ISA	0.6	0.2	2.1	0.7
CL2	climb at ISA minimum mass	0.4	0.1	0.8	0.3
CL3	climb at ISA maximum mass	3.6	1.1	4.2	2.0
CL4	climb at +10 ISA reference mass	1.4	0.7	2.7	1.8
CL5	climb at +20 ISA reference mass	3.4	1.4	4.8	3.4
CL6	climb at +20 ISA minimum mass	1.5	0.9	7.7	4.0
CL7	climb at +20 ISA maximum mass	4.9	2.3	5.2	4.3
DES1	reference descent	4.1	1.5	26.4	5.6
DES1	descent at V_{MO}	3.4	1.6	7.8	4.2

BA46: BAe 146

Table 1: BA46 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	30000	280/.60	ISA	min. mass	[RD3] II-04-07-65
CL2	climb	36000	280/.60	ISA	nom. mass	[RD3] II-04-07-65
CL3	climb	42000	280/.60	ISA	max. mass	[RD3] II-04-07-65
CL4	climb	30000	250/.60	ISA	min. mass	[RD3] II-04-07-71
CL5	climb	36000	250/.60	ISA	nom. mass	[RD3] II-04-07-71
CL6	climb	42000	250/.60	ISA	max. mass	[RD3] II-04-07-71
CL7	climb	30000	280/.60	ISA+10	min. mass	[RD3] II-04-07-67
CL8	climb	36000	280/.60	ISA+10	nom. mass	[RD3] II-04-07-67
CL9	climb	42000	280/.60	ISA+10	max. mass	[RD3] II-04-07-67
CL10	climb	36000	280/.60	ISA+20	nom. mass	[RD3] II-04-07-69
DES1	descent	36000	250/.60	ISA	nom. mass	[RD3] II-04-07-88
DES2	descent	36000	280/.60	ISA	nom. mass	[RD3] II-04-07-87

Table 2: BA46 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	280 / ISA / min. mass	2.4	1.2	1840	592
CL2	280 / ISA / nom. mass	2.6	1.4	997	454
CL3	280 / ISA / max. mass	6.3	2.4	804	458
CL4	250 / ISA / min. mass	3.8	1.6	1840	598
CL5	250 / ISA / nom. mass	4.7	2.1	1402	528
CL6	250 / ISA / max. mass	4.7	1.9	804	322
CL7	280 / ISA+10 / min. mass	3.3	2.0	1518	576
CL8	280 / ISA+10 / nom. mass	4.5	2.6	882	518
CL9	280 / ISA+10 / max. mass	25.5	7.5	1553	631
CL10	280 / ISA+20 / nom. mass	29.3	11.4	1391	719
	maximum (all profiles)	29.3	11.4	1840	719
	mean (all profiles)	8.7	3.4	1303	540
	max. (ISA)	6.3	2.4	1840	598
	mean (ISA)	4.1	1.8	1282	492

Table 3: BA46 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	280 / ISA / min. mass	3.3	1.6	5.9	1.9	3.2
CL2	280 / ISA / nom. mass	2.8	1.5	3.2	1.5	2.2
CL3	280 / ISA / max. mass	4.7	1.8	2.6	1.5	2.6
CL4	250 / ISA / min. mass	5.7	2.3	5.9	1.9	4.0
CL5	250 / ISA / nom. mass	5.2	2.3	4.5	1.7	3.4
CL6	250 / ISA / max. mass	3.7	1.5	2.6	1.0	2.2
CL7	280 / ISA+10 / min. mass	3.3	2.0	4.9	1.9	3.0
CL8	280 / ISA+10 / nom. mass	3.2	1.9	2.8	1.7	2.4
CL9	280 / ISA+10 / max. mass	11.5	3.4	5.0	2.0	5.5
CL10	280 / ISA+20 / nom. mass	12.7	4.9	4.5	2.3	6.1
	maximum (all profiles)	12.7	4.9	5.9	2.3	6.1
	mean (all profiles)	5.6	2.3	4.2	1.7	3.5
	max. (ISA)	5.7	2.3	5.9	1.9	4.0
	mean (ISA)	4.2	1.8	4.1	1.6	2.9

Table 4: BA46 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	280 / ISA / min. mass	31	9	4.2	1.3
CL2	280 / ISA / nom. mass	28	10	2.9	1.0
CL3	280 / ISA / max. mass	45	21	3.5	1.6
CL4	250 / ISA / min. mass	31	12	4.3	1.7
CL5	250 / ISA / nom. mass	28	13	3.0	1.4
CL6	250 / ISA / max. mass	27	12	2.2	1.0
CL7	280 / ISA+10 / min. mass	41	26	4.7	3.0
CL8	280 / ISA+10 / nom. mass	60	39	5.1	3.4
CL9	280 / ISA+10 / max. mass	217	76	13.4	4.7
CL10	280 / ISA+20 / nom. mass	112	57	6.4	3.2
	maximum (all profiles)	217	79	13.4	4.7
	mean (all profiles)	62	28	5.0	2.2

BATP: BAe ATP (Advanced Turboprop)

Table 1: BATP Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	20000	180/.38	ISA	ref. mass min. cost	[RD3] pg 13.22.1-4
CL2	climb	16000	180/.38	ISA	min. mass min. cost	[RD3] pg 13.22.1-4
CL3	climb	23000	180/.38	ISA	max. mass min. cost	[RD3] pg 13.22.1-4
CL4	climb	20000	180/.38	+10	ref. mass min. cost	[RD3] pg 13.22.1-6
CL5	climb	16000	180/.38	+10	min. mass min. cost	[RD3] pg 13.22.1-6
CL6	climb	23000	180/.38	+10	max. mass min. cost	[RD3] pg 13.22.1-6
CL7	climb	20000	170/.36	+20	ref. mass min. cost	[RD3] pg 13.22.1-8
CL8	climb	16000	170/.36	+20	min. mass min. cost	[RD3] pg 13.22.1-8
CL9	climb	23000	170/.36	+20	max. mass min. cost	[RD3] pg 13.22.1-8
CL10	climb	20000	160/.34	ISA	ref. mass min. fuel	[RD3] pg 13.24.1-4
CL11	climb	16000	160/.34	ISA	min. mass min. fuel	[RD3] pg 13.24.1-4
CL12	climb	23000	160/.34	ISA	max. mass min. fuel	[RD3] pg 13.24.1-4
CL13	climb	20000	160/.34	+10	ref. mass min. fuel	[RD3] pg 13.24.1-6
CL14	climb	16000	160/.34	+10	min. mass min. fuel	[RD3] pg 13.24.1-6
CL15	climb	23000	160/.34	+10	max. mass min. fuel	[RD3] pg 13.24.1-6
CL16	climb	20000	160/.34	+20	ref. mass min. fuel	[RD3] pg 13.24.1-8
CL17	climb	16000	160/.34	+20	min. mass min. fuel	[RD3] pg 13.24.1-8
CL18	climb	23000	160/.34	+20	max. mass min. fuel	[RD3] pg 13.24.1-8
DES1	descent	20000	180/0.38	ISA	min. fuel	[RD4] pg 13.41.1-1
DES2	descent	20000	215/0.45	ISA	min. cost	[RD4] pg 13.41.1-1

Table 2: BATP Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	180 / ISA / ref. mass	3.3	1.5	560	311
CL2	180 / ISA / min. mass	11.3	2.8	1016	435
CL3	180 / ISA / max. mass	11.3	2.8	688	414
CL4	180 / ISA / ref. mass	5.8	2.7	773	520
CL5	180 / +10 / min. mass	2.4	1.4	799	462
CL6	180 / +10 / max. mass	9.3	5.1	1122	782
CL7	170 / +20 / ref. mass	7.8	4.7	1246	839
CL8	170 / +20 / min. mass	20.6	5.7	1094	721
CL9	170 / +20 / max. mass	15.9	8.0	1520	1089
CL10	160 / ISA / ref. mass	3.5	1.2	579	268
CL11	160 / ISA / min. mass	2.4	1.1	617	328
CL12	160 / ISA / max. mass	1.7	.9	556	298
CL13	160 / +10 / ref. mass	2.4	1.4	652	398
CL14	160 / +10 / min. mass	2.4	.8	647	303
CL15	160 / +10 / max. mass	4.8	2.9	932	599
CL16	160 / +20 / ref. mass	22.7	6.0	1090	698
CL17	160 / +20 / min. mass	18.6	5.2	985	630
CL18	160 / +20 / max. mass	10.5	6.2	1379	967
	maximum (all profiles)	22.7	8	1520	1089
	mean (all profiles)	8.7	3.4	903	559
	maximum (ISA, +10)	11.3	5.1	1122	782
	mean (ISA, +10)	5.1	2.1	745	427

Table 3: B ATP Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	180 / ISA / ref. mass	2.7	1.3	2.5	1.4	2.0
CL2	180 / ISA / min. mass	10.8	2.7	3.4	2.1	4.9
CL3	180 / ISA / max. mass	3.5	1.6	3.4	2.1	2.6
CL4	180 / ISA / ref. mass	4.9	2.3	3.9	2.6	3.4
CL5	180 / +10 / min. mass	2.4	1.4	3.6	2.1	2.4
CL6	180 / +10 / max. mass	7.7	4.2	6.2	4.3	5.6
CL7	170 / +20 / ref. mass	6.9	4.7	6.6	4.4	5.5
CL8	170 / +20 / min. mass	19.1	5.3	5.0	3.3	8.2
CL9	170 / +20 / max. mass	15.1	7.7	9.5	6.8	9.8
CL10	160 / ISA / ref. mass	2.9	1.0	2.3	1.1	1.8
CL11	160 / ISA / min. mass	3.5	1.6	2.5	1.3	2.2
CL12	160 / ISA / max. mass	1.6	.8	2.5	1.4	1.6
CL13	160 / +10 / ref. mass	2.0	1.2	2.8	1.7	1.9
CL14	160 / +10 / min. mass	1.8	.9	2.6	1.2	1.6
CL15	160 / +10 / max. mass	4.5	2.7	4.7	3.0	2.7
CL16	160 / +20 / ref. mass	18.7	5.0	5.2	3.3	8.1
CL17	160 / +20 / min. mass	16.9	4.7	4.1	2.6	7.1
CL18	160 / +20 / max. mass	9.1	5.4	7.7	5.4	6.9
	maximum (all profiles)	19.1	7.7	9.5	6.8	9.8
	mean (all profiles)	7.5	3.0	4.4	2.8	4.4
	maximum (ISA, +10)	10.8	4.2	6.2	4.3	5.6
	mean (ISA, +10)	4.0	1.8	3.4	2.0	2.7

Table 4: B ATP Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	180 / ISA / ref. mass	13	6	3.4	1.6
CL2	180 / ISA / min. mass	27	8	9.4	2.9
CL3	180 / ISA / max. mass	9	4	2.1	0.9
CL4	180 / ISA / ref. mass	14	8	3.8	2.2
CL5	180 / +10 / min. mass	12	4	4.1	1.4
CL6	180 / +10 / max. mass	36	18	9.1	4.6
CL7	170 / +20 / ref. mass	36	21	10.3	6.0
CL8	170 / +20 / min. mass	18	11	5.4	3.2
CL9	170 / +20 / max. mass	69	34	22.7	11.2
CL10	160 / ISA / ref. mass	15	6	4.1	1.5
CL11	160 / ISA / min. mass	7	4	2.9	1.6
CL12	160 / ISA / max. mass	22	8	5.7	2.2
CL13	160 / +10 / ref. mass	23	11	6.4	3.1
CL14	160 / +10 / min. mass	18	6	6.9	2.3
CL15	160 / +10 / max. mass	33	18	9.3	5.0
CL16	160 / +20 / ref. mass	32	19	8.1	4.7
CL17	160 / +20 / min. mass	16	9	4.9	3.0
CL18	160 / +20 / max. mass	59	33	16.9	9.5
	maximum (all profiles)	69	34	22.7	11.2
	mean (all profiles)	25	13	6.4	3.7

BE90: Beech King Air 90

Table 1: BE90 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	3636	150/130/.40	ISA	ref. mass	RD1 pg II.IV.19
CL2	climb	3181	150/130/.40	ISA	ref. mass	RD1 pg II.IV.19
CL3	climb	4590	150/130/.40	ISA	ref. mass	RD1 pg II.IV.19
DES1	descent	3636	200/160/.40	ISA	ref. mass	RD1 pg II.IV.40

Table 2: BE90 Reference Trajectory Error Summary

Trajectory Id	Description CAS / Temp / Mass	max abs. dist err. [nm]	avg abs. dist err. [nm]	max rel. dist err. [%]	avg. rel. dist err. [%]	Fig. of Merit
CL1	150/130 / ISA / 3636	1.7	0.8	6.3	2.8	N/A
CL2	150/130 / ISA / 3181	2.5	1.0	5.6	3.3	N/A
CL3	150/130 / ISA / 4590	11.3	2.9	9.0	4.0	N/A
DES1	200/160 / ISA / 3636	2.8	1.7	7.7	3.3	N/A

C421: Cessna 421 Golden Eagle

Table 1: C421 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	3085	121/0.45	ISA	max. mass	RD3 pg 2.4.7
DES1	descent	2841	173/0.45	ISA	ref. speed	RD3 pg 2.4.12

Table 2: C421 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	121 / ISA / max. mass	1.7	1.5	521	435
DES1	173 / ISA / nom. mass	1.7	1.1	727	436

Table 3: C421 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	121 / ISA / max. mass	2.8	2.5	2.6	2.2	2.5
DES1	173 / ISA / nom. mass	2.6	1.6	3.2	1.9	2.3

Table 4: C421 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	121 / ISA / max. mass	10	6	14.1	8.8
DES1	173 / ISA / nom. mass	2	1	9.2	5.9

CL60: Canadair Challenger

Table 1: CL60 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	15460	250/.70	ISA	ref. mass	RD2 pg 18,19,20
CL2	climb	11820	250/.70	ISA	min. mass	RD2 pg 18,19,20
CL3	climb	19590	250/.70	ISA	max. mass	RD2 pg 18,19,20
DES1	descent	14550	250/.70	ISA	ref. mass	RD2 pg 18,19,20
DES2	descent	10910	250/.70	ISA	min. mass	RD2 pg 18,19,20
DES3	descent	18180	250/.70	ISA	max. mass	RD2 pg 18,19,20

Table 2: CL60 Reference Trajectory Error Summary

Trajectory Id	Description CAS / Temp / Mass	max abs. dist err. [nm]	avg abs. dist err. [nm]	max rel. dist err. [%]	avg. rel. dist err. [%]	Fig. of Merit
CL1	250 / ISA / 15460	1.7	1.0	5.2	2.3	N/A
CL2	250 / ISA / 11820	3.7	1.2	6.0	2.8	N/A
CL3	250 / ISA / 19590	5.8	3.0	7.0	3.9	N/A
DES1	250 / ISA / 14550	1.5	0.6	2.9	0.9	N/A
DES2	250 / ISA / 10910	3.3	1.9	5.7	3.3	N/A
DES3	250 / ISA / 18180	3.8	2.8	5.8	3.4	N/A

CL65: Canadair Regional Jet

Table 1: CL65 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	17000	290/.74	ISA	min. mass	RD3 3-6-16/17
CL2	climb	21000	290/.74	ISA	nom. mass	RD3 3-6-16/17
CL3	climb	24000	290/.74	ISA	max. mass	RD3 3-6-16/17
CL4	climb	17000	320/.77	ISA	min. mass	RD3 3-6-28/29
CL5	climb	21000	320/.77	ISA	nom. mass	RD3 3-6-28/29
CL6	climb	24000	320/.77	ISA	max. mass	RD3 3-6-28/29
CL7	climb	17000	290/.74	ISA+10	min. mass	RD3 3-6-20/21
CL8	climb	21000	290/.74	ISA+10	nom. mass	RD3 3-6-20/21
CL9	climb	24000	290/.74	ISA+10	max. mass	RD3 3-6-20/21
CL10	climb	21000	290/.74	ISA+20	nom. mass	RD3 3-6-24/25
DES1	descent	21000	290/.74	ISA	ref. speed	RD3 3-9-12/13

Table 2: CL65 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m.]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	290 / ISA / min. mass	9.6	3.0	1835	586
CL2	290 / ISA / nom. mass	6.8	3.7	1825	656
CL3	290 / ISA / max. mass	15.4	7.0	1845	734
CL4	320 / ISA / min. mass	10.8	6.7	2429	1154
CL5	320 / ISA / nom. mass	6.8	4.4	2426	877
CL6	320 / ISA / max. mass	9.5	5.2	2447	862
CL7	290 / ISA+10 / nom. mass	12.3	8.9	1743	1237
CL8	290 / ISA+10 / min. mass	15.7	10.0	1443	977
CL9	290 / ISA+10 / nom. mass	17.6	11.3	1310	955
CL10	290 / ISA+20 / max. mass	6.0	4.4	1338	880
	maximum (all profiles)	17.6	10.0	2447	1237
	mean (all profiles)	11.1	6.5	1864	892
	max (ISA)	15.4	7.0	2447	1154
	mean (ISA)	9.8	5.0	2135	812

Table 3: CL65 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	290 / ISA / min. mass	5.9	1.8	4.5	1.4	3.4
CL2	290 / ISA / nom. mass	4.1	2.2	4.9	1.8	3.3
CL3	290 / ISA / max. mass	8.2	3.7	5.3	2.1	4.8
CL4	320 / ISA / min. mass	6.3	3.9	6.2	3.0	4.8
CL5	320 / ISA / nom. mass	3.1	2.0	6.6	2.4	3.5
CL6	320 / ISA / max. mass	3.7	2.0	7.0	2.5	3.8
CL7	290 / ISA+10 / nom. mass	6.5	4.7	4.5	3.2	4.7
CL8	290 / ISA+10 / min. mass	6.2	4.0	3.9	2.6	4.2
CL9	290 / ISA+10 / nom. mass	7.0	4.5	4.0	2.9	4.6
CL10	290 / ISA+20 / max. mass	4.8	3.5	5.4	3.5	4.3
	maximum (all profiles)	8.2	4.7	7.0	3.5	4.8
	mean (all profiles)	5.6	3.2	5.2	2.5	4.1
	max (ISA)	8.2	3.9	7.0	3.0	4.8
	mean (ISA)	5.2	2.6	5.8	2.2	3.9

Table 4: CL65 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	290 / ISA / min. mass	35	14	6.0	2.4
CL2	290 / ISA / nom. mass	14	8	1.9	1.2
CL3	290 / ISA / max. mass	31	14	3.6	1.6
CL4	320 / ISA / min. mass	41	27	6.3	4.1
CL5	320 / ISA / nom. mass	28	19	3.2	2.2
CL6	320 / ISA / max. mass	32	18	2.9	1.6
CL7	290 / ISA+10 / nom. mass	58	42	8.8	6.5
CL8	290 / ISA+10 / min. mass	67	42	7.0	4.4
CL9	290 / ISA+10 / nom. mass	82	50	8.1	4.9
CL10	290 / ISA+20 / max. mass	60	36	11.4	6.8
	maximum (all profiles)	82	50	11.4	6.9
	mean (all profiles)	45	27	5.9	3.6

D228: Dornier 228

Table 1: D228 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	5600	165/.32	ISA	ref. mass	[RD3] pg 05-12
CL2	climb	5000	165/.32	ISA	min. mass	[RD3] pg 05-12
CL3	climb	6400	165/.32	ISA	max. mass	[RD3] pg 05-12
CL4	climb	5600	165/.32	ISA+10	ref. mass	[RD3] pg 05-13
CL5	climb	5000	165/.32	ISA+10	min. mass	[RD3] pg 05-13
CL6	climb	6400	165/.32	ISA+10	max. mass	[RD3] pg 05-13
CL7	climb	5600	165/.32	ISA+20	ref. mass	[RD3] pg 05-14
CL8	climb	5000	165/.32	ISA+20	min. mass	[RD3] pg 05-14
CL9	climb	6400	165/.32	ISA+20	max. mass	[RD3] pg. 05-14
DES1	descent	5600	165/.32	ISA	ref. mass	[RD3] pg 07-04

Table 2: D228 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	165 / ISA / ref. mass	0.7	0.4	254	154
CL2	165 / ISA / min. mass	1.0	0.6	355	252
CL3	165 / ISA / max. mass	1.2	0.7	317	204
CL4	165 / ISA+10 / ref. mass	1.2	0.7	365	198
CL5	165 / ISA+10 / min. mass	1.5	1.0	508	339
CL6	165 / ISA+10 / max. mass	3.2	1.4	463	272
CL7	165 / ISA+20 / ref. mass	2.3	1.5	542	335
CL8	165 / ISA+20 / min. mass	2.1	1.8	700	482
CL9	165 / ISA+20 / max. mass	11.4	4.2	759	403
	maximum (all profiles)	11.4	4.2	759	403
	mean (all profiles)	2.7	1.4	475	293
	max (ISA, +10)	3.2	1.4	508	339
	mean (ISA, +10)	1.5	0.8	377	237

Table 3: D228 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	165 / ISA / ref. mass	2.5	1.3	2.2	1.3	1.8
CL2	165 / ISA / min. mass	4.0	2.3	3.0	2.1	2.8
CL3	165 / ISA / max. mass	3.6	2.2	2.6	1.7	2.5
CL4	165 / ISA+10 / ref. mass	3.1	1.7	3.0	1.6	2.4
CL5	165 / ISA+10 / min. mass	4.4	2.9	4.2	2.8	3.6
CL6	165 / ISA+10 / max. mass	6.9	3.0	3.9	2.3	4.0
CL7	165 / ISA+20 / ref. mass	3.9	2.5	4.5	2.8	3.4
CL8	165 / ISA+20 / min. mass	4.4	3.7	5.8	4.0	4.5
CL9	165 / ISA+20 / max. mass	15.7	5.8	6.3	3.4	7.8
	maximum (all profiles)	15.7	5.8	6.3	4.0	7.8
	mean (all profiles)	5.4	2.8	3.9	2.4	3.6
	max (ISA, +10)	6.9	3.0	4.2	2.8	4.0
	mean (ISA, +10)	4.1	2.2	3.2	2.0	2.9

Table 4: D228 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	165 / ISA / ref. mass	4	2	3.0	1.4
CL2	165 / ISA / min. mass	4	2	3.3	1.7
CL3	165 / ISA / max. mass	9	4	5.7	2.8
CL4	165 / ISA+10 / ref. mass	6	3	3.7	2.1
CL5	165 / ISA+10 / min. mass	4	4	3.5	2.9
CL6	165 / ISA+10 / max. mass	14	6	7.1	3.0
CL7	165 / ISA+20 / ref. mass	8	6	4.1	3.1
CL8	165 / ISA+20 / min. mass	9	8	5.8	4.7
CL9	165 / ISA+20 / max. mass	39	15	13.7	5.1
	maximum (all profiles)	39	15	13.7	5.1
	mean (all profiles)	11	6	5.5	3.0

D328: Dornier 328

Table 1: D328 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	12000	180/.59	ISA	ref. mass	[RD3] pg A1-30-06
CL2	climb	11000	180/.59	ISA	min. mass	[RD3] pg A1-30-06
CL3	climb	13640	180/.59	ISA	max. mass	[RD3] pg A1-30-06
CL4	climb	12000	180/.59	ISA+10	ref. mass	[RD3] pg A1-30-07
CL5	climb	11000	180/.59	ISA+10	min. mass	[RD3] pg A1-30-07
CL6	climb	13640	180/.59	ISA+10	max. mass	[RD3] pg A1-30-07
CL7	climb	12000	180/.59	ISA+20	ref. mass	[RD3] pg A1-30-08
CL8	climb	12000	155/.59	ISA	ref. mass	[RD3] pg A1-30-10
CL9	climb	11000	155/.59	ISA	min. mass	[RD3] pg. A1-30-10
CL10	climb	13600	155/.59	ISA	max. mass	[RD3] pg. A1-30-10
DES1	descent	12000	250/.59	ISA	ref. mass	[RD3] pg. A1-50-04

Table 2: D328 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	180 / ISA / ref. mass	1.8	.8	594	307
CL2	180 / ISA / min. mass	1.7	.8	648	357
CL3	180 / ISA / max. mass	3.5	1.8	941	559
CL4	180 / ISA+10 / ref. mass	5.1	2.7	1328	903
CL5	180 / ISA+10 / min. mass	3.6	2.1	1155	774
CL6	180 / ISA+10 / max. mass	7.5	4.4	1635	1025
CL7	180 / ISA+20 / ref. mass	7.7	4.7	1891	1177
CL8	155 / ISA+20 / ref. mass	1.4	.6	885	371
CL9	155 / ISA+20 / min. mass	1.1	.6	840	475
CL10	155 / ISA+20 / max. mass	1.8	.9	607	383
	maximum (all profiles)	7.7	4.7	1891	1177
	mean (all profiles)	3.6	1.9	1050	630
	max (ISA, +10)	7.5	4.4	1635	1025
	mean (ISA, +10)	3.1	1.6	960	570

Table 3: D328 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	180 / ISA / ref. mass	2.8	1.3	2.1	1.1	1.8
CL2	180 / ISA / min. mass	3.0	1.4	2.3	1.3	2.0
CL3	180 / ISA / max. mass	4.2	2.2	3.4	2.0	2.9
CL4	180 / ISA+10 / ref. mass	6.2	3.3	4.7	3.2	4.4
CL5	180 / ISA+10 / min. mass	5.1	3.0	4.1	2.8	3.7
CL6	180 / ISA+10 / max. mass	6.8	4.0	5.8	3.7	5.1
CL7	180 / ISA+20 / ref. mass	7.0	4.3	6.8	4.2	5.6
CL8	155 / ISA / ref. mass	2.8	1.2	3.2	1.3	2.1
CL9	155 / ISA / min. mass	2.5	1.4	3.0	1.7	2.2
CL10	155 / ISA / max. mass	2.9	1.4	2.2	1.4	1.9
	maximum (all profiles)	7.0	4.3	6.8	4.2	5.6
	mean (all profiles)	4.3	2.4	3.8	2.3	3.2
	max (ISA, +10)	6.8	4.0	5.8	3.7	5.1
	mean (ISA, +10)	4.0	2.2	3.4	2.1	2.9

Table 4: D328 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	180 / ISA / ref. mass	5	3	2.7	1.5
CL2	180 / ISA / min. mass	4	2	2.2	1.2
CL3	180 / ISA / max. mass	12	5	4.9	2.0
CL4	180 / ISA+10 / ref. mass	6	3	2.8	1.2
CL5	180 / ISA+10 / min. mass	6	3	3.0	1.4
CL6	180 / ISA+10 / max. mass	13	5	4.5	1.9
CL7	180 / ISA+20 / ref. mass	13	4	5.1	1.5
CL8	155 / ISA+20 / ref. mass	6	5	3.8	2.7
CL9	155 / ISA+20 / min. mass	6	4	3.8	3.0
CL10	155 / ISA+20 / max. mass	9	5	4.0	2.3
	maximum (all profiles)	13	5	5.1	3.0
	mean (all profiles)	8.0	3.9	3.7	1.9

DC9 : McDonnell Douglas DC-9

Table 1: DC9 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	27200	320/.74	ISA	min. mass	[RD3]
CL2	climb	45400	320/.74	ISA	nom. mass	[RD3]
CL3	climb	52200	320/.74	ISA	max. mass	[RD3]
CL4	climb	27200	290/.72	ISA	min. mass	[RD3]
CL5	climb	45400	290/.72	ISA	nom. mass	[RD3]
CL6	climb	52200	290/.72	ISA	max. mass	[RD3]
CL7	climb	27200	320/.74	ISA+10	nom. mass	[RD3]
CL8	climb	45400	320/.74	ISA+10	min. mass	[RD3]
CL9	climb	52200	320/.74	ISA+10	nom. mass	[RD3]
CL10	climb	45400	320/.74	ISA+20	max. mass	[RD3]
DES1	descent	45400	250/.76	ISA	ref. speed	[RD3]

Table 2: DC9 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	320 / ISA / min. mass	1.2	0.7	1220	464
CL2	320 / ISA / nom. mass	2.5	1.2	1585	531
CL3	320 / ISA / max. mass	4.8	3.0	1380	513
CL4	290 / ISA / min. mass	1.0	0.6	1222	454
CL5	290 / ISA / nom. mass	3.6	1.2	397	196
CL6	290 / ISA / max. mass	2.1	1.2	859	383
CL7	320 / ISA+10 / min. mass	5.8	4.2	1737	1306
CL8	320 / ISA+10 / nom. mass	13.7	9.9	1545	1033
CL9	320 / ISA+10 / max. mass	19.6	12.9	1417	797
CL10	320 / ISA+20 / nom. mass	33.0	19.0	1214	791
	maximum (all profiles)	33.0	19.0	1737	1306
	mean (all profiles)	8.7	5.4	1258	647
	max. (ISA)	4.8	3.0	1585	531
	mean (ISA)	2.5	1.3	1111	424

Table 3: DC9 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	320 / ISA / min. mass	1.7	1.0	3.5	1.3	1.9
CL2	320 / ISA / nom. mass	1.6	0.8	4.5	1.5	2.1
CL3	320 / ISA / max. mass	2.2	1.3	3.9	1.5	2.2
CL4	290 / ISA / min. mass	1.6	1.0	3.5	1.3	1.9
CL5	290 / ISA / nom. mass	2.6	0.8	1.1	0.6	1.3
CL6	290 / ISA / max. mass	1.3	0.8	2.6	1.2	1.5
CL7	320 / ISA+10 / min. mass	6.3	4.5	5.0	3.7	4.9
CL8	320 / ISA+10 / nom. mass	6.2	4.5	4.4	3.0	4.5
CL9	320 / ISA+10 / max. mass	5.7	3.8	4.0	2.3	3.9
CL10	320 / ISA+20 / nom. mass	8.9	5.1	3.5	2.3	4.9
	maximum (all profiles)	8.9	5.1	5.0	3.7	4.9
	mean (all profiles)	3.8	2.4	3.6	1.9	2.9
	max. (ISA)	2.6	1.3	4.5	1.5	2.2
	mean (ISA)	1.8	1.0	3.2	1.2	1.8

Table 4: DC9 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	320 / ISA / min. mass	55	27	6.5	3.2
CL2	320 / ISA / nom. mass	60	30	3.5	1.7
CL3	320 / ISA / max. mass	92	44	3.6	1.8
CL4	290 / ISA / min. mass	66	35	8.6	4.5
CL5	290 / ISA / nom. mass	86	36	5.4	2.2
CL6	290 / ISA / max. mass	92	44	4.7	2.2
CL7	320 / ISA+10 / min. mass	50	32	5.3	3.4
CL8	320 / ISA+10 / nom. mass	123	91	5.7	4.2
CL9	320 / ISA+10 / max. mass	166	97	4.9	2.9
CL10	320 / ISA+20 / nom. mass	235	138	7.0	4.1
	maximum (all profiles)	235	138	8.6	4.5
	mean (all profiles)	103	57	5.5	3.0

DH83: DeHavilland Dash 8-300

Table 1: DH83 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	13000	165/0.332	ISA	min. mass	RD3 pg 5-32
CL2	climb	17000	165/0.332	ISA	nom. mass	RD3 pg 5-32
CL3	climb	19500	165/0.332	ISA	max. mass	RD3 pg 5-32
CL4	climb	13000	135/0.33	ISA	min. mass	RD3 pg 5-46
CL5	climb	17000	135/0.33	ISA	nom. mass	RD3 pg 5-46
CL6	climb	19500	135/0.33	ISA	max. mass	RD3 pg 5-46
CL7	climb	13000	165/0.332	ISA+10	nom. mass	RD3 pg 5-33
CL8	climb	17000	165/0.332	ISA+10	min. mass	RD3 pg 5-33
CL9	climb	19500	165/0.332	ISA+10	nom. mass	RD3 pg 5-33
CL10	climb	17000	165/0.332	ISA+20	max. mass	RD3 pg 5-34
DES1	descent	17000	135/0.33	ISA	ref. speed	RD3 pg 7-9

Table 2: DH83 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	165/ISA/min.mass	1.7	0.8	650	355
CL2	165/ISA/nom.mass	2.3	1.3	739	436
CL3	165/ISA/max.mass	5.3	2.6	552	442
CL4	135/ISA/min.mass	1.0	0.6	736	442
CL5	135/ISA/nom.mass	1.4	0.6	586	302
CL6	135/ISA/max.mass	5.0	2.6	602	421
CL7	165/ISA+10/min.mass	2.6	1.0	823	399
CL8	165/ISA+10/nom.mass	1.9	1.2	501	349
CL9	165/ISA+10/max.mass	4.6	2.8	656	431
CL10	165/ISA+20/nom.mass	2.6	1.6	483	282
	maximum (all profiles)	5.3	2.8	823	442
	mean (all profiles)	2.8	1.5	633	386
	max (ISA)	5.3	2.6	739	442
	mean (ISA)	2.8	1.4	644	400

Table 3: DH83 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	165/ISA/min.mass	4.0	1.8	2.6	1.4	2.5
CL2	165/ISA/nom.mass	3.4	1.9	3.0	1.7	2.5
CL3	165/ISA/max.mass	5.6	2.7	2.2	1.8	3.1
CL4	135/ISA/min.mass	3.0	1.6	2.9	1.8	2.3
CL5	135/ISA/nom.mass	2.5	1.1	2.3	1.2	1.8
CL6	135/ISA/max.mass	6.1	3.2	2.4	1.7	3.3
CL7	165/ISA+10/min.mass	5.1	2.1	3.3	1.6	3.0
CL8	165/ISA+10/nom.mass	2.3	1.4	2.0	1.4	1.8
CL9	165/ISA+10/max.mass	3.7	2.3	2.6	1.7	2.6
CL10	165/ISA+20/nom.mass	2.5	1.5	1.9	1.1	1.8
	maximum (all profiles)	6.1	3.2	3.3	1.8	3.3
	mean (all profiles)	3.8	2.0	2.5	1.5	2.5
	max (ISA)	6.1	3.2	3.0	1.8	3.3
	mean (ISA)	4.1	2.1	2.6	1.6	2.6

Table 4: DH83 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	165/ISA/min.mass	7	4	4.3	2.3
CL2	165/ISA/nom.mass	4	2	1.8	1.0
CL3	165/ISA/max.mass	13	6	3.8	1.8
CL4	135/ISA/min.mass	7	4	4.6	2.7
CL5	135/ISA/nom.mass	14	8	5.9	3.3
CL6	135/ISA/max.mass	29	16	8.0	4.6
CL7	165/ISA+10/min.mass	10	5	6.3	2.9
CL8	165/ISA+10/nom.mass	8	5	3.1	1.8
CL9	165/ISA+10/max.mass	10	5	2.6	1.3
CL10	165/ISA+20/nom.mass	18	10	6.2	3.4
	maximum (all profiles)	29	16	8.0	4.6
	mean (all profiles)	12	6.5	4.7	2.5

EA32: Airbus A320

Table 1: EA32 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	50000	300/.78	ISA	min. mass	RD3 05.50.03
CL2	climb	62000	300/.78	ISA	nom. mass	RD3 05.50.03
CL3	climb	74000	300/.78	ISA	max. mass	RD3 05.50.03
CL4	climb	50000	300/.78	ISA+10	min. mass	RD3 05.50.04
CL5	climb	62000	300/.78	ISA+10	nom. mass	RD3 05.50.04
CL6	climb	74000	300/.78	ISA+10	max. mass	RD3 05.50.04
DES1	descent	56000	300/.78	ISA	ref. speed	RD3 05.80.01/02

Table 2: EA32 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	300 / ISA / min. mass	3.0	1.6	1748	732
CL2	300 / ISA / nom. mass	3.5	2.7	1803	838
CL3	300 / ISA / max. mass	8.7	5.0	1627	949
CL4	300 / ISA+10 / min. mass	5.9	1.9	1275	612
CL5	300 / ISA+10 / nom. mass	3.5	2.3	1454	666
CL6	300 / ISA+10 / max. mass	15.0	6.5	1791	921
	maximum (all profiles)	15.0	6.5	1803	949
	mean (all profiles)	6.6	3.3	1616	786
	max. (ISA)	8.7	5.0	1803	949
	mean (ISA)	5.1	3.1	1726	893

Table 3: EA32 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	300 / ISA / min. mass	2.8	1.5	4.6	1.9	2.7
CL2	300 / ISA / nom. mass	2.2	1.7	4.6	2.1	2.7
CL3	300 / ISA / max. mass	4.1	2.4	4.4	2.6	3.4
CL4	300 / ISA+10 / min. mass	5.1	1.7	3.3	1.6	2.9
CL5	300 / ISA+10 / nom. mass	2.1	1.4	3.7	1.7	2.2
CL6	300 / ISA+10 / max. mass	6.7	2.9	4.8	2.5	4.2
	maximum (all profiles)	6.7	2.9	4.8	2.6	4.2
	mean (all profiles)	3.9	2.0	4.2	2.1	3.0
	max. (ISA)	4.1	2.4	4.6	2.6	3.4
	mean (ISA)	3.1	1.9	4.5	2.2	2.9

Table 4: EA32 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	300 / ISA / min. mass	92	56	8.7	5.3
CL2	300 / ISA / nom. mass	114	71	7.6	4.7
CL3	300 / ISA / max. mass	141	90	6.9	4.3
CL4	300 / ISA+10 / min. mass	104	56	9.7	5.2
CL5	300 / ISA+10 / nom. mass	162	71	10.5	4.6
CL6	300 / ISA+10 / max. mass	143	76	6.7	3.6
	maximum (all profiles)	162	88	10.5	5.3
	mean (all profiles)	126	70	8.4	4.6

EA33: Airbus A330

Table 1: EA33 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	160000	300/.80	ISA	ref. mass	RD1 pg 06.40.02
CL2	climb	184000	300/.80	ISA	max. mass	RD1 pg 06.40.02
CL3	climb	140000	300/.80	ISA	min. mass	RD1 pg 06.40.02
CL4	climb	160000	320/.84	ISA	high spd.	RD1 pg 06.40.04
DES1	descent	160000	300/.67	ISA	ref. mass	RD1 pg 06.60.03
DES2	descent	175000	300/.67	ISA	max. mass	RD1 pg 06.60.03
DES3	descent	150000	300/.67	ISA	min. mass	RD1 pg 06.60.03

Table 2: EA33 Reference Trajectory Error Summary

Trajectory Id	Description CAS / Temp / Mass	max abs. dist err. [nm]	avg abs. dist err. [nm]	max rel. dist err. [%]	avg. rel. dist err. [%]	Fig. of Merit
CL1	300 / ISA / 160000	3.0	1.6	5.6	2.4	N/A
CL2	300 / ISA / 184000	1.9	1.2	6.1	2.3	N/A
CL3	300 / ISA / 140000	4.2	1.8	6.2	2.5	N/A
CL4	320 / ISA / 160000	24.9	4.4	14.0	4.0	N/A
DES1	300 / ISA / 160000	3.1	1.4	17.6	3.3	N/A
DES2	300 / ISA / 175000	2.8	1.3	14.1	3.0	N/A
DES3	300 / ISA / 150000	3.1	1.4	10.8	2.5	N/A

FK10: Fokker 100

Table 1: FK10 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	34000	280/0.70	ISA	min. mass	UTI 4.4 p7
CL2	climb	38000	280/0.70	ISA	nom. mass	UTI 4.4 p7
CL3	climb	44000	280/0.70	ISA	max. mass	UTI 4.4 p7
CL4	climb	34000	255/0.65	ISA	min. mass	UTI 4.4 p8
CL5	climb	38000	255/0.65	ISA	nom. mass	UTI 4.4 p8
CL6	climb	44000	255/0.65	ISA	max. mass	UTI 4.4 p8
CL7	climb	34000	280/0.70	ISA+10	min. mass	UTI 4.4 p4
CL8	climb	38000	280/0.70	ISA+10	nom. mass	UTI 4.4 p4
CL9	climb	44000	280/0.70	ISA+10	max. mass	UTI 4.4 p4
CRZ1	cruise	38000	280/0.70	ISA	nom. mass	UTI 4.4 p14/18
DES1	descent	38000	280/0.70	ISA	ref. speed	UTI 4.4 p28

Table 2: FK10 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	280 / ISA / min. mass	4.3	1.7	839	430
CL2	280 / ISA / nom. mass	6.3	2.6	932	593
CL3	280 / ISA / max. mass	3.6	2.3	660	378
CL4	255 / ISA / min. mass	3.0	1.5	719	404
CL5	255 / ISA / nom. mass	3.5	2.0	929	524
CL6	255 / ISA / max. mass	8.4	4.2	962	540
CL7	280 / ISA+10 / min. mass	5.6	3.8	1055	768
CL8	280 / ISA+10 / nom. mass	5.7	3.8	1156	715
CL9	280 / ISA+10 / max. mass	8.3	5.7	1252	772
	maximum (all profiles)	8.4	5.7	1252	772
	mean (all profiles)	5.4	3.1	945	569
	max (ISA)	8.4	4.2	962	593
	mean (ISA)	4.9	2.4	840	478

Table 3: FK10 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	280 / ISA / min. mass	3.9	1.5	2.4	1.2	2.2
CL2	280 / ISA / nom. mass	4.6	1.9	2.7	1.7	2.7
CL3	280 / ISA / max. mass	2.2	1.4	2.0	1.1	1.7
CL4	255 / ISA / min. mass	3.3	1.6	2.1	1.2	2.0
CL5	255 / ISA / nom. mass	3.2	1.8	2.7	1.5	2.3
CL6	255 / ISA / max. mass	6.4	3.2	2.9	1.6	3.5
CL7	280 / ISA+10 / min. mass	3.9	2.6	3.0	2.2	2.9
CL8	280 / ISA+10 / nom. mass	3.2	2.1	3.3	2.0	2.6
CL9	280 / ISA+10 / max. mass	3.6	2.4	3.8	2.3	3.0
	maximum (all profiles)	6.4	3.2	3.8	2.3	3.5
	mean (all profiles)	3.8	2.1	2.8	1.6	2.5
	max (ISA)	6.4	3.2	2.9	1.7	3.5
	mean (ISA)	3.9	1.9	2.5	1.4	2.4

Table 4: FK10 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	280 / ISA / min. mass	17	10	2.0	1.1
CL2	280 / ISA / nom. mass	23	14	2.2	1.3
CL3	280 / ISA / max. mass	38	23	2.9	1.8
CL4	255 / ISA / min. mass	33	19	4.1	2.4
CL5	255 / ISA / nom. mass	48	29	5.0	3.0
CL6	255 / ISA / max. mass	79	44	6.6	3.7
CL7	280 / ISA+10 / min. mass	43	25	4.2	2.5
CL8	280 / ISA+10 / nom. mass	45	25	3.5	2.0
CL9	280 / ISA+10 / max. mass	36	21	2.1	1.2
	maximum (all profiles)	79	44	6.6	3.7
	mean (all profiles)	40	23	3.6	2.1

FK50: Fokker 50

Table 1: FK50 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	14000	160/.495	ISA	min. mass	[RD3] pg 10.20.13
CL2	climb	18000	160/.495	ISA	nom. mass	[RD3] pg 10.20.13
CL3	climb	20820	160/.495	ISA	max. mass	[RD3] pg 10.20.13
CL4	climb	14000	140/.495	ISA	min. mass	[RD3] pg 10.20.3
CL5	climb	18000	140/.495	ISA	nom. mass	[RD3] pg 10.20.3
CL6	climb	20820	140/.495	ISA	max. mass	[RD3] pg 10.20.3
CL7	climb	14000	160/.495	ISA+10	min. mass	[RD3] pg 10.20.14
CL8	climb	18000	160/.495	ISA+10	nom. mass	[RD3] pg 10.20.14
CL9	climb	20820	160/.495	ISA+10	max. mass	[RD3] pg 10.20.14
CL10	climb	18000	160/.495	ISA+20	nom. mass	[RD3] pg 10.20.15
DES1	descent	14000	227/.495	ISA	min.mass	[RD3] pg 10.50.2

Table 2: FK50 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	160 / ISA / min. mass	1.3	0.7	474	255
CL2	160 / ISA / nom. mass	2.3	0.9	416	202
CL3	160 / ISA / max. mass	2.7	1.7	493	312
CL4	140 / ISA / min. mass	1.2	0.7	837	375
CL5	140 / ISA / nom. mass	1.3	0.7	630	332
CL6	140 / ISA / max. mass	1.2	0.7	484	238
CL7	160 / ISA+10/ min. mass	3.7	1.1	495	251
CL8	160 / ISA+10/ nom. mass	1.2	0.5	258	134
CL9	160 / ISA+10/ max. mass	2.7	1.4	323	238
CL10	160 / ISA+20/ nom. mass	1.3	0.5	277	106
	maximum (all profiles)	3.7	1.7	837	375
	mean (all profiles)	1.9	0.9	469	244
	max (ISA)	2.7	1.7	837	375
	mean (ISA)	1.7	0.9	556	286

Table 3: FK50 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	160 / ISA / min. mass	2.3	0.6	1.9	1.0	1.6
CL2	160 / ISA / nom. mass	2.6	1.0	1.7	0.8	1.5
CL3	160 / ISA / max. mass	3.3	2.0	2.2	1.4	2.2
CL4	140 / ISA / min. mass	2.9	1.7	3.3	1.5	2.4
CL5	140 / ISA / nom. mass	1.9	1.1	2.5	1.3	1.7
CL6	140 / ISA / max. mass	1.4	0.8	2.0	1.0	1.3
CL7	160 / ISA+10/ min. mass	5.3	1.6	2.0	1.0	2.5
CL8	160 / ISA+10/ nom. mass	1.3	0.6	1.1	0.6	0.9
CL9	160 / ISA+10/ max. mass	3.3	1.8	1.6	1.2	2.0
CL10	160 / ISA+20/ nom. mass	1.4	0.6	1.3	0.5	1.0
	maximum (all profiles)	5.3	2.0	3.3	1.5	2.5
	mean (all profiles)	2.6	1.2	2.0	1.0	1.7
	max (ISA)	3.3	2.0	3.3	1.5	2.4
	mean (ISA)	2.4	1.2	2.3	1.2	1.8

Table 4: FK50 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	160 / ISA / min. mass	1	0	0.6	0.2
CL2	160 / ISA / nom. mass	3	1	1.0	0.4
CL3	160 / ISA / max. mass	8	4	2.6	1.3
CL4	140 / ISA / nom. mass	8	5	4.9	3.0
CL5	140 / ISA / nom. mass	6	5	2.5	2.1
CL6	140 / ISA / max. mass	6	5	2.0	1.5
CL7	160 / ISA+10/ min. mass	9	5	4.4	2.2
CL8	160 / ISA+10/ nom. mass	7	5	2.4	1.6
CL9	160 / ISA+10/ max. mass	5	3	1.6	1.0
CL10	160 / ISA+20/ nom. mass	13	10	4.5	3.4
	maximum (all profiles)	13	10	4.9	3.4
	mean (all profiles)	7	4	2.7	1.7

FK70: Fokker 70

Table 1: FK70 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	26000	280/.70	ISA	min. mass	RD3 3.01.02 p 19/20
CL2	climb	34000	280/.70	ISA	nom. mass	RD3 3.01.02 p 19/20
CL3	climb	40000	280/.70	ISA	max. mass	RD3 3.01.02 p 19/20
CL4	climb	26000	280/.70	ISA+10	min. mass	RD3 3.01.02 p 23/24
CL5	climb	34000	280/.70	ISA+10	nom. mass	RD3 3.01.02 p 23/24
CL6	climb	40000	280/.70	ISA+10	max. mass	RD3 3.01.02 p 23/24
CL7	climb	34000	280/.70	ISA+20	nom. mass	RD3 3.01.02 p 27/28
CL8	climb	26000	255/.65	ISA	min. mass	RD3 3.01.02 p5/6
CL9	climb	34000	255/.65	ISA	nom. mass	RD3 3.01.02 p5/6
CL10	climb	40000	255/.65	ISA	max. mass	RD3 3.01.02 p5/6
DES1	descent	26000	280/.70	ISA	ref. speed	RD3 5.01.02 p 9/10

Table 2: FK70 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	280 / ISA / min. mass	2.5	0.9	1468	456
CL2	280 / ISA / nom. mass	3.0	1.5	581	289
CL3	280 / ISA / max. mass	7.4	3.8	945	519
CL4	280 / ISA+10 / min. mass	3.5	2.4	1246	794
CL5	280 / ISA+10 / nom. mass	4.5	2.7	1117	630
CL6	280 / ISA+10 / max. mass	13.3	6.2	1083	757
CL7	280 / ISA+20 / nom. mass	16.4	10.5	2072	1414
CL8	255 / ISA / min. mass	1.7	0.8	1468	467
CL9	255 / ISA / nom. mass	3.2	1.6	729	402
CL10	255 / ISA / max. mass	6.2	3.2	956	528
	maximum (all profiles)	16.4	10.5	2072	1414
	mean (all profiles)	6.2	3.3	1167	626
	max (ISA)	7.4	3.8	1468	794
	mean (ISA)	4.0	2.0	1024	444

Table 3: FK70 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	280 / ISA / min. mass	3.0	1.1	4.0	1.2	2.3
CL2	280 / ISA / nom. mass	2.4	1.2	1.6	0.8	1.5
CL3	280 / ISA / max. mass	4.2	2.2	2.6	1.4	2.6
CL4	280 / ISA+10 / min. mass	3.4	2.3	3.4	2.1	2.8
CL5	280 / ISA+10 / nom. mass	2.9	1.7	3.0	1.7	2.3
CL6	280 / ISA+10 / max. mass	5.9	2.7	2.9	2.0	3.4
CL7	280 / ISA+20 / nom. mass	6.7	4.3	5.6	3.8	5.1
CL8	255 / ISA / min. mass	2.4	1.2	4.0	1.3	2.2
CL9	255 / ISA / nom. mass	3.0	1.5	2.0	1.1	1.9
CL10	255 / ISA / max. mass	4.2	2.2	2.6	1.4	2.6
	maximum (all profiles)	6.7	4.3	5.6	3.8	5.1
	mean (all profiles)	3.8	2.0	3.2	1.7	2.7
	max (ISA)	4.2	2.2	4.0	1.4	2.6
	mean (ISA)	3.2	1.6	2.8	1.2	2.2

Table 4: FK70 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	280 / ISA / min. mass	24	10	3.5	1.5
CL2	280 / ISA / nom. mass	27	13	2.7	1.3
CL3	280 / ISA / max. mass	31	20	2.3	1.5
CL4	280 / ISA+10 / min. mass	36	24	4.8	3.2
CL5	280 / ISA+10 / nom. mass	52	31	4.5	2.7
CL6	280 / ISA+10 / max. mass	76	45	4.6	2.7
CL7	280 / ISA+20 / nom. mass	121	73	7.3	4.4
CL8	255 / ISA / min. mass	29	16	4.9	2.8
CL9	255 / ISA / nom. mass	37	20	4.2	2.3
CL10	255 / ISA / max. mass	57	24	4.9	2.0
	maximum (all profiles)	121	73	7.3	4.4
	mean (all profiles)	49	27.6	4.4	2.4

MD11: McDonnell Douglas MD-11

Table 1: MD11 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	227300	330/.82	ISA	nom. mass	[RD3] pg INFL-10-07
CL2	climb	145500	330/.82	ISA	min. mass	[RD3] pg INFL-10-07
CL3	climb	272700	330/.82	ISA	max. mass	[RD3] pg INFL-10-07
CL4	climb	227300	330/.82	ISA+10	nom. mass	[RD3] pg INFL-10-08
CL5	climb	145500	330/.82	ISA+10	min. mass	[RD3] pg INFL-10-08
CL6	climb	272700	330/.82	ISA+10	max. mass	[RD3] pg INFL-10-08
CL7	climb	227300	330/.82	ISA+20	nom. mass	[RD3] pg INFL-10-09
DES1	descent	163500	300/.82	ISA	nominal speed	[RD3] pg. INFL-40-04
DES2	descent	163500	260/.82	ISA	long range	[RD3] pg. INFL-40-03

Table 2: MD11 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	330 / ISA / nom. mass	2.2	1.3	1557	550
CL2	330 / ISA / min. mass	4.2	1.3	988	379
CL3	330 / ISA / max. mass	3.1	1.6	894	361
CL4	330 / ISA+10 / nom. mass	2.8	1.6	1679	563
CL5	330 / ISA+10 / min. mass	7.3	2.3	1282	575
CL6	330 / ISA+10 / max. mass	4.7	2.2	1031	415
CL7	330 / ISA+20/ nom. mass	7.3	3.9	1089	750
	maximum (all profiles)	7.3	3.9	1679	750
	mean (all profiles)	4.5	2.0	1220	513
	max (ISA,ISA+10)	7.3	2.3	1679	575
	mean (ISA,ISA+10)	4.1	2.7	1242	474

Table 3: MD11 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	330 / ISA / nom. mass	1.5	0.9	4.3	1.5	2.0
CL2	330 / ISA / min. mass	4.3	1.3	2.3	0.9	2.2
CL3	330 / ISA+10 / max. mass	1.8	0.9	2.7	1.1	1.6
CL4	330 / ISA+10 / nom. mass	1.8	1.0	4.5	1.2	2.2
CL5	330 / ISA+10 / min. mass	7.1	2.2	3.0	1.3	3.4
CL6	330 / ISA+10 / max. mass	2.6	1.2	3.1	1.3	2.1
CL7	330 / ISA+20/ nom. mass	3.9	2.1	2.9	2.0	2.8
	maximum (all profiles)	7.1	2.2	4.5	2.0	3.4
	mean (all profiles)	3.3	1.8	3.3	1.3	2.3
	max (ISA, ISA+10)	7.1	2.2	4.5	1.3	3.4
	mean (ISA, ISA+10)	3.2	1.8	3.3	1.2	2.3

Table 4: MD11 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	330 / ISA / nom. mass	169	57	3.3	1.1
CL2	330 / ISA / min. mass	112	49	3.8	1.6
CL3	330 / ISA / max. mass	180	118	2.8	1.9
CL4	330 / ISA+10 / nom. mass	197	108	3.8	2.1
CL5	330 / ISA+10 / min. mass	204	82	6.8	2.7
CL6	330 / ISA+10/ max. mass	160	72	2.5	1.1
CL7	330 / ISA+20/ nom. mass	311	197	5.4	3.4
	maximum (all profiles)	311	197	6.8	3.4
	mean (all profiles)	190	98	4.1	2.0

MD80: McDonnell Douglas MD-80

Table 1: MD80 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	40800	290/.72	ISA	min. mass	RD3 3-10-20 pg 3
CL2	climb	61200	290/.72	ISA	nom. mass	RD3 3-10-20 pg 3
CL3	climb	72600	290/.72	ISA	max. mass	RD3 3-10-20 pg 3
CL4	climb	40800	310/.74	ISA	min. mass	RD3 3-10-20 pg 8
CL5	climb	61200	310/.74	ISA	nom. mass	RD3 3-10-20 pg 8
CL6	climb	72600	310/.74	ISA	max. mass	RD3 3-10-20 pg 8
CL7	climb	40800	290/.72	ISA+10	nom. mass	RD3 3-10-20 pg 4
CL8	climb	61200	290/.72	ISA+10	min. mass	RD3 3-10-20 pg 4
CL9	climb	72600	290/.72	ISA+10	nom. mass	RD3 3-10-20 pg 4
CL10	climb	61200	290/.72	ISA+20	max. mass	RD3 3-10-20 pg 5
DES1	descent	52200	250/.76	ISA	ref. speed	RD3 3-40-10 pg 1

Table 2: MD80 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	290 / ISA / min. mass	1.5	0.9	1203	568
CL2	290 / ISA / nom. mass	2.2	1.3	1381	543
CL3	290 / ISA / max. mass	2.8	1.5	1324	541
CL4	310 / ISA / min. mass	1.9	1.2	1655	739
CL5	310 / ISA / nom. mass	3.3	1.6	1899	685
CL6	310 / ISA / max. mass	4.1	2.0	1853	685
CL7	290 / ISA+10 / nom. mass	3.0	1.6	1437	776
CL8	290 / ISA+10 / min. mass	3.8	2.1	1094	602
CL9	290 / ISA+10 / nom. mass	4.5	2.7	1180	649
CL10	290 / ISA+20 / max. mass	6.7	3.4	1443	855
	maximum (all profiles)	6.7	3.4	1899	855
	mean (all profiles)	3.5	1.9	1447	671
	max (ISA)	4.2	2.0	1899	747
	mean (ISA)	2.8	1.5	1552	637

Table 3: MD80 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	290 / ISA / min. mass	2.3	1.4	3.3	1.5	2.1
CL2	290 / ISA / nom. mass	2.4	1.3	4.2	1.6	2.4
CL3	290 / ISA / max. mass	2.9	1.5	4.6	1.9	2.7
CL4	310 / ISA / min. mass	2.8	1.8	4.5	2.0	2.8
CL5	310 / ISA / nom. mass	3.4	1.7	5.8	2.1	3.2
CL6	310 / ISA / max. mass	4.0	2.0	6.4	2.4	3.7
CL7	290 / ISA+10 / nom. mass	4.3	2.3	3.9	2.1	3.1
CL8	290 / ISA+10 / min. mass	3.7	2.1	3.3	1.8	2.7
CL9	290 / ISA+10 / nom. mass	4.2	2.5	4.1	2.2	3.3
CL10	290 / ISA+20 / max. mass	6.0	3.1	4.4	2.6	4.0
	maximum (all profiles)	6.0	3.1	6.4	2.6	4.0
	mean (all profiles)	3.7	2.0	4.5	2.0	3.0
	max (ISA)	4.3	2.0	6.4	2.4	3.7
	mean (ISA)	3.1	1.7	4.8	2.0	2.8

Table 4: MD80 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	290 / ISA / min. mass	30	14	3.3	1.5
CL2	290 / ISA / nom. mass	41	23	2.8	1.6
CL3	290 / ISA / max. mass	48	32	2.9	2.0
CL4	310 / ISA / min. mass	44	15	4.5	1.6
CL5	310 / ISA / nom. mass	63	28	4.1	1.8
CL6	310 / ISA / max. mass	68	34	4.0	2.0
CL7	290 / ISA+10 / nom. mass	39	25	4.1	2.6
CL8	290 / ISA+10 / min. mass	71	43	4.7	2.9
CL9	290 / ISA+10 / nom. mass	95	59	5.5	3.4
CL10	290 / ISA+20 / max. mass	112	66	6.9	4.1
	maximum (all profiles)	112	66	6.9	4.1
	mean (all profiles)	61	34	4.3	2.4

SH36: Shorts 360

Table 1: SH36 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	11300	140/.32	ISA	ref. mass ref. speed	[RD3] pg 50,51
CL2	climb	8300	140/.32	ISA	min. mass ref. speed	[RD3] pg 50,51
CL3	climb	12300	140/.32	ISA	max. mass ref. speed	[RD3] pg 50,51
CL4	climb	11300	130/.30	ISA	ref. mass min. speed	[RD3] pg 48,49
CL5	climb	8300	130/.30	ISA	min. mass min. speed	[RD3] pg 48,49
CL6	climb	12300	130/.30	ISA	max. mass min. speed	[RD3] pg 48,49
CL7	climb	11300	150/.34	ISA	ref. mass max speed	[RD3] pg 52,53
CL8	climb	8300	150/.34	ISA	min. mass max speed	[RD3] pg 52,53
CL9	climb	12300	150/.34	ISA	max. mass max speed	[RD3] pg 52,53
CL10	climb	11300	140/.32	+10	ref. mass ref. speed	[RD3] pg 66,67
CL11	climb	11300	140/.32	+20	ref. mass ref. speed	[RD3] pg 98,99
CL12	climb	8300	130/.30	+10	min. mass min. speed	[RD3] pg 64,65
CL13	climb	12300	130/.30	+10	max. mass min. speed	[RD3] pg 64,65
CL14	climb	8300	150/.34	+10	min. mass max. speed	[RD3] pg 68,69
CL15	climb	12300	150/.34	+10	max. mass max. speed	[RD3] pg 68,69
CL16	climb	8300	130/.30	+20	min. mass min. speed	[RD3] pg 96,97
CL17	climb	12300	150/.34	+20	max. mass max. speed	[RD3] pg 100,101
CL18	climb	11300	140/.32	-10	ref. mass ref. speed	[RD3] pg 34,35
CL19	climb	11300	140/.32	-20	ref. mass ref. speed	[RD3] 18,19

Table 1: SH36 Reference Trajectory Summary (continued)

DES1	descent	7870	130/.30	ISA	500 fpm	[RD3] pg 60,61
DES2	descent	12292	130/.30	ISA	500 fpm	[RD3] pg 60,61
DES3	descent	7870	190/.42	ISA	500 fpm	[RD3] pg 60,61
DES4	descent	12292	190/.42	ISA	500 fpm	[RD3] pg 60,61
DES5	descent	11300	160/.36	ISA	500 fpm	[RD3] pg 60,61

Table 2: SH36 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m.]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	140 / ISA / ref. mass	1.7	1.1	615	355
CL2	140 / ISA / min. mass	1.3	0.7	514	319
CL3	140 / ISA / max. mass	2.2	1.3	667	368
CL4	130 / ISA / ref. mass	3.9	1.8	576	414
CL5	130 / ISA / min. mass	2.1	0.9	578	390
CL6	130 / ISA / max. mass	5.2	2.3	547	371
CL7	150 / ISA / ref. mass	20.0	6.7	1413	845
CL8	150 / ISA / min. mass	3.7	1.8	1028	703
CL9	140 / ISA / max. mass	10.0	4.6	1187	842
CL10	140 / +10 / ref. mass	4.0	2.3	558	407
CL11	140 / +20 / ref. mass	2.9	2.0	443	330
CL12	130 / +10 / min. mass	3.2	1.5	693	477
CL13	130 / +10 / max. mass	11.4	5.1	748	530
CL14	150 / +10 / min. mass	9.9	3.2	1164	492
CL15	150 / +10 / max. mass	7.8	2.9	535	329
CL16	130 / +20 / min. mass	2.7	1.5	596	415
CL17	150 / +20 / max. mass	12.4	4.5	684	325
CL18	140 / -10 / ref. mass	16.8	6.6	1619	948
CL19	140 / -20 / ref. mass	26.2	10.5	2830	1538
	maximum (all profiles)	26.2	10.5	2830	1538
	mean (all profiles)	7.8	3.2	894	547
	max (ISA, +10, +20)	20.0	6.7	1413	845
	mean (ISA, +10, +20)	6.1	2.6	738	465

Table 3: SH36 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	140 / ISA / ref. mass	2.1	1.3	3.1	1.8	2.1
CL2	140 / ISA / min. mass	3.0	1.6	2.6	1.6	2.2
CL3	140 / ISA / max. mass	2.1	1.3	3.3	1.8	2.1
CL4	130 / ISA / ref. mass	6.2	2.9	2.9	2.1	3.5
CL5	130 / ISA / min. mass	6.1	2.6	2.9	2.0	3.4
CL6	130 / ISA / max. mass	6.6	2.9	2.7	1.9	3.5
CL7	150 / ISA / ref. mass	16.7	5.6	7.1	4.2	8.5
CL8	150 / ISA / min. mass	6.5	3.2	5.1	3.5	4.6
CL9	150 / ISA / max. mass	9.7	4.5	6.6	4.7	6.4
CL10	140 / +10 / ref. mass	2.4	1.4	1.8	1.3	1.7
CL11	140 / +20 / ref. mass	2.3	1.6	2.5	1.8	2.1
CL12	130 / +10 / min. mass	7.5	3.5	3.5	2.4	4.2
CL13	130 / +10 / max. mass	10.4	4.6	3.7	2.6	5.3
CL14	150 / +10 / min. mass	12.6	4.1	5.8	2.5	6.3
CL15	150 / +10 / max. mass	7.5	2.8	3.3	2.1	3.9
CL16	130 / +20 / min. mass	5.0	2.8	2.7	2.1	3.1
CL17	150 / +20 / max. mass	10.5	3.8	4.9	2.2	5.3
CL18	140 / -10 / ref. mass	26.2	10.2	8.1	4.7	12.3
CL18	140 / -20 / ref. mass	48.5	19.4	14.1	7.7	22.5
	maximum (all profiles)	48.5	19.4	14.1	7.7	22.5
	mean (all profiles)	10.1	4.2	4.5	2.8	5.4
	max (ISA, +10, +20)	16.7	5.6	7.1	4.7	8.5
	mean (ISA, +10, +20)	6.8	3.0	3.8	2.4	4.0

Table 4: SH36 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	140 / ISA / ref. mass	3	2	1.5	0.9
CL2	140 / ISA / min. mass	3	2	2.9	1.4
CL3	140 / ISA / max. mass	5	3	2.1	1.2
CL4	130 / ISA / ref. mass	10	4	5.1	2.3
CL5	130 / ISA / min. mass	6	3	5.8	2.8
CL6	130 / ISA / max. mass	11	5	4.6	2.1
CL7	150 / ISA / ref. mass	41	14	17	5.9
CL8	150 / ISA / min. mass	8	3	6.0	2.3
CL9	150 / ISA / max. mass	25	11	10	4.8
CL10	140 / +10 / ref. mass	14	5	5.7	1.9
CL11	140 / +20 / ref. mass	30	11	11	4.4
CL12	130 / +10 / min. mass	3	1	2.4	1.0
CL13	130 / +10 / max. mass	14	6	4.7	1.9
CL14	150 / +10 / min. mass	26	9	17	6.3
CL15	150 / +10 / max. mass	31	13	13	5.5
CL16	130 / +20 / min. mass	6	3	4.4	2.4
CL17	150 / +20 / max. mass	53	22	23	9.5
CL18	140 / -10 / ref. mass	32	13	15	6.4
CL19	140 / -20 / ref. mass	51	22	25	11
	maximum (all profiles)	51	22	25	11
	mean (all profiles)	20	6.9	9.3	3.9

TU34: Tupolev Tu-134

Table 1: TU34 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	35000	270/0.74	ISA	min. mass	[RD3] pg 161/163/165
CL2	climb	42000	270/0.74	ISA	nom. mass	[RD3] pg 161/163/165
CL3	climb	47000	270/0.74	ISA	max. mass	[RD3] pg 161/163/165
CL4	climb	35000	270/0.74	ISA+10	min. mass	[RD3] pg 161/163/165
CL5	climb	42000	270/0.74	ISA+10	nom. mass	[RD3] pg 161/163/165
CL6	climb	47000	270/0.74	ISA+10	max. mass	[RD3] pg 161/163/165
CL7	climb	42000	270/0.74	ISA+20	nom. mass	[RD3] pg 161/163/165
DES1	descent	42000	323/0.82	ISA	reference speed	[RD3] pg 3.215

Table 2: TU34 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m.]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	270 / ISA / min. mass	4.5	2.8	1368	818
CL2	270 / ISA / nom. mass	5.1	2.4	667	411
CL3	270 / ISA / max. mass	2.6	1.6	789	422
CL4	270 / ISA+10 / min. mass	14.6	8.9	3187	2231
CL5	270 / ISA+10 / nom. mass	11.1	5.8	2012	1156
CL6	270 / ISA+10 / max. mass	27.5	13.6	1675	1101
CL7	270 / ISA+20 / min. mass	6.2	3.8	2354	1076
	maximum (all profiles)	27.5	13.6	3187	2231
	mean (all profiles)	10.2	5.6	1721	1030
	max (ISA)	5.1	2.8	1368	818
	mean (ISA)	4.1	4.3	941	550

Table 3: TU34 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	270 / ISA / min. mass	3.8	2.3	3.6	2.1	3.0
CL2	270 / ISA / nom. mass	3.6	1.7	1.9	1.2	2.1
CL3	270 / ISA / max. mass	1.4	0.9	2.3	1.2	1.4
CL4	270 / ISA+10 / min. mass	9.3	5.7	8.4	5.9	7.3
CL5	270 / ISA+10 / nom. mass	5.9	3.1	5.7	3.3	4.5
CL6	270 / ISA+10 / max. mass	11.4	5.7	4.8	3.1	6.2
CL7	270 / ISA+20 / min. mass	3.4	2.1	7.8	3.6	4.2
	maximum (all profiles)	11.4	5.7	8.4	5.9	7.3
	mean (all profiles)	5.5	3.1	4.9	2.9	4.1
	max (ISA)	3.8	2.3	3.6	2.1	3.0
	mean (ISA)	2.9	1.6	2.6	1.5	2.2

Table 4: TU34 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	270 / ISA / min. mass	60	29	4.8	2.3
CL2	270 / ISA / nom. mass	52	29	3.5	1.9
CL3	270 / ISA / max. mass	97	44	5.3	2.4
CL4	270 / ISA+10 / min. mass	137	72	9.6	5.0
CL5	270 / ISA+10 / nom. mass	151	70	8.7	4.0
CL6	270 / ISA+10 / max. mass	188	86	8.1	3.7
CL7	270 / ISA+20 / nom. mass	178	94	10.6	5.6
	maximum (all profiles)	188	94	10.6	5.6
	mean (all profiles)	123.3	60.6	7.2	3.6

TU54: Tupolev Tu-154

Table 1: TU54 Reference Trajectory Summary

Id	Climb/ Descent	Mass (kg)	Speed Law (CAS/M)	Atm.	Comments	Reference Source
CL1	climb	70000	297/.80	ISA	min. mass	[RD3] pg 3.1.96
CL2	climb	85000	297/.80	ISA	nom. mass	[RD3] pg 3.1.99
CL3	climb	100000	297/.80	ISA	max. mass	[RD3] pg 3.1.102
CL4	climb	70000	320/.80	ISA	min. mass	[RD3] pg 3.1.152
CL5	climb	85000	320/.85	ISA	nom. mass	[RD3] pg 3.1.155
CL6	climb	100000	320/.85	ISA	max. mass	[RD3] pg 3.1.158
CL7	climb	70000	297/.80	ISA+10	min. mass	[RD3] pg 3.1.103
CL8	climb	85000	297/.80	ISA+10	nom. mass	[RD3] pg 3.1.106
CL9	climb	100000	297/.80	ISA+10	max. mass	[RD3] pg 3.1.109
CL10	climb	85000	270/.80	ISA+20	nom. mass	[RD3] pg 3.1.120
DES1	descent	60000	280/.78	ISA	nom. speed	[RD3] pg. 3.1.201

Table 2: TU54 Reference Trajectory Error Summary (1)

Trajectory Id	Description CAS / Temp / Mass	max. dist error [n.m]	rms. dist error [n.m.]	max. alt. error [ft]	rms alt. error [ft]
CL1	297 / ISA / min. mass	1.8	0.7	962	324
CL2	297 / ISA / nom. mass	1.2	0.6	650	288
CL3	297 / ISA / max. mass	2.4	1.2	634	284
CL4	310 / ISA / min. mass	1.4	0.7	1031	355
CL5	310 / ISA / nom. mass	1.3	0.7	990	344
CL6	310 / ISA / max. mass	4.2	1.4	1038	344
CL7	297 / ISA+10/ min. mass	2.6	1.5	746	448
CL8	297 / ISA+10/ nom. mass	4.2	2.3	925	586
CL9	297 / ISA+10/ max. mass	7.8	4.5	1186	808
CL10	297 / ISA+20/ nom. mass	15.8	7.9	1831	1279
	maximum (all profiles)	15.8	7.9	1831	1279
	mean (all profiles)	4.3	2.2	999	506
	max (ISA)	4.2	1.4	1038	355
	mean (ISA)	2.1	0.9	884	323

Table 3: TU54 Reference Trajectory Error Summary (2)

Trajectory Id	Description CAS / Temp / Mass	max dist error %	rms dist error %	max alt. error %	rms alt. error %	Fig. of Merit
CL1	297 / ISA / min. mass	2.1	0.8	2.3	0.8	1.5
CL2	297 / ISA / nom. mass	1.1	0.5	1.7	0.7	1.0
CL3	297 / ISA / max. mass	1.8	0.9	1.7	0.8	1.3
CL4	310 / ISA / min. mass	1.5	0.8	2.5	0.9	1.4
CL5	310 / ISA / nom. mass	1.1	0.6	2.5	0.9	1.3
CL6	310 / ISA / max. mass	3.0	1.0	2.8	0.9	1.9
CL7	297 / ISA+10/ min. mass	2.4	1.3	1.8	1.1	1.7
CL8	297 / ISA+10/ nom. mass	3.0	1.7	2.4	1.5	2.1
CL9	297 / ISA+10/ max. mass	4.5	2.5	3.2	2.2	3.1
CL10	297 / ISA+20/ nom. mass	7.8	3.9	4.7	3.3	4.9
	maximum (all profiles)	7.8	3.9	4.7	3.3	4.9
	mean (all profiles)	2.8	1.4	2.6	1.3	2.0
	max (ISA)	3.0	1.0	2.8	0.9	1.9
	mean (ISA)	1.8	0.8	2.3	0.8	1.4

Table 4: TU54 Reference Trajectory Fuel Error Summary

Trajectory Id	Description CAS / Temp / Mass	max error [kg]	rms error [kg]	max error %	rms error %
CL1	297 / ISA / min. mass	41	17	2.2	0.9
CL2	297 / ISA / nom. mass	29	16	1.3	0.7
CL3	297 / ISA / max. mass	63	43	2.2	1.5
CL4	310 / ISA / min. mass	71	39	3.5	1.9
CL5	310 / ISA / nom. mass	45	27	1.8	1.1
CL6	310 / ISA / max. mass	44	23	1.4	0.7
CL7	297 / ISA+10/ min. mass	64	37	3.1	1.8
CL8	297 / ISA+10/ nom. mass	107	65	4.0	2.4
CL9	297 / ISA+10/ max. mass	197	128	5.8	3.8
CL10	297 / ISA+20/ nom. mass	254	160	7.3	4.6
	maximum (all profiles)	254	160	7.3	4.6
	mean (all profiles)	92	56	3.3	1.9