FLAWED METHODOLOGIES AND DATA ERRORS IN THE DRAFT MASTER PLAN CHAPTERS AND THE UNDERLYING 2019 AURORA STATE AIRPORT CONSTRAINED OPERATIONS RUNWAY JUSTIFICATION STUDY

Prepared by Friends of French Prairie, April 5, 2022

Draft chapters 1, 2 and 3 were presented to the Public Advisory Committee for the current Aurora Airport Master Plan process on March 1, 2022. It included data on Based Aircraft and Total Operations as well as preliminary data about constrained operations. Regular references are made to the 2012 Aurora Airport Master Plan and the 2019 Aurora Airport Constrained Study.

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The 2012 Aurora Airport Master Plan, which was never approved or adopted by the Oregon Aviation Board and has been the basis of a decade long legal dispute, included data about Based Aircraft, Total Operations and Constrained Operations that became the basis for a call to expand the Aurora State Airport—a $37 million expansion requiring 55 acres of EFU land Per the Airport Layout Plan in the unapproved 2012 Aurora Airport Master Plan.

Among the data assessed in a master plan are the inventory of aircraft based at an airport and the total operations taking place, and from these, growth is forecasted or the coming decades. Comparing prior master plan data and forecasts to current data and forecasts is important to assess overall need and is not being done in the current master planning process. This was not done in 2021-2041 Aviation Activity Forecasts (Draft Chp. 2) of the current master plan process.

BASED AIRCRAFT

The Based Aircraft inventories and forecasts for the 2012 and present Master Plan processes are:

<u>2012 Master Plan</u>

Table 3J. Based Aircraft and Fleet Mix Forecast

Year	Jet	Turboprop (Multi-engine)	Multi-engine Piston	Single Engine	Helicopter	Other	Total
2010	23	16	24	261	25	5	354
2015	27	19	24	276	28	5	379
2020	33	20	25	288	34	5	405
2030	47	26	27	316	43	5	464

Table 3J from Chapter Two: Inventory, 2012 Aurora State Airport Master Plan, Pg. 3-21

2022 Aurora Airport Master Plan – Draft Chapters for PAC

TABLE 3-14: FORECAST BASED AIRCRAFT FLEET MIX

	CAGR	2021	2026	2031	2036	2041
Single Engine*	0.9%	216	229	240	250	259
Multi Engine Piston	0.0%	6	6	6	6	6
Turbo Prop	1.1%	13	14	15	15	16
Jet	2.3%	36	40	45	50	56
Helicopter	1.4%	10	11	11	12	13
Total Based Aircraft	1.1%	281	300	317	333	350

Source: Century West Engineering
*Includes Experimental/LSA

Table 3-14: Forecast Based Aircraft Fleet Mix, Draft Chapter 3 of current master plan process

Based Aircraft growth was forecast in the unapproved 2012 Master Plan to increase from 354 to 464 in 2030. The Draft Chapter of the current master plan process is forecasting Based Aircraft in 2031 to only be 317. That is a **lowering of forecast for that year by 31.6 percent when compared to 2012.**

What has occurred in the last ten years though, is an increase in the corporate jet fleet which has increased from 23 to 36 (at the expense of general aviation aircraft) and is forecast to further increase to 45 by 2031.

TOTAL OPERATIONS

Correspondingly both master plans have Total Operations and forecast increases. The 2010 Total Operations number was an estimate based on adjusting the 2009 number for year-on-year growth.

Aurora Airport 2012 Master Plan

Table 3L. Aircraft Operations Forecast

Year	Itinerant Air Taxi	Itinerant GA	Itinerant Military	Total Itinerant	Local GA	Total Operations
2009 Historical	9,788	42,592	250	52,630	36,865	89,495
2010 Estimated	10,000	48,395	250	58,645	32,264	90,909
2015	10,815	52,354	250	63,419	34,902	98,321
2020	11,697	56,635	250	68,582	37,756	106,338
2030	13,682	66,272	250	80,205	44,181	124,386

Source: WHPacific, Inc., except Terminal Area Forecast for 2009.

Table 3J from Chapter Two: Inventory, 2012 Aurora State Airport Master Plan, Pg. 3-25

2022 Aurora Airport Master Plan – Draft Chapters for PAC

TABLE 3-15: AIRCRAFT OPERATIONS FORECAST MODELS

	CAGR	2021	2026	2031	2036	2041
Historical Tower Counts Trend	3.6%	76,028	95,039	114,646	134,254	153,862
TFMSC Historical Trend (20-Year) - Recommended Forecast	**2.3%**	**76,028**	**85,201**	**95,480**	**107,000**	**119,909**
Marion County Population Correlation	2.9%	76,028	96,244	112,162	124,981	135,506
National Aerospace Forecast Operations (w/ ATCT)	0.8%	76,028	78,939	81,966	85,114	88,388
Federal Contract Tower (Oregon) TAF	0.6%	76,028	81,924	82,972	84,046	85,151

Source: Century West Engineering developed using FAA TFMSC Data

Table 3-15: Aircraft Operations Forecast Models, Draft Chapter 3 of current master plan process

Total Operations was forecasted in the unapproved 2012 Master Plan to increase from 90,909 to 124,386 by 2030. The Draft Chapter of the current master plan process is forecasting Total Operations in 2031 to only be 94,480. That is a **lowering of the operations forecast for that year by 24 percent when compared to 2012.**

Dramatic reductions in these two forecast numbers call into question the entire premise of need to lengthen the runway and expand the Aurora Airport.

However, in order to support the need for an extended runway and expanded airport, the focus is moved from the failure to come close to the previously forecasted numbers and instead has been placed on forecasted year-on-year increases in based aircraft and total operations from 2021 to 2026, etc.

CONSTRAINED OPERATIONS

According to the FAA, a constraint is “anything that interferes with the normal flow of air traffic. Common constraints are weather, excess volume, and runway limitations,” and a constrained operation is a takeoff or landing in which the aircraft is forced to reduce freight, passenger or fuel load because of these conditions.

As part of the 2012 Aurora Airport master planning process:

> *…aircraft operators were surveyed to quantify operations that are constrained by the current runway length at Aurora State Airport (Pg. 4-9). The runway length survey (Appendix I) identified the number of aircraft operations constrained at the Airport annually total 473, using only existing aircraft with N numbers and operators’ names identified,* (Pg. 4-13).

A documented illustration of how growth in constrained operations is built into the system is found in the 2012 Master Plan on page 4-13 where it states:

One operator based at the Airport, RJ2/DB Aviation, plans to replace its 650 Citation III/VI with a 750 Citation X, which would be constrained by runway length more often (an estimated 40 times per year compared to 30 for the existing aircraft).

That is to say, this operator knowing full well that a 750 Citation X is oversized for the current airport specifications is going to upgrade to that aircraft and virtually all, if not all, of its operations will qualify as "constrained." It is doing so with the full knowledge and support of Oregon Dept. of Aviation!

Additionally, ODA has regularly granted weight waivers to larger and larger corporate jets, many of which exceed the weight rating of the runway, and require longer minimum runway lengths based on manufacturer's specifications. These approvals in turn result in constrained operations for virtually all flights by these oversized aircraft.

2019 Aurora Airport Constrained Operations Study

The Constrained Operations Study commissioned by the Dept. of Aviation in February 2018, and approved by the FAA in 2019, stated the following in the Scope of Work document which was titled "Aurora State Airport (UAO) Constrained Operations Runway Justification Study":

P*ROJECT INTENT*

The Oregon Department of Aviation (ODA) has selected Century West Engineering (Consultant) to complete a focused planning effort to provide FAA requested justification for a constrained operations study to determine if a runway extension at the Aurora State Airport (UAO) that is currently identified on the ALP is justified. ***This Constrained Operations Runway Justification Study scope identifies the planning efforts and supporting justification for the planned runway extension and appurtenant facilities.*** *The study will utilize the current 2012 Airport Master Plan (AMP) and updated Airport Layout Plan revised July 25, 2016 as the foundation documents upon which additional justification and modifications (as needed) are required to satisfy the FAA for funding eligibility and confirm project configuration, work elements, and agency approval requirements. The study will be self-funded by ODA, but will be coordinated with the FAA Seattle Airports District Office (ADO) to obtain concurrence on the scope, forecast approval, funding justification for relevant projects, and approval of the updated Airport Layout Plan, if required.*

It should be noted then, that the purpose of the study was to document constrained operations in order to justify the **planned** runway extension.

Thus, it comes as no surprise that the Final 2019 Constrained Operations Study, approved by the FAA begins in the Executive Summary by stating:

The purpose of this study is to review the current runway length requirements and activity at the Aurora State Airport compared to the assumptions made in the approved 2012 Airport Master Plan to consider if the eligibility threshold for a runway extension has been met. An analysis of aviation activity at the Airport has identified 349 based aircraft. 10.8% of the aircraft based at the Airport are jet aircraft. The Air Traffic Control Tower (ATCT) began *collecting data in October 2015 and has identified 48,459 Airport operations in 2016 and 58,597 Airport operations in 2017. The confirmed TAF numbers are 44,292 and 54,999 respectively. FAA Traffic Flow Management Systems Counts (TFMSC) operations data presented by Aircraft Design Group identified at least 860 annual operations by C and D aircraft on average from 2009 to 2018. A constrained operations Airport user survey was distributed as part of this study. The survey identified 645 constrained annual operations from a variety of aircraft and aircraft operators. Additional analysis of the TFMSC data and the airport user surveys indicates there have been in excess of 500 annual operations by aircraft to/from destinations beyond 1,000 nm of Aurora State Airport which justifies the use of the 100% Fleet Group at 90% Useful Load curve identified in FAA Advisory Circular (AC) 150-5325-4B, Runway Length Requirements for Airport Design.*

As demonstrated by Airport activity data and user surveys obtained as part of this study, a minimum runway length of 7,888' is justified based on the FAA substantial use threshold of 500 annual operations and the runway length methodologies defined by AC 150-5325-4B. However, given the future runway length of 6,002' identified in the 2012 Airport Master Plan and depicted in the current ALP, it is recommended that the runway only be extended by 1,000'.

[It should be noted that while this quotation references the "approved 2012 Master Plan, that master plan was never properly approved and adopted by the Oregon Aviation Board, as found by the Oregon Court of Appeals in 2021]

Constrained Operations - 2018 ODA Constrained Operations Study		
Cited Jets with Constrained Operations		
	Total	645

The majority of constrained operations are being experienced by oversize aircraft that are either too heavy for the current runway strength rating (45,000 pounds) or carry manufacturer requirements for a longer runway. Yet more and more of these oversized aircraft are being lured into use of Aurora State Airport.

Further, almost half of the reported constrained operations (315 out of 645) come from four aircraft (Astra 1125, Bombardier Global Express, Dassault Falcon 50 and Dassault Falcon 900).

Comparing the 2012 survey with that conducted in 2018 shows a 33% increase in Constrained Operations, in spite of the fact that actual Total Operations are running an average of 24% below that forecast in 2012, and based aircraft are down by 31% compared to that forecast in 2012. This increase is driven by the change in fleet mix from general aviation to large corporate jets.

The Constrained Operations Study does not include any data indicating that the constrained operations claimed by pilots were validated with actual flight data. This is particularly questionable when these two elements are considered:

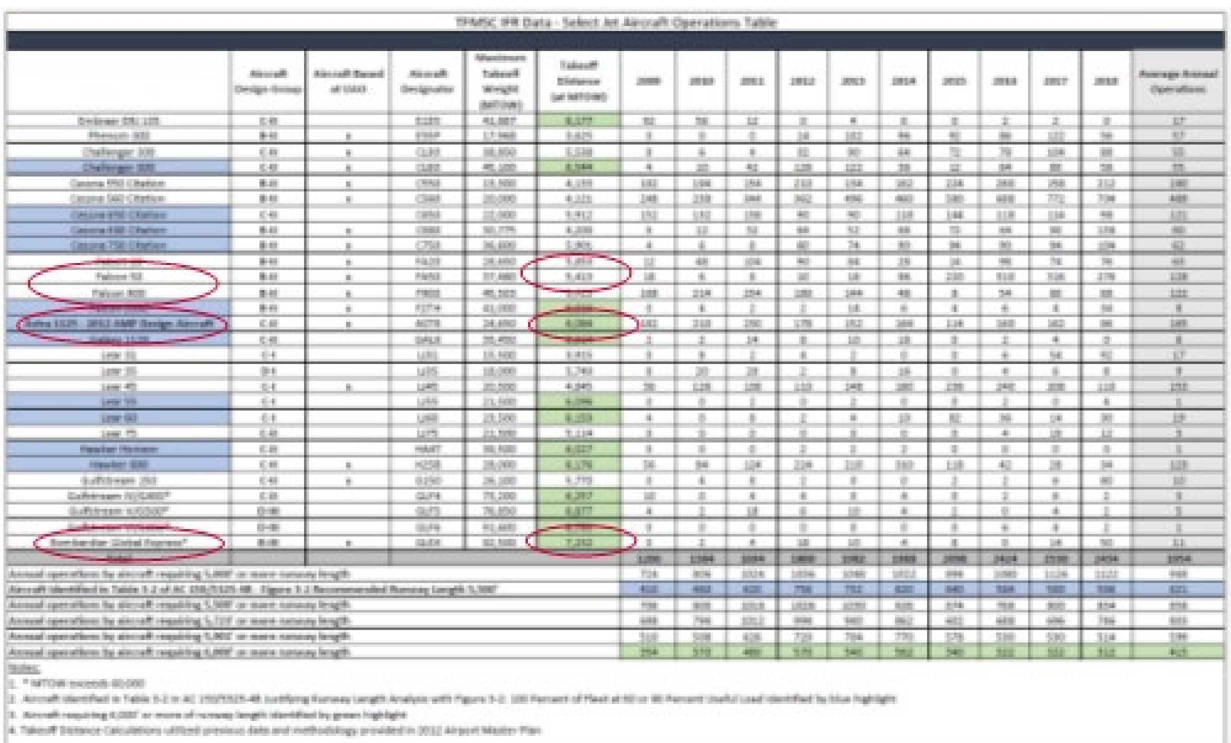
1. Seven of the 16 corporate jets reporting constrained operations reported a specific “typical stage length” on their survey, and that Stage Length is less than half of the Manufacturer Stated Maximum Range for the aircraft. For example:

	Reported CO's	Typical Stage Length Reported (nm)	Manufacturer Stated Range (nm)
Falcon 50	160	1,000-1,5000	3,200

2. In other words, what was done to assure that a 1,500 mile flight which only requires a 50% fuel load was not counted as a constrained operation? Fifty percent of the jets reporting Constrained Operations gave identical Reported Reasons for the experienced Constrained Operations, for example:

Reported reason for experienced Constrained Operations
Unable to depart with enough fuel to accomplish mission due to inadequate runway length

In the Final study, the following table of select jets shows those requiring 6,000 feet or more of runway highlighted in green. It also shows the four jets identified above that claimed to experience almost half of the constrained operations (circled in red).



The table (reproduced full size on last page) also shows the Minimum Runway Length required by those aircraft at Maximum Takeoff Weight (MTOW). It should be noted that for the four jets experiencing almost half of the constrained operations, the Minimum Runway Length shown in the table for this study is longer than the length found in published manufacturer specifications, as follows:

Aircraft	No. Const Ops	Aircraft Design Group	Manufacturer Stated Range (nm)	Minimum Takeoff Distance (at MTOW) In Const Ops Study	Minimum Takeoff Distance (at MTOW) in published Mfg or reseller literature	Empty or Operating Weight	Max Landing Weight	Maximum Takeoff Weight (MTOW)
Astra 1125	40	B-II	3,110	6,084	5,250	12,670	20,700	24,650
Bombardier Global Express	40	B-III	5,960	7,232	6,170	50,300	78,600	92,500
Falcon 50	160	B-II	3,260	5,413	4,935	22,250	35,715	37,480
Falcon 900	75	B-II	3,960	5,273	5,215	24,683	42,000	45,503

In addition, the table also shows annual and average annual operations. Again, if we look closely at the four aircraft identified above, and compare 2018 operations to the claimed constrained operations during the 2018 study period, we see the following:

	2018 Operations	2018 Reported Constrained Ops	% of Operations Constrained
Falcon 50	226	160	70.8%
Falcon 900	68	75	110.3%
Astra 1125	96	40	41.7%
Bombardier Global Express	50	40	80.0%

Credulity is stretched that a single aircraft (the one with the most annual constrained operations) which has a manufacturer's minimum takeoff distance shorter than the runway at Aurora should experience almost 71% of its operations as constrained. It is further stretched beyond belief for the Falcon 900 whose rate of constrained operations is 110% because it reported MORE constrained operations than actual operations at Aurora Airport during 2018!

These errors may be the result of a transposition during creation of the table, but given the weight the number of constrained operations comprise of the total, at a minimum it implies careless work, and maximally a manipulation of the data to give the appearance of regularity.

If Dept. of Aviation and its consultant Century West, to say nothing of the FAA, who approved the Constrained Operations Study are serious about the numbers of constrained operations being claimed by pilots, the questionable survey results should have been validated against filed flight plans and flight logs, not just accepted at face value.

For example, on listed aircraft, the Bombardier Global Express has a Minimum Takeoff Distance of 6,179 feet and an empty weight of 50,300 pounds. Aurora Airport has a 5,004 foot runway with a strength rating of 45,000 pounds and aspirations of 6,000 feet and 60,000 pounds. Not only will a lengthened runway not meet Bombardier's minimum specifications for the aircraft, this aircraft has received a Permanent Waiver from ODA, and many takeoffs and landings count as constrained operations.

Conclusion

As stated above, based on surveys about constrained operations the Constrained Operations Study show a 33% increase in Constrained Operations since 2012, in spite of the fact that actual Total Operations are 24% below the number forecast in 2012, and based aircraft are down by 31% compared to the 2012 forecast.

In the Aviation Activity Forecasts section of the Constrained Operations Study, the following is stated:

> ***AVIATION ACTIVITY FORECASTS***
>
> *The primary purpose of the forecast update associated with the Aurora State Airport Constrained Operations Runway Justification Study is to evaluate the forecasts of aviation activity (2010-2030) contained in the 2012 Aurora State Airport Master Plan (AMP), which supported the planned runway extension depicted on the 2012 Airport Layout Plan (ALP). This forecast update focuses on the activity generated by the critical aircraft, or group of aircraft, required to support the runway length justification study, but also updates other elements of the 2012 AMP forecast, per FAA requirements for aviation activity forecast approval. This interim forecast update will rely on existing master plan data where appropriate, and supplement with more recent data, where available.*
>
> *The primary tasks supporting the runway justification study include verifying current year activity (2018 based aircraft and aircraft operations, including critical aircraft) and updating key forecasts for the next twenty years (2018-2038). Events occurring at UAO since the AMP was completed in 2012 will be reviewed to evaluate the accuracy of AMP forecasts and to support the updated forecast.*
>
> *The updated forecasts will support the runway length justification study by identifying the current and future levels of critical aircraft operations. The critical aircraft operations are used to establish the corresponding Airport Reference Code (ARC) and Runway Design Code (RDC) designations for Runway 17/35 that define the applicable FAA design standards and length requirements.*

How can such an assertion be made?

Because while the study says this about current Total Operations data from the Air Traffic Control Tower:

The 2012 AMP forecasts provided reasonable growth assumptions for both based aircraft and annual aircraft operations that reflected both broad regional economic conditions and airport-specific factors. An updated discussion of the underlying economic conditions and airport events is provided in the existing conditions section of this memo (see 2012 AMP for additional information).[1] The evaluation of critical aircraft activity contained in this forecast update confirms that the current and future C-II ARC and RDC defined for Runway 17/35 in the 2012 AMP remain valid.

However, the availability of new data sources, particularly air traffic control tower (ATCT) operations counts (adjusted to include aircraft activity when the tower is closed) indicates that recent UAO activity is currently about 25 percent below previously forecast levels. The ability to rely on actual traffic counts improves the accuracy of the overall forecasts, although it appears that the original long term growth rate assumptions were reasonable.

It then goes on to pass over the very fact that Total Operations forecasts in the 2012 Master Plan were dramatically overstated and the forecast error was very large, by pivoting to make the case that it doesn't matter because the MIX of aircraft has changed, and now the major aircraft at Aurora Airport are corporate jets:

However, the availability of new data sources, particularly air traffic control tower (ATCT) operations counts (adjusted to include aircraft activity when the tower is closed) indicates that recent UAO activity is currently about 25 percent below previously forecast levels. The ability to rely on actual traffic counts improves the accuracy of the overall forecasts, although it appears that the original long term growth rate assumptions were reasonable.

Although the recalibration (lowering) of overall air traffic volumes at UAO is significant, data confirms that this adjustment does not affect critical aircraft (business jet) determination at UAO. Table 9, provided later in this chapter, illustrates that the volume of high performance business jet activity at UAO increased by 40 percent between 2012 and 2018.[2] This most recent five-year period of business jet activity represents an average annual growth rate of 7 percent, which is slightly lower than the 9.7 percent annual growth experienced at UAO between 2009 and 2018. This trend provides a strong indication of future growth potential at UAO.

On the face of it, how can it be asserted in the same paragraph that forecast levels were off by 25% and then also state that "it appears that the original long-term growth rate assumptions were reasonable?"

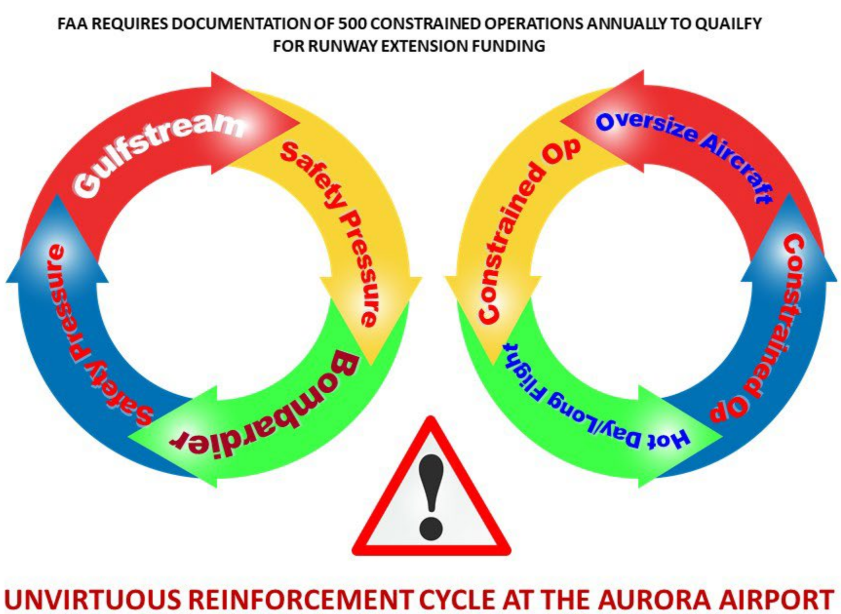
What is obviously taking place is enticing larger corporate jets to base at or regularly operate into Aurora State Airport. Because the airport only has a 5,000 foot runway with a strength rating of 45,000 pounds, it is clearly not designed to accommodate large corporate jets, let alone commuter jet aircraft like the Bombardier Global Express.

Yet, the airport owner and sponsor, Oregon Department of Aviation, has been aiding and abetting this undertaking by granting waivers for oversize aircraft (oversize in wingspan and in total weight). Because oversize aircraft are granted waivers and can operate at Aurora, many (if not all) of their operations now qualify as "constrained" by virtue of the aircraft being heavier than the runway strength rating, or having to takeoff with lighter load/less fuel because of the runway length.

There appears to be very little objective criteria other than bad weather that are to be applied in the determination of whether a takeoff or landing is “constrained” beyond the personal opinion of the pilot. The subjective nature of assessing constrained operations themselves, is then further compounded by 1) an airport sponsor that has openly approved ever increasing operations by oversized aircraft at Aurora and 2) a data collection method used by the sponsor’s consultant that was based on **unvalidated pilot survey**s to arrive at the annual number of constrained operations.

The straightforward data errors concerning Minimum Take Off Distances are striking. That a single aircraft can be included in this study to have more constrained operations than actual operations illustrates calls the data itself into question, while the subjective nature of data collection via unvalidated surveys demonstrates flawed methodology. All of this is compounded by the fact that the Constrained Operations Study was conducted with no public involvement. In spite of eight years of legal dispute over the 2012 master plan, there was no public notice for the Scope of Work or the contract award, nor of the completion of the Draft study. We only received a copy via Public Records Request. There was, correspondingly, no public notice about FAA approval of the Draft study, not that the Final version was released. Yet it is now being used as a major element in the current master planning process.

This absence of public transparency is compounded by the practice of allowing more and more oversized aircraft operate at Aurora, not only causing safety problems, but directly driving constrained operations even as overall aviation activity has dropped in the last decade.



TFMSC IFR Data - Select Jet Aircraft Operations Table

	Aircraft Design Group	Aircraft Based at UAO	Aircraft Designator	Maximum Takeoff Weight (MTOW)	Takeoff Distance (at MTOW)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average Annual Operations
Embraer ERJ 135	C-II		E135	41,887	6,177	92	56	12	0	4	6	0	2	2	0	17
Phenom 300	B-II	x	E55P	17,968	3,625	0	0	0	14	102	96	92	86	122	56	57
Challenger 300	C-II	x	CL30	38,850	5,538	8	6	4	32	90	64	72	78	104	88	55
Challenger 600	C-II	x	CL60	45,100	6,544	4	10	42	126	122	36	12	64	80	58	55
Cessna 550 Citation	B-II	x	C550	13,300	4,133	192	194	154	210	134	162	224	260	158	212	190
Cessna 560 Citation	B-II	x	C560	20,000	4,121	248	238	344	362	496	460	580	688	772	704	489
Cessna 650 Citation	C-II		C650	22,000	5,912	152	132	158	90	90	118	144	118	114	98	121
Cessna 680 Citation	B-II	x	C680	30,775	4,200	6	12	32	64	52	68	72	64	90	138	60
Cessna 750 Citation	B-II	x	C750	36,600	5,901	4	6	8	60	74	90	94	90	94	104	62
Falcon 20	B-II	x	FA20	28,650	5,853	12	48	104	90	84	28	14	98	74	76	63
Falcon 50	B-II	x	FA50	37,480	5,413	18	6	8	10	18	96	220	310	316	276	128
Falcon 900	B-II	x	F900	45,503	5,723	168	214	254	180	144	48	8	54	80	68	122
Falcon 2000	B-II	x	F2TH	41,000	6,016	0	4	2	2	14	6	4	6	4	34	8
Astra 1125 - 2012 AMP Design Aircraft	C-II	x	ASTR	24,650	6,084	182	210	230	178	152	164	114	160	162	96	165
Galaxy 1126	C-II		GALX	35,450	6,314	2	2	14	8	10	16	0	2	4	0	6
Lear 31	C-I		LJ31	15,500	3,915	0	8	2	4	2	0	0	6	54	92	17
Lear 35	D-I		LJ35	18,000	5,740	8	20	20	2	8	16	0	4	6	8	9
Lear 45	C-I	x	LJ45	20,500	4,845	36	126	138	110	148	180	236	240	208	110	153
Lear 55	C-I		LJ55	21,500	6,096	0	0	2	0	2	0	0	2	0	4	1
Lear 60	C-I		LJ60	23,500	6,153	4	0	8	2	4	10	82	36	14	30	19
Lear 75	C-II		LJ75	21,500	5,114	0	0	0	0	0	0	0	4	10	12	3
Hawker Horizon	C-II		HA4T	39,500	6,027	0	0	0	2	2	2	0	0	0	0	1
Hawker 800	C-II	x	H25B	28,000	6,176	56	84	124	224	210	310	118	42	28	34	123
Gulfstream 150	C-II	x	G150	26,100	5,770	0	4	8	2	0	0	2	2	6	80	10
Gulfstream IV/G400*	C-II		GLF4	73,200	6,257	10	0	4	4	0	4	0	2	6	2	3
Gulfstream V/G500*	D-III		GLF5	76,850	6,877	4	2	18	6	10	4	2	0	4	2	5
Gulfstream VI/G600*	D-III		GLF6	91,600	6,785	0	0	0	0	0	0	0	6	4	2	1
Bombardier Global Express*	B-III	x	GLEX	92,500	7,232	0	2	4	18	10	4	8	0	14	50	11
Total						**1206**	**1384**	**1694**	**1800**	**1982**	**1988**	**2098**	**2424**	**2530**	**2434**	**1954**
Annual operations by aircraft requiring 5,000' or more runway length						724	806	1024	1036	1048	1022	894	1080	1126	1122	988
Aircraft Identified in Table 3-2 of AC 150/5325-4B - Figure 3-2 Recommended Runway Length 5,500'						410	460	620	756	732	820	640	584	590	596	621
Annual operations by aircraft requiring 5,500' or more runway length						706	800	1016	1026	1030	926	674	766	800	834	858
Annual operations by aircraft requiring 5,723' or more runway length						698	794	1012	994	940	862	602	688	696	746	803
Annual operations by aircraft requiring 5,901' or more runway length						510	508	626	720	704	770	578	530	530	514	599
Annual operations by aircraft requiring 6,000' or more runway length						354	370	460	570	540	562	340	322	322	312	415

Notes:

1. * MTOW exceeds 60,000
2. Aircraft Identified in Table 3-2 in AC 150/5325-4B Justifying Runway Length Analysis with Figure 3-2: 100 Percent of Fleet at 60 or 90 Percent Useful Load Identified by blue highlight
3. Aircraft requiring 6,000' or more of runway length identified by green highlight
4. Takeoff Distance Calculations utilized previous data and methodology provided in 2012 Airport Master Plan

ASTRA 1125

IAI Astra 1125

Technical Specifications

Occupancy

Crew: 2

Passengers: 6

Operating Weights

Max T/O Weight: 23501 Lb

Max Landing Weight: 24650 Lb

Empty Weight: 12670 Lb

Fuel Capacity: 9365 lbs Lb

Payload Useful: 10700 Lb

Payload W/Full Fuel: 1335 Lb

Max Payload: 2900 Lb

Range

Max Range: 3110 nm

Service Ceiling: 45000 ft

Distances

Takeoff Distance: 5250 ft

Landing Distance: 2250 ft

Performance

Rate of Climb: 3500 fpm

Max Speed: 465 kts

Normal Cruise: 424 kts

Economy Cruise: 412 kts

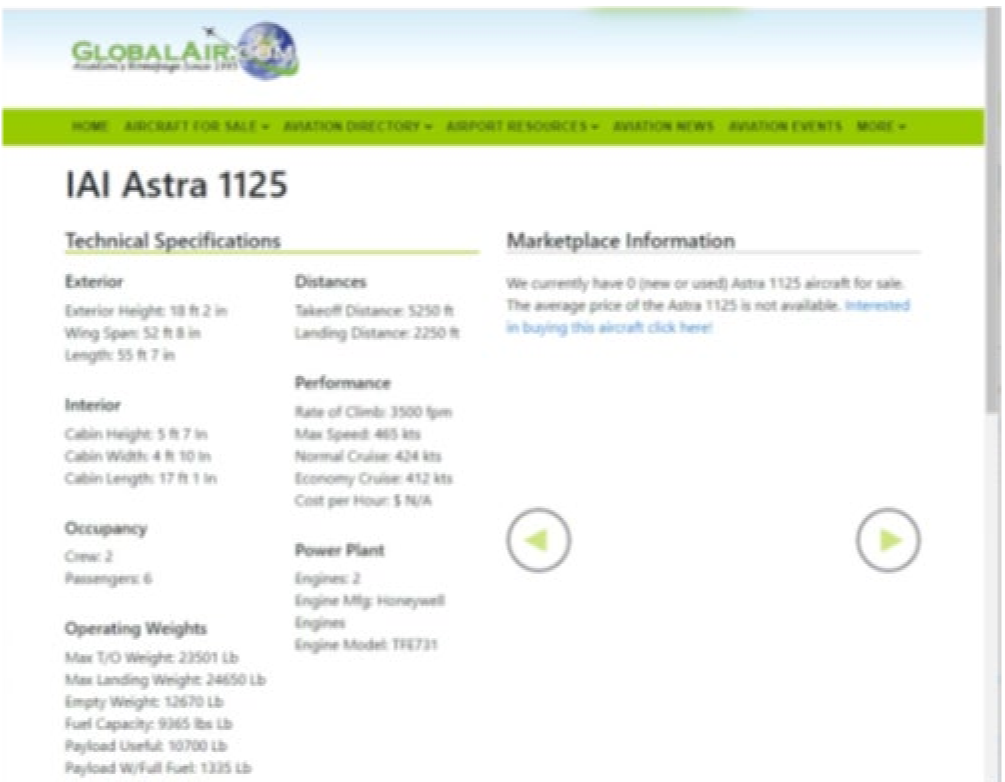
Cost per Hour: $ N/A

Power Plant

Engines: 2

Engine Mfg: Honeywell Engines

Engine Model: TFE731



BOMBARDIER GLOBAL EXPRESS

Global Express Specifications, Ca

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Bombardier Global Express

Technical Specifications

Exterior

Exterior Height: 25 ft 5 in
Wing Span: 94 ft 0 in
Length: 99 ft 4 in

Interior

Cabin Height: 6 ft 3 In
Cabin Width: 8 ft 2 In
Cabin Length: 48 ft 4 In
Cabin Volume: 2140 cu ft
Door Height: 6 ft 2 In
Door Width: 3 ft 0 In
Internal Baggage: 195 cu ft

Occupancy

Crew: 2
Passengers: 8-19

Operating Weights

Max T/O Weight: 98000 Lb
Max Landing Weight: 78600 Lb
Operating Weight: 51200 Lb
Fuel Capacity: 44642 lbs Lb

Range

Normal Range: 6055 nm
Max Range: 6226 nm
Service Ceiling: 51000 ft

Distances

Balanced Field Length: 6170 ft
Landing Distance: 2670 ft

Performance

Rate of Climb: 3300 fpm
Climb Rate One Engine Inop: 474 fpm
Max Speed: 511 kts
Normal Cruise: 488 kts
Economy Cruise: 471 kts

Power Plant

Engines: 2
Engine Mfg: Rolls Royce
Engine Model: BR 710-A2-20

Marketplace Information

We currently have 5 (new or used) Global Express aircraft for sale. The average price of the Global Express is $12,250,000.
Interested in buying this aircraft click here!

Bombardier Global Express

Description | Performance | Cabin

Description

The Global Express was the pioneer of ultra-long-range private jets. At the time of its release, no other private jet had a cabin nearly as large, nor could any jet make such long-range direct flights like New York to Tokyo or Paris to Singapore. The Global Express offers everything an airliner does – range, comfort, and speed –- without the hassle. The cabin of the Global Express is designed to offer maximum comfort and amenities for the duration of long, transoceanic flights. The cabin can be configured to hold between thirteen and nineteen passengers in a space that is 6.3 feet high, 8.2 feet wide, and 48.4 feet long. The cabin can be divided into three areas for increased privacy in conferences. Two fully-enclosed lavatories are located in the cabin, one of which can be equipped with a shower, if desired. Extensive cabin insulation cuts down on noise, and improved engines produce less audible vibration. There is a wide range of standard and optional cabin amenities, including a 17 channel SATCOM, fax machine, cabin entertainment system with VHS, DVD, and CD players, as well as individual video screens and a full-sized galley.

The engines themselves are BMW/Rolls-Royce BR710A2-20 turbofans, which produce 14,750 pounds of thrust each on takeoff. The Global Express can climb to 37,000 feet in nineteen minutes. Its maximum certified flight ceiling is 51,000 feet, but it generally cruises around 42,000 feet –well above most commercial and private jets. For long-distance flights, the Global Express can reach speeds of 488 knots, and reach 499 knots when cruising at high speed.

Fortunately, one of the strengths of the Global Express is its ability to fly at high speeds without sacrificing range. Its maximum range is 7,000 miles (6,100 nautical miles) at a speed of .85 Mach.

Despite a fairly high maximum takeoff weight of 95,000 pounds, the Global Express needs only 5,820 feet of runway to take off at sea level, and 7,880 feet to take off from a runway 5,000 feet above sea level.

The avionics and flight control systems were designed to be intuitive and easy to operate. Many systems require almost no input from the pilots. The Express' cabin pressurization system, for example, automatically adjusts cabin pressure throughout the flight. The pilot merely has to enter the altitudes of the runways at the initial and final destinations. The cabin is rated to 10 psi, meaning it can maintain a sea level cabin while at an altitude of 26,500 feet. Engine startup is very simple, as is the fuel balance system, which automatically adjusts the fuel levels in the two wet wing tanks. Besides being easy to fly, the Global Express is very reliable. Most of its critical systems have two or three backup systems in place.

The avionics system equipped in the Global Express is the Honeywell Primus 2000XP suite. It has six 7 x 8 inch screens. Some screens display flight and environment information, while others are blank (to minimize distractions), except when notifying the pilots of an emergency. The avionics system comes standard with a triple LASEREF IV inertial reference system, a GPS receiver, avionics computers, nav/comm radios, and can be configured to include almost any piece of avionics equipment desired.

DASSAULT FALCON 50

FROM WIKIPEDIA: https://en.m.wikipedia.org/wiki/Dassault_Falcon_50

Data from Flight International[15]

General characteristics

- **Crew:** 2
- **Capacity:** 8 to 9 passengers / 1,080 kg (2,381 lb) payload with full fuel
- **Length:** 18.52 m (60 ft 9 in)
- **Wingspan:** 18.86 m (61 ft 11 in)
- **Height:** 6.98 m (22 ft 11 in)
- **Wing area:** 46.83 m^2 (504.1 sq ft) [16]
- **Max takeoff weight:** 18,008 kg (39,701 lb)
- **Max Landing Weight:** 16,200 kg (35,715 lb)
- **Powerplant:** 3 × Honeywell TFE 731-40 turbofan engines, 16.46 kN (3,700 lbf) thrust each

Performance

- **Maximum speed:** 1,015 km/h (631 mph, 548 kn)
- **Maximum speed:** Mach 0.86
- **Cruise speed:** 903 km/h (561 mph, 488 kn) / M0.85 at 15,000 m (49,000 ft)
- **Range:** 5,695 km (3,539 mi, 3,075 nmi)
- **Service ceiling:** 14,936 m (49,003 ft)
- **Rate of climb:** 10.433 m/s (2,053.7 ft/min)
- **Take-off run:** 1,504 m (4,934 ft)
- **Landing run:** 685 m (2,247 ft)

DASSAULT FALCON 50 TECHNICAL SPECS

From GLOBAL AIR: https://www.globalair.com/aircraft-for-sale/Specifications?specid=209

Technical Specifications

Exterior

- Exterior Height: 22 ft 9 in
- Wing Span: 61 ft 8 in
- Length: 60 ft 8 in
- External Baggage: 90 cu ft

Interior

- Cabin Height: 5 ft 9 In
- Cabin Width: 6 ft 1 In
- Cabin Length: 22 ft 11 In
- Cabin Volume: 569 cu ft
- Internal Baggage: 25 cu ft

Occupancy

- Crew: 2
- Passengers: 9

Operating Weights

- Max T/O Weight: 38320 Lb
- Max Landing Weight: 35715 Lb
- Operating Weight: 22000 Lb
- Fuel Capacity: 15520 lbs Lb
- Payload W/Full Fuel: 1280 Lb
- Max Payload: 3570 Lb

Range

- Normal Range: 3057 nm
- Max Range: 3200 nm
- Service Ceiling: 31000 ft

Distances

- Take Off Distance: 4.935 ft
- Landing Distance: 3500 ft

Performance

- Rate of Climb: 3430 fpm
- Climb Rate One Engine Inop: 601 fpm
- Max Speed: 480 kts
- Normal Cruise: 431 kts
- Economy Cruise: 410 kts
- Cost per Hour: $ 4,444.65

Power Plant

- Engines: 3
- Engine Mfg: Honeywell Engines
- Engine Model: TFE 731-3-1C

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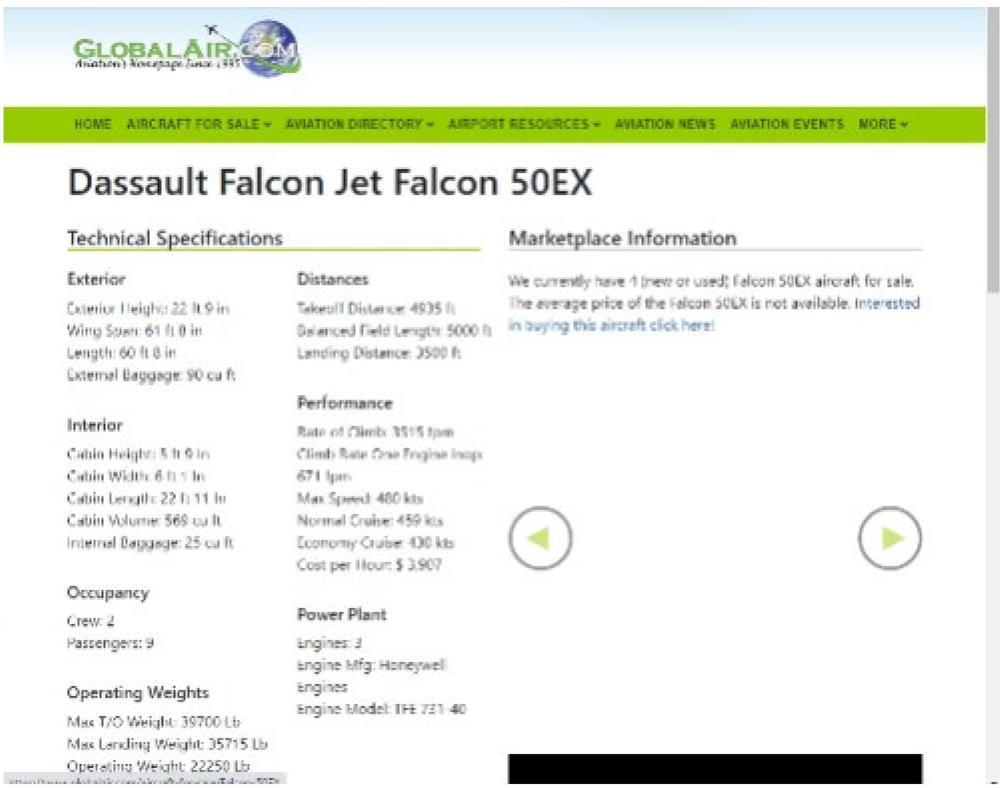

TECHNICAL SPECIFICATIONS FOR FALCON 50

FROM PLANEPHD: https://planephd.com/wizard/details/670/DASSAULT-FALCON-50-specifications-performance-operating-cost-valuation

1980 - 1996 DASSAULT FALCON 50 Multi engine turbofan aircraft. The FALCON 50 seats up to 8 passengers plus 2 pilot(s).

Performance specifications

Thrust: 3 x 3,700 N

Best Cruise Speed: 468 KIAS

Best Range (i): 3,500 NM

Fuel Burn: 229.0 GPH

Stall Speed: 77 KIAS

Rate of climb: 3,430 FPM

Rate of climb (1 engine out): 2,200 FPM

Ceiling: 49,000 FT

Ceiling (1 engine out): 31,000 FT

Takeoff distance: 4,700 FT

Landing distance: 2,150 FT

Takeoff distance over 50ft obstacle: 4,700 FT

Landing distance over 50ft obstacle: 2,800 FT

Weights

Gross Weight: 38,800 LBS

Empty Weight: 20,170 LBS

Maximum Payload: 3,570 LBS

Fuel capacity: 15,520 LBS

TECHNICAL SPECIICATIONS FALCON 50

FROM AIRCRAFT EXCHANGE: https://planephd.com/wizard/details/670/DASSAULT-FALCON-50-specifications-performance-operating-cost-valuation

Dassault Falcon 50 Range:

Normal Range: 3,057 nm

Maximum Range: 3,200 nm

Service Ceiling: 31,000 ft

Dassault Falcon 50 Performance

Rate of Climb: 3430 fpm

Maximum Speed: 480 kts

Normal Cruise: 431 kts

Economy Cruise: 410 kts

Dassault Falcon 50 Distances

Balanced Field Length: 5000 ft

Takeoff Field Length: 4,950 ft

Landing Distance: 3,500 ft

Dassault Falcon 50 Operating Weights

Max T/O Weight: 38,320 lb

Max Landing Weight: 35,715 lb

Operating Weight: 22,000 lb

Fuel Capacity: 15,520 lb

Payload with Full Fuel: 1,280 lb

Maximum Payload: 3,570 lb

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Dassault Falcon Jet Falcon 900EX

Technical Specifications

Exterior

Exterior Height: 24 ft 10 in
Wing Span: 63 ft 5 in
Length: 66 ft 4 in

Interior

Cabin Height: 6 ft 2 In
Cabin Width: 7 ft 8 In
Cabin Length: 33 ft 2 In
Cabin Volume: 1218 cu ft
Internal Baggage: 127 cu ft

Occupancy

Crew: 2
Passengers: 12

Operating Weights

Max T/O Weight: 48300 Lb
Max Landing Weight: 44500 Lb
Operating Weight: 24700 Lb
Fuel Capacity: 21000 Lb
Payload W/Full Fuel: 2800 Lb
Max Payload: 6164 Lb

Distances

Takeoff Distance: 5215 ft
Balanced Field Length: 5215 ft
Landing Distance: 3750 ft

Performance

Rate of Climb: 3880 fpm
Climb Rate One Engine Inop: 755 fpm
Max Speed: 482 kts
Normal Cruise: 459 kts
Economy Cruise: 430 kts
Cost per Hour: $ 4,090.01
Avionics: Rockwell Collins system

Power Plant

Engines: 3
Engine Mfg: Honeywell Engines
Engine Model: TFE 731-60

Marketplace Information

We currently have 2 (new or used) Falcon 900EX aircraft for sale. The average price of the Falcon 900EX is not available. Interested in buying this aircraft click here!