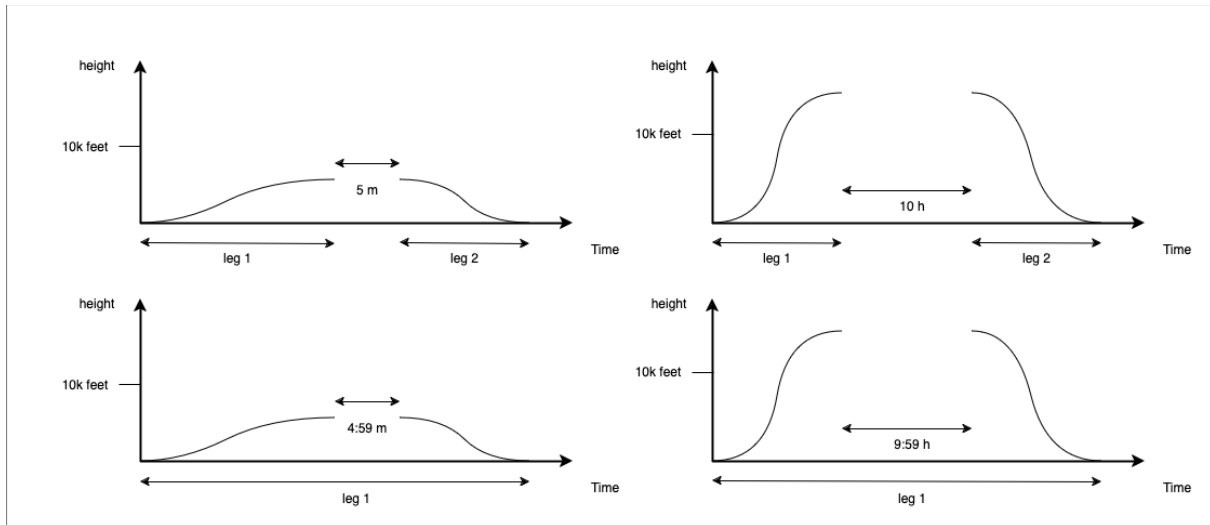


Supplementary information



Supplementary Figure 1: Calculation of legs in lost signal cases*

*In the standard situation, an ADS-B signal is received when the aircraft has landed. When a signal is lost in regions with low ADS-B coverage (for example, in central Africa), rules for calculations apply as shown in the Figure.



Supplementary Figure 2: Company flight patterns, 2019-2023*

* Five-year PA pattern for three family-business owned jets. Flight data for the period 2019-2023 (5 years) shows that of a total of 1,772 flights (legs), 206 (11.6%) went to Switzerland and 134 (7.6%) to Scotland, indicating second home ownership. Another 54 flights were made to Florida, USA. 186 flights were shorter than <100 km, mostly for pick-up. Delivery may result in an empty return flight, and a reverse pick-up pattern. Aircraft are also used for long-haul flights to typical holiday destinations in the Caribbean and the West Indian Ocean. For a global map see Supplementary information, Figure 2.

Supplementary Table 1: Number of private aircraft by aircraft model (February 2024)

Jet Model	Number of Jets	Percent of Fleet	fuel consumption (gph)
PILATUS PC-12	2066	7.81%	76
BOMBARDIER CL-600 Challenger	1062	4.01%	365
PIPER PA-46-500TP*	1049	3.97%	48
CESSNA 560XL Citation XLS	1032	3.90%	239
HAWKER BEECHCRAFT Hawker 750/850	1004	3.80%	291
CESSNA 525A Citation CJ2	962	3.64%	141
GULFSTREAM 4	871	3.29%	540
GULFSTREAM 5	837	3.16%	500
BOMBARDIER BD-100 Challenger 300	814	3.08%	295
BOMBARDIER BD-700 Global 6000/6500	779	2.94%	512
CESSNA 550 Citation S2	762	2.88%	181
EMBRAER EMB-505 Phenom 300	754	2.85%	179
BEECH 400 Beechjet	749	2.83%	222
CESSNA 560 Citation Ultra	733	2.77%	222
DASSAULT Falcon 2000	703	2.66%	287
CESSNA 525B Citation CJ3	675	2.55%	149
LEARJET 45	664	2.51%	205
DASSAULT Falcon 900	605	2.29%	335
GULFSTREAM G650	552	2.09%	500
CIRRUS SF-50 Vision	485	1.83%	78
CESSNA 510 Citation Mustang	480	1.81%	90
CESSNA 680 Citation Sovereign	456	1.72%	281
CESSNA 525C Citation CJ4	435	1.64%	209
CESSNA 525 CitationJet	431	1.63%	132
LEARJET 35	430	1.63%	225
EMBRAER EMB-500 Phenom 100	414	1.56%	113
LEARJET 60	412	1.56%	239
CESSNA 680 Citation Latitude	382	1.44%	264
DASSAULT Falcon 7X	380	1.44%	385
PILATUS PC-24	311	1.18%	191
CESSNA 650 Citation	305	1.15%	276
DASSAULT Falcon 50	300	1.13%	356
EMBRAER EMB-135 Legacy	296	1.12%	285
ECLIPSE 550	289	1.09%	76
GULFSTREAM G280	278	1.05%	286
RAYTHEON 390 Premier 1	274	1.04%	159
BOMBARDIER BD-700 Global 5000/5500	273	1.03%	506
HONDA HondaJet	263	0.99%	120
GULFSTREAM G200	229	0.87%	278

LEARJET 31	204	0.77%	202
EMBRAER EMB-550 Praetor 600	183	0.69%	298
DASSAULT Falcon 200	179	0.68%	277
BOMBARDIER BD-700 Global 7000/7500	171	0.65%	528
GULFSTREAM AEROSPACE Gulfstream G100	136	0.51%	207
IAI 1124 Westwind	136	0.51%	222
GULFSTREAM G500	134	0.51%	430
GULFSTREAM G150	130	0.49%	288
GULFSTREAM G600	130	0.49%	500
BOMBARDIER BD-100 Challenger 350	119	0.45%	297
CESSNA 700 Citation Longitude	112	0.42%	316
EMBRAER EMB545 Praetor 500	109	0.41%	287
DASSAULT Falcon 100	108	0.41%	240
LEARJET 55	108	0.41%	244
CESSNA 550B Citation Bravo	99	0.37%	171
CESSNA 525 Citation M2	98	0.37%	134
DASSAULT Falcon 8X	89	0.34%	377
RAYTHEON 4000 Hawker Horizon	73	0.28%	321
NORTH AMERICAN Sabre 40/50/60/65	67	0.25%	283
LEARJET 40	56	0.21%	224
LEARJET 75	48	0.18%	199
RAYTHEON Hawker 1000	44	0.17%	232
GULFSTREAM G700	40	0.15%	509
HAWKER SIDDELEY HS-125	29	0.11%	263
DASSAULT Falcon 6X**	12	0.05%	419
LOCKHEED L-1329 Jetstar 731	11	0.04%	576
SWEARINGEN SJ-30	7	0.03%	156
GULFSTREAM 200	6	0.02%	278
BEECH 400XT Beechjet	5	0.02%	150
GULFSTREAM G-7 G400	5	0.02%	540
BAE 125-1000A	4	0.02%	232
GULFSTREAM G-8 G800	3	0.01%	462
HA-420	3	0.01%	120
Total	26454	100.00%	

*Piper PA-46-500TP with very low fuel consumption of 48gph not depicted in Figure 1. **DASSAULT Falcon 6X: no fuel burn estimate was available for this aircraft model, and thus computed based on data provided in the manufacturer file. The calculation used was: $1,211,748 \text{ [$/400h]} / 400 \text{ [h]} / 7.23 \text{ [$/gal]} = 419 \text{ gph}$.

Supplementary Table 2: Number of private aircraft by country

Country	Private aircraft	%	Population	Private aircraft per 1 million inhabitants
United States	18,163	68.66%	333,287,557	54.50
Brazil	927	3.50%	215,313,498	4.31
Canada	770	2.91%	38,929,902	19.78
Germany	630	2.38%	83,797,985	7.52
Mexico	534	2.02%	127,504,125	4.19
United Kingdom	522	1.97%	66,971,395	7.79
Switzerland	330	1.25%	8,775,760	37.60
Australia	317	1.20%	26,005,540	12.19
Unassigned (EUR / NAT regions)	286	1.08%		
Austria	266	1.01%	9,041,851	29.42
France	248	0.94%	67,971,311	3.65
Malta	247	0.93%	531,113	465.06
China	213	0.81%	1,412,175,000	0.15
Argentina	167	0.63%	46,234,830	3.61
Portugal	160	0.60%	10,409,704	15.37
South Africa	160	0.60%	59,893,885	2.67
India	147	0.56%	1,417,173,173	0.10
Russia	139	0.53%	144,236,933	0.96
Turkey	137	0.52%	84,979,913	1.61
Venezuela	129	0.49%	28,301,696	4.56
Netherlands	114	0.43%	17,700,982	6.44
Czechia	107	0.40%	10,672,118	10.03
Luxembourg	100	0.38%	653,103	153.12
Italy	94	0.36%	58,940,425	1.59
Cayman Islands	87	0.33%	68,706	1266.26
Belgium	78	0.29%	11,685,814	6.67
Spain	78	0.29%	47,778,340	1.63
Denmark	74	0.28%	5,903,037	12.54
Guernsey	67	0.25%	63,711	1051.62
Poland	67	0.25%	36,821,749	1.82
Japan	60	0.23%	125,124,989	0.48
Nigeria	57	0.22%	218,541,212	0.26
Finland	54	0.20%	5,556,106	9.72
Sweden	53	0.20%	10,486,941	5.05
Saudi Arabia	41	0.15%	36,408,820	1.13
United Arab Emirates	39	0.15%	9,441,129	4.13
Serbia	34	0.13%	6,664,449	5.10
Morocco	33	0.12%	37,457,971	0.88

Chile	32	0.12%	19,603,733	1.63
Israel	29	0.11%	9,557,500	3.03
Pakistan	29	0.11%	235,824,862	0.12
Philippines	28	0.11%	115,559,009	0.24
Indonesia	27	0.10%	275,501,339	0.10
Egypt	25	0.09%	110,990,103	0.23
Hungary	25	0.09%	9,643,048	2.59
Thailand	25	0.09%	71,697,030	0.35
Colombia	24	0.09%	51,874,024	0.46
Ireland	23	0.09%	5,127,170	4.49
Greece	22	0.08%	10,426,919	2.11
New Zealand	22	0.08%	5,124,100	4.29
Qatar	22	0.08%	2,695,122	8.16
Kazakhstan	20	0.08%	19,621,972	1.02
Norway	20	0.08%	5,457,127	3.66
Romania	18	0.07%	19,047,009	0.95
Slovakia	16	0.06%	5,431,752	2.95
Bulgaria	15	0.06%	6,465,097	2.32
Dominican Republic	13	0.05%	11,228,821	1.16
Angola	11	0.04%	35,588,987	0.31
Kenya	11	0.04%	54,027,487	0.20
Latvia	11	0.04%	1,879,383	5.85
Malaysia	11	0.04%	33,938,221	0.32
Slovenia	11	0.04%	2,111,986	5.21
South Korea	11	0.04%	51,628,117	0.21
Taiwan	11	0.04%	23,300,000	0.47
Viet Nam	11	0.04%	98,186,856	0.11
Lebanon	10	0.04%	5,489,739	1.82
Paraguay	10	0.04%	6,780,744	1.47
Algeria	9	0.03%	44,903,225	0.20
Bahamas	8	0.03%	409,984	19.51
Croatia	8	0.03%	3,855,600	2.07
Azerbaijan	7	0.03%	10,141,756	0.69
Botswana	7	0.03%	2,630,296	2.66
Lithuania	7	0.03%	2,831,639	2.47
Namibia	7	0.03%	2,567,012	2.73
Guatemala	6	0.02%	17,357,886	0.35
Libya	6	0.02%	6,812,341	0.88
Tanzania	6	0.02%	65,497,748	0.09
Uruguay	6	0.02%	3,422,794	1.75
Cote d'Ivoire	5	0.02%	28,160,542	0.18
Kuwait	5	0.02%	4,268,873	1.17
Panama	5	0.02%	4,408,581	1.13
Peru	5	0.02%	34,049,588	0.15
Unassigned (MID region)	5	0.02%		
Bahrain	4	0.02%	1,472,233	2.72
Bolivia	4	0.02%	12,224,110	0.33
Oman	4	0.02%	4,576,298	0.87

Belarus	3	0.01%	9,228,071	0.33
Chad	3	0.01%	17,723,315	0.17
Congo	3	0.01%	5,970,424	0.50
DR Congo	3	0.01%	99,010,212	0.03
Ecuador	3	0.01%	18,001,000	0.17
Gabon	3	0.01%	2,388,992	1.26
Iran	3	0.01%	88,550,570	0.03
Jordan	3	0.01%	11,285,869	0.27
Madagascar	3	0.01%	29,611,714	0.10
Monaco	3	0.01%	36,469	82.26
Sudan	3	0.01%	46,874,204	0.06
Bangladesh	2	0.01%	171,186,372	0.01
Barbados	2	0.01%	281,635	7.10
Bosnia and Herzegovina	2	0.01%	3,233,526	0.62
Equatorial Guinea	2	0.01%	1,674,908	1.19
Gambia	2	0.01%	2,705,992	0.74
Mauritius	2	0.01%	1,262,523	1.58
Papua New Guinea	2	0.01%	10,142,619	0.20
Saint Vincent and the Grenadines	2	0.01%	103,950	19.24
Senegal	2	0.01%	17,316,449	0.12
Uganda	2	0.01%	47,249,585	0.04
Unassigned (AFI region)	2	0.01%		
Zambia	2	0.01%	20,017,675	0.10
Burundi	1	0.00%	12,889,576	0.08
Cyprus	1	0.00%	1,251,488	0.80
Djibouti	1	0.00%	1,120,849	0.89
Ghana	1	0.00%	33,475,870	0.03
Honduras	1	0.00%	10,432,860	0.10
Iraq	1	0.00%	44,496,122	0.02
Mozambique	1	0.00%	32,969,518	0.03
Seychelles	1	0.00%	119,878	8.34
Singapore	1	0.00%	5,637,022	0.18
Togo	1	0.00%	8,848,699	0.11
Uzbekistan	1	0.00%	35,648,100	0.03
Total	26,454	100.00%		