

CIVIL AVIATION AND THE ENVIRONMENT

NOISE

Aviation generates noise emissions too. However, the number of people exposed, in relation to other transport carriers, is rather low.

Exceeding the emission limit value pursuant to LSV:

Transport Carrier	Exposed population over IGW ¹⁾	
	Day	Night
Road	1,200,000	700,000
Railroad	70,000	140,000
Aviation	35,000	40,000

The noise-exposed area²⁾ around Zurich Airport has decreased over the last 20 years by two thirds, despite an increase in flight movements. At the same time, the population in the affected areas increased by 83%.

ENERGY / CO₂

Around 2% of worldwide fossil energy consumption is assignable to civil air transport. This results in a share of 2% of man-made CO₂ output. Air transport contributes with approximately 12% of worldwide CO₂ emissions of the transport sector. A modern airliner consumes during an intercontinental flight based on 100 km around 3 litres of fuel per passenger carried.

CLIMATE

According to the report «Aviation and the Global Atmosphere» of UNEP and WMO (IPCC 1999) ³⁾ the worldwide air traffic contributes with 3.5% ⁴⁾ to the man-made greenhouse effect. With increasing air traffic that share could grow to 5% in 2050, as per IPCC. The state of scientific research about the impact of nitric oxides and water vapour arising from aircraft engines on the greenhouse effect still shows significant uncertainties. The latest scientific studies assume that the substances amplify the greenhouse effect of CO₂ by factor 1.2. CO₂ emissions at cruise altitude have the same effect as ground-level emissions (e.g. road traffic, industry or heating). Approximately one third of the nitrogen oxide at cruising level originates from shipped ground-level emissions, from aircraft or has natural origins (thunderstorms).

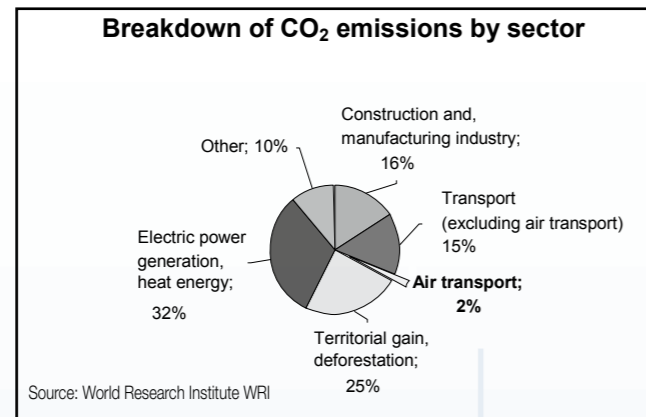
¹⁾ IGW - imission limit value

²⁾ 60 dB Leq day-time noise (IGW ES II)

³⁾ IPCC is the scientific body of UNEP (United Nations Environmental Program) and WMO (World Meteorological Organisation).

⁴⁾ Besides the impact of CO₂, further effects such as nitric oxides and condensation trails are included herein.

CIVIL AVIATION AND THE ENVIRONMENT



The global aviation industry is engaged to further mitigate greenhouse gas emissions.

This engagement is based on four pillars:

- **1st pillar: improved technology** (e.g. lower-emission engines, lighter aircraft equipment, alternative fuels from renewable resources)
- **2nd pillar: operational measures** (e.g. shorter and more direct air routes, fuel-saving start and landing procedures)
- **3rd pillar: more efficient infrastructure** (e.g. better use of airspace and airports)
- **4th pillar: economic measures** (e.g. voluntary CO₂- offset, emission trading)

EMMISSION TRADING

In 2012, the EU introduced the Emission Trading System (ETS). This applies to all flights starting from or landing in an EU-country, including also non-EU airlines. ETS is a cap-and-trade system. The affected airlines receive 85% of CO₂ emissions based in 2005 free of charge. The difference including growth need to be purchased via certificates, which evidence that CO₂ could be saved through measures elsewhere. In principle the aviation industry is not against the introduction of an ETS. However, such initiative must be introduced globally. A regional ETS like the EU-ETS distorts competition and leads to detours via hubs outside of Europe, what eventually creates more emissions. Due to international pressure, the EU has postponed the launch for another year. The union expects from the international community concrete measures. In case a respective agreement for a globalised system can be achieved until autumn 2013, the EU wants to waive introducing a European system.

AEROSUISSE

LIST OF ITS 129 MEMBERS (as at 30th April 2013)

Aero-Club of Switzerland, Lucerne
 Aero Insurance Service AG, Zurich-Airport
 Aerolite Max Bucher AG, Ennetbürgen
 Aéroport de Neuchâtel SA, Colombier
 Aéroport de Sion, Sion
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 ISS Aviation AG, Zurich-Airport
 Japat AG / Novartis International AG, Basel
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 Jordi AG – Das Medienhaus, Belp
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AEROSUISSE

The umbrella organisation AEROSUISSE, established in 1968, looks after the interests of Swiss civil aviation and space and ensures its long-term means of existence. It represents all on promotion and preservation of Swiss aerospace ideally and economically interested stakeholders and coordinates their aspirations. AEROSUISSE takes influence on design of the legal framework in connection with aerospace and maintains active contact to government, parliament and respective authorities as well as the media. AEROSUISSE today encompasses ca. 130 companies and organisations, including scheduled and charter airlines, national and regional airports, ground handlers, air traffic control, maintenance shops, manufacturer of aircraft and subcomponents, flight training schools, all influential aerospace associations as well in a broader sense other aerospace-related companies.

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SOURCES

- Aero-Club der Schweiz, Lucerne
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- BAZL Bundesamt für Zivilluftfahrt, Bern
- BFS Bundesamt für Statistik, Neuchâtel
- BAFU Bundesamt für Umwelt, Bern
- Deutsche Forschungsanstalt für Luft- und Raumfahrt, Oberpfaffenhofen (D)
- Flughafen Zürich AG, Zurich-Airport
- IATA International Air Transport Association, Geneva
- IDT Institut für öffentliche Dienstleistungen und Tourismus, St. Gallen
- INFRAS, Zurich
- Luftfahrtpolitischer Bericht des Bundesrates vom 10. Dezember 2004
- Rega Schweizerische Rettungsflugwacht, Zurich
- RUAG Schweiz AG, RUAG Space, Zurich
- Schweizerischer Hängegleiter-Verband, Zurich
- Schweiz Tourismus, Zurich
- SIAA Swiss International Airports Association, Zurich
- skyguide, Schweizerische AG für zivile und militärische Flugsicherung, Geneva
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- Verband öffentlicher Verkehr, Bern

AEROSUISSE

VADEMECUM 2013

**SWISS CIVIL AVIATION IS OF
OUTSTANDING IMPORTANCE FOR
THE NATIONAL ECONOMY ¹⁾**



VALUE ADDED AND LABOUR FORCE OF CIVIL AVIATION 2008 ²⁾

Effects ³⁾	Value Added ⁴⁾ in billion CHF	GDP ⁴⁾ %	Occupation FTE ⁵⁾
Direct	7.0		35,600
Indirect	2.7		16,800
Economic significance in a narrower sense	9.7	1.8	52,400
Induced	11.6		71,200
Passenger-driven catalysis	9.0		55,300
Economic significance in a broader sense	20.6	3.8	126,500
Sum of all effects ⁶⁾	30.3	5.6	178,900

BREAKDOWN OF DIRECT EMPLOYMENT EFFECTS 2008 ²⁾

	No. of employees
Zurich	20,100
Geneva	7,700
Basel	5,900
Bern	290
St. Gallen-Altenrhein	150
Lugano	260
Sion	150

Airports with airline movements ⁶⁾

	34,550
Regional airports without airline traffic	340
Airfields and miscellaneous (flying schools etc.)	550
Heliports	110
Airports without airline movements ⁶⁾	1,000
Aviation industry (maintenance, fitting, sub-components)	12,900

Operation of a short- / medium-haul aircraft	40 - 120
Operation of a long-haul aircraft	130 - 160
Per million flight passengers ⁷⁾	750 - 2,000

¹⁾ Aviation Policy Report of Federal Council, 2004

²⁾ Economic significance of aviation in Switzerland, 1 June 2011, INFRAS

³⁾ The sum of direct and indirect effect corresponds to the (causally narrow) economic significance of aviation in Switzerland (incl. exports of aviation industry). The induced and passenger-driven catalytic effect illustrates, which further, causally less narrow, economic linkages aviation exhibits with the rest of the economy.

⁴⁾ Incl. exports of aviation industry

⁵⁾ Full Time Equivalents

⁶⁾ Including aviation industry

⁷⁾ Direct and indirect effects

**CIVIL AVIATION IN
THE PUBLIC INTEREST**



The state government specifically highlights in its Aviation Policy Report of the Federal Council dated 10 December 2004 the outstanding economic importance of aviation and air transport connections from Switzerland to key destinations in Europe and overseas. The airline traffic is explicitly recognised as part of the public transport. On a value basis, one third of all exports is processed by air freight. Each third foreign tourist approaches Switzerland by air.

THE CONFEDERATION'S CIVIL AVIATION EXPENDITURES
IN COMPARISON (CHFM)

	2011	2012
Total expenditures federal government	62,333	61,736
whereof transport	8,062	8,130
whereof aviation ¹⁾	132	160

The confederation's expenditures in favour of civil aviation are with 0.21% in 2011 and with 0.26% in 2012 in relation to the overall expenditures extremely modest.

Neither the infrastructure nor aircraft operations are subsidised.

AIR TRAFFIC CONTROL

Skyguide, the Swiss incorporated limited company for civil and military air traffic control, coordinates and directs the air traffic of Switzerland and parts of neighbouring airspace. Skyguide is an enterprising and customer oriented private limited company owned by the federal government. Its running costs are covered by route and landing charges as well as statutory contributions of the federal government.

	2010	2011	2012
Revenue in CHFM	365	427	440
Employees (Full Time Equivalents)	1,316	1,330	1,376

Airports where Skyguide is in charge: Alpnach, Bern, Buochs, Dubendorf, Emmen, Geneva, Grenchen, Locarno, Lugano, Meiringen, Payerne, Sion, St. Gallen-Altenrhein und Zurich. On the regional airport Les Éplatures the local air navigation service is delegated to the airport operator.

Per capita basis, Switzerland is one of the countries with the most condensed air navigation demand in the world.

¹⁾ Expenditures for international organisations of civil aviation, certain security tasks, supervision (FOCA), education, aircraft procurement, payments to Skyguide, contributions of mineral oil tax money

**FIGURES ON SWISS
CIVIL AVIATION**



	2010	2011	2012
FLIGHT PASSENGERS (on SIAA airports) ¹⁾			
Zurich	22,878,251	24,337,954	24,802,400
Geneva	11,880,397	13,130,222	13,899,422
Basel	4,129,186	5,053,643	5,354,674
Lugano	169,084	175,348	177,415
Bern	101,286	184,339	271,111
St. Gallen-Altenrhein	81,835	108,000	120,000
Total	39,240,039	42,989,506	44,625,022

FLIGHT MOVEMENTS (on national and regional airports)

Zurich	268,765	279,001	270,027
Geneva	177,400	189,121	192,944
Basel	77,154	87,583	87,352
Birrfeld	72,340	76,254	68,963
Grenchen	74,491	76,211	79,260
Bern	56,136	61,507	59,669
Sion	42,444	44,036	41,276
Lausanne-Blécherette	35,391	38,878	33,013
St. Gallen-Altenrhein	29,756	28,753	30,000
Écuvillens	21,972	18,177	15,011
Lugano	21,310	24,392	21,672
Samedan	18,662	18,732	14,855
Les Éplatures	10,951	15,407	11,836
Bressaucourt		5,225	9,115
Total	906,772	963,277	934,993

Transit flights within the Swiss airspace	706,165	712,830	690,253
Destination / countries ²⁾	184 / 54	175 / 53	178 / 54
Rescue flights by helicopter (Rega)	10,213	10,797	10,250
Ambulance flights by jet (Rega)	702	698	847
Freight and post (t)	379,389	394,423	401,869

¹⁾ SIAA Swiss International Airports Association

²⁾ operated by Swiss domiciled airlines

**FIGURES ON SWISS
CIVIL AVIATION**



	2010	2011	2012
AIRPORTS			
National airports	3	3	3
Regional airports	10	11	11
Airfields	46	45	48
Heliports	23	23	24
COMPANIES			
Airline operators	9	8	8
Commercial operators (non-airline)	81	77	70
Maintenance and repair shops	90	90	89
Flight schools	142	137	142
Hang-gliding schools with SHV label	60	62	63
other hang-gliding schools	54	59	56
Parachute schools	13	15	14
Manufacturers	13	13	16

DEVELOPMENT OF THE AIRCRAFT PORTFOLIO

Airplanes (fixed wing)	1,913	1,932	1,922
Helicopter (rotor wing)	327	334	326
Engine-powered gliders	251	254	255
Gliders	824	800	767
Hang-gliders	14,318	14,765	14,957
Balloons	381	379	377
Airships	9	10	10

SWISS TRAFFIC NETWORK

	2012
Line network of Swiss-domiciled airlines	432,951 km
Roadways (in Switzerland)	71,473 km
Railways (in Switzerland)	5,427 km

EXPOSED TERRAIN

	Area	Area per capita
Land area of Switzerland	41,285 km ²	5,252 m ²
Airports ¹⁾	30 km ²	3.81 m ²
Sealed land area in respect of:		
Roadways	741 km ²	94.27 m ²
Railways	114 km ²	14.50 m ²
Airports ¹⁾	8 km ²	1.02 m ²

¹⁾ National and regional airports

**FIGURES ON SWISS
CIVIL AVIATION**



TRAINING CENTRES IN SWITZERLAND

Airfields across the entire country offer various opportunities getting trained in aviation activities and practice aviation sports. This task is provided by 142 flight training schools, 119 hang-gliding flight schools and more than 400 clubs.

Many dynamic companies offering qualified employment and access to several vocational training are located at domestic airfields.

LICENCES

	2010	2011	2012
Private Pilot	5,581	5,565	5,604
Commercial Pilot	952	947	1,136
Airline Transport Pilot	2,266	2,201	2,362
Multi-Crew Pilot License (MPL/A)	46	63	84
Helicopter Pilot	1,168	1,208	1,003
Glider Pilot	2,617	2,324	2,116
Balloonist	340	346	334
Hang-Glider	33,309	34,245	35,018
Parachutist	1,472	1,550	1,572
Recognition of foreign permits	8	26	25
On-Board Engineer	2	1	1
On-Board Radio Operator	10	7	4
Aircraft Maintenance Mechanic	2,977	2,992	3,025

In total, Swiss space companies achieve an annual turnover of around CHF 200 million.

The majority of the approximately 800 individuals employed have above-average qualifications.

Half of the employed space-related workforce has a university degree.

Most space companies in Switzerland are represented in the Swiss Space Industries Group (SSIG) of Swissmem.

SWISS SPACE INDUSTRY



Switzerland shaped European space activities since its beginning.

Swiss Technology was already on-board of the first European satellite ESRO-1.

Switzerland is a founding member of ESA (European Space Agency) and participates in many programmes of the European space organisation. Switzerland participates in ESA budget with ca. CHF 150 million per annum and is thus the eighth largest contributor.

The main focus of Swiss space industry is based on the development and manufacture of subsystems for the use in space. The product portfolio is broad and extends from payload claddings and structures up to optical, mechanical and electronic components as well as scientific instruments and ground equipment.

Thanks to the sound competencies and technologies that could be acquired by the Swiss space industry in the context of ESA programmes, companies are meanwhile successful in commercial space projects too, e.g. in the European launch vehicle programme Ariane.