

Alphabetical list of abbreviations and lexicon.

*I opted to write the book assuming most readers had a fairly good knowledge of aviation terms and abbreviations. All along the book, the * sign direct people in doubt about the meaning to this alphabetical list providing non-aviators sufficient extra information in non-technical language, to understand what I tried to write in the book. I tried to keep everything as simple as possible, and do not have the ambition to suggest that it has any scientific value, nor complete more in depth descriptions of the treated subjects.*

AAA: Anti-Aircraft Artillery: from small-arms fire to radar-guided high-speed bullets or shells, specifically designed to hit low-flying aircraft.

AAFCE: Allied Air Forces Central Europe. A HQ* on top of the Northern 2ATAF* and Southern 4ATAF, directing air operations in case of troubles in or around Central Europe.

ABCCC: Airborne Command and Control Centre

AC: Aircraft Commander (rating). Also, in the context of electricity: Alternate Current produced by alternators.

ACE: Allied Command Europe

ACM: Air Combat Maneuvering: aircraft fighting each other using appropriate tactics.

ACOS: Assistant Chief Of Staff. Division chief responsible to HQ* Generals regarding policy and execution of agreed upon international doctrines.

ADA: Air Display Association: UK organization gathering UK airshow organizers and pilots.

ADF: Automatic Direction Finder: Non-precision instrument pointing at the source of radio emitted radio waves such as LW/MW radio broadcasting stations, or NDB* ground signals for aircraft. Can be seriously deflected by mountains or coastal effects, and are slowly vanishing from anything but remote regions.

Afterburner: A/B: A section mounted behind the exhaust of jet engines, in which fuel is ignited to burn residual air behind the turbine. This produces up to 50% extra thrust, but at the cost of a fuel consumption being multiplied by a factor of up to 3. Fighters use it for additional thrust during takeoff, and during short periods in combat situation.

AGL: Above Ground Level: altitudes can be measures versus many references, AGL means above the actual terrain height.

Aileron roll: A maneuver during which the aircraft is completely rolled around its longitudinal axis while the nose remains pointed at a spot on the horizon. Properly executed and depending on the roll rate, it means negative Gs and some knife-edge flying.

AI: Attitude Indicator: unlike older artificial horizons which only displayed a horizon bar within limited pitch and roll, modern attitude indicators keep giving you accurate information on a marked colored sphere throughout any maneuvers. It is the primary reference for instrument flying for any pilot and has to be believed, whatever your internal senses make you

feel or think. Some types (called BALL) even depict heading information by rotation, but these never became widespread.

AIS: Aeronautical Information Service, a service taking care of grouping all specific information for airmen to fly anywhere in the world. They sometimes file the flight-plans for all aircraft leaving the airfield.

ALO: Air Liaison Officer: An officer assigned to ground units, knowledgeable about air operations, ensuring adequate information being exchanged between both services to conduct operations and coordinate air support when necessary.

AMF: Ace Mobile Forces, limited forces from various services and nations trained and allocated to ACE*, able to be deployed on short notice to reinforce threatened remote areas.

AOA: Angle Of Attack: angle between the chord of the wing (imaginary line between the extreme front and back point of an airfoil), and the relative wind hitting the wing. Remember relative wind is often completely different to the horizontal wind we think of, everything is relative to the direction of the movement of the aircraft through the air.

AOCC: Air Operations Coordination Centre: office responsible for coordinating all aircraft (and helicopter) movements in its specific and well-defined region.

APU: Auxiliary Power Unit: separate small (jet) engine mainly providing press-air and limited electric power to an aircraft with main engine power (still) inoperative.

ASAP: As Soon As Possible / As Soon As Practical

ASR: Airport Surveillance Radar

ATAF: Allied Tactical Air Force. HQ* commanding allotted air assets from various air forces within a geographical region. Europe had initially been divided into 6 such regions bordering the Warsaw Pact countries.

ATC: Air Traffic Control: a term to describe the function of a whole range of people, from distant radar controllers, to local tower controllers, drivers of follow-me vehicles, aeronautical information services etc.

ATM: Air Task Message: A coded compressed message to task air assets on fixed targets, such as bridges, radar sites, railroad yards etc. For moving targets, the ATM included FAC* details.

ATP(L): Airline Transport Pilot (License). A license to fly large aircraft for commercial operations

AWACS: Airborne Warning And Control System: an airliner or transport aircraft airframe modified with a large dish mounted on top, and consoles with radar screens and operators in the fuselage.

BAF: Belgian Air Force: It became an independent defense branch in 1946, but Belgium started with military aviation in 1912, and had 50 military aviators when WW1 broke out.

BAI: Battlefield Air Interdiction: Disrupting enemy supplies to his forward troops, for example by attacking convoys, railroads or neutralizing bridges.

Bailout: leaving an aircraft, either by jumping out of it, or by activating the ejection seat.

Barrel roll: contrary to a simple aileron during which an aircraft rolls along its longitudinal axis, the barrel roll combines that with a vertical pitching as well. The result is a kind of corkscrew similar to an aircraft flying along a horizontally placed barrel, while turning completely around it. When seen from the ground, this is a very elegant maneuver around all axis. It requires feeling, dexterity and practice from the pilot because of the few direct references available to him. If insufficient vertical pitch is attained during the first part, and the nose is not above the horizon when inverted, disaster can take place when the nose falls too low for safe recovery, as proven many times during fatal crashes at airshows.

Base Co: Base Commander

BBMF: Battle of Britain Memorial Flight: an RAF flight created decades ago, to perpetuate the spirit of 'the few' who saved Britain from an invasion early in WW2. Its centerpiece is a Lancaster bomber. Sedate displays by immaculately restored and maintained Spitfires and Hurricanes, are always crowd pleasers. Support or training aircraft such as the Chipmunk and C47 Dakota complete the flight.

Bingo (fuel): A precomputed fuel figure that assures a safe return to the recovery airfield. The Bingo radio call means the end of the mission for the individual calling, or for the whole formation, depending on the situation.

BOQ: Bachelor Officer Quarters: at any USAF base in the whole world you find rooms with the same furniture and stuff, so stationed people and visiting officers feel at home wherever they happen to be deployed.

Bowser: common denomination for autonomous aviation refueling trucks. These not only carry a substantial amount of fuel, but are equipped with filters to eliminate possible contamination with strange matters or water, and a powerful pump and large diameter hoses and connectors.

CAA: Civilian Aviation Authority: (UK) organism that regulates all aviation related matters such as licenses, use of airspace, aircraft maintenance, airshow limitations etc. The Belgian authorities also use that term in English written documents.

Captaincy (check): A theoretical and practice examination of a 1st officer before he can assume the functions of aircraft captain on multi-crew transport airplanes.

CAS: Close Air Support: Attacking enemy formations on the battlefield, but being limited by the presence of nearby friendly troops, usually executed only after detailed coordination with a FAC* or TACP*

Carburetor heating: In a carburetor fuel is vaporized into an accelerated airstream. To go from a liquid to a gaseous form, any matter needs heat. In a carburetor it extracts that from the air, reducing its temperature and increasing the risk of icing-up the orifice. Some engines are

more prone than others to this phenomena, and ice might form under certain conditions even at outside temperatures of 20°C.

CB: Cumulonimbus: very nasty clouds from ground to tropopause or even higher, with tremendous up- and downdrafts, and hailstones thicker than a fist. All these frictions cause static electricity and result in serious lightning.

CDI: Course Deviation Indicator: an easy to interpret instrument often mounted in the center of the HSI*. After selection of a course or radial, it depicts your deviation from it, and the direction to correct. It can function with various electronic inputs, and combined with VOR* signals it also displays TO and FROM flags which necessitate more interpretation than their name suggest.

CEP: Circular Error Probable: an average distance figure from the desired impact point, related to systems and pilot accuracy measured over a period of time.

CFE: treaty on Conventional armed Forces in Europe, signed by NATO and Warsaw pact countries to reduce the amount of conventional weapons in Europe to an acceptable parity.

CG: Center of Gravity: an imaginary point on which an aircraft would sit in equilibrium. Any added weight in front of or after that point will shift it. An aircraft can only fly safely within a certain range of CG location, and it therefore has to be calculated accurately before each flight using weight and balance sheets.

CHIMP: CHief Intelligence and Mission Planning: head of the various intelligence and mission planning departments on a (Belgian) airbase.

CO: Commanding Officer: title used at various levels, but for pilots it means the officer in command of a complete squadron, in the Belgian Air Force usually with a rank of major.

COMAO: COMBined Air Operations: mass offensive operation when assets from different nations using different aircraft types, are combined into a single operation.

CPL: Commercial Pilot License: a prerequisite to fly for money in any type of aircraft

CRM: Crew Resource Management: worldwide recognized inter-crew procedures to avoid dangerous situations caused by fear of questioning doubtful captain's decisions.

CRT: Cathode Ray Tube: similar to a small television screen

CSAR: Combat Search And Rescue: demanding combined asset technique to extract bailed-out pilots from hostile territories.

CTR: Aerodrome control zone, area immediately around an airfield, controlled by ATC.

Cold War: A period starting after the second world war, and ending with the fall of the Berlin wall in 1989. This was a period of severe tension between the Warsaw Pact and NATO, both separated by a real Iron Curtain. Little aggression took place between the parties, and both were afraid any escalation would lead to total nuclear war and annihilation. This strategy of dissuasion worked, and central Europe finally enjoys relative peace since a few decades.

Cuban eight: A vertical maneuver describing a figure eight on its side. Practically two $\frac{3}{4}$ loops, with the aircraft being half-rolled in-between and at the end. Many variations in execution are possible, but let's keep it simple here.

DA: Display Authorization: a mandatory document authorizing a display pilot to perform public displays during airshows, issued per aircraft type, only after dedicated examiners observed the pilot perform his declared routine in a satisfactory and safe manner. It also mentions if a pilot is authorized to lead small or large formations.

Dash 1: (-1): a very thick elaborate personal manual, provided and updated by the aircraft factory, providing all the information a pilot needs to operate an American military aircraft type. Besides technical info, it details procedures, emergency operations, and performance data to calculate any approved configuration or weapon delivery parameter.

DBAF: Duke of Brabant Air Force: Dutch private historical aircraft collection created by the enthusiastic and capable pilot Edwin Bosshof. Mostly remembered by the spirited displays of his B25 Mitchell bomber on airshows throughout Europe.

DC: Direct Current: as produced by batteries and generators

DDA: Dutch Dakota Association: a Dutch association created early 80s to maintain and promote Dakota flying, but later expanding into the rare DC2 Uiver, and even DC4 airliner. Bureaucracy later imposed so many rules that commercial operation (even only for historic flights) became impossible, and curtailed most of the highly professional organization and well maintained historic airliners.

DGAC: Direction Generale de l'Aviation Civile: similar as CAA/FAA but for France and ex-French territories

Distaff: Directing Staff: experienced team of persons who prepare and direct major large events or exercises, military or civilian.

DME: Distance Measuring Equipment: a counter providing distance in nautical miles from a selected station, this could either be from a VOR*-DME or a TACAN* station.

DMPI: Desired Main Point of Impact: The ideal impact point (or average point if using multiple weapons) to obtain the destruction of a selected target. A complicated term for aiming point.

DoD: Department of Defense: highest national military organism

DZ: Drop Zone: area designated for landing of parachutists or material

EEC: Electronic Engine Control, commonly referred to by other manufacturers as FADEC for Fully Automated Digital Engine Control

ECM: Electronic Counter Measures

EGT: Exhaust Gas Temperature: temperature measured in the jet exhaust, limiting factor for jet engines, but also a good indication of power being produced. Some manufacturers use TGT, FTIT, ITT as measurement depending on the position of the probe on various engine types.

Engine torque: has more to do with secondary effects created by the propeller. First is the air being swung around the fuselage like a corkscrew, and hitting the vertical tail on one side, pushing the nose to the other. Second is a gyroscopic effect, resulting in an applied force being felt 90° further in the direction of the rotation. Third the law of action and reaction, which on powerful large prop airplanes caused uncontrollable roll movements if the throttle was moved abruptly.

EPU: External Power Unit: an electrical cart relieving battery strain during ground operations.

ESHP: Equivalent Shaft Horse-Power: a figure used to indicate the power of turboprop engines, it comprises the horsepower transmitted to the gearbox for the propeller, as well as residual thrust from the turbine.

ETA: Estimated Time of Arrival

EW: Electronic Warfare

Extrados: upper curved part of a wing, the bottom being referred to as intrados.

FAA: Federal Aviation Authority: the (US) organism that regulates all aviation related matters such as licenses, use of airspace, aircraft maintenance, airshow limitations etc.

FAC: Forward Air Controller: A qualified pilot is either embedded with troops at the front, or in another airplane. He guides armed aircraft by providing instructions on exact target positions versus references on the map or on the ground. This method is very flexible, and minimizes collateral damage for nearby own troops.

FATAC: Force Aérienne TACTique: after the French chose not to be an integral part of NATO, they kept their assets under their own control, allotting parts of it to NATO at their own discretion. All (offensive) conventional French air units were controlled by the FATAC.

FCC: Flight Control Computer: a computer analyzing stick and rudder inputs to translate them into appropriate flight control deflections, according to actual flight data and airframe limitations.

Feathering: aligning propeller blades along the airstream to drastically reduce their drag after an engine failure.

Flaps: a portion of the wing that moves up or down to adjust the camber of a wing to accommodate various speed or drag regimes. Leading-edge flaps are at the forward part of the wing and are for camber. Trailing-edge flaps are on the back of the wing and change camber, lift and drag.

FL: Flight Level: above a certain altitude, height or altitude cannot be used as reference to maintain vertical separation between aircraft because of terrain height and atmospheric pressure differences on various parts of the globe. Therefore above a certain height, all traffic must set their altimeters at a standard pressure of 29.92 inches or 1013.2 Hectopascal. Whatever figure you read on your altimeter has nothing to do with true altitudes anymore, but everybody reads Flight Levels and thus can deconflict with others. FL300 means 30.000 feet.

Flight director: a system consisting of two needles or guidance bars displayed on an attitude indicator. The computer-generated information gives the pilot the ideal pitch and bank to be flown, to intercept or fly approaches without having to think about wind or lead angles. It therefore often gets referred to as 'monkey bars' because even a monkey could fly a precision approach with such guidance.

FLIR: Forward Looking Infra-Red: a system that captures heat-sensitive information to compose an image of people and objects, without actually seeing them (due to clouds or night conditions).

FLOT: Forward Line of Own Troops

FOD: Foreign Object Damage: the enemy of jet engines is everything but air that gets aspirated by the engine intake, and damages the compressor blades. A single small screw can ruin a multi-million dollar engine in a fraction of a second. Small stones falling from the tread of car tires can cause deformations in compressor blades, serious enough to require engine changes.

FSCL: Fire Support Coordination Line: Uncertainty or proximity of friendly troop position requires mandatory use of FAC* for live weapon-drops or firing on the side of the own forces.

G: gravitational force: When you are standing on terra firma, the earth's gravity pulls your body down, resulting in a 1G feeling. If you make a coordinated turn in an airplane, the bank angle causes no lateral body movement, but the centrifugal force presses you deeper into your seat. A 60° bank (level) turn results in your body mass being pushed down at 2G (twice the normal gravity). A slight increase to 75° of bank already causes 4G, or about the same force you need for looping a traditional aircraft. At 6G, every part of (and on) your body weighs 6 times more than on earth, your heart has to pump much harder to force the blood, against the increased gravity, towards your brain. The reduced blood flow initially causes the field of view of your eyes to narrow, then vision only remains in black and white, next comes no more vision (blackout) and unconsciousness. Modern fighters like the F16 can handle 9Gs, about the maximum a trained pilot can stand for a short time. With negative Gs, you are pulled out of your seat, and the human limit is much lower for that, -4G already feels very uncomfortable and often results in bloodshot eyes.

G3: Army denomination of the division responsible for the pure operational aspects.

GCA: Ground Controlled Approach: An approach where a specialized ground controller continuously talks to the pilot, giving him minor heading and rate of descent corrections from final till touchdown. Officially flown down to 200 feet AGL* minima, but certain excellent controllers could talk you down all the way, necessitating great skill from their part, only looking at a couple of thick long return blips on two clutter-filled WW2 radar scopes.

GIB: Guy In the Back. This term is used either when 2 qualified pilots fly together in a two-seater, or pilots denoting their navigator/weapon system operator who usually occupies the back seat. On the F111 side-by-side aircraft, these operators sometimes were referred to as YOT, meaning You Over There.

Glide ratio: expressed as an undefined fraction. 1/20 means for every foot, meter or mile of height, you can glide a distance of 20 feet, meters or miles horizontally. Modern gliders can reach glide ratios of 1/50 or better.

GLO: Ground Liaison Officer: An experienced army officer specialized in translating and communicating specific ground troop needs into efficient air support. Each Belgian fighter-bomber squadron had one assigned and 'embedded', and after they got used to our very different Air Force mentality, they usually stayed for years if not till their retirement.

Go-around: when a landing is aborted, and the aircraft has to be reconfigured into a climbing mode by applying full power and raising gear and flaps. Sometimes also referred to as an overshoot.

GPS: Global Positioning System: an autonomous system taking information from various geostationary positioned satellites around the globe, providing users with time, position and altitude information, with accuracies nearing a few feet.

Ground effect: a condition where the proximity of the ground causes the air to compress under the wing, thereby producing additional lift. This happens when flying lower than 1/3th of the total wingspan.

Groundspeed: the speed indicated in the cockpit is the one measured versus the surrounding air mass. Wind is nothing but the air mass moving over a ground surface. Groundspeed is a result of your speed in the air, being corrected for this air moving over the ground, i.e. the speed of the aircraft versus a stationary observer on the ground. On windy days in slow airplanes, groundspeed could be double of the airspeed (going downwind) or even zero (with headwind)

GRP: Glass Reinforced Plastics. Modern material of two component impregnated synthetic-cloth weaving producing light, strong and smooth complicated structural shapes for aircraft, boats and automobiles.

G-Suit: An assembly of inflatable bags that fit tightly around the legs and abdomen to restrain the blood-flow in the lower part of the body. A gravity-operated valve allows pressair to inflate the bags as G forces increase, keeping the blood in the upper part of the body, and delaying brain-drain by about 2G. This assembly is zipped on top of the flying suit, and coupled to a hose on the left cockpit console.

Guard frequency: A UHF frequency monitored by all military pilots at all times, independent from the selected working frequency. Could be used by aircraft in distress to warn about their problems, or by ground agencies to make general broadcasts towards one or many unspecified aircraft regarding dangerous situations or recalls etc.

HAS: Hardened Aircraft Shelter: individual aircraft hangar built of thick concrete with steel doors front and back, capable of absorbing direct hits from standard bombs without affecting the aircraft, that can start inside and only leave its protection just before takeoff.

High Key point: In order to increase chances of success for landing an airplane following total engine failure, practice forced landings are regularly trained to develop a standard picture for the glide. The airplane is positioned almost vertical of the touchdown point into the landing direction, at an altitude specific for every type, this is called the high-key point. From there on, optimum glide speed is used during one continuous shallow bank angle 360° turn. After 180° turn Low-Key point is attained, and altitude checked versus the prescribed one. Higher or lower means adjusting the ground track and distance to intercept the final straight segment. This method allows a continuous monitoring of the desired touchdown plus eventual obstacles, and make it easier to visualize and intercept the ideal glide slope.

HOTAS: Hands On Throttle And Stick: a design philosophy that allows an aircraft to be flown in most situations without need to take away the hands from the stick or throttle to actuate switches. This is done by placing multiple function switches all over the stick and throttle, the pilot actuating them by separate finger movements.

HSI: Horizontal Situation Indicator: vertical instrument positioned close to the attitude indicator. If laid out flat, it would depict the position and distance of various navaids relative to the aircraft orientation, without necessitating any mental calculations.

HQ: Headquarter: location where brains make plans and decisions, excellent for promotion, but the necessary pilots posted there for a tour (usually 3-5 years) rarely get to fly. Some forces allow part of their desk staff to maintain flying proficiency as a visitor, flying a restricted number of hours on less demanding types.

HUD: Head Up Display: an angled piece of thick glass in front of the pilot, on which essential flight parameters are projected, but still allowing him to see through straight ahead.

ICAO: International Civil Aviation Organization

IFF: Identification Friend or Foe: by selecting appropriate codes on your transponder*, radar operators get information about your identity. Later it was coupled with the altimeter, in order to allow better vertical separation between individual aircraft. An aircraft transmitting info is said to be squawking, A silent aircraft will only display a faint blip on a primary radar scope (pure reflection of the radar waves on the aircraft).

IFR: Instrument Flight Rules: this does not necessarily mean the weather is bad, IFR means that irrespective of meteorological conditions, you have to adhere to specific rules and procedures, and will be controlled by a ground agency. Below certain meteorological minima called IMC*, it is mandatory to operate aircraft in IFR. Long time ago, a lot of pilots had their own version of that, if the weather got bad, they got there by I Follow Roads.

ILS: Instrument Landing System: By transmitting highly accurate signals in the runway axis, denoting you are either on one side or the other of the centerline, and another one from the touchdown point denoting you are above or below the set glide path, a pilot can center the two needles to follow an imaginary ideal line towards touchdown, without any outside references. An outer, middle and sometimes inner marker flashing, indicated your approximate range out.

Early ILS approaches were limited to 200ft ceilings, but specially trained crews flying auto-land approach in approved airplanes, can now land airplanes without vertical or horizontal visibility.

IMC: Instrument Meteorological Conditions: When either horizontal or vertical separation from clouds, or visibility or ceiling drops below certain levels, conditions are deemed unsafe for flying visually (Visual Meteorological Conditions). The flight has to be rerouted or controlled under IFR*.

Immelman: aerobatic maneuver consisting of half a loop up, followed by a half-roll. You thus finish the maneuver the opposite way you started, but with a substantial gain of altitude.

IN(U): Inertial Navigation (Unit): an autonomous gyroscope-driven platform with accelerators in all 3 axis, capable (after a long correct alignment) of providing attitude and position information. System drift increases with time, and violent maneuvers cause reduced overall system accuracy in the long run.

Induced drag: contrary to shape or frontal drag which increases with speed, induced drag is only dependent from the angle of attack AOA* of a wing. The higher the angle, the more induced drag. The situation becomes critical close to stall* speed, or when making very tight turns. It caused many crashes in early jets with limited power, mostly during go-around*, final turns or carrier-approaches.

Instrument penetrations: a set of published procedures to descend from high-level, and penetrate the lower airspaces in order to land at an airfield using various nav aids such as Tacan*, VOR* or NDB*

IP: Initial Point, or Instructor Pilot

ITC: Initial Transport Course, a Belgian Air Force ground course that everybody posted to transport aircraft had to succeed, before conversion on specific types could start.

ITO: Instrument Take Off: a takeoff purely on instruments, without any visual cues. Often practiced 'under the hood' with an instructor as safety pilot, but rarely performed in real circumstances.

Jump-seat: a seat in the cockpit generally behind the pilot, normally unoccupied, but which can be used by additional crew members such as check pilots, to monitor the performance of other crew members. Crews on positioning flights are allowed to use this seat when they travel with fully occupied planes.

Kts or knots: speed scale often used in maritime and aeronautical environments because of its easy correlation to maps, where distances are measured in nautical miles (NM), a unit equal to 1/60th of one degree measured vertically on the charts. 1 NM = 1852 meters, to obtain the speed in km/h you just multiply the speed in knots by 1.8 ; 200 kts thus equals 360 km/h, 450 kts = 833 km/h, etc

LAX: Los Angeles international airport

Load master: a crew member in charge of the payload in cargo aircraft. He positions and secures cargo in accordance to the weight-and-balance of the aircraft type. He remains in the cargo hold for the duration of the flight, monitoring any developments. This can become critical when large animals or dangerous cargo are hauled, or when paratroopers or material have to be dropped en-route.

Loop: looping the loop was a maneuver made famous by Pégoud in 1913. The airplane continuously pitching backwards resulting in a full vertical circle, the airplane coming out with approximately the same altitude, direction and airspeed as it started with.

Mach: unit defining the speed of sound. This speed expressed in ‘earth numbers’ like km/h or mph varies with pressure and temperature (and thus altitude), therefore it is more practicable to express higher speeds in Mach numbers. Mach 2 means twice the speed of sound. Most modern jets (civil and military) cruise between 30 and 40.000ft between Mach 0,8 and Mach 0,9. For people on the ground, Mach 2,2 means 2200 km/h but the actual speed after calculation might differ more than 10% from that.

MANPAD: Man Portable Air Defense missiles: shoulder-launched anti-aircraft missiles.

MAP: 1) Military Aid Program: The United States provided military aid programs to their allies. This came in the shape of modern airplanes and training of personnel in order to boost the capabilities of nations with a smaller defense budget.

2) Manifold Air Pressure: MAP is also a measurement of boost pressure in combustion engines, effectively controlling the horsepower output of an engine at a certain RPM*.

MATS: Military Air Transport Service, a predecessor of the later US Military Airtransport Command or MAC.

MDAP: Military Development and Aid Program: similar to MAP, but also allowing individual nations and industries to participate in the development and manufacturing of the license-produced military products.

MEL: Minimum Equipment List: a list of onboard systems and equipment that has to be functional before an aircraft can legally be taken into the air.

METO: Maximum (power) Except for Take Off : synonym of maximum continuous power.

MFD: Multi-Functional Display

Military power: MIL: full engine power without use of afterburner, sometimes referred to as ‘max dry power’.

Mixture: to create the explosion in a combustion engine, a specific mix of air and fuel is needed. As you climb in thinner air, fuel quantity has to be leaned proportionally, otherwise performance is reduced, or you could even get a “rich cut”.

MOD: Ministry Of Defense

MOT&E: Multi-national Operational Testing and Evaluation.

NAEW: NATO Airborne Early Warning

Mud movers: Term used to designate pilots trained to deliver bombs from fighter-type aircraft.

Napalm: cheap bomb-type consisting of a container filled with a mix of fuel and paraffin, with an igniter. This sticky stuff ensured a longer burn on everything it engulfed. It caused terrible burns on human bodies (remember the images of the Vietnamese girl running towards a camera after being hit?). This weapon type has been banned by the Geneva Convention.

NATO: North Atlantic Treaty Organization: Post-WW2 civilian organization with military advisors, created to organize the defense of Allied forces opposing the Soviet block and its allies.

Navigator: An aircrew member who is in charge of navigating the airplane anywhere. In the early days he used maps, radio navigation aids, and during night a sextant, to plot the position of the airplane. With the advent of modern integrated long-range navigation aids, inertial platforms and GPS, he disappeared from all but a few specialized cockpits.

NBC: Nuclear, Bacteriological and Chemical warfare

NCO: Non Commissioned Officer: in the 60s, many air forces still had specialist aircrew in the lower ranks. They were given the opportunity to become officers, but many didn't bother taking the exams, and in the BAF* retired as late as mid-80s, some of them as flight instructors on F16. Our Army still had NCOs flying helicopters, but our Air Force, like most others, only have Officers flying the planes. After the turn of the century, our arms were integrated in a single Air Component, and all pilots became officers, as well as our air traffic controllers.

NDB: Non Directional Beacon: a ground station emitting a 360° signal that can be received by aircraft over long ranges, if equipped with an ADF* receiver.

Noise abatement climb: after takeoff, airplanes make a steep climb to a certain altitude in order to minimize the noise footprint for the people living around airfields. When reaching that altitude (lower regions in the order of 2000 feet), the airplanes level off, accelerate rapidly while flaps are retracted, and power gets reduces from max to climb settings, whereupon the climb to cruise altitude is resumed.

NWS: Nose Wheel Steering: most modern aircraft can be directionally controlled on the ground by steering the nose wheel through a variety of systems, particular to the aircraft type. Some are controlled directly by the rudder pedals, others through a separate tiller around the yoke, or wheel on the pilot console.

NOTAM: NOtice To Air Men: continuously updated worldwide aviation coded listing of relevant information concerning airspace, airfields and services.

NTS: Negative Torque System: a system installed on many high-performance multi-engine turboprops, it automatically governs the prop of an engine not producing positive thrust anymore, in a feathered angle.

OAT: Outside Air Temperature: air cools by about 2°C per 1000 feet. Depending on the moisture or saturation level of that air, ice can quickly form on the leading edges, windscreen or any orifices such as pitot tubes* or air intakes.

OCA: Offensive Counter Air: preventing the enemy to use his air assets, this can be as diverse as bombing his airfields, knocking out radars or communication nodes, or destroying maintenance depots or refineries.

OJT: On the Job Training: no formal training, but learning it on the fly, only by practice.

OSN: Officier Supérieur Navigant: the French term for Wing commander Flying. Usually a lieutenant colonel in the BAF*, the boss of all the flying personnel and direct support.

P1: a pilot qualified to fly the aircraft from the captain's seat, without having obtained the actual aircraft-type captain rating.

P2: pilot qualified to perform co-pilot duties from the co-pilot seat of a specified aircraft type.

Pax: common civilian and military abbreviation for passengers

Payload: When you subtract empty weight from maximum weight, you come up with a new figure. This result can again be split in a weight of fuel and a payload. Most airplanes can carry a lot of fuel, but at the detriment of remaining payload. It is the operator who has to decide what percentage of each he is going to use according to the task or mission. It is a misconception by many, that any aircraft can carry their maximum load of cargo or passengers, to their maximum range. This applies equally to light planes, large commercial airliners as to fighter-bombers. Numbers and pictures advertised by manufacturers don't mean anything if not put into relation with the other factors.

PCPL: Para Center Province of Limburg: independent parachutist club operating from, and using facilities of Aeroclub Sanicole, on military soil adjacent to the town of Leopoldsburg.

PF: Pilot Flying: notwithstanding rank or qualification, the pilot actually flying the aircraft

PIC: Pilot In Command, the pilot responsible for the aircraft, passengers and flight.

Pitot tube: To measure airspeed, altitude, and rate of climb, you need to measure total pressure (coming directly into a tube pointed into the airstream), and static pressure measured at a point perpendicular to the airstream. A combination of those exact pressures is essential for the functioning of the related instruments. Any dirt, paint, moisture or ice in the orifices can completely falsify the cockpit readings. It is essential that pitot tubes are heated in the air, but on the ground this could cause severe burns to people, or parts to melt down.

Pipper: dot in the middle of an aiming circle, where weapons are supposed to impact.

PNF: Pilot Non Flying: Notwithstanding rank or qualification, the pilot not controlling the aircraft, but performing the co-pilot duties such as navigation, radio and aircraft system manipulation.

PPL: Private Pilot License

PPR: Prior Permission Required: numbers allocated to aircraft desiring to use the facilities of an airfield to train, refuel or stay overnight.

PR: Public Relations: it took the military more than 35 years to realize that excellence and secrecy by itself, were not sufficient in a modern society, taxpayers wanted to see for themselves where their money went, or wanted something in return for our day and night noise.

PSP: Plain Steel Planking: a WW2 invention to allow vehicles and aircraft to operate over muddy soils in loaded conditions. The relatively lightweight plates were perforated with about 2-inch holes, allowing water through, and natural vegetation to surface for improved camouflage. They were simply hooked on all sides to adjacent plates, and once laid over bulldozed sand or mud surfaces long and wide enough, allowed bombers to take off and land.

QRA: Quick Readiness Alert. At various bases, fully armed airplanes are positioned near the runway, with adjacent pilots and mechanics. The airplane is alert-cocked, and pilots are expected to be airborne within 15 minutes after the bell rings, or even 5 minutes if in cockpit-readiness. QRA can be with bombs or air-defense weapons, according to the system or threat.

Radio telegrapher: A crew member who, in the early days, used to communicate with ground stations using Morse code. Quality long-range radio and satellite communications now allow speech to be used almost anywhere around the globe, making his job totally redundant.

Rapcon: Radar Approach CONTROL: an ATC* facility to control or provide info about traffic in the airspace, even well outside of the CTR*

Right seat: In airplanes, the left seat is the captain's seat, the right seat is for the co-pilot. With helicopters, the opposite is often the case.

RIP: Rest In Peace

RPM: Revolutions Per Minute.

RSU: Runway Supervisor Unit: fixed or mobile windowed assembly, positioned at the beginning of the active runway to allow trained personnel to monitor aircraft configuration prior to takeoff and landing. They are equipped to shoot flares in front of the aircraft, if for instance the landing gear had not been lowered prior to landing.

R/T: Radio Transmission

Rudder need: most conventional aircraft have a negative secondary effect when the ailerons are deflected. Due to the cambered shape of an airfoil and the increased lift, the aileron moving down creates more drag than the one moving up, thus creating adverse yaw, meaning the nose moves away from the direction you want to turn the aircraft to. Various solutions to minimize this phenomenon are routinely adopted by manufacturers, but use of rudder into the turn as long as ailerons are sharply deflected (entering or exiting a turn), often is necessary to obtain a so-called 'coordinated flight'.

SAC: Strategic Air Command: HQ commanding all US strategic (long range) bombers

SACEUR: Supreme Allied Commander EUROpe: SHAPE* Casteau stationed US General commanding all NATO declared European based forces, irrespective of service or nation.

SAM: Surface to Air Missile: missiles especially developed for air-defense means. These range from man-portable, to huge ones on fixed installations. Their effectiveness vary much according to type, but can be from 100ft AGL to 100.000 feet, with ranges up to 50NM.

SAR: Search And Rescue: missions mainly flown by helicopters to locate and pick up people (military or civilians) in need of immediate help.

SATCO: Senior Air Traffic COntroller

SATCOM: SATellite COMmunication, a telephone useable worldwide because of its direct link to orbiting satellites, instead of using ground relay antennas.

SCP: Stores Control Panel: centralized panel on F16 aircraft, on which you programmed the exact aircraft configuration and desired weapon dispense criteria.

SFO: Simulated Flame Out: a procedure or pattern practiced by single-engine airplanes, to train pilots in a possible so-called dead-stick landing after losing their sole engine.

SHAPE: Supreme Headquarter Allied Power Europe: NATO military headquarter harboring SACEUR* and his staff, located in Castau Belgium.

SID: Standard Instrument Departure: in order to better channel and separate traffic leaving an airport for higher airspace, a set of procedures is developed for various runways and destinations. This allows both pilots and air traffic controllers to ensure smooth and safe routing with minimal radio chat.

Sideslip: a voluntary uncoordinated flight with a wing low on one side, and the nose pointing to the other. Lift is greatly reduced while direction can still be controlled, but increasing the rate of descent without allowing speed to increase.

Single-engine ceiling: maximum sustainable altitude of a twin-engine aircraft with one engine inoperative and propeller feathered to minimize drag.

Snowcat: Support of Nuclear Operations With Conventional Air Tactics

Spin: condition where one wing is in a deeper stall* than the other, thus having higher drag and causing the aircraft to rapidly rotate around its vertical axis. Some aircraft recover more easily than others from this condition. If allowed to develop, the condition may evolve in violent pitching, or flat attitude combined to the gyration, complicating the recovery.

SNR: Senior National Rep(resentative): the highest ranking national person in a foreign HQ, he represents the nation, and ensures that the participation of allocated units happens in accordance with the latest governmental decisions regarding specific operations.

SOP: Standard Operating Procedures. Published procedures to ensure that all involved, operate in a predictable safe way. Standardization checks insure proper compliance by all affected personnel.

SPBF: Semi-hardened Pilot Briefing Facility: reinforced wartime squadron area where missions are prepared, and where pilots operate from.

Split-S: aerobatic maneuver starting with a half-roll, then pull through a half-loop downwards. You end up opposite the direction you entered, but with great speed.

Spoilers: temporarily raised surfaces on part of the top of a wing, to disturb the airflow and thereby reducing lift. Some aircraft like the Mitsubishi Mu2 or B52 bombers use differential spoilers instead of ailerons to control bank, thereby eliminating adverse yaw. Large modern airplanes use a combination of both for various reasons and airspeeds.

Stall: condition where the AOA* of a wing becomes so large, that air becomes turbulent on part of the top of the wing, drastically reducing lift with an accompanying abrupt nose-down movement and loss of altitude. This is independent of speed, high speed stalls (at twice the basic stalling speed) are equally frequent during maneuvering.

Stall turn: maneuver during which the airplane initially pitches up vertically, and is held there until the airspeed drops to near zero, then with the help of engine torque and rudder, the nose is forced sideways to point from vertical upward, to vertical downward, the airplane being held in one plane but pivoting around its (now horizontal) vertical axis. When airspeed picks up, the airplane's nose is raised back to the horizon. If executed correctly, the airplane follows an identical trajectory on the way down as it went up, thus recovering at the same airspeed and altitude, but pointing in the reciprocal direction.

STAR: STandard ARrival: published procedures for letdown between airways and final approach types.

Strike: a general term used when referring to nuclear operations.

SQN: squadron: an air Wing is usually composed of a few squadrons. Those are individual units with up to 18 combat aircraft, associated pilots, and a limited number of direct administrative and support people.

Staneval: STANdard EVALuation: In every USAF Wing, a few experienced pilots are designated to evaluate all others at regular intervals, in order to verify their knowledge and application of established operating procedures, and their knowledge of their particular aircraft type. The thoroughness and in-depth questioning often was felt as irrational, what lead to calling them 'the screw guys'. I still have to encounter a pilot who went fully relaxed to a Staneval flight.

Stick time: term used to describe the actual time a pilot is flying the airplane manually. Most civilian transport pilots have only a few minutes of stick time per flight, because company regulations require them to fly on autopilot (for either passenger comfort or safety during very bad weather landings), and they have to share the little remaining time with their co-pilot. Long-haul airline pilots usually have less than 15 minutes of stick time during a double 8-hour ocean crossings. Flying hours therefore never should be confused with stick time.

STOL: Short Take Off and Landing: a term used to describe the capabilities of aircraft to operate from small airstrips or runways.

SV4bis: Stampe and Vertongen were Antwerp-based aircraft designers and builders. Their glory came with their end of 30s SV4 design, an open-cockpit biplane similar in appearance to the Tiger Moth, but equipped with ailerons on both top and bottom wings, and a fuel and oil system capable of inverted flight, giving it much superior aerobatic capabilities. Later on, Stampe worked with Renard, but they never found buyers for their new trainers, and they quit aeronautical related activities in the early 70s.

Synthetic trainer: A complete functional cockpit with accurate instrument movements, but fixed on the ground, with an opaque canopy and no visual projections.

TACAN: Tactical Air Navigation: A ground station providing a signal identifying a specific radial from it, and when linked to an onboard interrogator, it also provides the distance.

Taceval: TACTical EVALuation: evaluators from various NATO nations' in-depth check of the wartime capabilities of a single unit, usually during a complete week.

TACP: Tactical Air Control Party: for each serious part of the front, a ground/air liaison office will be established in the rear lines, embedded with the local ground troop HQ, manned by air force qualified officers, who by radio will brief incoming aircraft about the latest situation, and assign them specific targets or FAC*s.

Taildragger: an aircraft resting on a couple of forward main-wheels, and a small tail skid or wheel under the back of the fuselage. This is still an ideal configuration for flying from rough or unprepared surfaces. Airplanes equipped with a tricycle landing gear are easier to land, offer better ground visibility, but weigh more, need higher hangars, and can't turn on a dime.

TAM: Tactical Air Meet: large weeklong AAFCE* exercise to evaluate combined air tactics in a realistic threat environment.

Tandem: a term to describe crew members sitting one behind the other. Another popular layout is side-by-side seating, where they can share instruments or control handles.

TCU: Transport Conversion Unit: the 15th wing instructors for all different aircraft types

TD box: Target Designator box: A small box projected in the HUD* or on the radar screen, in which you could expect the selected target in the air or on the ground to appear.

TFR: Terrain Following Radar: usually a separate dedicated radar, used to ensure all-weather offensive aircraft could navigate at very low-level without hitting the ground.

TISEO: Target Identification System Electro Optical. A system to visually confirm the identity of a targeted aircraft before launching a missile, or shooting at him.

TMA: TerMinal Area, a large zone of protected airspace around major airfields, in which all traffic is controlled to allow safe transit between high-level airways and the lower CTR*

TOT: Time Over Target: preplanned mandatory time when the first aircraft bomb should detonate over their specific individual or collective target.

TPT: abbreviation for Transport

Transponder: electronic device automatically answering interrogations from ground or air, providing the requestor with information about who, what, how high, a blip is on the radar. Developed at the end of WW2, and also known under the name IFF* in the military community.

Travel pod: most military jets have only limited baggage capacity. When traveling without transport support, a canister can be mounted on a pylon, to provide space for military or civilian clothing and toiletry. The canister can be either purpose-designed, or modified from fuel tanks or napalm bombs, in which quick-access doors or removable nose cones have been mounted.

Tropopause: an altitude where the temperature stops dropping when climbing further. It is the separation between the atmosphere and the troposphere, and is defined by an altitude where the temperature is roughly -56°C . Its true altitude varies daily, and according to latitude.

Turboprop: jet engine connected through a reduction gear to a propeller. This provides vibration-free power with much lower fuel consumption than a pure jet, but at the detriment of top speed and cruise altitude. Still very much in use for short-haul medium-size transports.

Turbofan: jet engine which uses an additional turbine to convert residual thrust into power to turn front mounted large-diameter fan blades. This provides additional free thrust, and thus significantly reduces fuel consumption.

UN: United Nations, an organization with representatives of almost every country in the world, created after WW2, to prevent conflicts to spread, or develop into wars.

UNPROFOR: United Nations PROtection FORce: the name of the operation to calm down hostilities on the former Yugoslavian territory. Early 1995 the scope of operation had changed and we all were requested to propose a new anachronism that had to begin with UN. In our office we unanimously proposed UNABLE (self-explanatory), but in the end it became UNCRO (for UN operations in CROatia).

Updrafts: Hot air over sandy places rises more than the surrounding air over wooded areas. This creates vertical movements of air, and is used by birds and gliders to gain altitude. An airplane crossing a series of up- and downdrafts, experiences what we call turbulence, that sometimes can be very severe and even cause structural failures.

USAFE: United States Air Forces Europe

V1: decision speed for multi-engine aircraft, computed for each takeoff according to the meteo data, runway and aircraft parameters. Below V1, you can reject a takeoff and stop within the available remaining runway distance. Above V1, even if an engine fails, there is no other option than to takeoff.

V2: Safety speed for climb in engine-out situation for multi-engine aircraft.

Vario(meter): instrument indicating the rate an airplanes changes altitude, either graduated in meters per second, or thousands of feet per minute.

VFR: Visual Flight Rules. A combination of minimum cloud separation distance and visibility, allows you to fly visually to ensure your own separation from other air traffic, within airspace that has been designated for use as such.

VIP: Very Important Person

VIFF: Vectoring In Forward Flight: the unique capability of Harriers to deflect their engine thrust down (and even slightly forward) at any speed.

Vmca: minimum controllable airspeed for multiengine aircraft, with the critical engine inoperative

Vne: V(elocity) Never to Exceed: maximum design-speed in smooth air, established by test pilots and aerodynamic constraints. Exceeding that speed might cause structural damage, flutter, or control reversal. Lower limits exist for flying through rough air or maximum deflection of the control surfaces.

VOR: ground radio-navigation aid providing signals to aircraft about their position relative to that station. Depending on the aircraft's altitude, the signal can be received for up to 100 miles.

V-tail: instead of having a vertical and horizontal stabilizer at the back of airplanes, some designers opted for a construction with only 2 planes in a V shape. This had the advantage of minimizing the drag and lowering the overall height, but at the detriment of spin recovery characteristics. Typical examples were the Beechcraft Bonanza and the Fouga Magister. The F117 Nighthawk also used that, but that had more to do with stealth technology.

Vr: speed during takeoff acceleration at which an aircraft is rotated in pitch, to lift off from the runway.

VTOL: Vertical Take Off and Landing: aircraft that have the capability to operate vertically from a restricted surface.

VVI: Vertical Velocity Indicator (idem as VSI or Vario)

VVIP: Very Very Important Person: heads of state and royal family members

Wake turbulence: whirling vortices originating from the wing tips of aircraft preceding you. Their strength and size are proportional to aircraft gross weight and AOA*. Lighter aircraft following too close to heavies can encounter a rolling moment that is stronger than their aileron capability to counter it. Too close may mean less than 5 miles behind a jumbo jet.

Warbird: Literally an airplane which has been used during wartime. Practically, all (type of) planes that were used by any military during air Wars. The airframe itself may never have flown during the war, it's the type that is relevant. Not only combat aircraft, but liaison, training and transport types are also eligible.

WEWO: Wing Electronic Warfare Officer: person responsible for all operational matters concerning Electronic Warfare on a base, on the ground (e.g. ATC radars, wartime radio procedures etc) and in the air (pilot knowledge of radar, jamming equipment, chaff and flares etc). He develops tailored local procedures and tactics, trains and evaluates involved base people for wartime situations, irrespective of their affected subordination.

Wing load: aircraft weight divided by the surface of its wings. The higher the wing load, the more speed it needs to remain in the air, but the less susceptible it is to wind and turbulence.

WOC: Wing Operation Centre: wartime-oriented facility where all aspects of a war are coordinated and directed. Operations, Intelligence, maintenance and security are all physically located together, and in close contact with their own wing personnel and HQ's to maximize the war effort and minimize attrition. The same facility (with reduced personnel) is mostly used to run the airbase in peacetime as well.

WSO: Weapon System Operator: crew member in the cockpit of a fighter-type aircraft, not necessarily a pilot or navigator, who manages all operational weapon systems, and who is the second pair of eyes available to clear the skies during combat.

WW2: World War 2 between 1939-1945

2D: situation or location in 2 dimensions or plan-form (flat surface).

3D: 3 Dimensions: The human brain needs time to adapt to thinking in 3D. Because of the additional vertical plane (compared to 2D when moving on the surface of the earth), and an aircraft's ability to be pointed in any direction, left and right or up and down get a totally different meaning if you are sitting within the aircraft, or look at an aircraft from a fixed point on the ground. This term is now also used to describe a type of flying that can only be performed by use of extremely powerful engines on light aircraft (models), using the engine (power and torque) more than aerodynamic control responses, to perform unique maneuvers.