It's no surprise the 49th edition of the Paris Air Show, the world's largest aviation and space industry event, was spectacular.

Taking place from June 20 to 26, 2011, at Le Bourget airport, near Paris, the Paris Air Show showcased some of the best flying machines conceived, built and operated in recent times.

This photo gallery presents a collection of the latest and greatest in both civilian and military aviation. Enjoy!

**Aircrafts are going green**

Green aviation was a hot topic at this year's Paris Air Show. As oil prices continue to be highly volatile and uncertain, manufacturers demonstrated environmentally-friendly biofuels, diesel power and electric power.

Presented as the 'Special Guest' was Solar Impulse, powered by solar cells with zero emissions.

"Solar Impulse was not built to carry passengers, but to carry messages. We want to show what can be achieved using clean technologies, to reduce our society's dependence on fossil energies. What we can achieve in the air, anyone can do on the ground, in their everyday lives," stated Bertrand Piccard, Initiator and Chairman of Solar Impulse.

**Solar impulse, the zero fuel airplane**

Solar Impulse is a long-range solar powered plane project being undertaken at the École Polytechnique Fédérale de Lausanne, by Bertrand Piccard and André Borschberg. The project eventually hopes to succeed in the first circling of the earth with a piloted fixed-wing aircraft using
only solar power.

The first aircraft, bearing the Swiss aircraft registration code of HB-SIA, is a single-seater, capable of taking off under its own power, and intended to remain airborne up to 36 hours. This aircraft first flew an entire diurnal solar cycle, including nearly 9 hours of night flying, in a 26-hour flight on 7–8 July 2010. Building on the experience of this prototype, a slightly larger follow-on design (HB-SIB) is planned to make circumnavigation of the globe in 20–25 days.

**Technical datasheet:**
- Wingspan: 63.40 m
- Length: 21.85 m
- Height: 6.4 m
- Power source: 4 x 10 HP electric engines
- Solar cells: 11,628 (10,748 on the wing, 880 on the horizontal stabilizer)
- Weight: 1600 kg
- Average flying speed: 70 km/h
- Take-off speed: 44 km/h
- Stalling speed: 35 km/h
- Maximum cruising altitude: 8500 m (27,900 ft)
- 3 world records in the solar-powered aircraft category: Duration (26h, 10 min, 19 sec); Absolute altitude (9235 m, 30,300 ft); Gain of height (8744, 28,688 ft).

*Solar Impulse flying at the Paris Air Show on Sunday, June 26th at 10:00 am.*

*Source: Paris Air Show - Le Bourget Website*

**Roadmap:**
2010: First solar energy night flight
2011: European solar flights
2012: Multi-day mission flights
2013: Test Flights HB-SIB
2014: Attempting the round-the-world flight

*Boeing 747-8 Freighter*
The Paris Air Show saw the international debut of Boeing’s newest commercial aircraft models - the 747-8 Intercontinental and 747-8 Freighter - together with the appearance of the 787 Dreamliner.

The new 747-8 Freighter flew to Le Bourget Airport with all four engines powered by a fuel blend containing 15 percent camelina-based biofuel, achieving the world’s first transatlantic crossing of a commercial jetliner with biofuels.

Boeing also proved its environmental commitment through an agreement with American Airlines, announced at the show, under which the airline will be the launch partner for the ecoDemonstrator Program, a Next-Generation 737-800 aircraft that will be used to flight test emerging technologies and accelerate their market readiness.

. Airbus A380
The double-deck A380 indeed provides seating for 525 people in a typical three-class configuration or up to 853 people in all-economy class configurations. The A380-800 has a design range of 15,200 km (8,200 nmi; 9,400 mi), sufficient to fly from New York to Hong Kong for instance, and a cruising speed of Mach 0.85 (about 900 km/h or 560 mph at cruising altitude).

The Airbus A380 has a very low fuel consumption of less than 3 liters per passenger per 100 kilometers.

The Airbus A380 generates as little as 75 g of CO2 per passenger kilometer, knowing that the European car industry aims at 140 g of CO2 per km in 2009.

**Airbus A320neo**

The A320neo (new engine option) is an efficiency improvement package which Airbus is offering as an option for the A319, A320 and A321 models of the A320 Family.

- Entry into service will start in Oct. 2015 with the A320neo, to be followed by the A319neo and finally the A321neo.
- Incorporating both Sharklets and new more fuel-efficient engines, the key benefits of the A320neo compared to today's A320 are:
  - 15% reduced fuel burn which is equivalent to 3,600 tones of CO2 savings per year per A320neo;
  - two tones additional payload or up to 500 nautical miles/900 kilometers more range;
  - significantly reduced noise (15 dB below Chapter 4);
  - eight percent lower cash operating costs;
- Offering the latest technology to our customers as it becomes available, the two new engine options are:
  - Pratt & Whitney’s PurePower PW1100G geared turbofan and
o CFM International’s LEAP-X.

**Significant environmental improvements**
- Annual fuel savings of 15% equate to:
  - 1.4 million litres of fuel (the annual consumption of 1,000 mid-size cars);
  - 3,600 tonnes of CO2 (the CO2 absorption of 240,000 trees);
- NOx emissions 50% below CAEP/6;
- Aircraft noise up to 15dB below Chapter 4.

**A320neo and the competition**
- 16% less fuel burn per seat compared to Boeing’s winglet-equipped 737-800;
- Equivalent fuel burn to the Bombardier C-Series (CS300) but with 1,300 nautical miles more range;
- 95 percent airframe spares commonality with the A320 Family which has proven its very high level of reliability (99.7 percent) in over 54 million flights.

**ATR, the Green Player**

ATR combines the strengths of two leading European aerospace industry companies, EADS and Alenia Aeronautica, with each bringing their respective design, development and production expertise into the company.

ATR has become the benchmark for regional turboprop aircraft. Low weights, along with an advanced aerodynamic design and the choice of state-of-the-art, highly efficient Pratt & Whitney of Canada PW100 series engines keep fuel burn to a minimum. Low fuel consumption associated with high tank capacity ensures excellent range characteristics and the capability to fly multiple sectors without refueling.

At last week's Paris Air Show, ATR announced it has expanded its ISO 14001 certification, concerning businesses’ adherence to environmental standards. The broadening in scope of this certification enables ATR to become the first regional aircraft manufacturer to obtain ISO 14001 certification covering the entire lifecycle of the aircraft.

In addition, ATR concluded 60 new orders and 37 options, adding to the 28 orders and 5 options previously revealed this year. The total value of these orders, including the options, is estimated at $2.8 billion.

**UAVs, military planes at Paris Air Show**
All major international manufacturers, as well as representatives of the military forces of several countries, attend the Paris Air Show.

The Thales UK Watchkeeper Unmanned Air System

The Watchkeeper unmanned air system delivers accurate and timely combat ISR (Intelligence, Surveillance and Reconnaissance) information to decision makers at all levels of command right down to the soldier on the battlefield.

The Watchkeeper is a high-performance multi-sensor, all-weather UAS that can remain airborne for over 16 hours in a single mission. It includes a high degree of automation, with automatic take-off and landing (ATOL), and has a de-icing capability, to expand its ability to operate in all weather/operational environments. Delivered in a dual-payload configuration, the system includes enhanced electro-optic/infrared sensors, with laser target designator, as well as an advanced I-Master synthetic aperture radar/ground moving target indicator radar.

Benefits:

- Affordable persistent ISR
- Flexible system architecture
- Multi-sensor air vehicle
- Advanced levels of autonomy and mission management
- Tactically deployable
- Capacity to support future growth capability

Unmanned Aircraft System MQ-9 Predator B
The U.S. Customs and Border Protection (CBP) agency displayed the Guardian, a maritime variant of the MQ-9 Predator B unmanned aircraft system (UAS) at the Paris Air Show. CBP acquired the UAS, manufactured by General Atomics Aeronautical Systems of Poway, California, to enhance the agency’s long-range maritime surveillance, detection and targeting capabilities in the Eastern Pacific, Caribbean and Gulf of Mexico, as well as to support anti-terror efforts along maritime smuggling routes.

The Guardian began operational testing and evaluation at Cape Canaveral Air Force Station in February 2010 and began conducting missions in April.

Performance and weights:
- Level Speed 240 knots
- Altitude Ceiling Up to 50,000 ft.
- Range 2,800 NM
- Endurance up to 20 operational hours
- LOS Link Distance 150 NM
- Max Gross Weight 10,500 lbs.

Features:
- Ground Control Station
- Launch and Recovery System
- Electro-optical/Infrared Sensors
- Surface Search Radar/Ground Moving Target Indicator
- Line-of-sight Data and Control Link
- Ku-band Satcom Data and Control Link

RQ-7 Tactical unmanned aerial system

The RQ-7 Shadow unmanned aerial vehicle (UAV) is used by the United States Army and Marine Corps. Launched from a trailer-mounted pneumatic catapult, it is recovered with the aid of arresting gear similar to jets on an aircraft carrier. Its gimbal-mounted, digitally-stabilized, liquid nitrogen-cooled electro-optical/infrared (EO/IR) camera relays video in real time via a C-band line-of-sight data link to the ground control station (GCS). The “R” is the Department of Defense designation for reconnaissance; “Q” means unmanned aircraft system. The “7” refers to it being the seventh of a series of purpose-built unmanned reconnaissance aircraft systems.

Dimensions:
- Wingspan: 4.27m
- Length: 3.4m
- Height: 0.86m

Weights:
- Empty Weight: 90kg
. Maximum Payload: 25.3kg
. Maximum Take-Off Weight: 127.3kg
. Maximum Gross Weight: 170kg

**Engines:**
. Type: 1 x UEL AR 741 rotary engine
. Rating: 28.3kW
. Fuel capacity: RQ-7A – 40l
  RQ-7B – 57l

**Performance:**
. Speed: 194.5km/h (105kt)
. Flight Ceiling: 4,572m (15,000ft)
. Endurance: 5 to 7 hours
. Mission Radius: 200km
. Climb Rate: 300m to 450m a minute
. Take-Off Distance (Launcher): 10m
. Maximum Dash Speed: 219km/h (118kt)
. Cruise Speed: 167km/h (90kt)
. Loiter Speed: 111km/h (60kt)

**UAVs, military planes**

**Safran's Patroller**

Sagem’s (Safran) Patroller UAV is a 1-ton class medium-altitude, long-endurance (MALE) drone system, based on the S15 special-mission aircraft manufactured by the German company Stemme, and certified by EASA (European Aviation Safety Agency).

Patroller is designed for long-endurance surveillance (up to 30 hours), and can be used for homeland security, military missions or civil security assignments. Its speed ranges from 50 to 120 knots with an operational ceiling of 25,000 ft (approximately 7,500 meters).

**Talarion unmanned air vehicle**
The Talarion is an unmanned air vehicle, designed by EADS to meet future European military needs for reconnaissance, intelligence, and surveillance. The source of the name is the Talaria - the winged sandals of the Greek Messenger God Hermes.

Airbus' A400M

The Airbus A400M is a multi-national four-engine turboprop military transport aircraft. It was designed by Airbus Military as a tactical airlifter with strategic capabilities. The aircraft’s maiden flight, originally planned for 2008, took place on 11 December 2009 in Seville, Spain.

The A400M is undergoing flight testing. Orders totaled 174 aircraft from eight nations as of 2010. Airbus Military is expected to deliver the first aircraft in early 2013.
The Ground Master 400 is part of ThalesRaytheonSystems’ fully digital 3D air defense radar family. Designed to protect key assets to forces deployed on remote operations, the Ground Master 400 is the only system of its kind to combine superior detection of the most difficult threats at low, medium and high altitudes with an unprecedented level of availability and mobility. The Ground Master 400 has already been selected by Finland, Estonia, France, Malaysia and Slovenia.

**Features:**
- Detection 5 to 470 km, up to 100 000 ft, TBM capabilities
- Fully digital, S-band, solid state, air cooled Tx/Rx
- Digital Beam Forming
- High operational reliability (MTBCF >3.500 hours), highly simplified maintenance
- Operational availability > 99.9%
- One single package (20 feet ISO standard container, 10 tons)
• Plug, play and operate in Network Centric Operations
• Chosen and planned maintenance with limited team