

## Flying Car

A flying car or roadable aircraft is an automobile that can legally travel on roads and can take off, fly, and land as an aircraft. In practice, the vehicle usually has to be converted from a standard aeroplane to an aeroplane with sufficient roadworthiness. In science fiction, the vision of a flying car is usually a practical aircraft that the average person can fly directly from any point to another (e.g. from home to work or to the supermarket) without the requirement for roads, runways or other special prepared operating areas. In addition, the science-fiction version of the flying car typically resembles a conventional car with no visible means of propulsion, rather than an aeroplane. For more information on the science-fiction stereotype, see hovercar. Early experiments Glenn Curtiss, the Wrights' chief rival, was the first to design a flying car. The first flying car to actually fly was built by Waldo Waterman. Waterman became associated with Curtiss while Curtiss was pioneering naval aviation at North Island on San Diego Bay in the 1910s. However, it wasn't until March 21, 1937 that Waterman's Aerobile first took to the air. The Aerobile was a development of Waterman's tailless aircraft, the Whatsit. It had a wingspan of 38 feet (11 m) and a length of 20 feet 6 inches (6.25 m). On the ground and in the air it was powered by a Studebaker engine. It could fly at 112 MPH (180 km/h) and drive at 56 MPH (90 km/h). In 1926, Henry Ford displayed an experimental single-seat aeroplane that he called the "sky flivver". The project was abandoned two years later when a test flight crashed, killing the pilot. Post-war development In the 1950s, the western world was recovering from World War II and everything seemed possible. The flying car was a vision of transportation in the 21st century, and a common feature of science fiction futures. Several designs (such as the Convair flying car and Molt Taylor's Aircar) have flown, none have enjoyed commercial success and those that have flown are not widely known about by the general public. One notable design, Henry Smolinski's Mizar, made by mating the rear end of a Cessna Skymaster with a Ford Pinto, disintegrated during test flights, killing Smolinski and the pilot. In the 1950s, Ford Motor Company performed a serious feasibility study for a flying car product. They concluded that such a product was technically feasible, economically manufacturable, and had significant realistic markets. The markets explored included ambulance services, police and emergency services, military uses, and initially, luxury transportation. Some of these markets are now served by light helicopters. However, the flying car explored by Ford would be at least fiftyfold less expensive. When Ford approached the U.S. Federal Aviation Administration (FAA) about regulatory issues, the critical problem was that the (then) known forms of air traffic control were inadequate for the volume of traffic Ford proposed. At the time, air traffic control consisted of flight numbers, altitudes and headings written on little slips of paper and placed in a case. Quite possibly computerized traffic control, or some form of directional allocation by altitude could resolve the problems. Other problems would also need to be resolved in some ways, however, including intoxicated drivers or motorists that drive without a license. Notable historic flying cars and roadable aircraft Waterman Aerobile - 1937 two examples in museums as of 2004 Aerocar Aerocar - 1949, one example still flying as of 2006; two examples in museums Aerauto PL.5C - early 1950s AVE Mizar - 1973, Cessna Skymaster / Ford Pinto hybrid. Crashed, killing developer. M200G Volantor- 2007, a flying saucer shaped aircraft Modern development Today, there is an active movement in the search for a practical flying car. Several conventions are held yearly to discuss and review current flying car projects. Two notable events are the Flying Car forum held at the world-famous EAA Airventure at Oshkosh, Wisconsin, and the Society of Automotive Engineers (SAE) conventions held at various cities. Styles Flying cars can fall into one of two styles: Integrated &ndash; Take all the pieces with you while you drive Modular &ndash; Leave pieces to fly at the airport while you drive Current development examples

An artist's impression of a flying car, in the March 2006 issue of Popular Science

A number of companies are developing vehicles.

The StrongMobile "Magic Dragon" Aircar has been developed by retired Air Force pilot-engineer Rich Strong over a 50-year period. The design uses an automobile-type lifting body fuselage and automotive suspension. Flight propulsion uses a front-mounted ducted fan with side outlets. Automatic conversion uses a combination of folding and swinging to stow the wings into the body. The current design envisions a core market of frequent regional business travellers whose time savings make using the StrongMobile virtually revenue neutral.

The LaBiche Aerospace FSC-1 is a developmental prototype Flying Car and is an example of a practical flying car capable of utilizing today's automotive and aviation infrastructure to provide true "door-to-door" travel. The vehicle can be parked in any garage or parking space available for cars. The FSC-1 is the first known vehicle capable of automatic conversion from aircraft to car at the touch of a button. LaBiche has flown a 1/10th scale model, tested a ¼-scale model and is currently finishing the FSC-1 prototype for road and air testing, as of 2008. Currently, the FSC-1 requires a pilot and driver's license to operate. However, upon approval from the FAA, development is underway for utilizing a new satellite-navigation "hands free" flight system to travel from airport to airport that will eliminate the need for a pilot's license. Numerous safety systems and fail safes are also employed on the FSC-1, such as a recovery parachute.

The Haynes Aero Skyblazer is a development stage vehicle that uses a single turbofan engine to provide thrust in the air and to generate electricity to power electric motors for ground travel. In "car mode", a patented mechanism allows the wings to fold into the body of the vehicle, which is designed fit into a single car garage and regular parking space. In "aircraft mode" the vehicle will have STOL capabilities and be able to use almost any public use airfield. It is expected to have a top speed of 400 mph and a range of 830 miles. The skyblazer team has completed wind tunnel, stability and control testing and flown a 1/6th scale model.

The Moller Skycar is a prototype personal VTOL (vertical take-off and landing) aircraft that some call a flying car. However, the Skycar is a good demonstration of the technological barriers to developing the VTOL flying car. Moller International continues to develop the Skycar M400, which is powered by four pairs of in-tandem Wankel rotary engines, and is approaching the problems of satellite-navigation, incorporated in the proposed Small Aircraft Transportation System. Moller also advises that, currently, the Skycar would only be allowed to fly from airports & heliports. Possible future 'vertiports' might include FAA-specified fields, parking lot areas & private properties, depending on space & noise parameters.

The Urban Aero X-Hawk is a VTOL aircraft which operates much like a tandem rotor helicopter, however it doesn't have the exposed rotors which make helicopters dangerous for personal use. This is accomplished by containing the rotors in large 'ducts' which make up most of the body of the craft; the requisite decrease in rotor size also decreases fuel efficiency. The X-Hawk is being developed by Urban Aeronautics, and is being promoted for rescue and utility functions. It is expected to be available for about \$3 million around 2010.

Terrafugia is a private company based in Cambridge, Massachusetts that is developing The Transition, a roadable aircraft that the company describes as a "Personal Air Vehicle". The aircraft is designed to change configurations, enabling it to operate as a traditional road vehicle and as a general aviation aeroplane. The Transition "Personal Air Vehicle" is expected to be released in late 2009 with an operational prototype expected in 2008. The estimated purchase price is \$148,000. Owners will drive the car from their garage to an airport where they will then be able to fly within a range of 100 to 500 miles. It will carry two people plus luggage and will operate on a single tank of premium unleaded gas.

At this time, no flying prototypes exist for any of these vehicles.

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