

## AE Update – Jan. 19, 2010 – Odd planes

### SpaceShipTwo

Sir Richard Branson of **Virgin Galactic** and designer Burt Rutan of Scaled Composites

SS2 was christened Virgin Space Ship (VSS) Enterprise in honor of ships in the U.S. and British Royal Navy, as well as spaceships flown by NASA and *Star Trek*.

Holds six passengers and two pilots

Start flight tests early next year.

WhiteKnightTwo carrier vehicle.

Hybrid rocket motor a rubber-burning

First spaceflights with paying customers could come as early as 2011.

Plans are to fly 500 people in the first year and 50,000 in the first 10 years, at about \$200,000 per seat.



### Slowed Rotor Technology

Carter Copter

AAI Corp., a subsidiary of Textron (Cessna)

Textron owns Bell Helicopter, Cessna, and Lycoming Engines.

Slowed Rotor/Compound (SR/C) technology.

Unmanned, turbine-powered aircraft that could deliver 3,000 pounds of cargo across 1,300 nm at 250 knots, or that could be deployed for surveillance missions with up to 24 hours' endurance.

Carter's SR/C technology is a fixed- and rotary-wing hybrid that delivers high speed, long endurance and off-airport vertical/short takeoff and landing capability at low cost

Well suited for unmanned aircraft that serve multiple mission roles



**J-UCAS-D**

Joint Unmanned Combat Air System demonstration program

Forerunner of the next generation of stealthy robot-strike aircraft

Radar-absorbent materials

Operate from aircraft carriers

Payload (such as bombs) of up to 2,000 pounds, plus an extra 2,500 pounds externally when stealth is not required.

Typical use: send unmanned drones in as a first wave to take out enemy air defenses and clear the way for manned aircraft.



**Snow Goose**

Parafoil-wing UAV

Carry medical equipment or other urgent supplies to Special Forces operating in unfriendly territory.

Can be launched from ground or loading ramp of a transport aircraft.

CQ-10 can carry a 75-pound payload for 200 miles, or 500 pounds for a shorter distance depending on launch altitude and wind speed.



**Helios**

NASA solar-powered flight demonstrator.

Altitude more than 96,000 ft -- highest for any aircraft not powered by a rocket.

Solar cells and fuel cells

Stay aloft for days, weeks or even months at a time.



### **Battlehog 150**

Marine Corps vertical takeoff drone  
Capable of operating from aircraft carriers.  
Fly at more than 300 mph with a payload  
of 500 pounds  
Likely carry Hellfire missiles, rocket pods  
and 7.62-mm mini-guns.  
Withstand small-arms fire from close  
range.



Steered by moving the two wingtip fans -- no vulnerable flight controls.

### **Killer Bee**

Northrop Grumman  
Part UAV, part missile.  
Deploy groups of many vehicles  
working cooperatively.  
Reconnaissance or attack -- up to 30  
pounds of weapons per drone.  
Designed so several can be stacked in  
the cargo bay of an aircraft or truck



### **Micrdrone**

German-made  
Equipped with GPS, a camera and a  
loud-hailer to give instructions to  
those on the ground  
Being tested by police in the UK.  
Hope can carry out some tasks of  
police helicopters, but at a fraction of  
the cost.



## **MMALV**

Morphing micro air/land vehicle

Can fly, then land, fold up its wings and crawl around

BioRobots, in collaboration with the Biologically Inspired Robotics Laboratory at Case Western Reserve University, the University of Florida and the Naval Postgraduate School.



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## **Micro Air Vehicle**

Hand-sized infrared controlled micro air vehicle (MAV)

Flies by flapping four polyethylene wings up to 30 times per second.

Professor Hiroshi Liu, of Japan's Chiba University

2.6-gram, four-inch long

Rechargeable battery good for six minutes of flight.

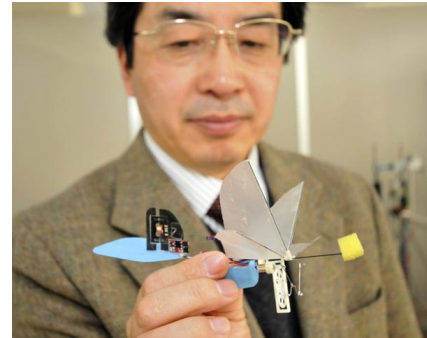
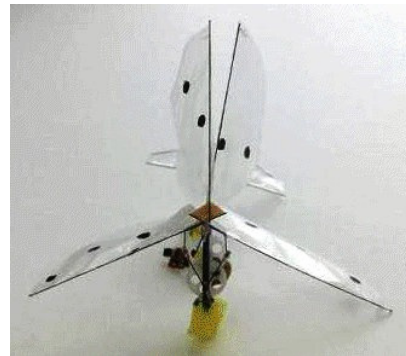
Yet to demonstrate hover, next on the list

Stable figure-eight flight.

Earthquake search missions by equipping it with a tiny camera.

Like Dutch **DeFly Micro**, an ornithopter that weighs in (with camera) at about 3 grams and has a flight duration of about three minutes.

Maybe extra-terrestrial explorer by flying reconnaissance missions in the Martian atmosphere.



## Boeing 797

Popular on internet -- no such aircraft

Picture from Popular Science article pre 1996

However, Boeing & NASA  
exploring technology

Also McDonnell-Douglas,  
Stanford U, Clark Atlanta, U Fla

Very efficient – all wing, single  
lifting surface

Double-deck passenger  
compartment

800 passengers, 7,000 miles, 560  
mph

2/3 fuel & emissions, lower noise

Problems: pressurizing non-circular cabin, high speed aerodynamic drag

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