ＮＰＯ ＡＳＴＲＯ セミナー

Flying Car related

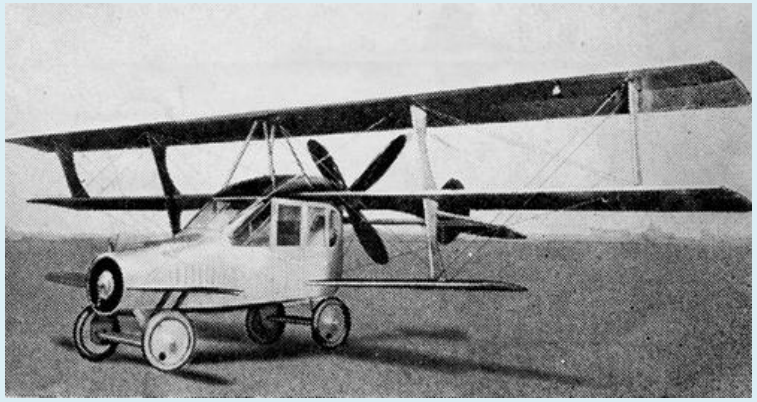
’17.10.29

西野 公夫

Pioneer era - first stage : roadable aircraft

The Long, Weird History of the Flying Car link

1917 Curtiss Autoplane



1937 Waterman Aerobile video

1947 ConVairCar Model 118

1966 Aero-Car video

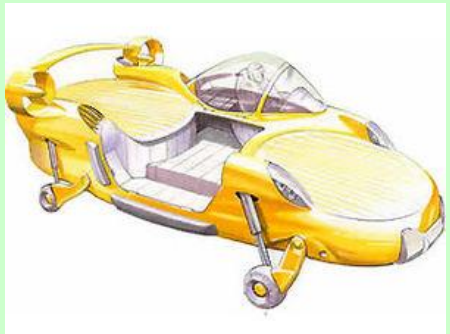
Pioneer era - second stage : VTOL commuter

1980's Moller M200G

1990's Moller M400 Sky-car

1990's Boeing Sky Commuter

2000's Urban Aeronautics X-Hawk



2000's SoloTrek XFV

Current stage : Flying Car Red Ocean era

No Longer a Dream: Silicon Valley Takes On the Flying Car link

More than a dozen companies — from large to small — are now in various stages of creating flying vehicles.

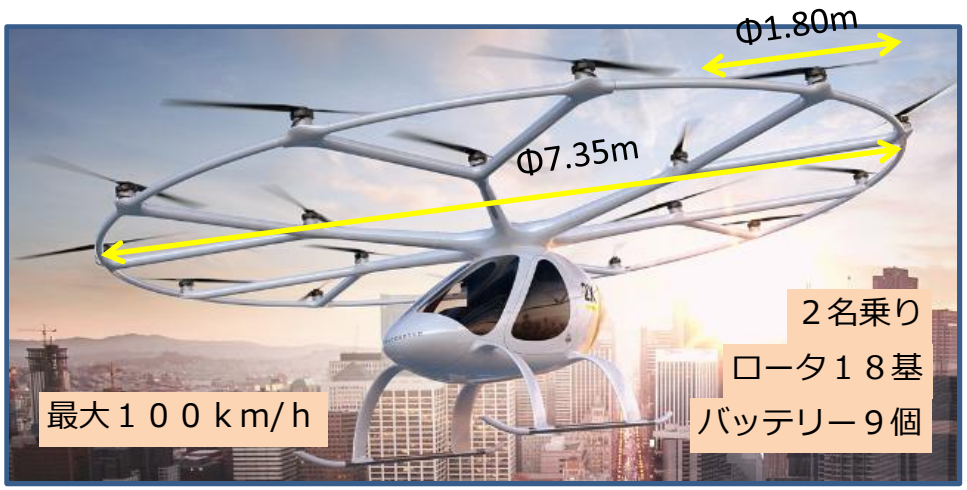
- **Terrafugia**
- **Kitty Hawk**
- **Airbus Group**
- **Moller International**
- **Xplorair**
- **PAL-V**
- **Joby Aviation**
- **EHang**
- **Volocopter**
- **Uber**
- **Haynes Aero**
- **Samson Motorworks**
- **AeroMobil**
- **Parajet**
- **Lilium**

Is the flying car ready for takeoff? Link

At least six developers have retail road-air vehicles in the pipeline

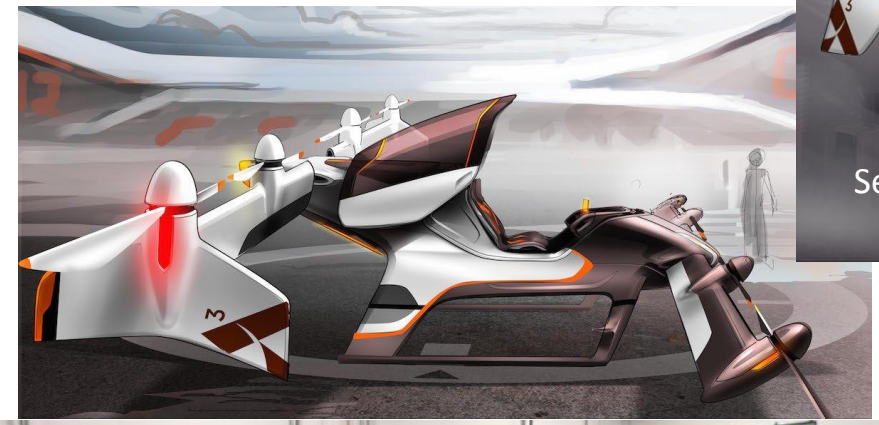
Volocopter 2X

A German startup is planning to test its futuristic aircraft for a flying-taxi service in 2018 [link]
Specification [PDF]



Airbus -1: Project Vahana @ Silicon Valley arm A³

Vahana Project Update link
How Airbus Dreamed Up the Wild Design for Its Flying Car link



designed for individual passenger and cargo transport.

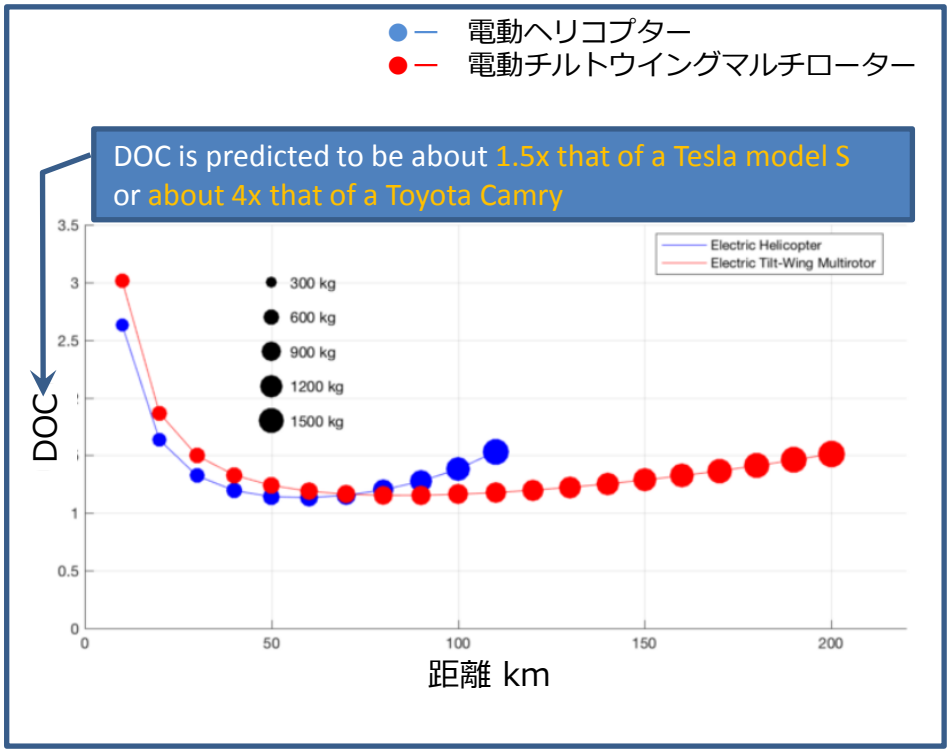
link

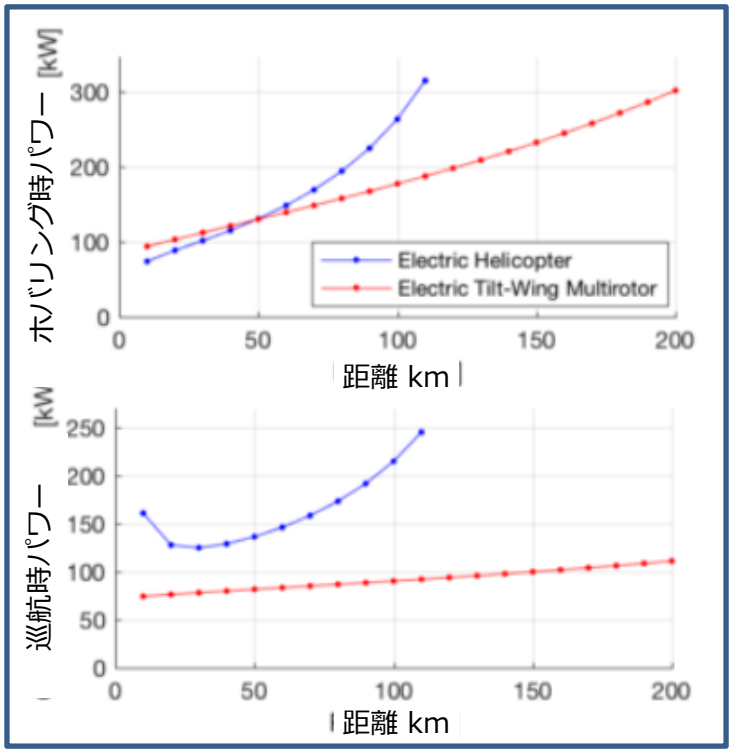
The aim is to fly a full-size prototype before the end of 2017, and to have a product-ready demonstrator by 2020, by FlightHouse Engineering.

The Future of Urban Air Mobility link
Passenger Experience link

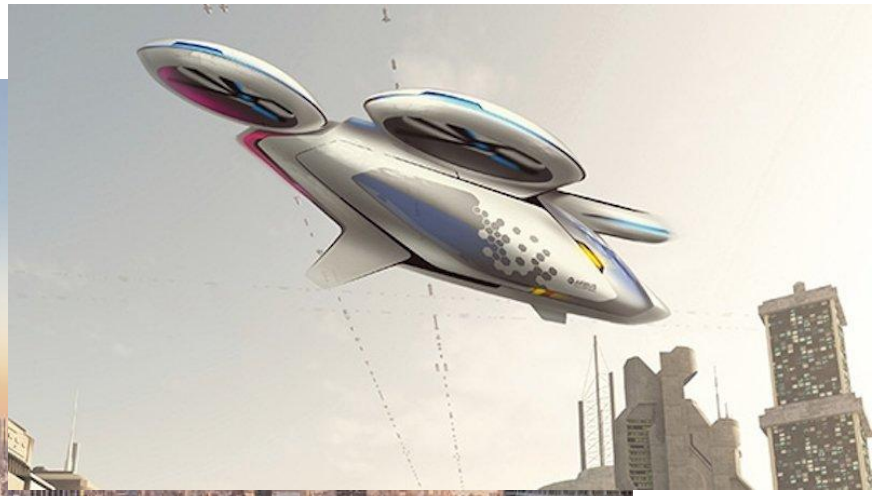
Airbus -1: Project Vahana

Airbus‘ Urban Air Mobility Roadmap leads to an electric future [link]





Airbus-2 : CityAirbus



２０１７年６月 パリエアショー link

Airbus-2 : CityAirbus

CityAirbus demonstrator passes major propulsion testing milestone link

CityAirbus

A multi-passenger, self-piloted electric vertical takeoff and landing (VTOL) demonstrator designed for urban air mobility with cost efficiency, high-volume production and a low environmental footprint in mind.

固定ピッチプロペラ ２個×４発
ダイレクトドライブモータ
@１００ｋW（シーメンス）

最大４名

１４０ｋW出力×４個
１１０ｋW/ｈ

１２０ｋm/ｈ

Making CityAirbus a reality

デモ機　サービス

2015	2016		2017	2018	2023
	Full scale component testing: Key technologies demonstrated at full size	Flight testing with small scale drone: Control algorithms and flight mechanics developed	Demonstrator team created: Collaborative team of highly dynamic and experienced engineers set up	Full size demonstrator: Full-scale in-flight demostration and verification of a full electric, RPM-controlled multi-propeller vertical takeoff and landing (VTOL)	CityAirbus takes to the sky: Fully certified CityAirbus becomes part of public urban transport mix, in conjunction with upgraded urban air traffic management

Benefits of adding the third dimension to urban transport networks

1 URBAN DEVELOPMENT
The third dimension increases the geographic accessibility to remote and underserved areas of the city

2 HIGHER SPEED AND RANGE
Self-piloted flying vehicles can operate at three times the speed of the average road vehicle and extend commuters' geographical reach by tenfold

3 ENVIRONMENTAL FOOTPRINT
Self-piloted flying vehicles are fueled by electricity and are energy efficient

Siemens develops world-record electric motor for aircraft link
50 kg, delivers a continuous output of about 260 kW （’2015)

AIRBUS

Airbus-2 : CityAirbus

URBAN AIR MOBILITY

Airbus believes that adding the third dimension to multimodal urban transport networks will improve the way we live and offer an alternative to congested megacity transport systems. To that end, the company is working with a diverse ecosystem to develop partnerships and a portfolio of projects to make urban air mobility a reality.

Urban Air Traffic Management

Actively shaping regulations and future air traffic control requirements to safely utilise urban skies

Voom

An on-demand service developed by A³ that allows megacity dwellers to book a helicopter on a shared basis via a mobile app

CityAirbus

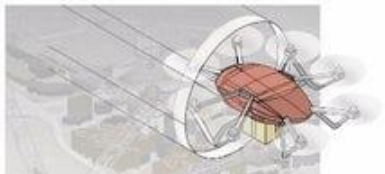
A multi-passenger, self-piloted electric vertical take-off and landing (VTOL) demonstrator designed for urban air mobility with cost efficiency, high-volume production and a low environmental footprint in mind

Vahana

A single-passenger, self-piloted electric vertical take-off and landing (VTOL) aircraft being developed by A³ to open up urban airways

Skyways

Collaboration with Airbus Helicopters and the National University of Singapore to test the seamless delivery of small parcels on its campus using unmanned aircraft systems



Airbus-4 : Pop.Up

ドローンと合体する自動運転タクシー「Pop.Up」--エアバスが描く未来の姿 link

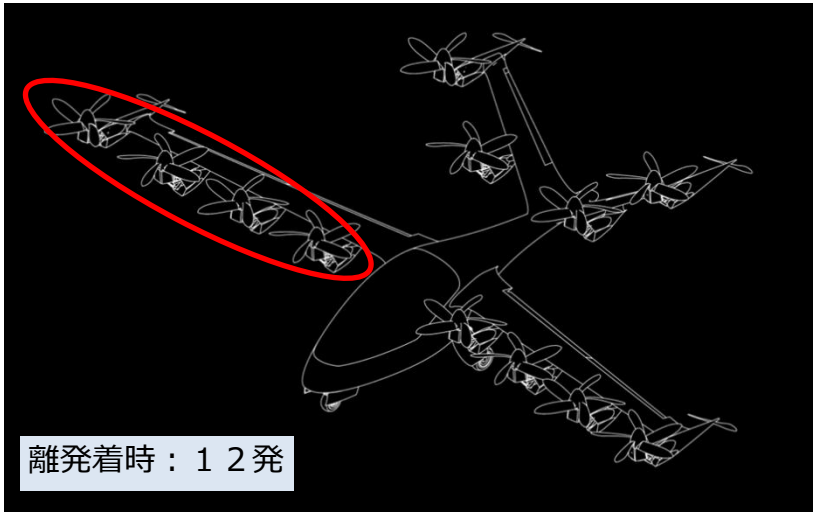
the 87th Geneva International Motor Show link

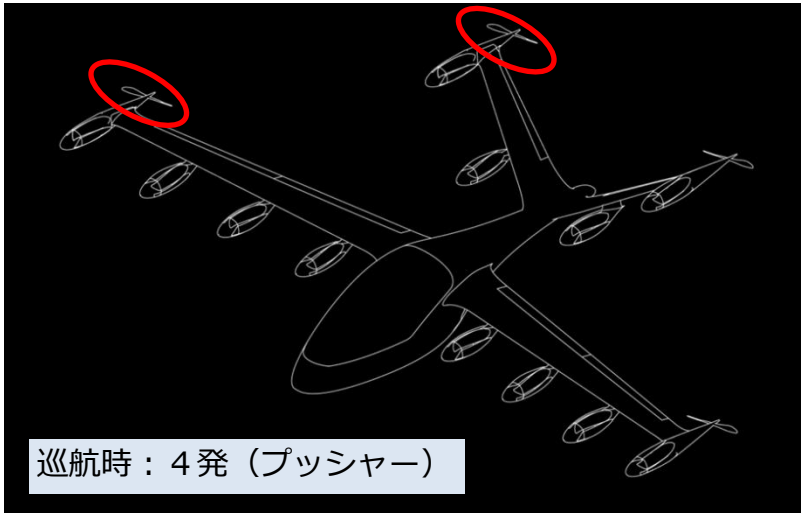
Airbus-4 : Pop.Up

Italdesign and Airbus unveil Pop.Up , a trailblazing modular ground and air passenger concept vehicle system [link]
CG(2:46) [YT]

Uber: Elevate

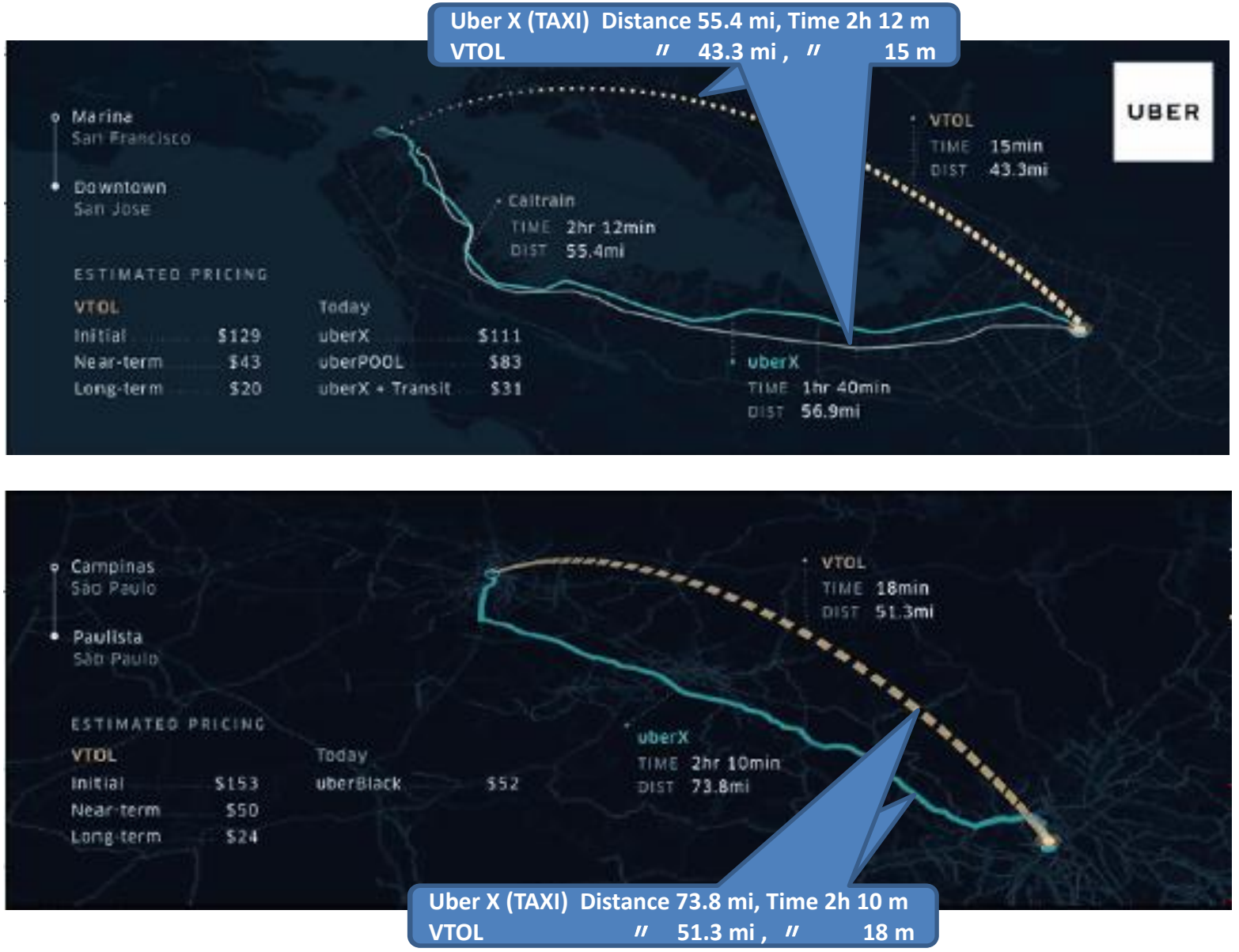
Joby S2 has 12 propellers and 16 electric motors for a clean, long-range flight for two link
Uber: Elevate Fast-Forwarding to a Future of On-Demand Urban Air Transportation PDF
Joby Technical Paper PDF Project-YT(4min) CG-YT(1min)





Uber: Elevate

SFに登場するような「空飛ぶタクシー」をUberが計画中であると判明 link



Larry Page's Flying cars

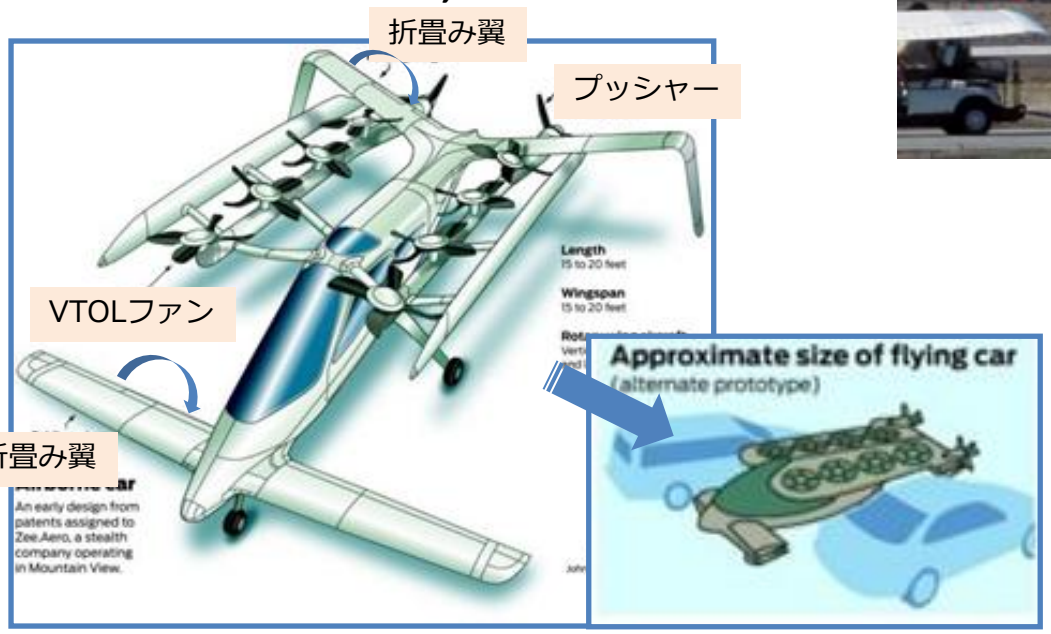
Kitty hawk : Flyer

the kitty hawk flyer ultralight electric aircraft speeds over water for serious fun link
Video(2:21) YT

- Ultralight aircraft.
- Details to come at the end of 2017.
- Flyer was designed to be enjoyed over freshwater In uncongested areas.

Zee: Will Smart Scarecrow finally get his flying car? link

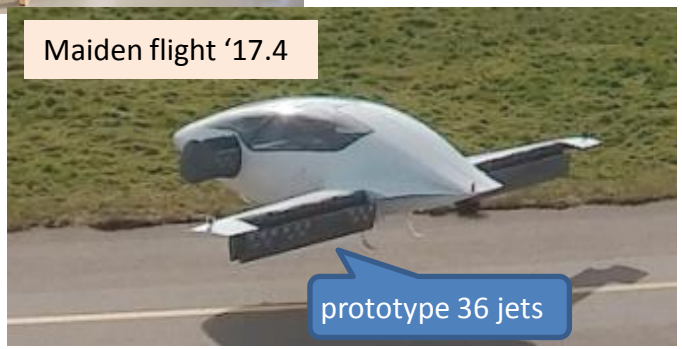
Zee.Aero : Airborne Car, ZP-1



Lilium

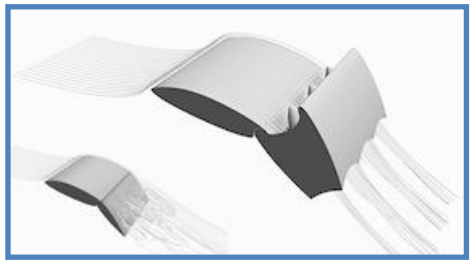
On-demand air taxis move one step closer as Lilium flight-tests electric vertical takeoff jet link
Maiden flight (1:53) YT

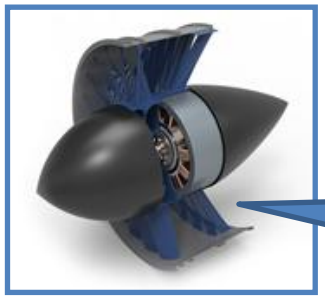
prototype two-seater capable of both VTOL and jet-powered flight



Maiden flight ‘17.4

prototype 36 jets





- longer-term vision is to offer a piloted 5-seater
- travel 300 km, with a maximum cruising speed of 300 km/h, and its in-flight power consumption per km would be “comparable to an electric car,”

The high redundancy of the system allows large inspection intervals to keep costs much lower than for helicopters or reciprocating engines

EHang

中国の人乗りドローン「Ehang 184」の飛行テストの映像を公開 link
Specs link プロモーション動画 (1:50) YT

積載質量：１２０ｋｇ
飛行速度：１００ｋｍ/ｈ
飛行時間：２３分間
飛行距離：約３２ｋｍ

電動プロペラ８基（直径１６０ｃｍ）

コマンドセンター建設
・速度、高度、場所、ドローンの撮影映像等の監視
・乗客と通信し航空交通をスケジュール

Terrafugia : Transition

Volvo‘s parent company acquires flying car startup link
Promotion (0:34) YT

Cruise Speed: 160km/h
Useful Load: 230 kg
Range: 640 km
Engine: 100hp(4-cylinder)
Price: 数千万円

Aeromobil 4.0 @ Slovakian company

AeroMobil 4.0 might be the first successful flying car link
空飛ぶ自動車「AeroMobil」がついに予約開始 link
プロモーション(1:30) YT

Airvinci Helicopter

運搬できるイスラエルの
大型ドローン
AirMule

米陸軍が開発中のホバーバイク
Malloy Aeronautics

Samson Motorworks envisions
its SkyBike

Haynes Aero Skyblazer

空飛ぶバイク「Scorpion 3」
の飛行テスト映像

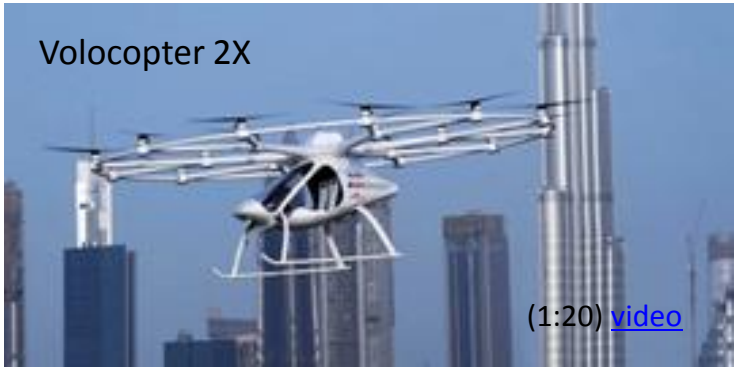
**The PAL-V One, A Flying
Car Worth Driving**

**Xplorair, car of the future, to
fly in 2017**

**Kalashnikov Unveils Flying
'Hovercycle'**

Dubai@UAE

Martin Jetpack

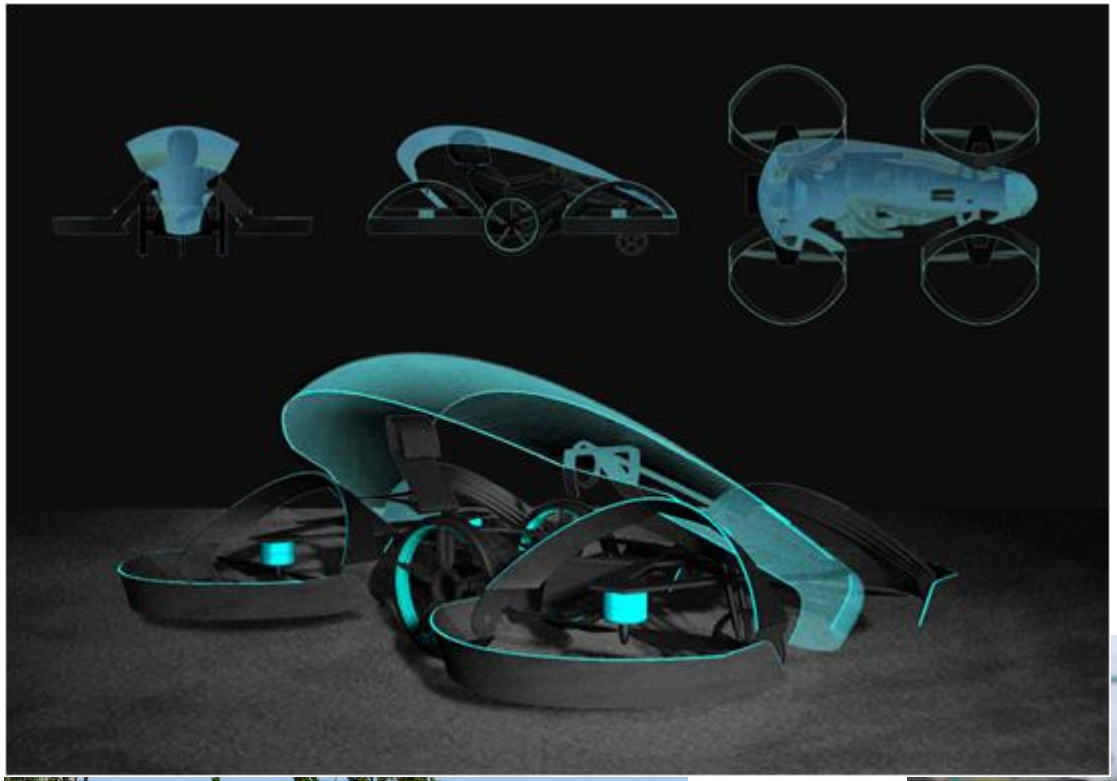


火星上探査機「アル・アマル」

Mars Science City

Cartivator Project

Will Japan win the flying car race? Link
These 7 companies are looking to make 'flying cars' a reality by 2020 link



Length 2.9m, Width 1.3m, Height 1.1m
Maximum Flight Speed (Target) 100km/h
Maximum Driving Speed (Target) 150km/h
Flight Altitude (Target) ～10m