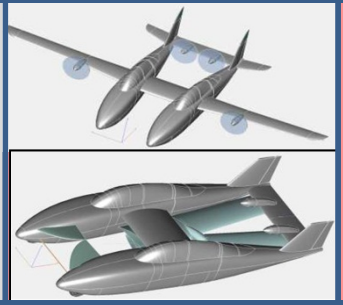
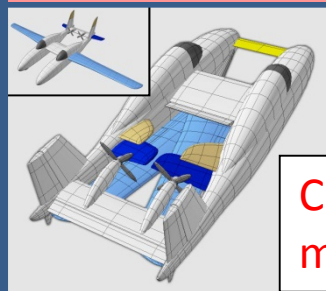
5 BiPod versions presented so far:	interchangeable canard/tail fins	No canard, both modes	Large canard road only	Small canard, both modes
1 tail-motor, 2 wing-motors				
2 tail-motors, 2 wing-motors				
2 tail-motors, no wing-motor				
No motors				

Wing motors abandoned due to „linkage“
(real reason: they don‘t fit in storage pos.

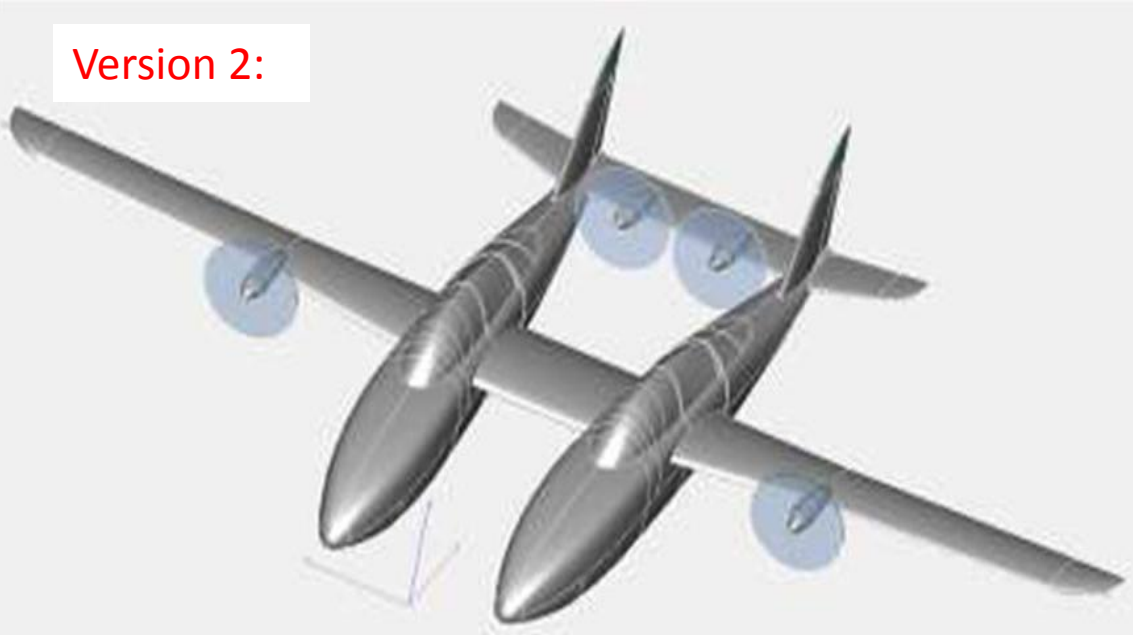
Current model

Version 1:

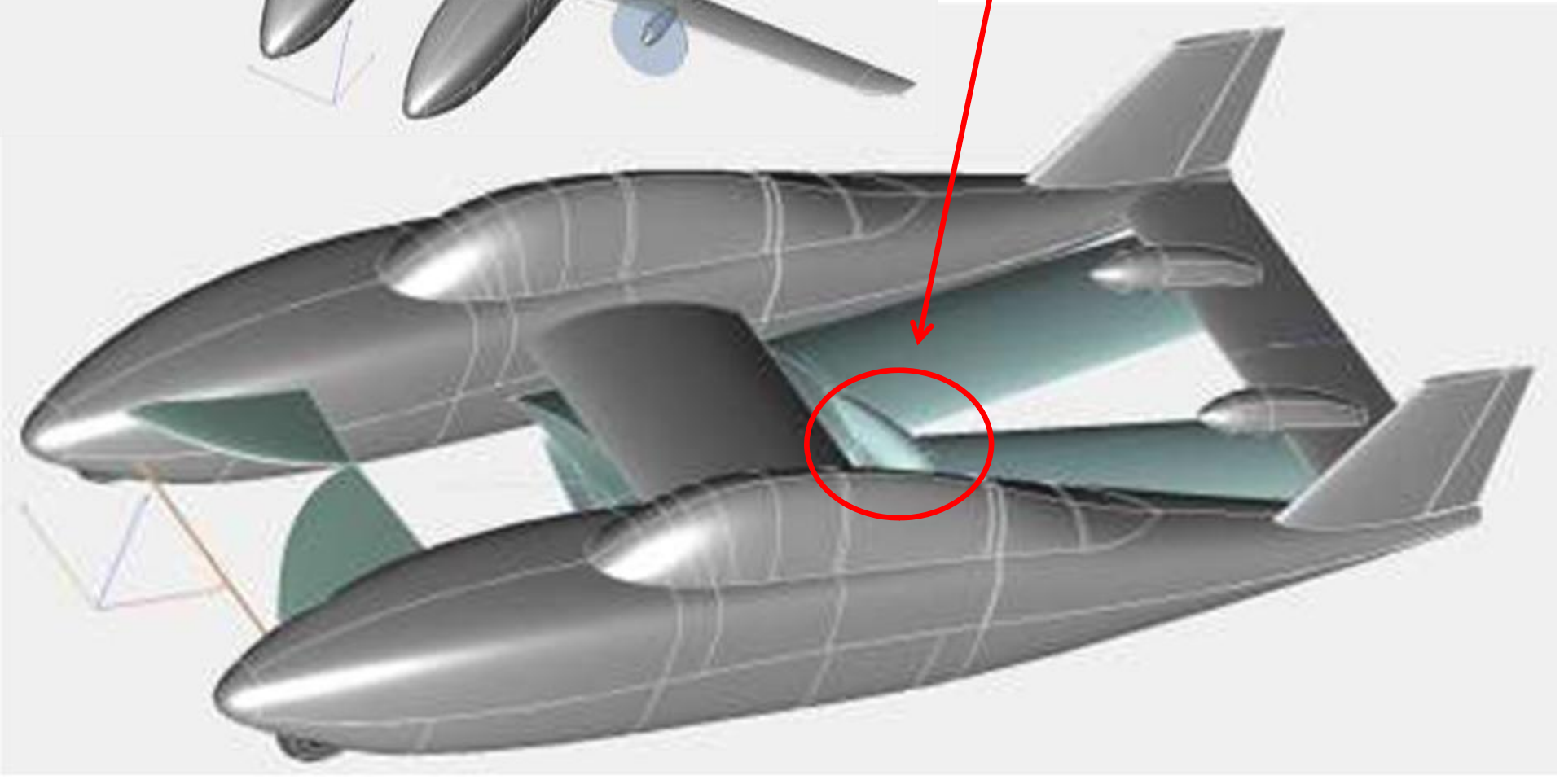
A multiblade prop with twice the radius raises efficency >threefold (area of circle = πr^2) over 2 props of half diameter. But stored wings can't fit under its blades and stay above the ground.

Version 1 may have used prop for road propulsion

Version 2:



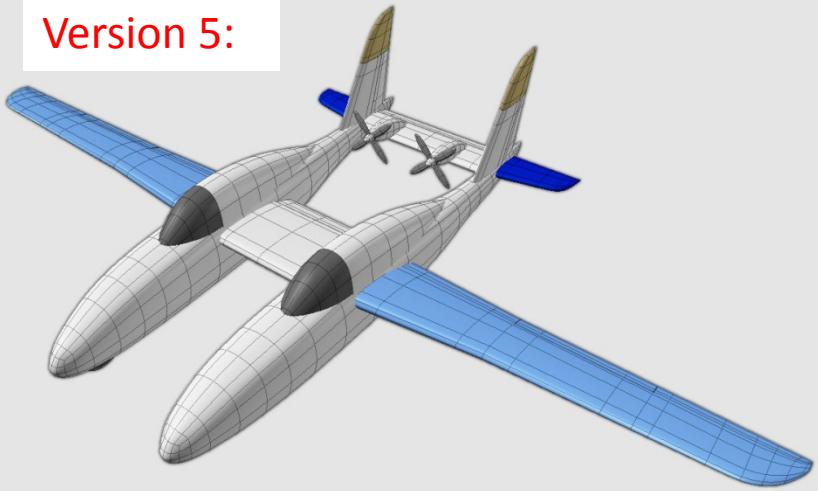
Wing-mounted motors were eliminated due to motor-linkages complicating mode-change (says B.Rutan). Real reason: the wings + motors would scrape the ground due to their thickness.

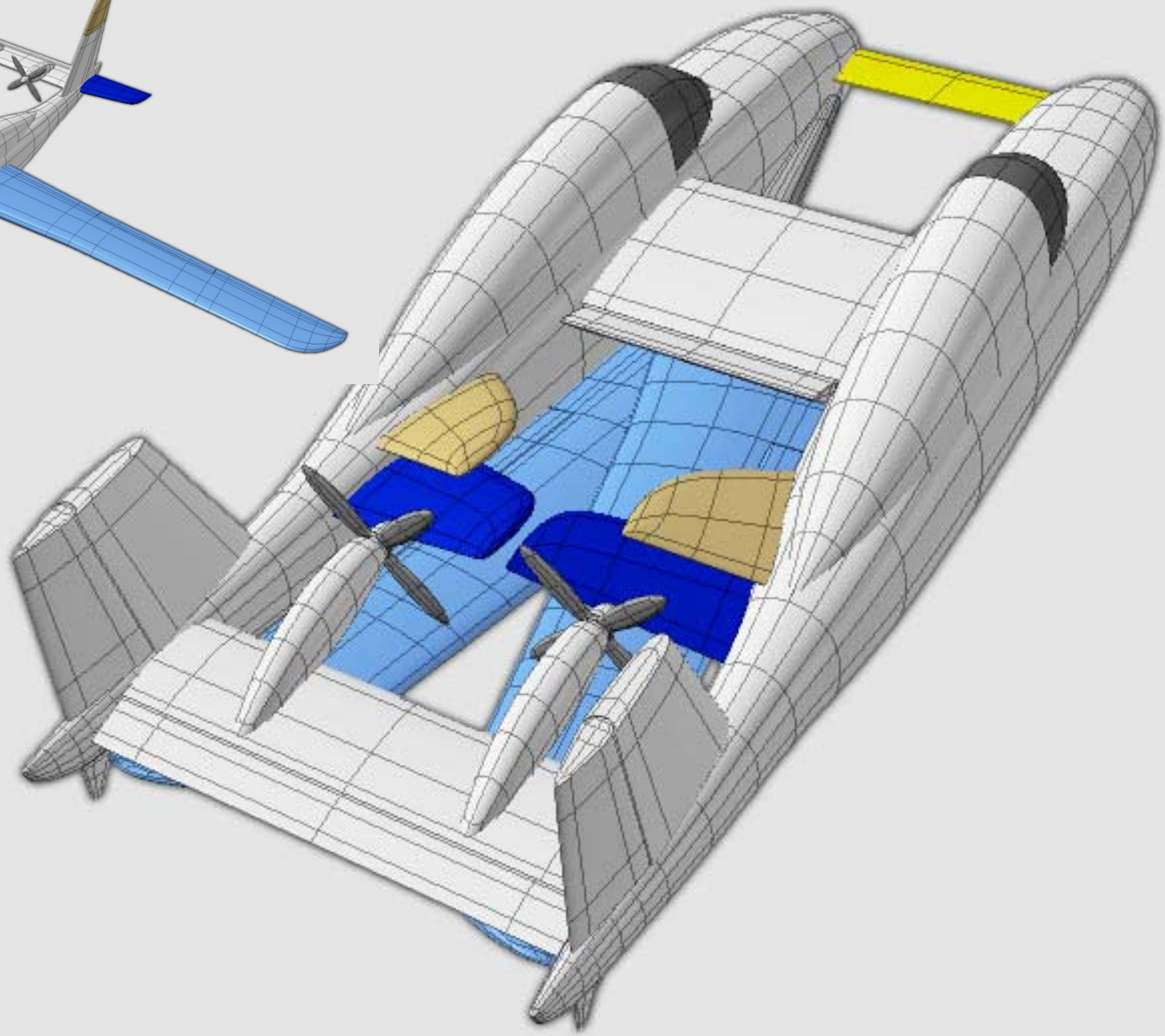


Version 4:

This version was shown to the public - noticeably with NEITHER motors NOR stored wings. This way, the unsolved issue of wing-storage was avoided.

Version 5:



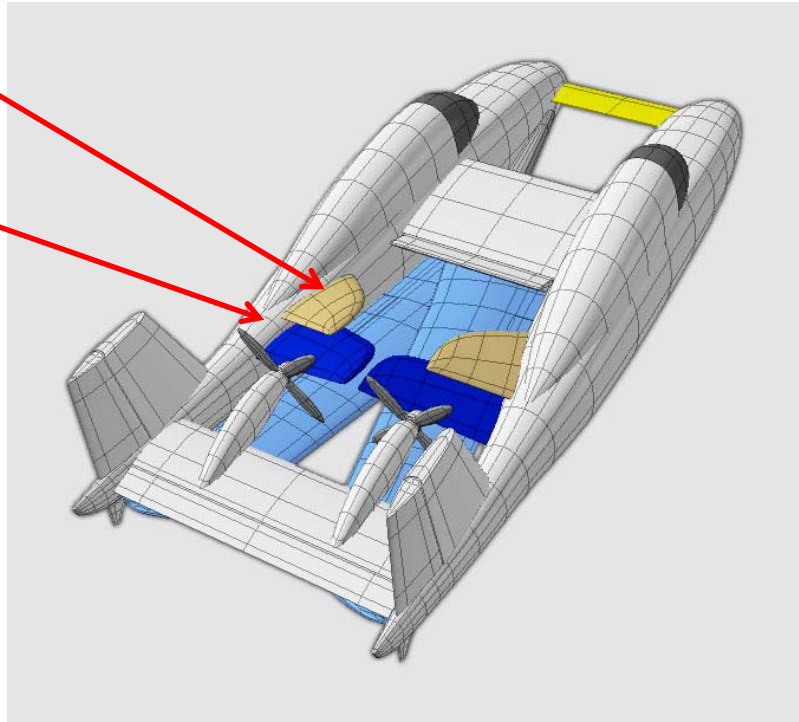


At Oshkosh, Burt Rutan stated, this is the current version.

This rendering DOESN‘T show how far down the lower wingroot lies… for good reason:

Analysis:

1). Mode-Conversion



First, a wrench is needed to detatch four empennage surfaces, then re-attach them on the inner rear fuselage.

Then the wings (incl. Aileron-linkage) are detached and secured between the hulls.
Burt Rutan says, this all takes just 10 minutes.

2). Cabin & Entry

Getting into the vehicle is via climb-in since there are no doors.

…and you need to switch to another cockpit after mode-change to continue your journey.

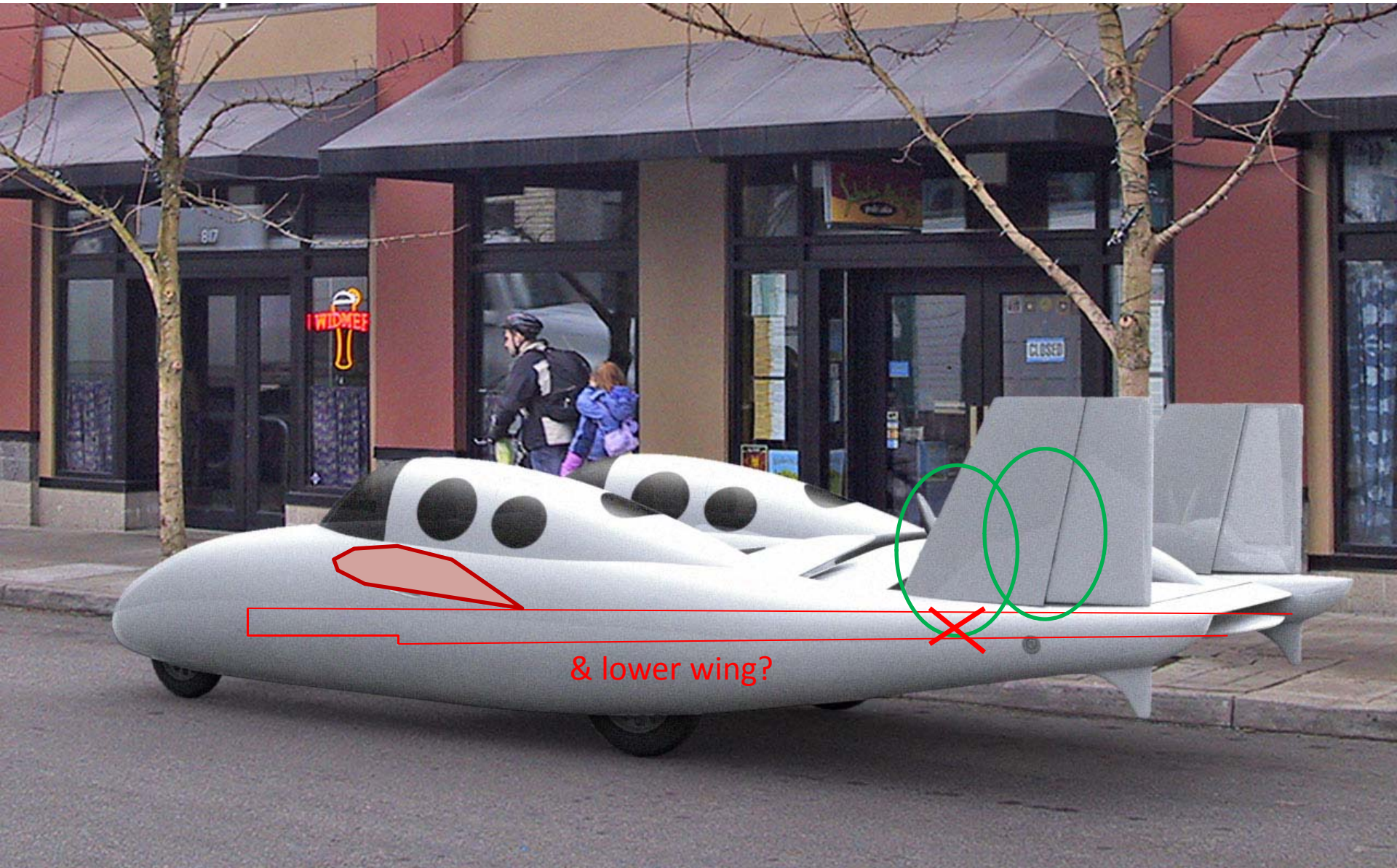
3). Wing-storage

When the upper spar stub is at canard height… how low is the one below?

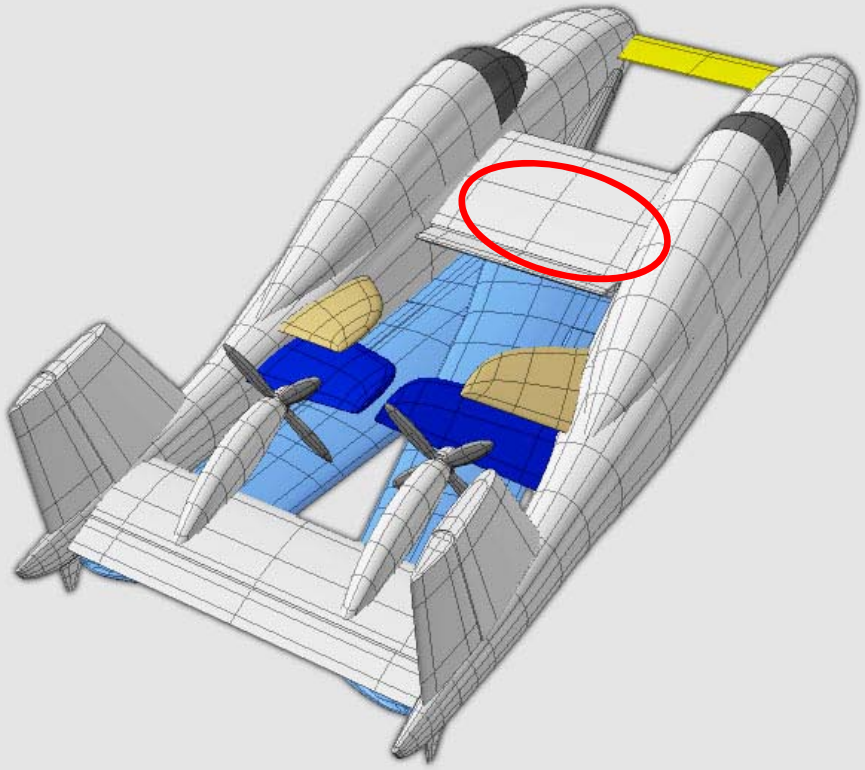
Geometry dictates:
this is below ground level.

The prop already touches the lower wing…
So the other prop tip can‘t possibly clear the upper one!

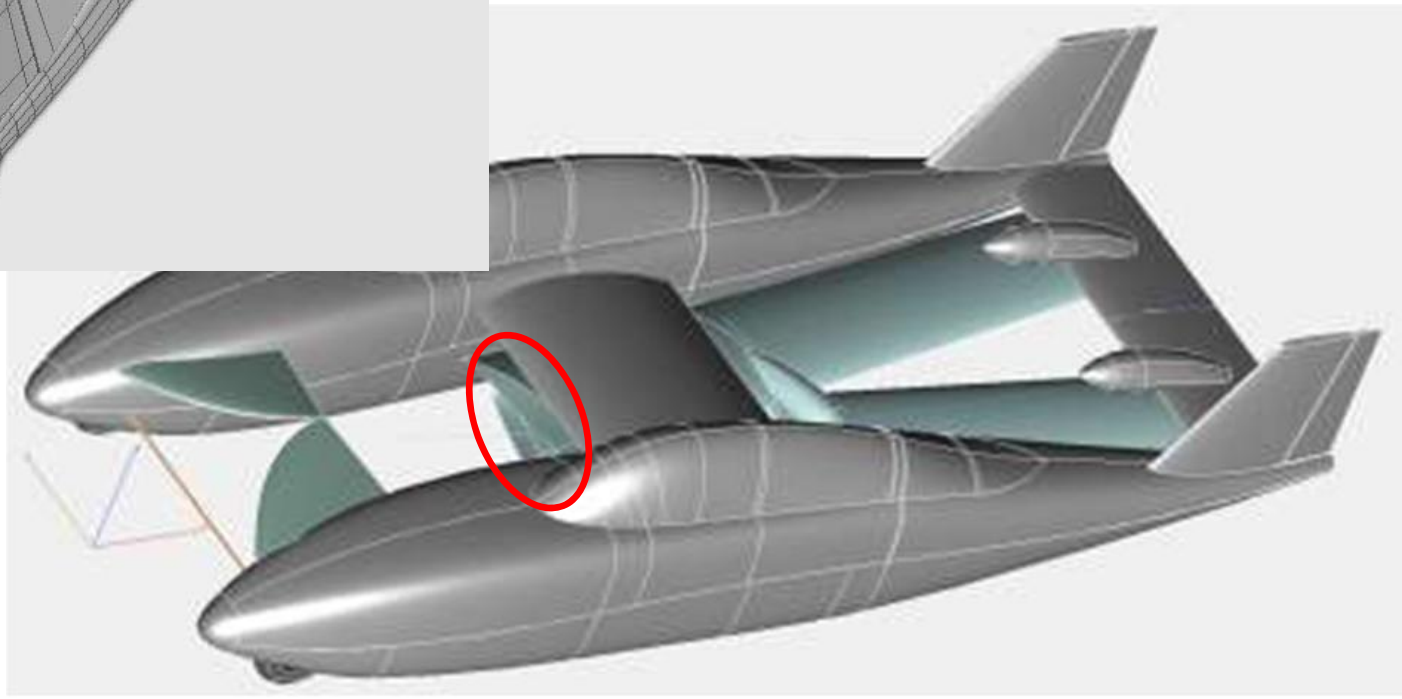
This is the closest thing to a side-view available.
Superimposed are a). upper stored wing, b). Prop arcs.

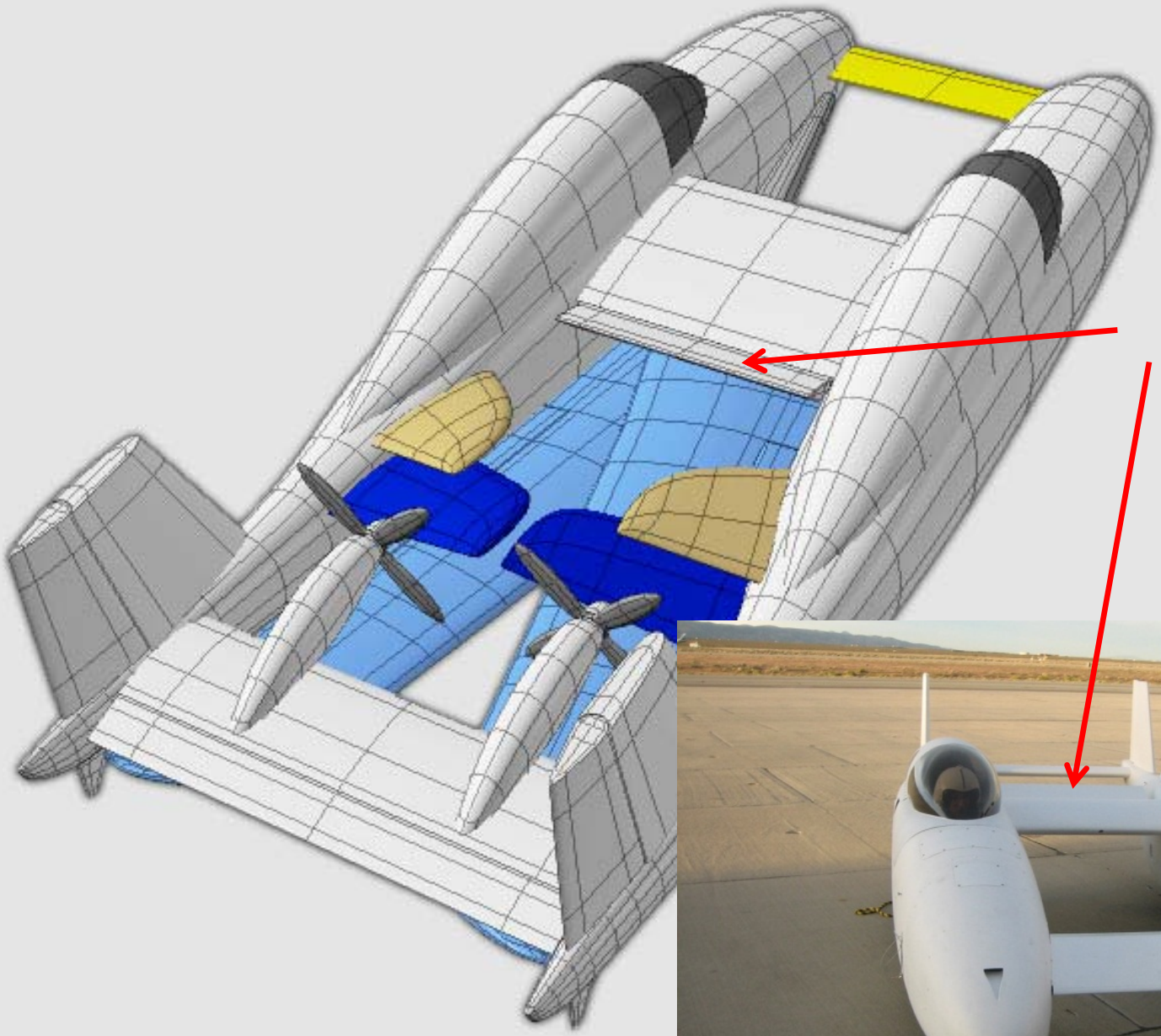


4). Road-Mode Aerodynamics



The wing roots face flat into the airflow in road-mode. Road aerodynamics suffer as a result.

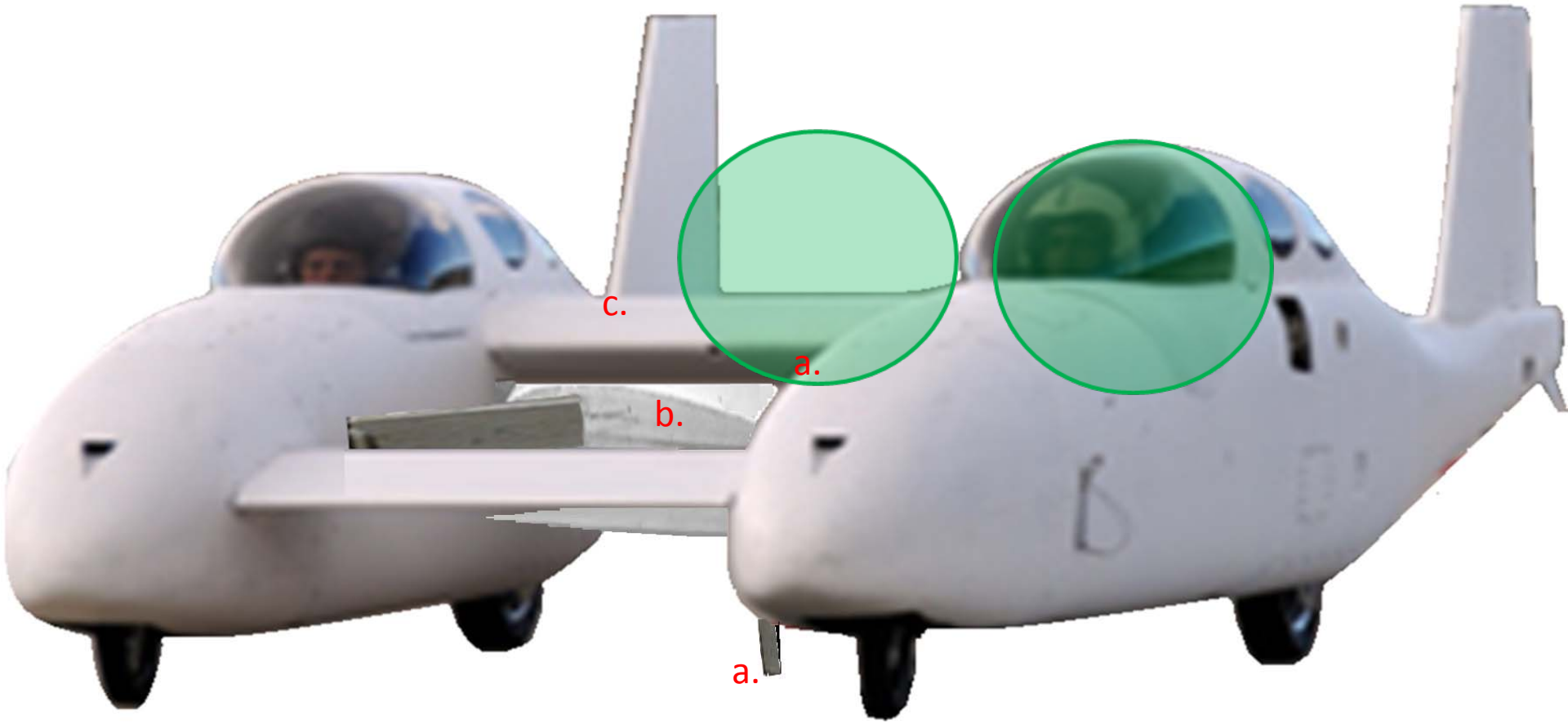




B.Rutan says, this flap creates negative lift in road-mode. How? The stored wings block flow below. The result is an airbrake causing the nose to rise!

Summary, points 3 & 4:

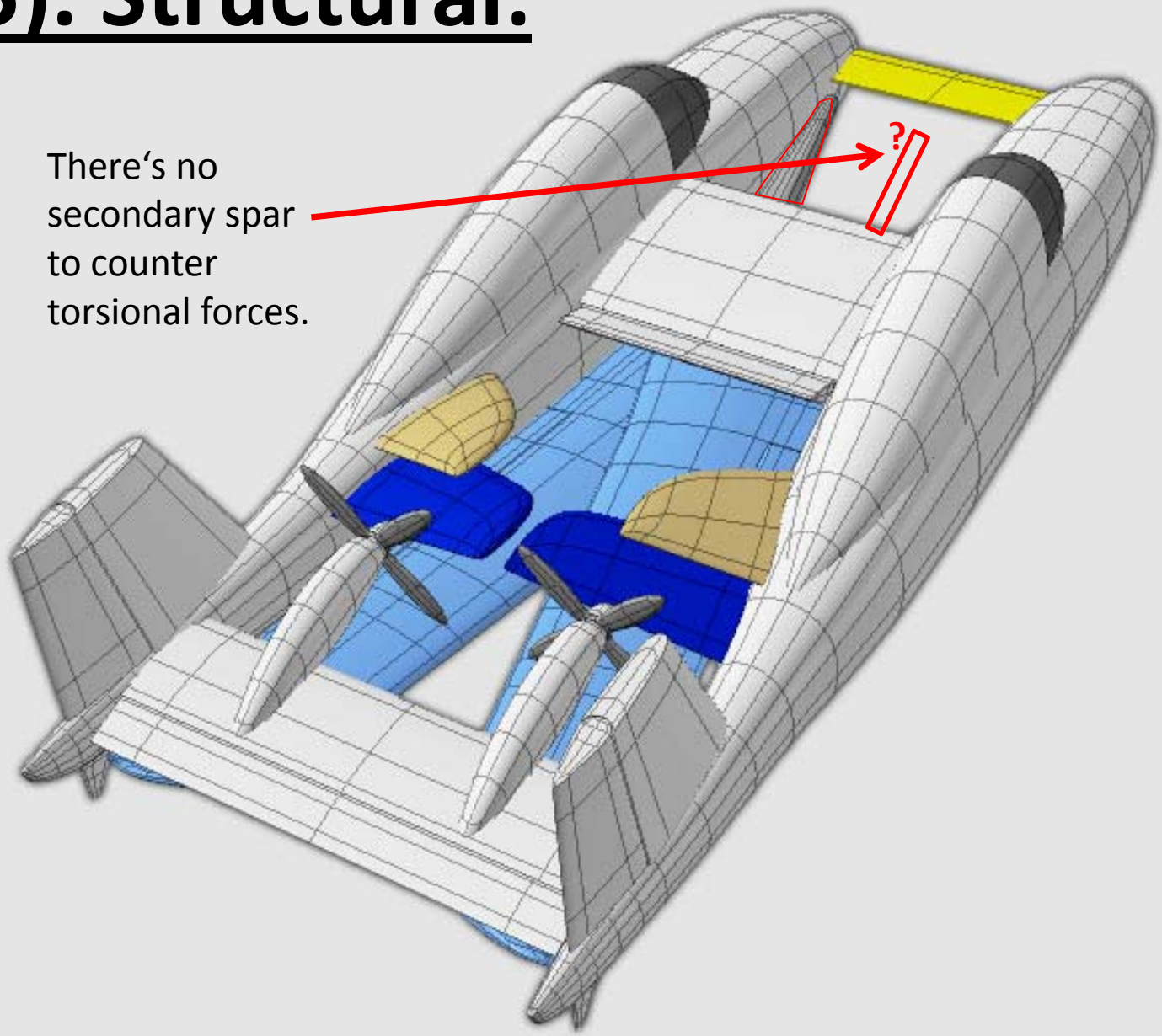
a. Fore and aft: stored wings would cut into prop arc/ground.
b. Frontal wind resistance would be significant.
c. The central flap could not create negative lift.



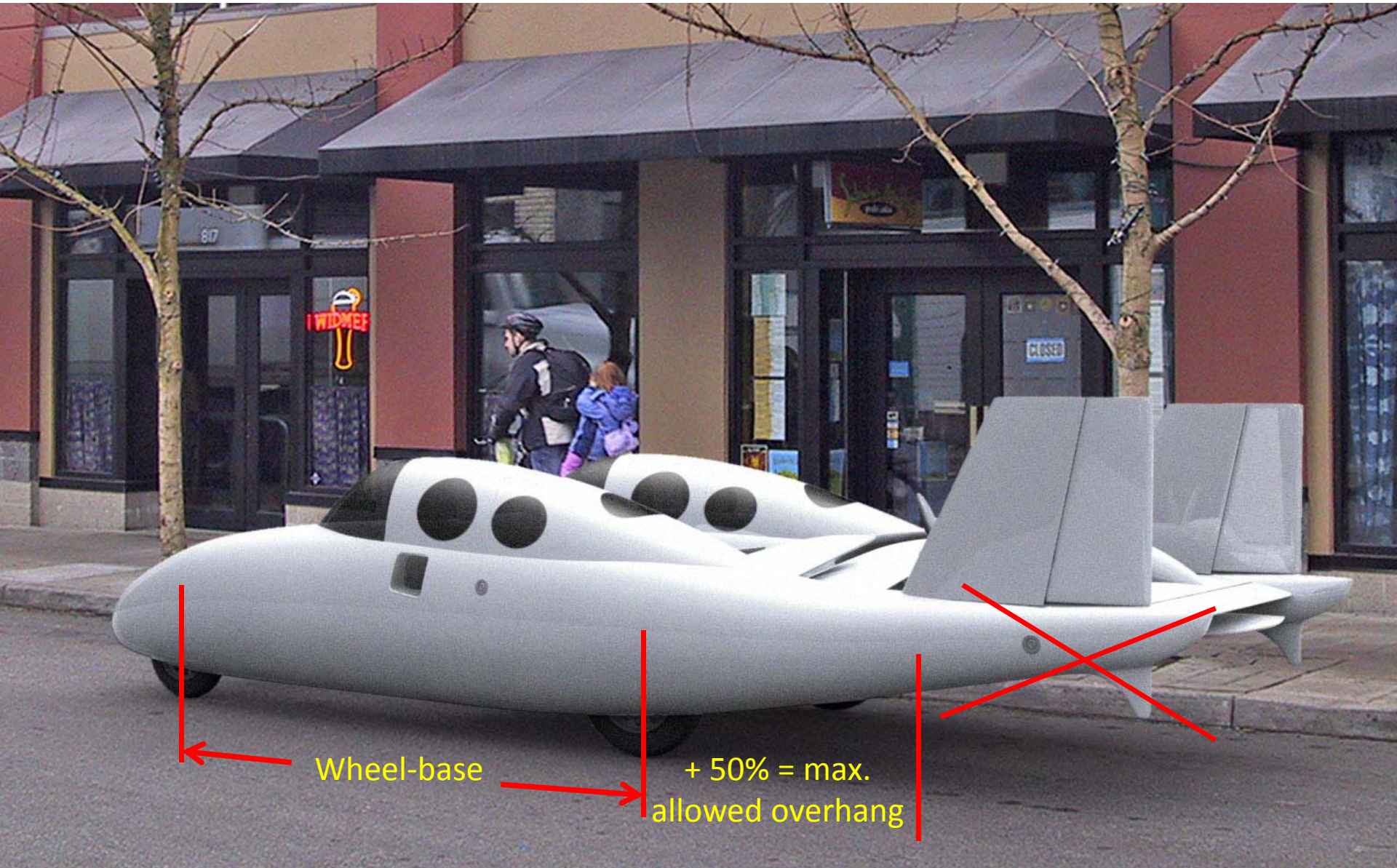
a. Fore and aft: stored wings would cut into prop arc/ground.
b. Frontal wind resistance would be significant.
c. The central flap could not create negative lift.

5). Structural:

There‘s no secondary spar to counter torsional forces.



6). Not roadworthy



7). Rotation blockage

8). Small tires, rounded section

Small-diameter tires limit road-speed.
Round-section tires reduce road-grip for cornering/braking.

9). Too big

Exceeds „compact car“ dimensions (garage/parking spots as used by architects = max. 2.2m x 5.5m).

[Conforms only to max. trunk-road dimensions for big-rigs = max. 8.5ft./2.6m.]

10). Too slippery

Burt Rutan claims 197mp/h cruise but an LSA certification where max. is 130mp/h. Slippery profiles with laminar flow wings add performance, but eliminate many hobby-flyers.

Comparisons

TERRAFUGIA

CARPLANE®

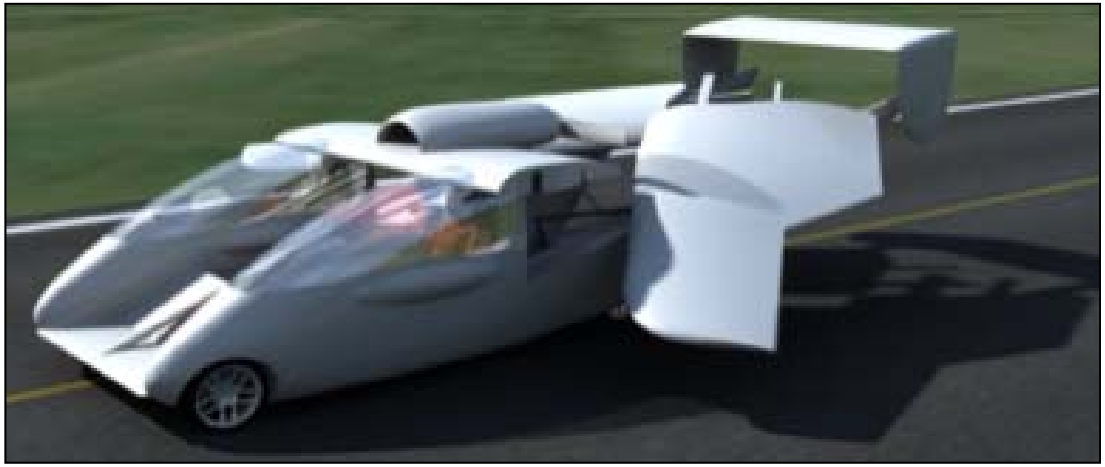
SCALED COMPOSITES

TERRAFUGIA

CARPLANE®

SCALED COMPOSITES

TERRAFUGIA



CARPLANE®

Originality

„unique!“

sh ng the
m ng pro-
pe ing up
speed using the battery-powered driving wheels. "The next step would be to de-

"The most significant technical accomplishment is the new configuration—unique for a roadable airplane, in that the flight mode has an efficient aerodynamic configuration, low span-

liminary flight characteristics were assessed during a short series of tests over recent months. Scaled test pilot Mike Alsbury says inadequate power from the current batteries and electric drive

Powered solely by electrically driven wheels, the Bipod has so far only made short test hops at Mojave.

SCALED COMPOSITES

„not so unique after all!“

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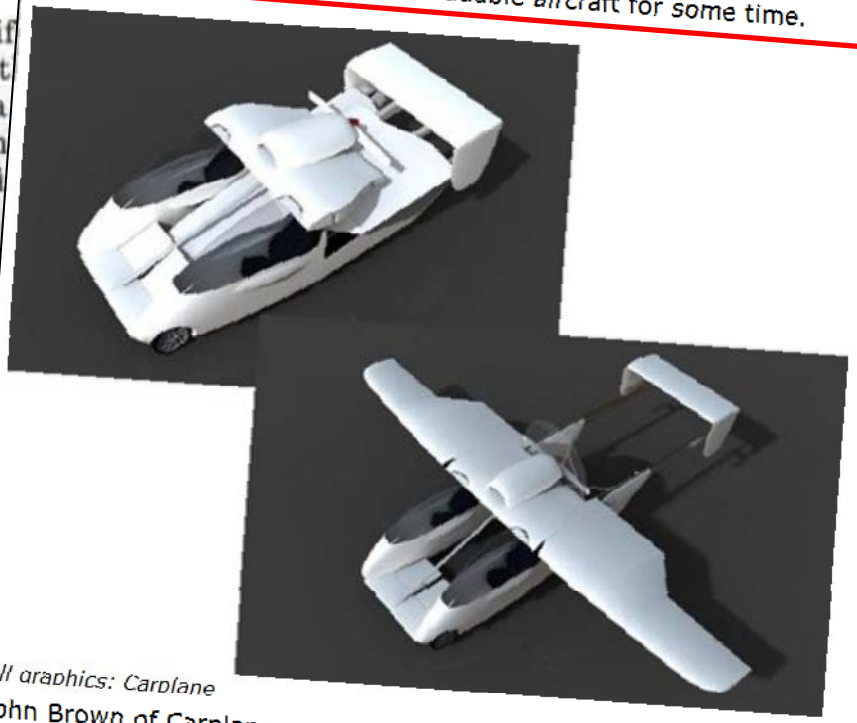
Roadable Carplane - Twin-Hull Pioneer

Posted by Graham Warwick at 7/26/2011 1:41 PM CDT

The twin-fuselage design of Burt Rutan's BiPod flying car is not as unique as we thought. It seems Germany-based Carplane has been working on a twin-hulled roadable aircraft for some time.



All graphics: Carplane

John Brown of Carplane says the design was patented in 2008 and, in addition to the twin hulls, includes a mechanism to extend and stow the wings automatically without having to exit the vehicle to remove or replace the wings. Swapping modes takes about 15sec.

...ng the
...ng pro-
...ing up
speed using the battery-powered driving wheels. "The next step would be to de-

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complishment is t...
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AviationWeek.com/awst

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