Flying Cars

Steven Crow
Aerospace and Mechanical Engineering Department
The University of Arizona

Presented at the NASA Langley Research Center Transportation Beyond 2000 Workshop
26 September 1995
## Personal Aviation System Specifications

<table>
<thead>
<tr>
<th>Price</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>$40,000</td>
<td>Robotic with display</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liability</th>
<th>Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured ownership</td>
<td>Equivalent to autos</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparable to airplanes</td>
<td>Equivalent to autos</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Convenience</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portal to portal</td>
<td>Continuously profitable</td>
</tr>
</tbody>
</table>
FIGURE 7: ADVANCED FLYING AUTOMOBILE IN AUTOMOTIVE AND AIRPLANE CONFIGURATION
The Search for Utility

4 Roadable Amphibian and Other Aircars
   More Schugt designs

17 Light Plane and Light Trailer
   Towing an airplane on the highway

20 Flying Motorcycle
   A complete flying and driving machine

22 The Mainair Skybike
   More on the original flex-wing trike/motorcycle

24 New Joe Yasecko Design
   Light single place roadable concept

2 From the Editor
3 Oshkosh 94 Forum
3 Letters
19 Networking
27 Classified Ads
27 Back Issues
Inboard profile and side views for the High Wing ROADRUNNER.
Joe Yasecko

Joe does think the nose is too long and would need to be shortened. The tail booms are designed for construction of telescoping aluminum tubes.

The fuselage is based on a mold which he has already. Joe does think the nose is too long and would need to be shortened. The tail booms are designed for construction of telescoping aluminum tubes.

As the plans are currently drawn the airborne length is 17 feet. The tailbooms would retract about 3 feet for road use. Joe is concerned about the weight distribution of the vehicle in the ground mode. Because the majority of a tapered cantilever wing panel's weight is concentrated at the root, the folded wing does not move the CG forward very much.

The power plant will be a Rotax 503 of 46 to 52 horsepower.

See next 2 pages for more drawings.

End of text

Joe Yasecko's new roadable aircraft design in flight configuration.
Road configuration. CAD dimension marks on drawing are at one foot intervals.
Fourth in the series, the Aircar - 11. Also known as the Mini-Aircar 11.

May/June 1994  ROADABLE AIRCRAFT  21
New Technologies

Information

GPS and enhancements
Radio modem communications
Kalman filters

Structures

Advanced composite structures

Propulsion

Electronic fuel and spark controls
Propeller diameter 70"

Trailer work
- For ease of transportation to or from the airport, the outboard wing panels are easily removable. Attach bolts are reached from the gear wells.
PERFORMANCE ADVANTAGES OF AN AIRPLANE OVER AN AUTOMOBILE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mazda RX-7</th>
<th>Lancair 320</th>
<th>Airplane Advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\rho$ (slug/ft$^3$)</td>
<td>0.002378</td>
<td>0.001756</td>
<td>1.35</td>
</tr>
<tr>
<td>c (lb/hr/hp)</td>
<td>0.62</td>
<td>0.45</td>
<td>1.38</td>
</tr>
<tr>
<td>$\eta$</td>
<td>0.90</td>
<td>0.85</td>
<td>0.94</td>
</tr>
<tr>
<td>$S_d$ (ft$^2$)</td>
<td>7.20</td>
<td>1.60</td>
<td>4.50</td>
</tr>
<tr>
<td>Rolling friction</td>
<td></td>
<td></td>
<td>1.18</td>
</tr>
<tr>
<td>Net airplane advantage</td>
<td></td>
<td></td>
<td>9.30</td>
</tr>
</tbody>
</table>
Starcar 3

Goals

Precision control with differential GPS, including automatic landings.

Informed use of automobile engine for flight.

Practical transformation between automobile and airplane.

Feature

Two seats with separate automobile and airplane controls.
Starcar 3 (Continued)

Specifications

Span of 28 ft.

Gross weight of 2190 lbs as airplane.

Fuel economy of 21.6 mpg at 200 mph.

Top speed of 235 mph.
Materiale composito / Composition material / Matériau composite
Trafo in acciaio / Steel structure / Cadre en treillis en acier
Adesivo strutturale bicomponente / Dual component structural adhesive / Adhésif structural bicomposant
Conclusion and Goals

Conclusion

Flying cars are possible and have commercial potential.

The penalty for roadability is about 500 lbs.

Goals

Integrate an automotive engine with a dual-mode transmission.

Build a flying car similar to Starcar 3 but self-contained, with folding wings and telescoping tail booms.