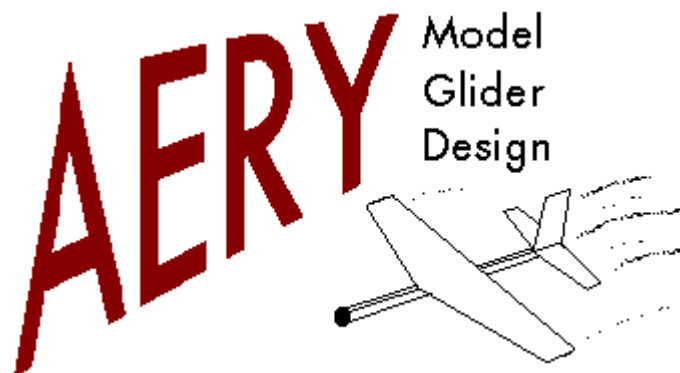


# Development and Application of a Program for the Computer Aided Design of Simple Gliders

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Plan B Project Presentation



AERY

## Outline of Presentation

- Project Description
- Background
- Program Development
- Program Testing
- Results
- Summary & Future Plans

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## Project Description

- Interactive computer program, “Aery”
- Written in Visual Basic for PC’s running Windows
- Intended for secondary and post-secondary levels
- Design and analysis of simple gliders
- Creates plans for glider construction
- Testing and use within Aviation Career Education (ACE) Academy sessions
- Freely distributed for use by individuals and educational institutions

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## Background

- Spring of 1995, spoke with Mr. Gordon Hoff, Minnesota Department of Transportation, Office of Aeronautics
- Technical (engineering) session at ACE Academy
- Suggested airplane design using computers
- Develop program usable by the students
- Session would teach about aerospace engineering and the aircraft design process
- Original inspiration drawn from “Glider Design” for Macintosh computers, by Mr. Michael Kamprath and the Michigan Space Grant Consortium
- Secured permission to use the program for Plan B Project

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## Program Development

- Aery written in Visual Basic 3.0 for Windows 3.1  
(Windows 95 compatible)
- VSVBX custom control licensed from Videosoft  
for “tab” interface and window resizing
- “Point and click” interface for adjustment of glider  
parameters
- Continuously updated graphical display of glider  
and glider components
- Save and load glider and data files
- Print dimensioned drawings of glider
- Glider analysis applies simple methods and  
approximations
  - center of gravity
  - neutral point
  - vertical tail & stabilizer volume coefficients
  - stabilizer incidence angle

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## Program Testing

- Comparison of output with expected results
- Construction of test gliders
  - Insufficient directional stability
  - Required lateral balancing
- Modification of program design criteria
- Center of gravity deviation dependent upon specified material properties
- Early version tested at ACE Academy  
August, 1995
- First version capable of printing plans tested at  
ACE Academy in June, 1996
- Resolved problems with printing of plans
- Tested full version of Aery at ACE Academy  
August, 1996

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## Results

- Aery may be successfully used to design flying model gliders.
- Flight performance is acceptable given type of glider design.
- Validity of analytical approach proven.
- Glider construction methods developed.
- Different styles of glider design explored.
- Excellent student response.
- Feedback on “bugs” and features invaluable.
- Aery shown to be easy to use.

## Summary

- ✈ Aery allows the interactive design, analysis, and creation of plans for simple gliders.
- ✈ Aery was developed with the assistance of, and tested at, ACE Academy.

## Future Plans

- ✈ Free distribution through the World Wide Web
- ✈ Educator's lesson plan; glider construction guide
- ✈ Windows on-line help file
- ✈ Aery rewrite as Windows 95 specific, 32 bit application

