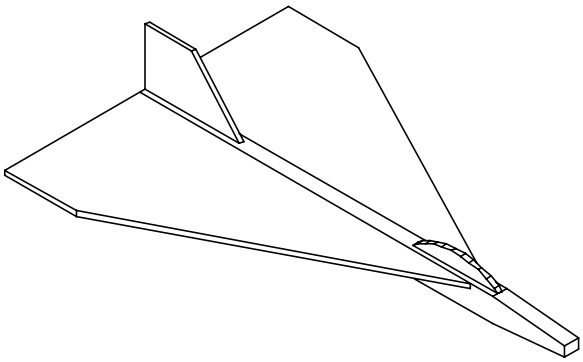
Chapter 13

B1 GLIDER

A. OPEN B FILE.

Step 1. When you start a new drawing away start with the B file. If you started this drawing as the B file go directly to Steps B. If your did not start as the B file complete these Steps: Click **Open** from the File Menu. Click **No** to save current part. Key in **a:b** for the filename and press ENTER.



B. CREATE A RECTANGLE.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F7 RECTANGLE.

Step 5. F2 WIDTH/HEIGHT.

Step 6. Key in **9** for width and press ENTER.

Step 7. Key in **6** for height and press ENTER.

Step 8. F9 KEYIN.

Step 9. Key in:
Zero (0) for coordinate X and press ENTER.
-2.85 for Y and press ENTER.
0 for Z and press ENTER.

Step 10. Use **ALT-A** to center the rectangle on the screen. Hold down ALT and press A.

C. DRAW THE FUSELAGE USING PARALLEL LINES.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F3 PARALLEL.

Step 5. F2 AT A DISTANCE.

Step 6. Key in **2.85** for distance and press ENTER.

Step 7. Move the cursor onto the **bottom line** of the rectangle and click to select it as the reference line, **Fig. 1**. Click inside the rectangle to indicate side.

Step 8. Now, click the **top line** of the rectangle as the reference line, Line 2. Click inside the rectangle to indicate side.

Step 9. Use CTRL-R to clear highlighted entities. Hold down CTRL and press R.

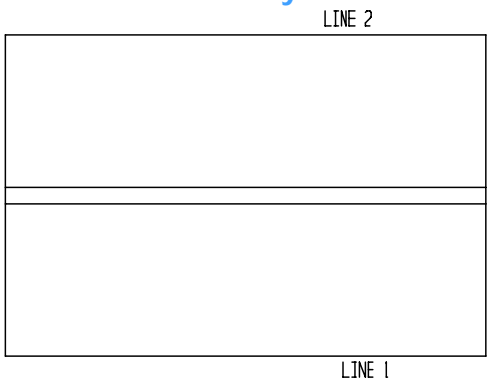


FIG. 1

Step 10. At this time it is a good idea to save the drawing. Click **Save As** from the File Menu. Key **a:b1glider** filename and press ENTER. Press ESC for Part Description.

D. DRAW WING USING ALONG LINE.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F1 ENDPOINTS.

Step 5. F6 ALONG LINE.

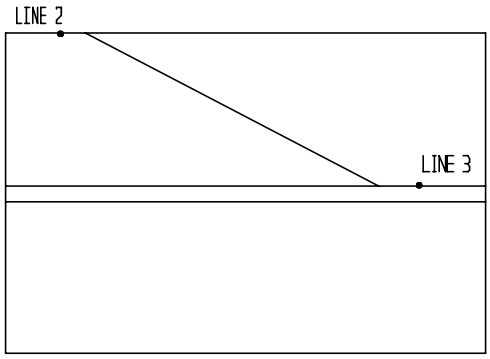


FIG. 2

Step 6. To indicate Start Point move cursor to the top line of the rectangle, Line 2, **Fig. 2** and click.

Step 7. Key in **1.5** for distance and press ENTER.

Step 8. To indicate End Point move cursor to the top fuselage line, Line 3 and click.

Step 9. Key in **2** for distance and press ENTER.

Step 10. Save the drawing. Use **CTRL-S**.

E. MIRROR WING.

Step 1. ESC to Main Menu.

Step 2. F4 X-FORM.

Step 3. F5 MIRROR.

Step 4. F2 COPY.

Step 5. F1 SINGLE.

Step 6. Select the wing Line 4, **Fig. 3**, with a click and press ENTER.

Step 7. F1 1 POINT HORIZONTAL.

Step 8. F4 CENTER.

Step 9. To indicate position on the plane click on the aft end (rear), Line 5, **Fig. 3**.

Step 10. Use CTRL-R to clear highlighted entities and temporary markers. Hold down CTRL and press R.

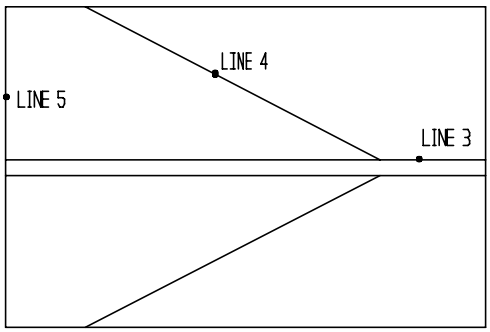


FIG. 3

Step 11. Save the drawing. Use **CTRL-S**.

F. EDIT THE WINGS USING TRIM FIRST.

Step 1. ESC to Main Menu.

Step 2. F2 EDIT.

Step 3. F1 TRIM/EXTEND.

Step 4. F1 FIRST.

Step 5. To trim part of a line, click the line you are to keep, Line 2, **Fig. 4**. Move cursor close to the intersection with Line 4 and click. Repeat at the other wing. That is, click the part of the line you are keeping, Line 1, then move cursor close to the intersection with Line 6 and click.

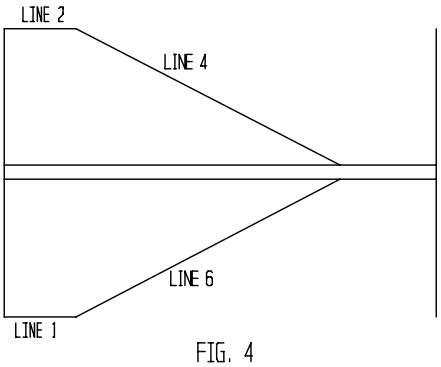


FIG. 4

Step 6. Use **ALT-W** to zoom in on the forward end of the fuselage (nose). Hold down ALT and press W. Move the cursor to just above and to the left of the nose, **Fig. 5**. Click to start 1ST WINDOW CORNER. Move the mouse to surround the nose. Click to set 2ND WINDOW CORNER.

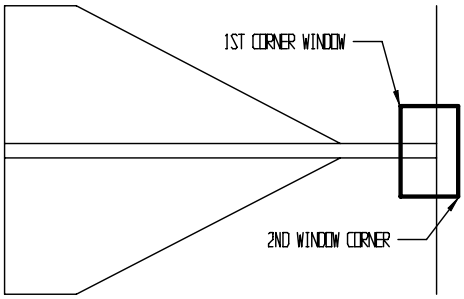


FIG. 5

Step 7. To trim part of a line, click the line you are to trim, the vertical line between the fuselage lines, Line 7, **Fig. 6**. Move cursor close to the intersection with Line 3 and click. Repeat at other end. That is, click the part of the line you are keeping, Line 7 between the fuselage lines, then move cursor close to the intersection with Line 8 and click.

Step 8. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

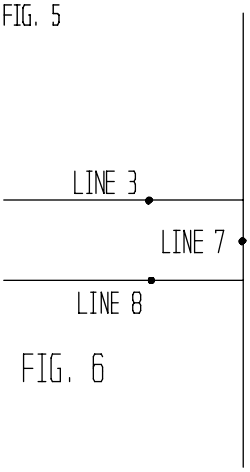


FIG. 6

Step 9. Save the drawing. Use **CTRL-S**.

G. ADD THE 3rd DIMENSION TO THE FUSELAGE.

Step 1. Change to the Isometric View. Use **ALT-V 7**. Hold ALT and press V. Key in 7 and press ENTER.

Step 2. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

Step 3. ESC to Main Menu.

Step 4. F4 X-FORM.

Step 5. F1 DELTA.

Step 6. F3 JOIN.

Step 7. F1 SINGLE.

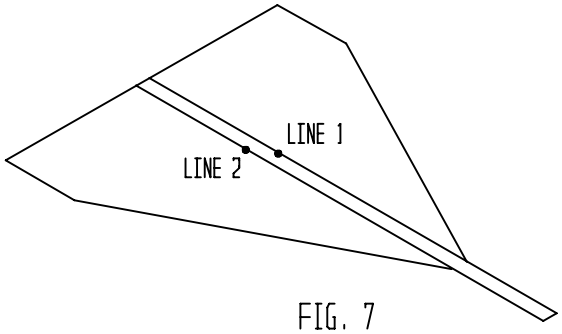


FIG. 7

Step 8. Click the two blue lines of the fuselage, Lines 1 and 2, **Fig. 7**, and press ENTER.

Step 9. Key in 1 for the Number of Copies and press ENTER.

Step 10. Key in:
0 for dX and press ENTER.
0 for dY and press ENTER.
-.5 for dZ and press ENTER.

H. ADD 3rd DIMENSION TO THE WINGS.

Step 1. F10 BACKUP **two times** to choose option.

Step 2. F1 SINGLE.

Step 3. Click the 5 wings entities Lines 1 thru 5, **Fig. 8** and press ENTER.

Step 4. Key in 1 for Number of Copies and press ENTER.

Step 5. Key in:
0 for dX and press ENTER.
0 for dY and press ENTER.
-.1 for dZ and press ENTER.

Step 6. ESC to Main Menu.

Step 7. Save the drawing. Use **CTRL-S**.

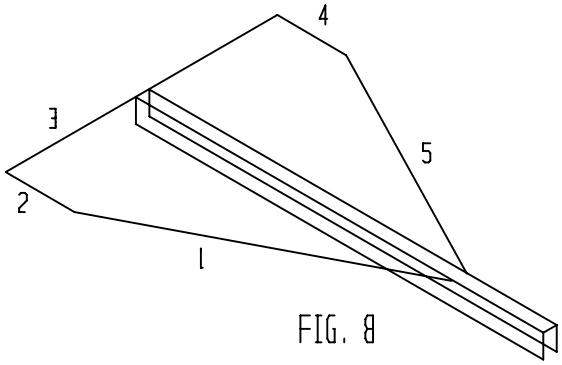


FIG. 8

I. DRAW IN NOSE USING ALONG LINE.

Step 1. Change to the Side View. Use **ALT-V 2**. Hold ALT and press V. Key in 2 and press ENTER.

Step 2. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

Step 3. Zoom in to draw the nose details. Use **ALT-W** to zoom. Hold down ALT and press W. Move the cursor to just above the middle of the fuselage and click to start 1ST WINDOW CORNER, **Fig. 9**. Stretch the window to surround the nose. Click to set 2ND WINDOW CORNER.

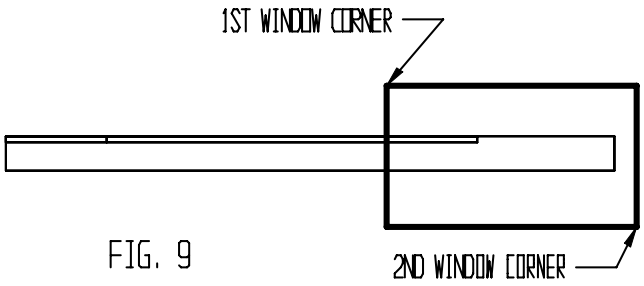


FIG. 9

Step 4. Turn on Tracking. Use **CTRL-T**. Hold down CTRL and press T.

Step 5. F3 WORLD.

Step 6. **Set the Snap to .05**. Use **CTRL-G**. Hold down CTRL and press G. Change the **Snap Properties Increment** to **X = .05 and Y = .05** Click OK.

Step 7. Draw the next lines in a different color. Change color to **yellow**. Click the color swatch in the side Tool Bar. Click the yellow, number 4.

Step 8. ESC to Main Menu.

Step 9. F1 CREATE.

Step 10. F1 LINE.

Step 11. F1 ENDPOINTS.

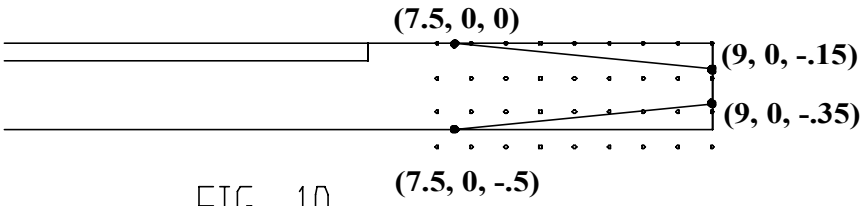


FIG. 10

Step 12. F1 CURSOR. Draw the nose lines between points shown in **Fig. 10**. Click to start the line then move the cursor to the next point and click. Use the Cursor Tracking Window located at the bottom of the display to view the coordinates.

Step 13. Save the drawing. Use **CTRL-S**.

J. COPY THE NOSE TO THE BACK SIDE USING OLD-NEW.

Step 1. Change to the Isometric View. Use **ALT-V 7**. Hold ALT and press V. Key in 7 and press ENTER.

Step 2. Zoom in to draw the nose details. Use **ALT-W** to zoom. Hold down ALT and press W. Move the cursor to just outside the top left corner of the nose and click to start 1ST WINDOW CORNER, **Fig. 11**. Stretch the window to surround the nose. Click to set 2ND WINDOW CORNER.

Step 3. ESC to Main Menu.

Step 4. F4 X-FORM.

Step 5. F2 OLD-NEW.

Step 6. F2 COPY.

Step 7. F1 SINGLE.

Step 8. Click the two yellow lines of the nose, Lines 5 and 6, **Fig. 12** and press ENTER.

Step 9. Key in 1 for the Number of Copies and press ENTER.

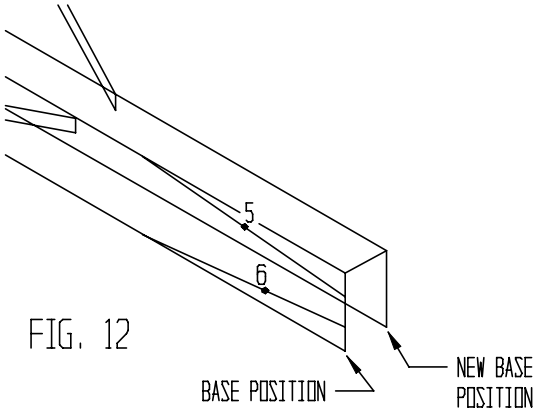


FIG. 12

Step 10. F3 ENDENT. Endent will preform a search and locate the exact corner.

Step 11. Click the forward left corner of the fuselage as the Base Position, **Fig. 12**.

Step 12. Press ENTER to indicate first direction point.

Step 13. Click the back corner of the fuselage as the New Base.

Step 14. Use CTRL-R to clear highlighted entities. Hold down CTRL and press R.

Step 15. Save the drawing. Use **CTRL-S**.

K. TRIM THE NOSE USING TRIM FIRST.

Step 1. ESC to Main Menu.

Step 2. F2 EDIT.

Step 3. F1 TRIM/EXTEND.

Step 4. F1 FIRST.

Step 5. To trim part of a line, click the line you are to keep, Line 1, **Fig. 13**. Move cursor close to the intersection with Line 2 and click. Repeat at other side. That is, click the part of the line you are keeping, Line 1, then move cursor close to the intersection with Line 2 and click.

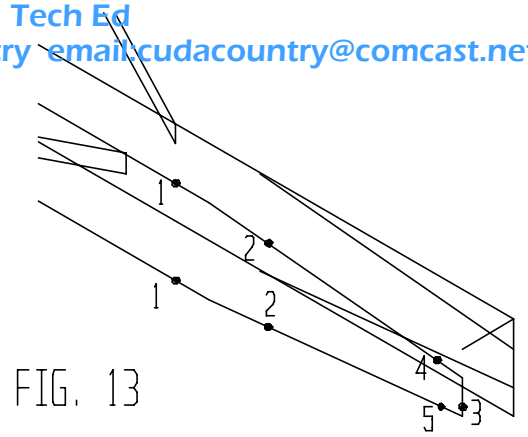


FIG. 13

Step 6. Trim the vertical lines. To trim part of a line, click the line you are to keep, Line 3, **Fig. 13**. Move cursor close to the intersection with Line 4 and click. Repeat at other end. That is, click the part of the line you are keeping, Line 3, then move cursor close to the intersection with Line 5 and click.

Step 7. Repeats Steps 5 and 6 at the back of the nose, **Fig 14**.

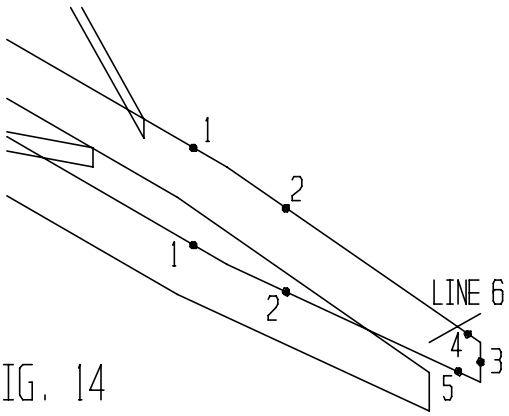


FIG. 14

Step 8. Use **CTRL-Q** to delete Line 6. Hold down CTRL and press Q. Move the cursor over the line, select with a click and press ENTER.

L. DRAW NOSE LINES USING ENDPOINTS.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F1 ENDPOINTS.

Step 5. F3 ENDENT. Endent will preform a search and locate the exact corner your are drawing the line to.

Step 6. Move cursor to Line 1, **Fig. 15** and click. Then click Line 2. Repeat for other nose lines.

Step 7. Save the drawing. Use **CTRL-S**.

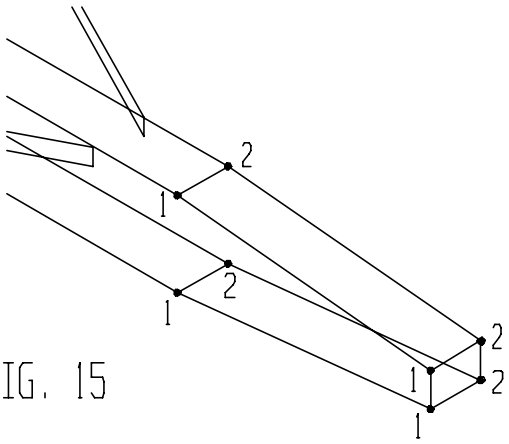


FIG. 15

M. DRAW POLYLINES N-GONS

Step 1. Change to the Side View. Use **ALT-V 2**. Hold down ALT and press V. Key in 2 and press ENTER.

Step 2. Change color to **red**. Click the color swatch in the side Tool Bar. Click the red, number 2.

Step 3. **Change the Depth.** Use **CTRL-D**. Hold down CTRL and press D.

Step 4. F1 VALUE.

Step 5. Key in **-.1 for the new depth** and press ENTER.

Step 6. ESC to Main Menu.

Step 7. F1 CREATE.

Step 8. F5 POLYLINE.

Step 9. F3 N-GON.

Step 10. Key in **50** for the Number of Side.

Step 11. Key in 0 for Rotation Angle.

Step 12. Key in **1.5** for Radius and press ENTER.

Step 13. F2 FLAT.

Step 14. Locate point (**6.6, .1, -1.2**) and click, **Fig. 16**.

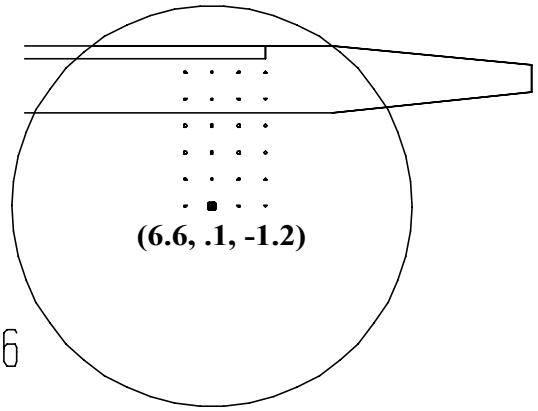


FIG. 16

Step 15. Save the drawing. Use **CTRL-S**.

N. EDIT USING TRIM DOUBLE.

Step 1. ESC to Main Menu.

Step 2. F2 EDIT.

Step 3. F1 TRIM/EXTEND.

Step 4. F3 DOUBLE.

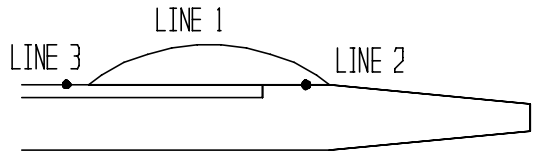


FIG. 17

Step 5. Click the n-gon Line 1, **Fig. 17** as the line to keep, then click the intersections with the n-gon, Lines 2 and 3.

Step 6. Save the drawing. Use **CTRL-S**.

O. ADD THE 3rd DIMENSION TO COCKPIT.

Step 1. Change to the Isometric View. Use **ALT-V 7**. Hold ALT and press V. Key in 7 and press ENTER.

Step 2. Use **ALT-W** to zoom in on the cockpit. Hold down ALT and press W. Move the cursor to just outside the back end of the cockpit and click to start 1ST WINDOW CORNER, **Fig. 18**. Stretch the window to surround the cockpit. Click to set the 2ND WINDOW CORNER.

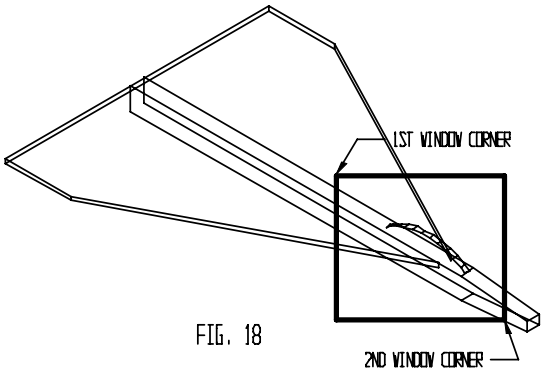


FIG. 18

Step 3. ESC to Main Menu.

Step 4. F4 X-FORM.

Step 5. F1 DELTA.

Step 6. F3 JOIN.

Step 7. F1 SINGLE.

Step 8. Click the n-gon, Line 1, **Fig. 19**, and press ENTER.

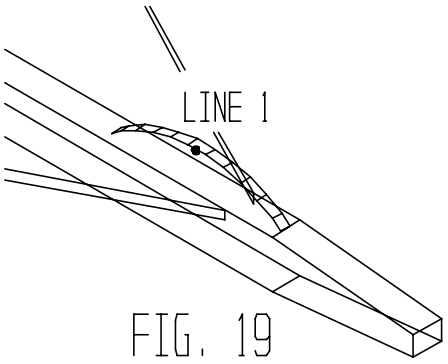


FIG. 19

Step 9. Key in 1 for the Number of Copies and press ENTER.

Step 10. Key in:
0 for dX and press ENTER.
.1 for dY and press ENTER.
O for dZ and press ENTER.

Step 11. Use CTRL-R to clear highlighted entities. Hold down CTRL and press R.

Step 12. Save the drawing. Use **CTRL-S**.

P. USE ENDPOINTS FOR BOTTOM EDGE OF COCKPIT.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F1 ENDPOINTS.

Step 5. F3 ENDENT. Endent will perform a search and locate the exact corner your are drawing the line to.

Step 6. Draw line across the bottom of the cockpit. Move cursor to Line 1, **Fig. 20** and click the

bottom end of the cockpit (curve). Then click Line 2. Repeat for other line.

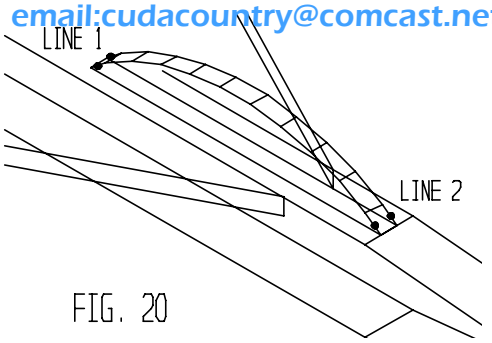


FIG. 20

Step 7. Save the drawing. Use **CTRL-S**.

Q. DRAW RUDDER IN SIDE VIEW.

Step 1. Change to the Side View. Use **ALT-V 2**. Hold down ALT and press V. Key in 2 and press ENTER.

Step 2. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

Step 3. Use **ALT-W** to zoom in on the back end of the fuselage. Hold down ALT and press W. Move the cursor to just outside the aft end of the fuselage and click to start 1ST WINDOW CORNER, **Fig. 21**. Stretch the window to surround the aft end. Click to set the 2ND WINDOW CORNER.

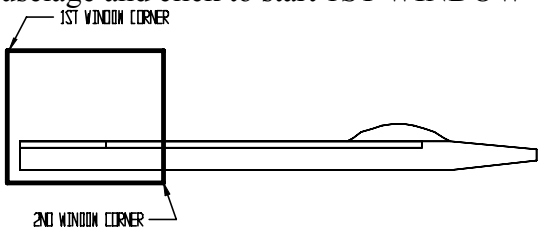


FIG. 21

Step 4. ESC to Main Menu.

Step 5. F1 CREATE.

Step 6. F1 LINE.

Step 7. F1 ENDPOINTS.

Step 8. F1 CURSOR. Draw the rudder between points shown in **Fig. 22**. Click to start the line then move the cursor to the next point and click. View the coordinates in the Status Window.

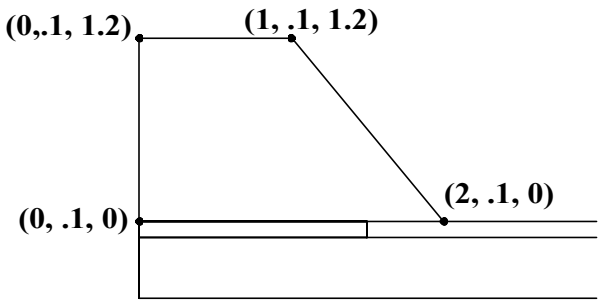


FIG. 22

R. ADD THE 3rd DIMENSION TO RUDDER.

Step 1. Change to the Isometric View. Use **ALT-V 7**. Hold ALT and press V. Key in 7 and press ENTER.

Step 2. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

Step 3. ESC to Main Menu.

Step 4. F4 X-FORM.

Step 5. F1 DELTA.

Step 6. F3 JOIN.

Step 7. F1 SINGLE.

Step 8. Click the three rudder lines, Lines 1,2 and 3, **Fig. 23**, and press ENTER.

Step 9. Key in 1 for the Number of Copies and press ENTER.

Step 10. Key in:
0 for dX and press ENTER.
.1 for dY and press ENTER.
0 for dZ and press ENTER.

Step 11. ESC to Main Menu.

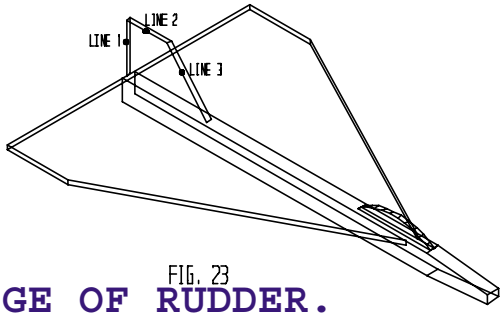


FIG. 23

S. USE ENDPOINTS FOR BOTTOM EDGE OF RUDDER.

Step 1. Use **ALT-W** to zoom in around the rudder. Hold down ALT and press W. Move the cursor to just outside the top back end of the rudder and click to start 1ST WINDOW CORNER, **Fig. 24**. Stretch the window to surround the rudder. Click to set the 2ND WINDOW CORNER.

Step 2. ESC to Main Menu.

Step 3. F1 CREATE.

Step 4. F1 LINE.

Step 5. F1 ENDPOINTS.

Step 6. F3 ENDENT. Endent will perform a search and locate the exact corner your are drawing the line to.

Step 7. Draw line across the bottom of the rudder. Move cursor to Line 1, **Fig. 25** and click. Then click Line 2. Repeat for other line.

Step 8. Save the drawing. Use **CTRL-S**.

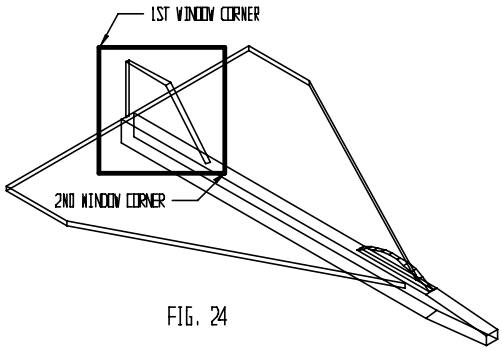


FIG. 24

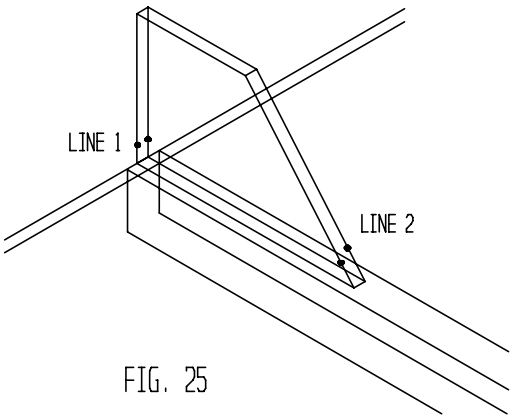


FIG. 25

T. CREATE LAYOUT VIEW.

Step 1. B-1 Glider construction is now complete. The final step is to create a layout drawing of the B-1 Glider in three different views, plus the Isometric View.

Step 2. ESC to Main Menu.

Step 3. Click the **down arrow** on the top Tool Bar until the **Layout Button** is displayed.

Step 4. Click the **Layout Button**.

Step 5. Key in: **b1 glider** for the Name.

Step 6. Set the **Paper Size** to **B**.

Step 7. Set the **Drawing Scale** to **1:1**.

Step 8. Click OK.

Step 9. F5 INSTANCE.

Step 10. F1 CREATE.

Step 11. Select **Top View** and click OK.

Step 12. Key in **0** for Rotation Angle and Press ENTER.

Step 13. F9 KEYIN.

Step 14. Key in: For **TOP VIEW**,
5 for X and press ENTER.
6.5 for Y and press ENTER.
0 for Z and press ENTER.

Step 15. F1 CREATE.

Step 16. Select **Front View** and click OK.

Step 17. Key in **0** for Rotation Angle and Press ENTER.

Step 18. F9 KEYIN.

Step 19. Key in: For **FRONT VIEW**,
5 for X and press ENTER.
2 for Y and press ENTER.
0 for Z and press ENTER.

Step 20. F1 CREATE.

Step 21. Select **Left View** and click OK.

Step 22. Key in **0** for Rotation Angle and Press ENTER.

Step 23. F9 KEYIN.

Step 24. Key in: For **LEFT VIEW**,
13.2 for X and press ENTER.
2 for Y and press ENTER.
0 for Z and press ENTER.

Step 25. F1 CREATE.

Step 26. Select **Isometric View** and click OK.

Step 27. Key in **0** for Rotation Angle and Press ENTER.

Step 28. F9 KEYIN.

Step 29. Key in: For **ISOMETRIC VIEW**,
13 for X and press ENTER.
7.7 for Y and press ENTER.
0 for Z and press ENTER.

Step 30. Save the drawing. Use **CTRL-S**.

U. REFINE THE VIEWS.

Step 1. Window, **ALT-W** in and delete lines that can not be seen in the Isometric View.

Step 2. Trim lines, Use ESC, EDIT, TRIM and both First and Divide. Be careful!!