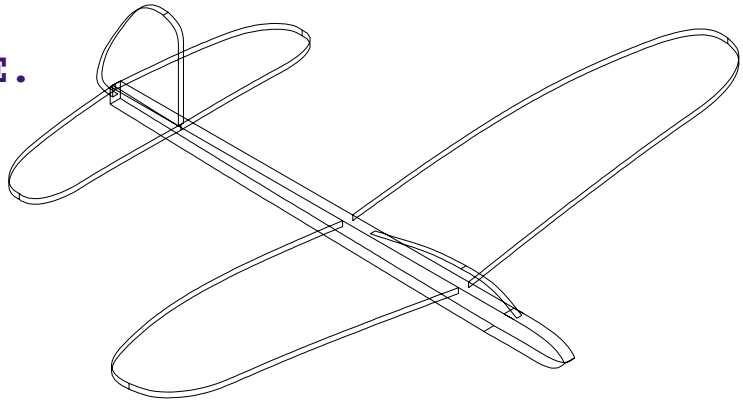
Chapter 14 B4 GLIDER

A. OPEN B FILE.

Step 1. When you start a new drawing away start with the B file. If you started this drawing with the B file go directly to Steps B. If your did not start with 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 **.2** for height and press ENTER.

Step 8. F9 KEY IN.

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

Step 10. ESC to Main Menu.

Step 11. Use **ALT-A** to center the rectangle on the screen. Hold down ALT and press A.

Step 12. At this time it is a good idea to save the drawing. Click **Save As** from the File Menu. Key **a:b4glider** filename and press ENTER. Press ESC for Part Description.

C. DRAW WING IN TOP VIEW.

Step 1. Turn on Tracking. Use **CTRL-T**. Hold down CTRL and press T.

Step 2. F3 WORLD.

Step 3. Scale (reduce) the drawing down to make room for the wing. Use **ALT-S** to scale. Hold down ALT and press S.

Step 4. Key in **.5** and press ENTER **two times**.

Step 5. Use **ALT-W** to zoom in on the bottom half of the screen. Hold down ALT and press W. Move the cursor to just above and to the left of the fuselage, **Fig. 1**. Click to start 1ST WINDOW CORNER. Move the mouse to surround the fuselage and the bottom portion of the screen. Click to set 2ND WINDOW CORNER.

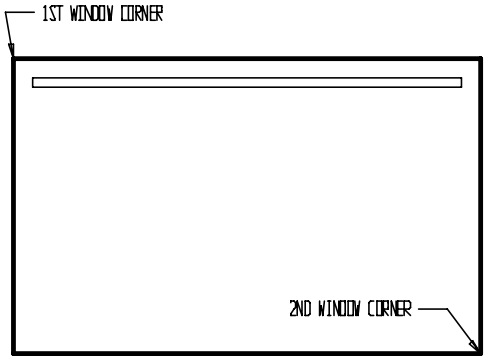


FIG. 1

Step 6. **Set the Snap to .1**. Use **CTRL-G**. Hold down CTRL and press G. Change the **Snap Properties Increment** to **X = .1 and Y = .1** Click OK.

Step 7. ESC to Main Menu.

Step 8. F1 CREATE.

Step 9. F9 SPLINE.

Step 10. F2 3D CUBI.

Step 11. Move cursor to coordinates (**4.6, 0**) and click for start point, **Fig. 2**. Use the Cursor Tracking Window located at the bottom of the display to view the coordinates.

Step 12. Refer to **Fig. 2** for the other coordinates.

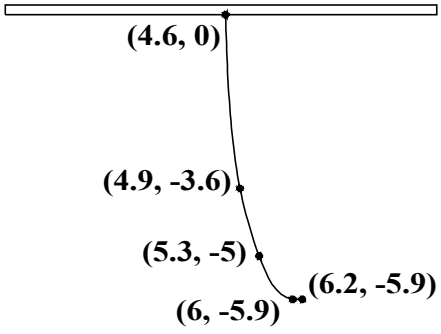


FIG. 2

Step 13. Press ENTER after all coordinates are located.

Step 14. F1 NATURAL **two times**.

Step 15. Use CTRL-R to clear temporary markers. Hold down CTRL and press R.

Step 16. Move cursor to coordinates (**6.2, -5.9**), **Fig. 3** and click for start point.

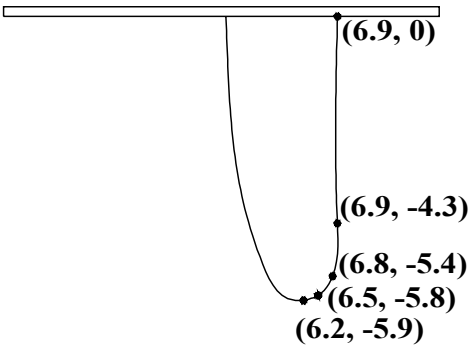


FIG. 3

Step 17. Refer to **Fig. 3** for the other coordinates.

Step 18. Press ENTER after all coordinates are located.

Step 19. F1 NATURAL **two times**.

Step 20. Use CTRL-R to clear temporary markers. Hold down CTRL and press R.

D. DRAW TAIL IN TOP VIEW.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F9 SPLINE.

Step 4. F2 3D CUBI.

Step 5. Move cursor to coordinates (**0, .1**) and click for start point, **Fig. 4**. Use the Cursor Tracking Window located at the bottom of the display.

Step 6. Refer to **Fig. 4** for the other coordinates.

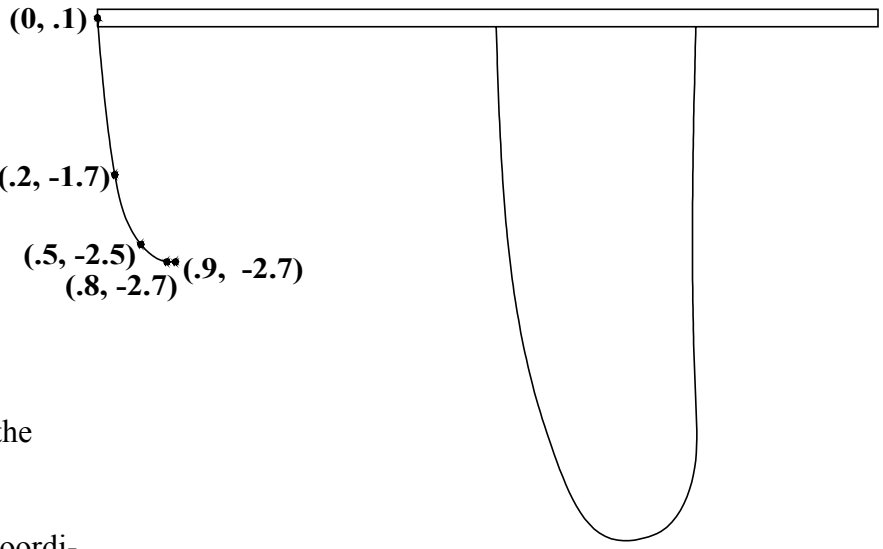


FIG. 4

Step 7. Press ENTER after last coordinate is located.

Step 8. F1 NATURAL **two times**.

Step 9. Use CTRL-R to clear temporary markers. Hold down CTRL and press R.

Step 10. Move cursor to coordinates (**.9, -2.7**), **Fig. 5** and click for start point.

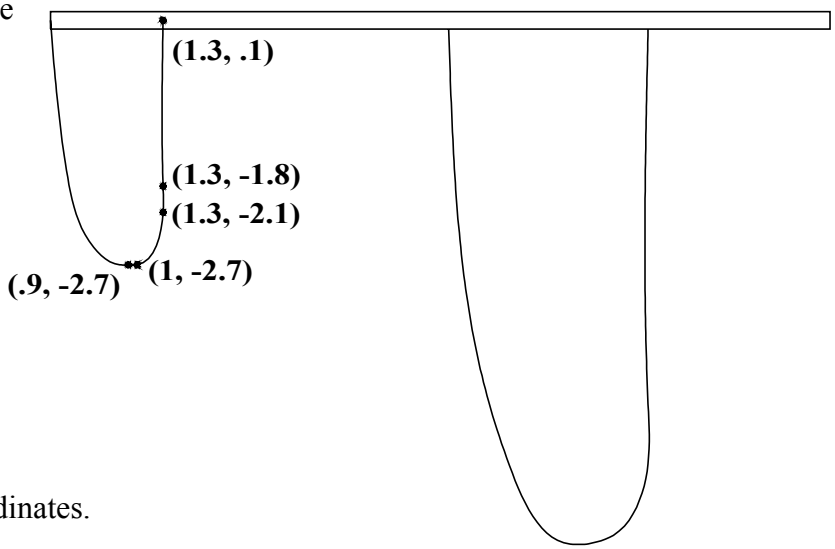


FIG. 5

Step 11. Refer to **Fig. 5** for the other coordinates.

Step 12. Press ENTER after all coordinates are located.

Step 13. F1 NATURAL **two times**.

Step 14. Use CTRL-R to clear temporary markers. Hold down CTRL and press R.

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

E. MIRROR THE OTHER WING AND TAIL.

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 and tail splines (curves), Splines 1, 2, 3 and 4, **Fig. 6**, with a click and press ENTER.

Step 7. F1 1 POINT HORIZONTAL.

Step 8. To indicate 1st position for mirror click on the center of the back line, Line 5, (**0,.1,0**), **Fig. 6**.

Step 9. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

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

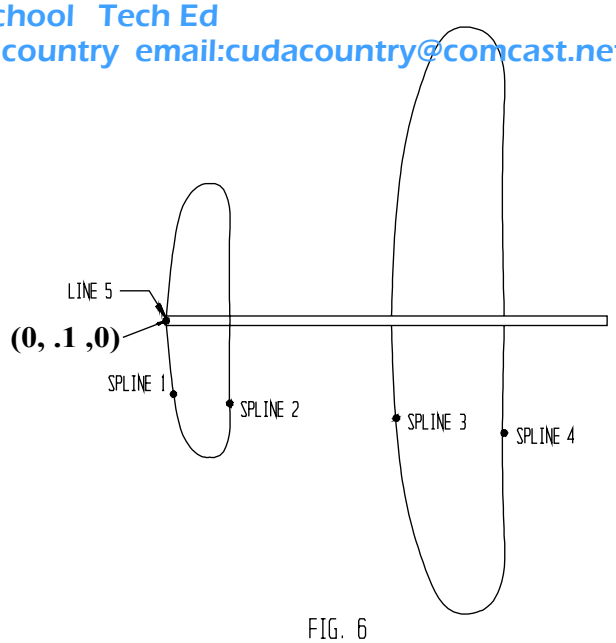


FIG. 6

F. 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.

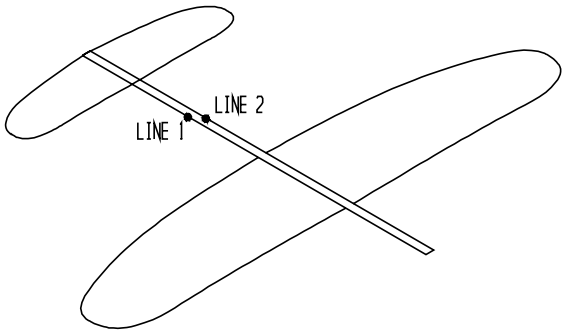


FIG. 7

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.

G. ROTATE WINGS IN FRONT VIEW.

Step 1. Change to the Front View. Use **ALT-V 5**. Hold ALT and press V. Key in 5 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. F3 ROTATE.

Step 6. F1 MOVE.

Step 7. F1 SINGLE.

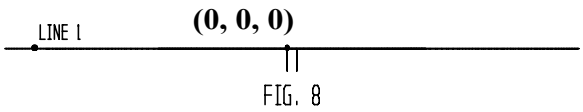


FIG. 8

Step 8. In the Front View, click the line of the wing on the left end **two times** to select both wing splines, Line 1, **Fig. 8** and press ENTER.

Step 9. Click at the intersection of the left wing and fuselage, **(0, 0, 0)**, **Fig. 8**, for first point of rotation.

Step 10. Press ENTER to accept 2nd point on axis.

Step 11. Key in **-9** degrees for rotation angle and press ENTER.

Step 12. Use CTRL-R to redraw the screen. Hold down CTRL and press R.

Step 13. F10 BACKUP.

Step 14. F1 SINGLE.

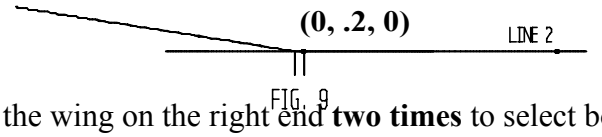


FIG. 9

Step 15. In the Front View, click the line of the wing on the right end **two times** to select both wing splines, Line 3, **Fig. 9** and press ENTER.

Step 16. Click at the intersection of the right wing and fuselage, **(0, .2, 0)** for position of rotation, **Fig. 9**, for 1st point on axis.

Step 17. Press ENTER to accept 2nd point on axis.

Step 18. Key in **9** degrees for rotation angle and press ENTER.

Step 19. Use CTRL-R to redraw the screen. Hold down CTRL and press R.

Step 20. Save the drawing. Use **CTRL-S**.

H. ROTATE TAIL IN SIDE VIEW.

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

Step 2. ESC to Main Menu.

Step 3. F4 X-FORM.

Step 4. F3 ROTATE.

Step 5. F1 MOVE.

Step 6. F1 SINGLE.

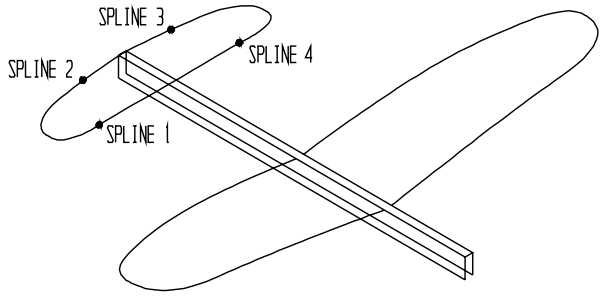


FIG. 10

Step 7. Click on the splines that make of the tail, Splines 1, 2, 3 and 4, **Fig. 10**, and press ENTER.

Step 8. Change to the Side View. Use **ALT-V 2**. Hold ALT and press V. Key in 2 and press ENTER.

Step 9. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

Step 10. Move the cursor to the top left corner of the fuselage **(0, 0, 0)** and click for point of rotation, **Fig. 11**.

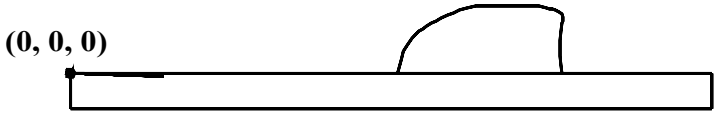


FIG. 11

Step 11. Key in **-2** degrees for rotation angle and press ENTER, **Fig. 11**.

Step 12. Use CTRL-R to redraw the screen. Hold down CTRL and press R.

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

I. ADD 3rd DIMENSION TO THE WINGS and TAIL.

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

Step 2. ESC to Main Menu.

Step 3. F4 X-FORM.

Step 4. F1 DELTA.

Step 5. F3 JOIN.

Step 6. F1 SINGLE.

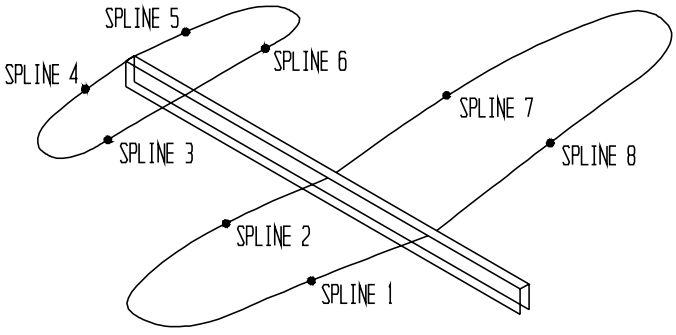


FIG. 12

Step 7. Click the eight splines that make up the wings and tail, Splines 1 thru 8, **Fig. 12**, and press ENTER.

Step 8. Key in 1 for the Number of Copies and press ENTER.

Step 9. Key in:
0 for dX and press ENTER.
0 for dY and press ENTER.
-.1 for dZ and press ENTER.

Step 10. ESC to Main Menu.

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

J. DRAW FUSELAGE IN SIDE VIEW.

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

Step 2. Draw the next lines in a different color. Change color to **dark blue**. Click the color swatch in the side Tool Bar. Click the dark blue, number 8.

Step 3. ESC to Main Menu.

Step 4. F1 CREATE.

Step 5. F9 SPLINE.

Step 6. F2 3D CUBI.

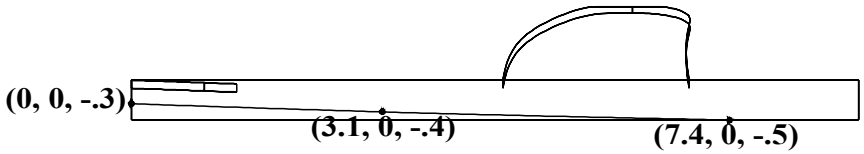


FIG. 13

Step 7. Move cursor to coordinates (**0, 0, -3**) and click for start point, **Fig. 13**. Use the Cursor Tracking Window located at the bottom of the display.

Step 8. Move cursor to coordinates (**3.1, 0, -.4**) and click.

Step 9. Move cursor to coordinates (**7.4, 0, -.5**) and click,

Step 10. Press ENTER after all coordinates are located.

Step 11. F1 NATURAL **two times**.

K. DRAW NOSE IN SIDE VIEW.

Step 1. Use **ALT-W** to zoom in on the forward half of the fuselage. Hold down ALT and press W. Move the cursor to just above and back of the wing, **Fig. 14**. Click to start 1ST WINDOW CORNER. Move the mouse to surround the front of the fuselage. Click to set 2ND WINDOW CORNER.

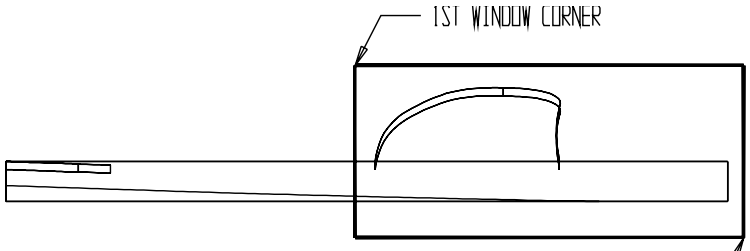


FIG. 14

Step 2. **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 3. ESC to Main Menu.

Step 4. F1 CREATE.

Step 5. F9 SPLINE.

Step 6. F2 3D CUBI.

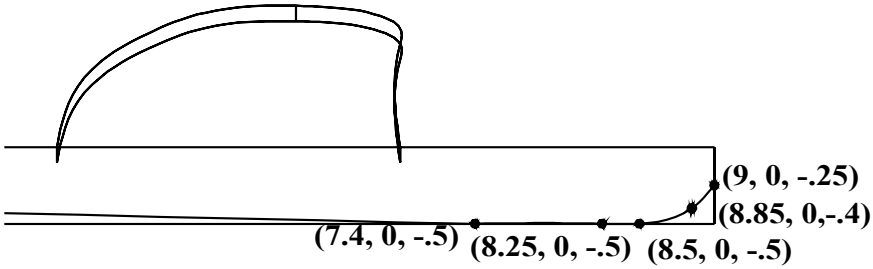


FIG. 15

Step 7. Move cursor to coordinates (**7.4, 0, -.5**) and click for start point, **Fig. 15**.

Step 8. Move cursor to coordinates (**8.35, 0, -.5**) and click for the next point, **Fig. 15**.

Step 9. Refer to **Fig. 15** for the other coordinates.

Step 10. Press ENTER after all coordinates are located.

Step 11. F1 NATURAL **two times**.

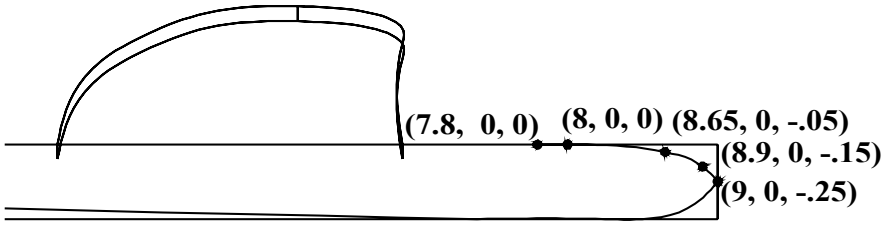


FIG. 16

Step 12. Use CTRL-R to clear temporary markers. Hold down CTRL and press R.

Step 13. Move cursor to coordinates (**9, 0, -.25**), **Fig. 16** and click for start point.

Step 14. Refer to **Fig. 16** for the other coordinates.

Step 15. Press ENTER after all coordinates are located.

Step 16. F1 NATURAL **two times**.

L. DRAW COCKPIT IN SIDE VIEW.

Step 1. 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 2. **Change the Depth.** Use CTRL D. Hold down CTRL and press D.

Step 3. F1 Value.

Step 4. Key in **-.05 for the new depth** and press ENTER.

Step 5. ESC to Main Menu.

Step 6. F1 CREATE.

Step 7. F9 SPLINE.

Step 8. F2 3D CUBI.

Step 9. Refer to **Fig. 17** for the coordinates.

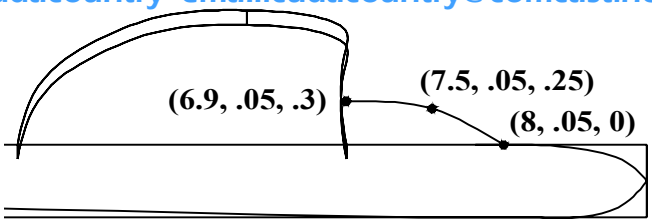


FIG. 17

Step 10. Press ENTER after all coordinates are located.

Step 11. F1 NATURAL **two times**.

Step 12. Use CTRL-R to clear temporary markers.

Step 13. Refer to **Fig. 18** for the coordinates.

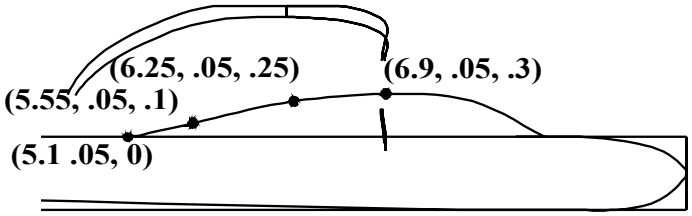


FIG. 18

Step 14. Press ENTER after all coordinates are located.

Step 15. F1 NATURAL **two times**.

Step 16. Save the drawing. Use **CTRL-S**.

M. DRAW RUDDER IN SIDE VIEW.

Step 1. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

Step 2. Use **ALT-W** to zoom in on the tail section. Hold down ALT and press W. Move the cursor above and to the left of the tail section, **Fig. 19**. Click to start 1ST WINDOW CORNER. Move the mouse to surround the tail section. Click to set 2ND WINDOW CORNER.

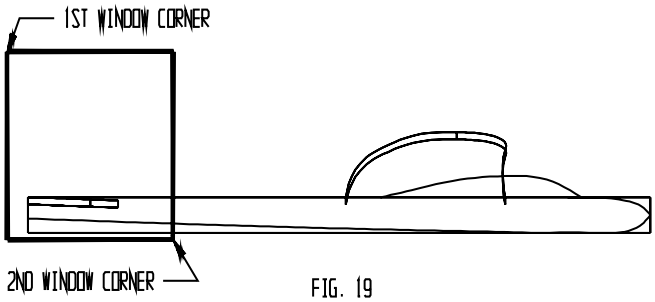


FIG. 19

Step 3. ESC to Main Menu.

Step 4. F1 CREATE.

Step 5. F9 SPLINE.

Step 6. F2 3D CUBI.

Step 7. Refer to **Fig. 20** for the coordinates for the forward spline of the rudder.

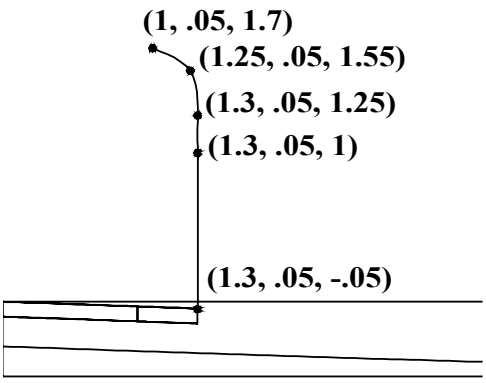


FIG. 20

Step 8. Press ENTER after all coordinates are located.

Step 9. F1 NATURAL **two times**.

Step 10. Refer to **Fig. 21** for the coordinates for the rear spline of the rudder.

Step 11. Press ENTER after all coordinates are located.

Step 12. F1 NATURAL **two times**.

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

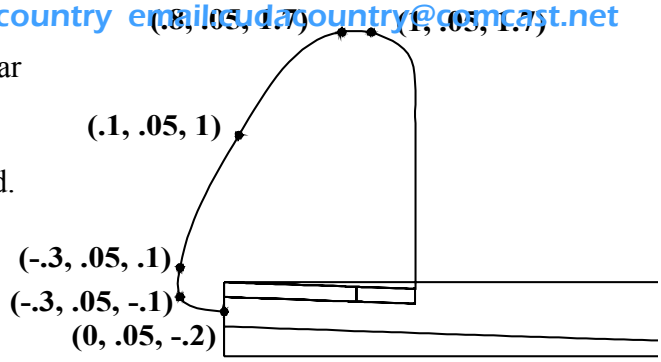


FIG. 21

N. COMPLETE RUDDER LINES.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F1 ENDPOINTS.

Step 5. Draw in the lines between Point 1, 2 and 3, **Fig. 22.**

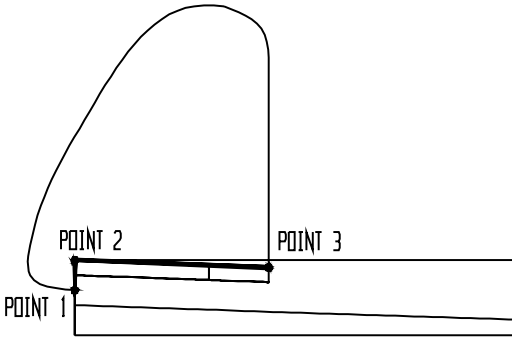


FIG. 22

O. ADD THE 3rd DIMENSION TO THE FUSELAGE SPLINE.

Step 1. Draw the next lines in a different color. Change color to **dark blue**. Click the color swatch in the side Tool Bar. Click the dark blue, number 8.

Step 2. Change to the Isometric View. Use **ALT-V 7**. Hold ALT and press V. Key in 7 and press ENTER.

Step 3. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

Step 4. ESC to Main Menu.

Step 5. F4 X-FORM.

Step 6. F1 DELTA.

Step 7. F3 JOIN.

Step 8. F1 SINGLE.

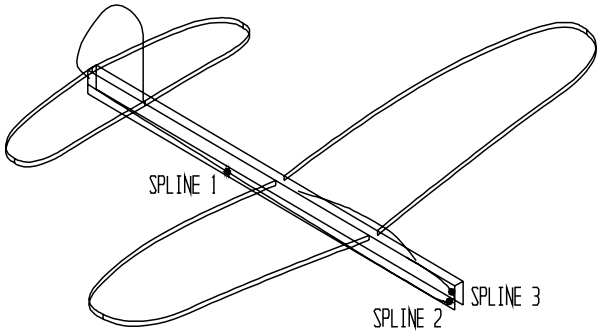


FIG. 23

Step 9. Click the splines of fuselage and the nose, Splines 1, 2 and 3, **Fig. 23**, and press ENTER.

Step 10. Key in 1 for the Number of Copies and press ENTER.

Step 11. Key in:
0 for dX and press ENTER.
.2 for dY and press ENTER.
0 for dZ and press ENTER.

P. ADD 3rd DIMENSION TO THE RUDDER AND COCKPIT.

Step 1. 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 2. ESC to Main Menu.

Step 3. F4 X-FORM.

Step 4. F1 DELTA.

Step 5. F3 JOIN.

Step 6. F1 SINGLE.

Step 7. Click the yellow splines of the tail and the cockpit, Splines 1, 2, 3 and 4, **Fig. 24**, and press ENTER.

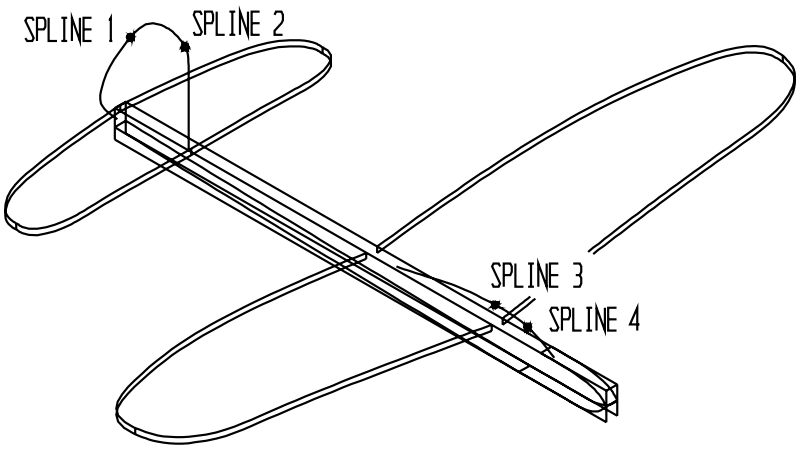


FIG. 24

Step 8. Key in 1 for the Number of Copies and press ENTER.

Step 9. Key in:
0 for dX and press ENTER.
.1 for dY and press ENTER.
0 for dZ and press ENTER.

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

Q. DELETE FUSELAGE LINES.

Step 1. ESC to Main Menu.

Step 2. Use **ALT-W** to zoom in on the front half of the glider. Hold down ALT and press W. Move the cursor to just behind the wing at the fuselage, **Fig. 25**. Click to start 1ST WINDOW CORNER. Move the mouse to surround the front half of the fuselage. Click to set 2ND WINDOW CORNER.

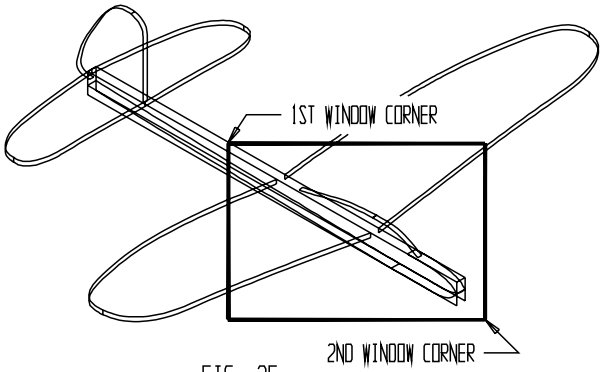


FIG. 25

Step 3. Delete Lines 1 through 5, **Fig. 26**. Use CTRL-Q to delete the line. Hold down CTRL and press Q. Move the cursor over the line, select with a click and press ENTER.

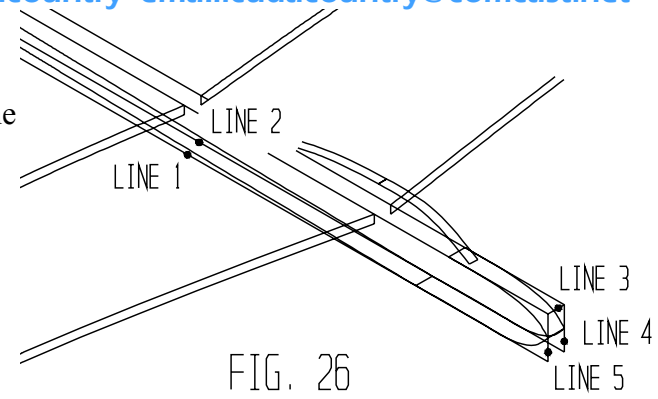


FIG. 26

R. EDIT the FUSELAGE.

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. 27**. Move cursor close to the intersection with Spline 2 and click. Repeat at the other fuselage line. That is, click the part of the line you are keeping, Line 3, then move cursor close to the intersection with Spline 4 and click.

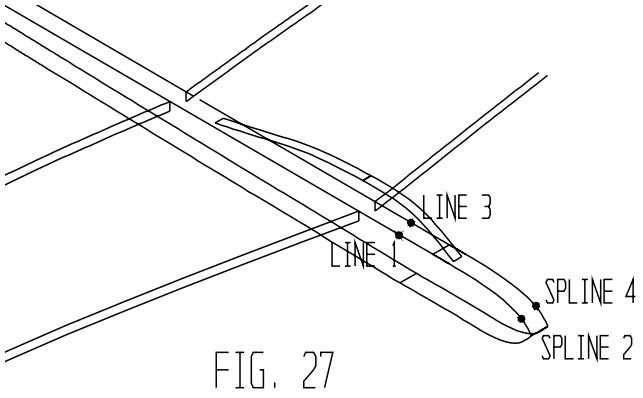


FIG. 27

Step 6. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

Step 7. Use **ALT-W** to zoom in on the rudder area. Hold down ALT and press W. Move the cursor to just above and to the rudder area, **Fig. 28**. Click to start 1ST WINDOW CORNER. Move the mouse to surround the rudder area. Click to set 2ND WINDOW CORNER.

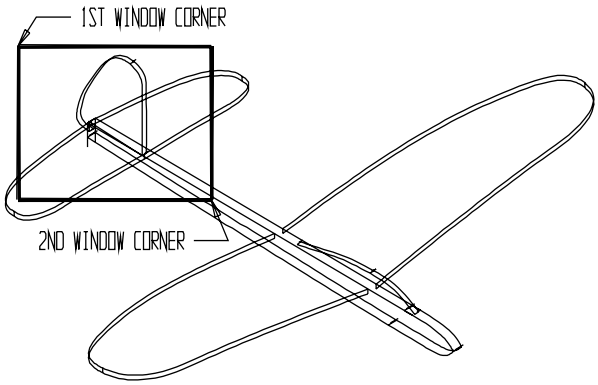


FIG. 28

Step 8. To trim part of a line, click the line you are to keep, the vertical line, Line 1, **Fig. 29**. Move cursor close to the intersection with Line 2 and click. Repeat at other line. That is, click the part of the line you are keeping, Line 3, then move cursor close to the intersection with Line 4 and click.

Step 9. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

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

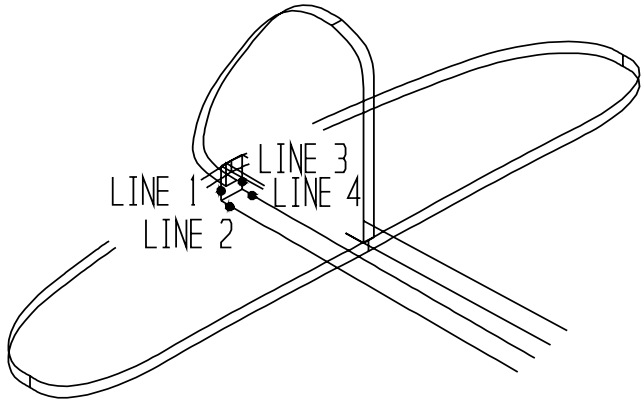


FIG. 29

S. CREATE LAYOUT DRAWING.

Step 1. B-4 Glider construction is now complete. The final step is to create a layout drawing of the B-4 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: **b4 glider** for the Name.

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

Step 7. Set the **Drawing Scale** to **1:2**.

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**,
2.7 for /XV and press ENTER.
4 for /YV and press ENTER.
0 for /ZV 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**,
2.7 for /XV and press ENTER.
.7 for /YV and press ENTER.
0 for /ZV 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**,
8.5 for /XV and press ENTER.
.7 for /YV and press ENTER.
0 for /ZV 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**,
8 for /XV and press ENTER.
5.2 for /YV and press ENTER.
0 for /ZV and press ENTER.

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