

SECTION

PERFORMANCE

REV

PAGE

8.6

MAKING DREAMS FLY!

CG-CP

Center of Gravity (from bottom)

Section	Dist	Wt. (oz.)	MOM
Body	46.5	83.5	3882.75
Capsule	88	14	1232
Tower	101.75	10.5	1068.375
Computer	78	4	312
Motor (1161)	4	13.58	54.32
TOTALS		125.58	6549.445
CG			52.15357

Center of Pressure (from bottom)

Section	Dist	Area	Num.	Tot area	MOM
Body	46.5	807.5	1	807.5	37548.75
Main fin	2.5	19.33	4	79.72	199.3
Main fin triangle	3	15.4	4	61.6	492.8
Sub Fin	2	10.35	4	41.4	82.8
Capsule	88	57.81	1	57.81	5087.28
Drogue canister	96	4	1	4	384
Tower motor	112	12	1	12	1344
Tower nozzles	107	3.75	3	11.25	1203.75
TOTALS				1075.28	46342.68
CP					43.09824

Static Margin (CG - CP)

9.055323 or 1.034894 Diameters

SECTION

PERFORMANCE

REV

PAGE

8.7

MAKING DREAMS FLY!

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Sub Test1()
alt = Cells(4, 2): vel = Cells(5, 2): D = Cells(9, 2): wt = Cells(3, 2)
cd = Cells(6, 2): temp0 = Cells(8, 2): motors = Cells(10, 2): r = 1716
dt = 1 / 10: t1 = dt: a = 3.141592 * (D / 24) ^ 2: g = 32.2
tb = Worksheets(1).Cells(13, 5)
Range(Cells(12, 2), Cells(18, 2)).Value = 0
Dim t(40), f(40)
For i = 0 To Worksheets(1).Cells(14, 5)
    t(i) = Worksheets(1).Cells(i + 15, 5)
    f(i) = Worksheets(1).Cells(i + 15, 6)
Next i
30: i = 0: j = 0 ' Start Main
Do While vel >= 0
    j = j + 1
    If t1 <= t(i + 1) Then GoTo 40
    If t1 > tb Then GoTo 50
    i = i + 1
40: ' Thrust interpolation
    If f(i + 1) - f(i) < 0 Then
        Ft = f(i + 1) - ((t(i + 1) - t1) * (f(i + 1) - f(i)) / (t(i + 1) - t(i)))
        liftoff = 0
    ElseIf (f(i + 1) - f(i)) = 0 Then
        Ft = f(i + 1)
        liftoff = 0
    Else Ft = f(i) + (t1 - t(i)) * (f(i + 1) - f(i)) / (t(i + 1) - t(i))
        liftoff = 1
    End If
    If Ft > Fmax Then Fmax = Ft
50:
    If t1 > tb Then Ft = 0 Else Ft = Ft * motors
    press = 144 * 14.7 * (1 - alt / 1000 / 145.45) ^ 5.2561
    temp = temp0 + 460 - (3.5662 * (alt / 1000))
    rho = press / r / temp
    drag = 0.5 * rho * a * cd * vel ^ 2
    accel = (Ft - wt - drag) / (wt / g)
    vel = vel + accel * dt
    If Ft > 0 Then wt = wt - motors * wp / (tb / dt)
    If vel > vmax Then vmax = vel
    If accel > amax Then amax = accel
    If Ft < wt And liftoff = 1 Then vel = 0.01
    alt = alt + vel * dt
    Cells(j + 1, 8).Value = t1
    Cells(j + 1, 9).Value = Ft
    Cells(j + 1, 10).Value = vel
    Cells(j + 1, 11).Value = alt
    t1 = (Int((t1 + dt / 2) / dt) * dt) + dt 'eliminate roundoff error
    If t1 < tb Then GoTo 60
    If t1 > tb And flag = 1 Then GoTo 60
    Cells(17, 2).Value = alt
    Cells(18, 2).Value = vel
    flag = flag + 1
60: Loop
    Cells(12, 2).Value = alt
    Cells(13, 2).Value = t1 - dt
    Cells(14, 2).Value = vmax
    Cells(15, 2).Value = amax / 32.1
    Cells(16, 2).Value = Fmax
End Sub

```

SECTION

PERFORMANCE

REV

PAGE

8.8

**TEMPLATES AND
CONSTRUCTION SKETCHES**

AeroVentures

MAKING DREAMS FLY!

MERCURY-REDSTONE

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Aero Ventures

MAKING DREAMS FLY!

MERCURY-REDSTONE

S

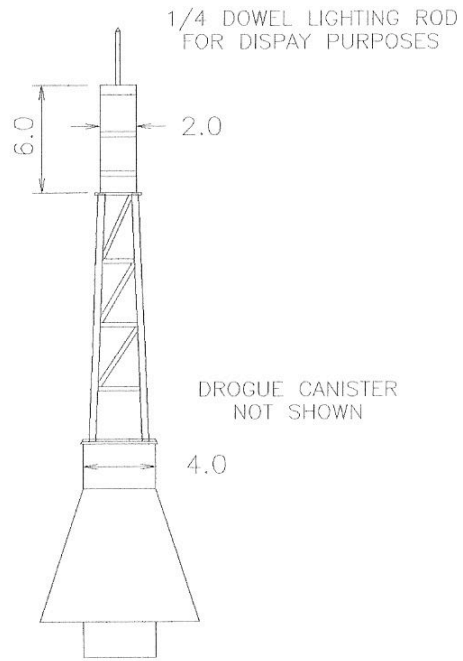
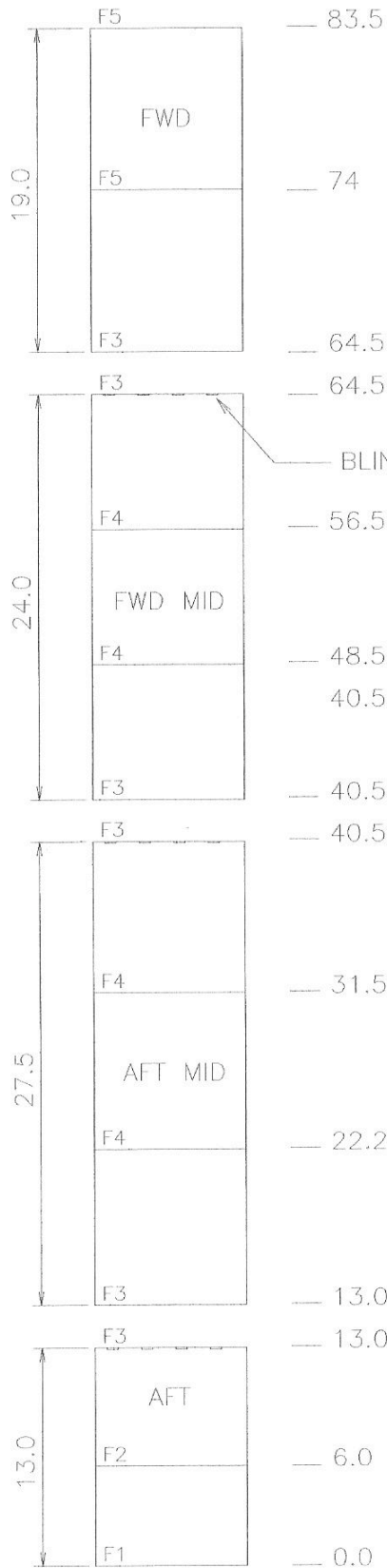
T

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S



- ROCKET SEGMENTS SHOWN SEPERATED FOR CLARITY
- DIMENSIONS TO OUTER EDGE OF SEGMENTS EXCEPT INTERNAL BULKHEADS TO FORWARD (TOP) OF BULKHEAD
- RE-INFORCING CROSS-STRINGERS IN FWD SECTION NOT SHOWN. SEE TEXT
- CAPSULE AND TOWER SHOWN FOR REFERENCE ONLY
- FINS SHOULD EXTEND 1" BELOW F1 SEE PHOTOS AND VIDEO

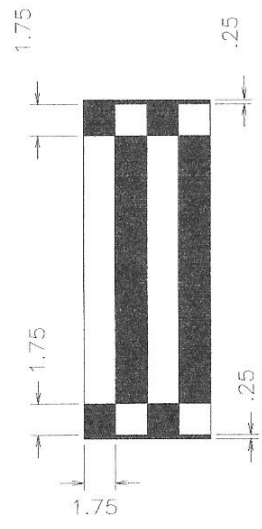
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	MRM01	
Date: 8/15/96	Scale: FULL	

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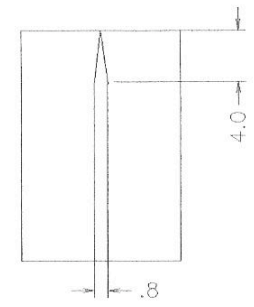
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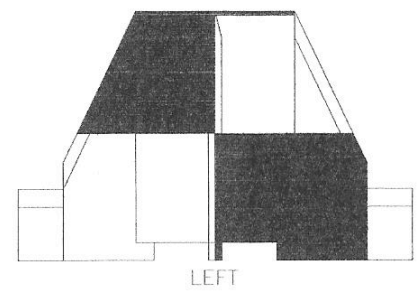
1.0 (FWD MID SEGMENT)

- FLAT PATTERN SHOWN (4 of 16 VERTICAL BARS SHOWN)
- CUT 8 WHITE (2.0) AND 8 BLACK (1.75) BARS 20" LONG. CUT AND SAVE 2" FROM EACH
- APPLY WHITE BARS FIRST ALLOWING FOR OVERLAP
- APPLY BLACK BARS NEXT WITH 1/8 OVERLAP EACH SIDE. THIS WILL MAKE BARS SAME FINAL WIDTH (1.75)
- ADD 2" PIECES AS ABOVE AT BOTTOM OF SEGMENT ALLOWING FOR OVERLAP
- UPPER AND LOWER BLACK (.25) STRIPS SHOULD BE LAST



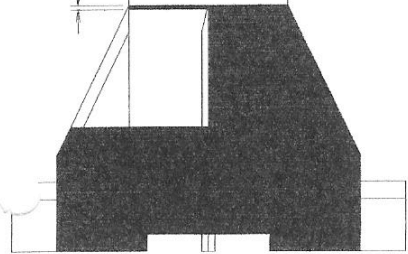
FIN CUTOUTS

- ROLL PATTERN ON FINS AS SHOWN
- STEERING FINS AND PLATES ARE ENTIRELY WHITE
- PAINTING FIN PLATES IS RECOMMENDED

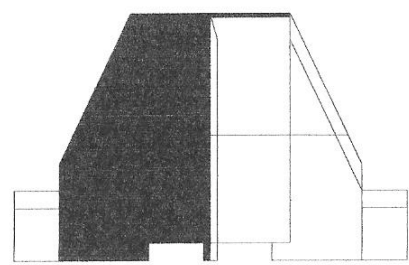


LEFT

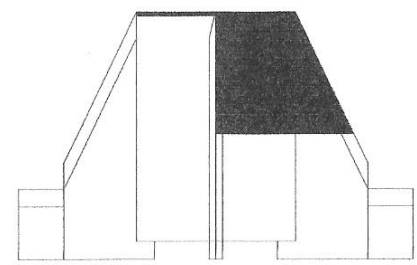
.25 (AFT SEGMENT)



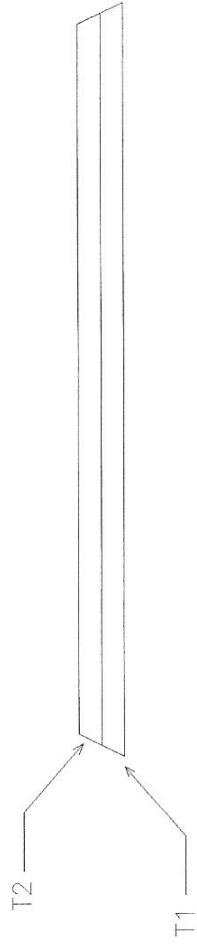
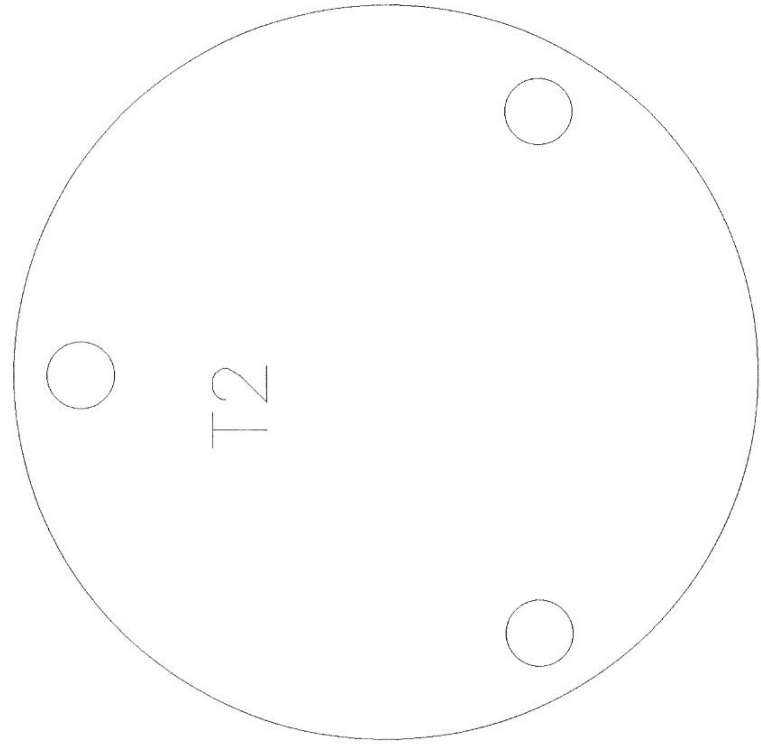
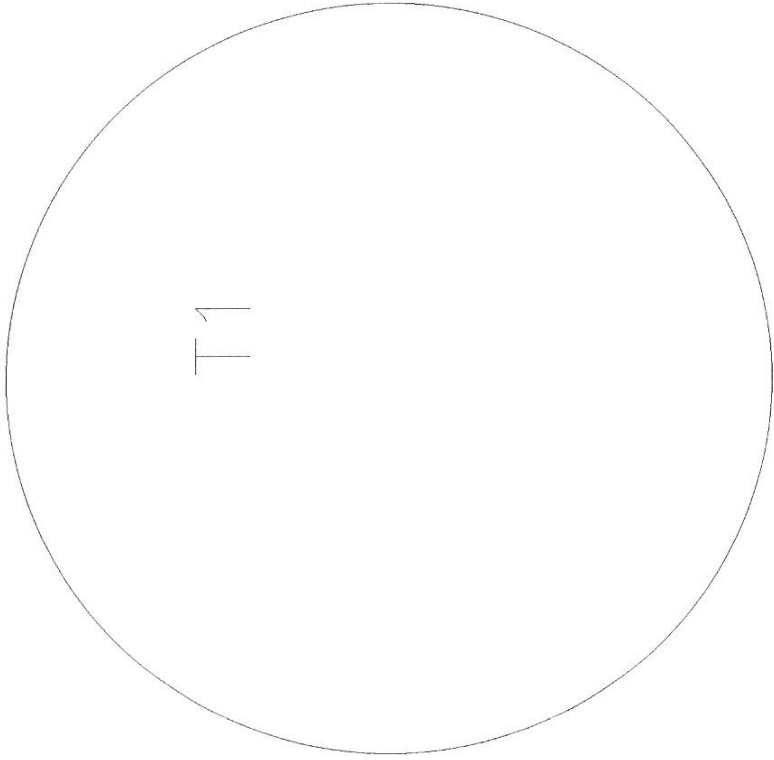
FRONT




RIGHT



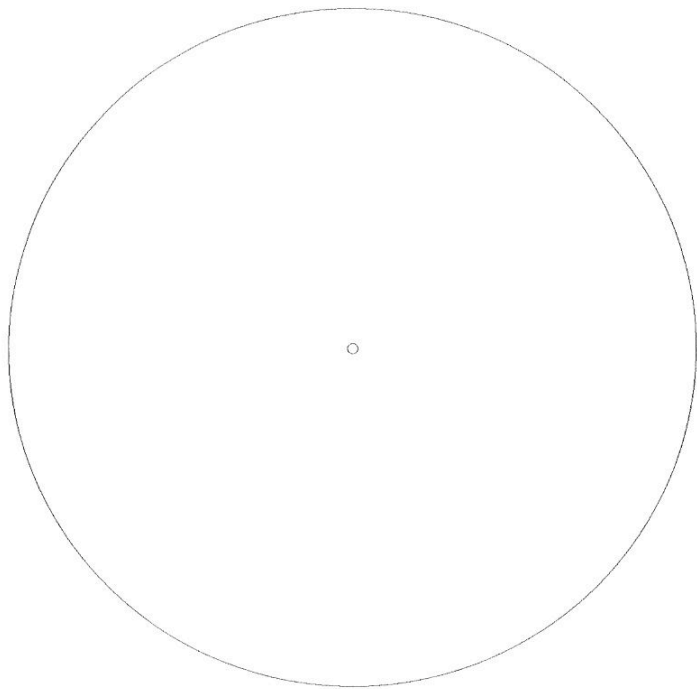
BACK



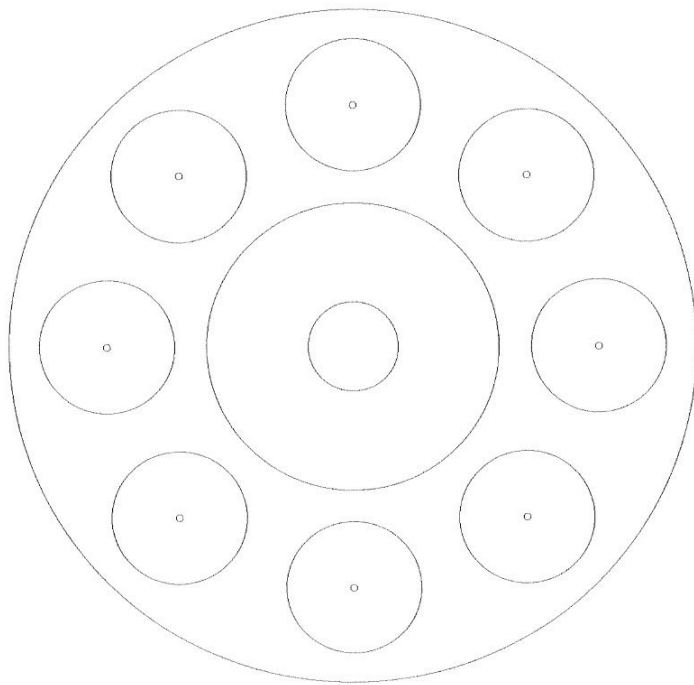
- Tower Bulkheads T1 & T2
- 1 each required 1/8 ply
- Sand to cross section after assembly

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MRT01		
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C1



C4



- Capsule Bulkheads C1 & C4
- 1 each required 1/8 ply
- Sand each bulkhead to fit inside 4" tube coupler



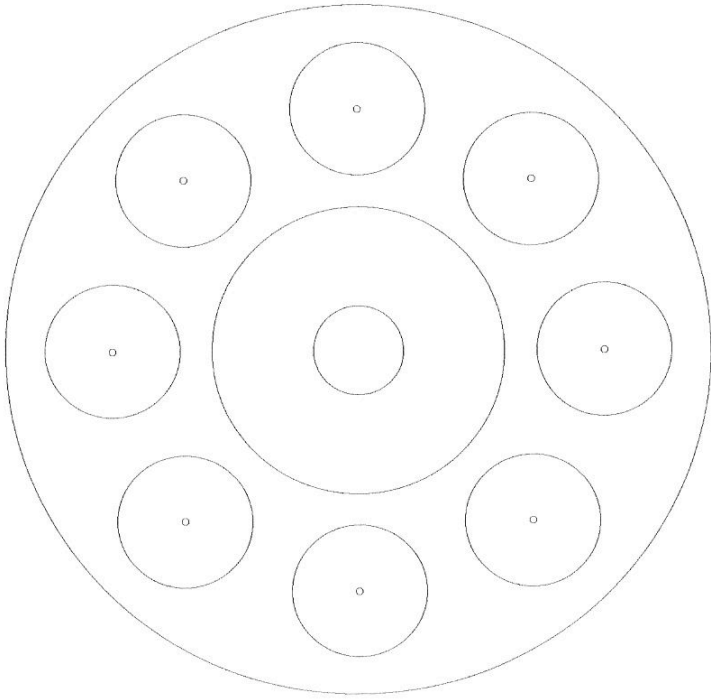
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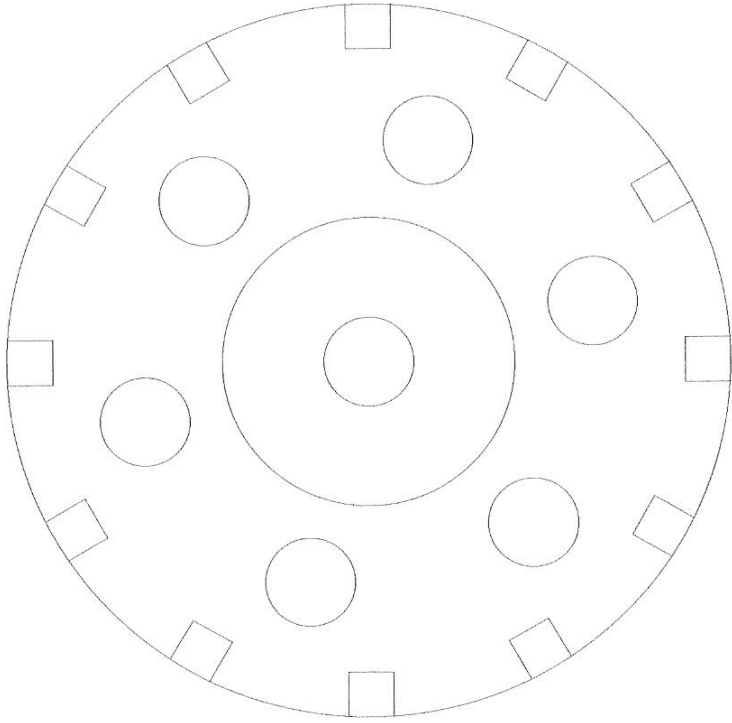
Date: 8/15/96

Scale: FULL

C6



C5



- Capsule Bulkheads C5 & C6

- 1 each required 1/8 ply

- Sand C5 to fit after assembly



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MRC05

Date: 8/15/96

Scale: FULL