ENGINEERING MEMO # 106 February 12, 1976

Notes on Deformable Sub-Reflector

Surface error budget for the 140-ft. as a 1 cm wave telescope:

measurement	0.15 mm	0.63 mm rms
improved panel	0.20 mm	
gravity effect	0.42 mm	
thermal effect	0.35 mm	

Gravity effects on the surface at present:

zenith	- (adjusted away)
south	1.07 mm rms
east	1.19 mm rms

Latest results on deformable sub-reflector: (residue in mm rms)

	uncorrected	with the deformable sub-reflector	goal
south	1.07	0.36	0.42
east	1.19	0.57	0.42

The proposed deformable sub-reflector package consists of:

1) The hyperbolic surface
   - one piece fiberglass-honeycomb sandwich construction
   - 10.4 ft. in diameter
   - one-half of an inch in thickness
   - rib arrangement different from the first one
   - asymmetrical

2) Modification of the existing back-up frame
   - provide supports for motor-actuator
   - provide more support for the sub-reflector

3) Motor-actuator units
   - provide the forces and displacements required for the sub-reflector

4) Weight adds 160 lbs. (present weight - 300 lbs.)

5) Inertia adds 40 ft-lb-sec^2 (present 42 ft-lb-sec^2)

COST

Sub-reflector	3.0	K$
mold & templates	15.0	K$
analysis	4.0	K$
motors (10)	2.0	K$
controller	50 ~~1.5~~	K$
aluminum shapes	.3	K$
actuators (10)	.3	K$
	31.1 ~~23.1~~	K$
+20%	6.2 ~~4.62~~	K$
Total	37.3 ~~27.72~~	K$

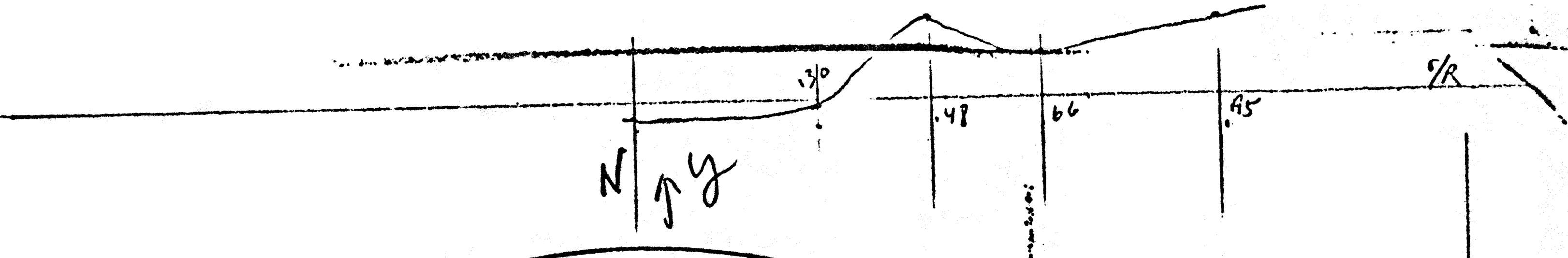
Frame
Interface
Counter wts
Computer
Elec
Cabling
Test Equip

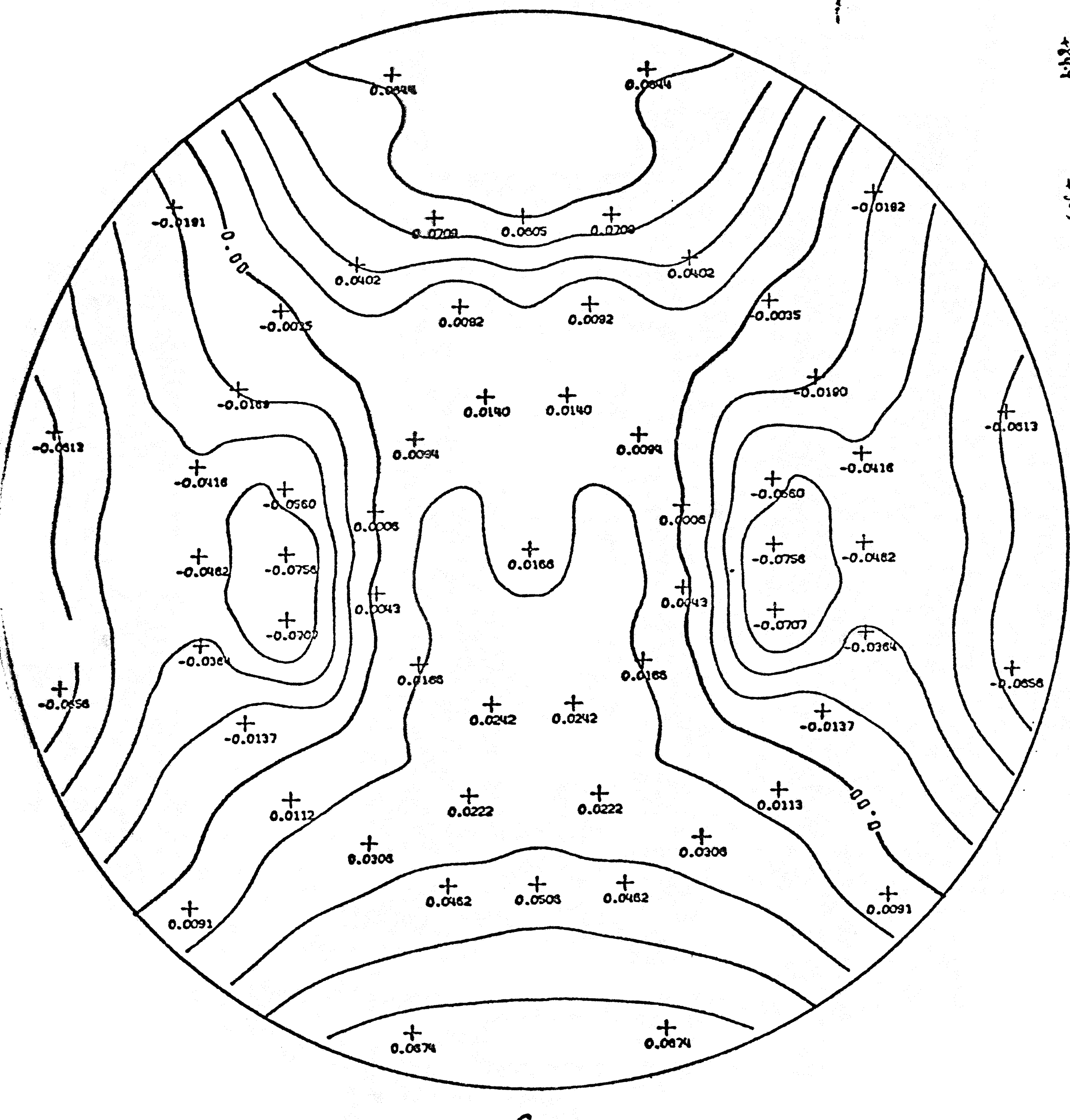
TIME

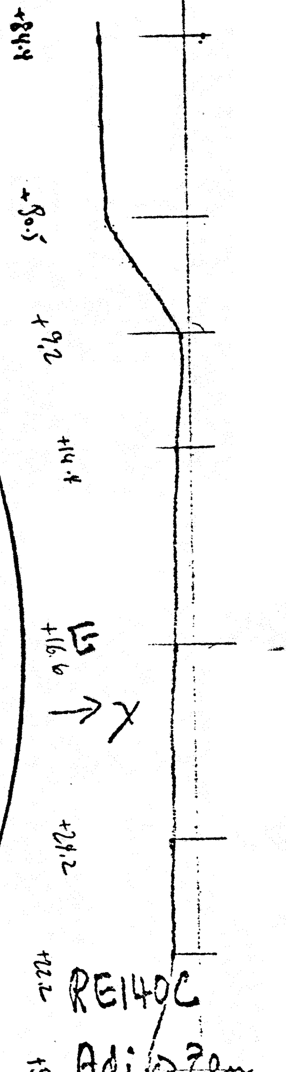
analysis	4 months	outside manufacturer
manufacture	8 months	outside manufacturer
frame design	4 months	in-house work
frame assembling	6 months	in-house work
test	2 months	in-house work

Estimate schedule for the deformable sub-reflector: ~~March 1977~~

20 months after award of contract.







RE140C

Adj ∝ Zen

Position:

Zen angle:

H. angle:

15 de tape

11/6/75

looking South

Gravity contribution

{0.0
0.94
0.34

Surface = 42.1×10^{-3} in

ΔX = .002 in

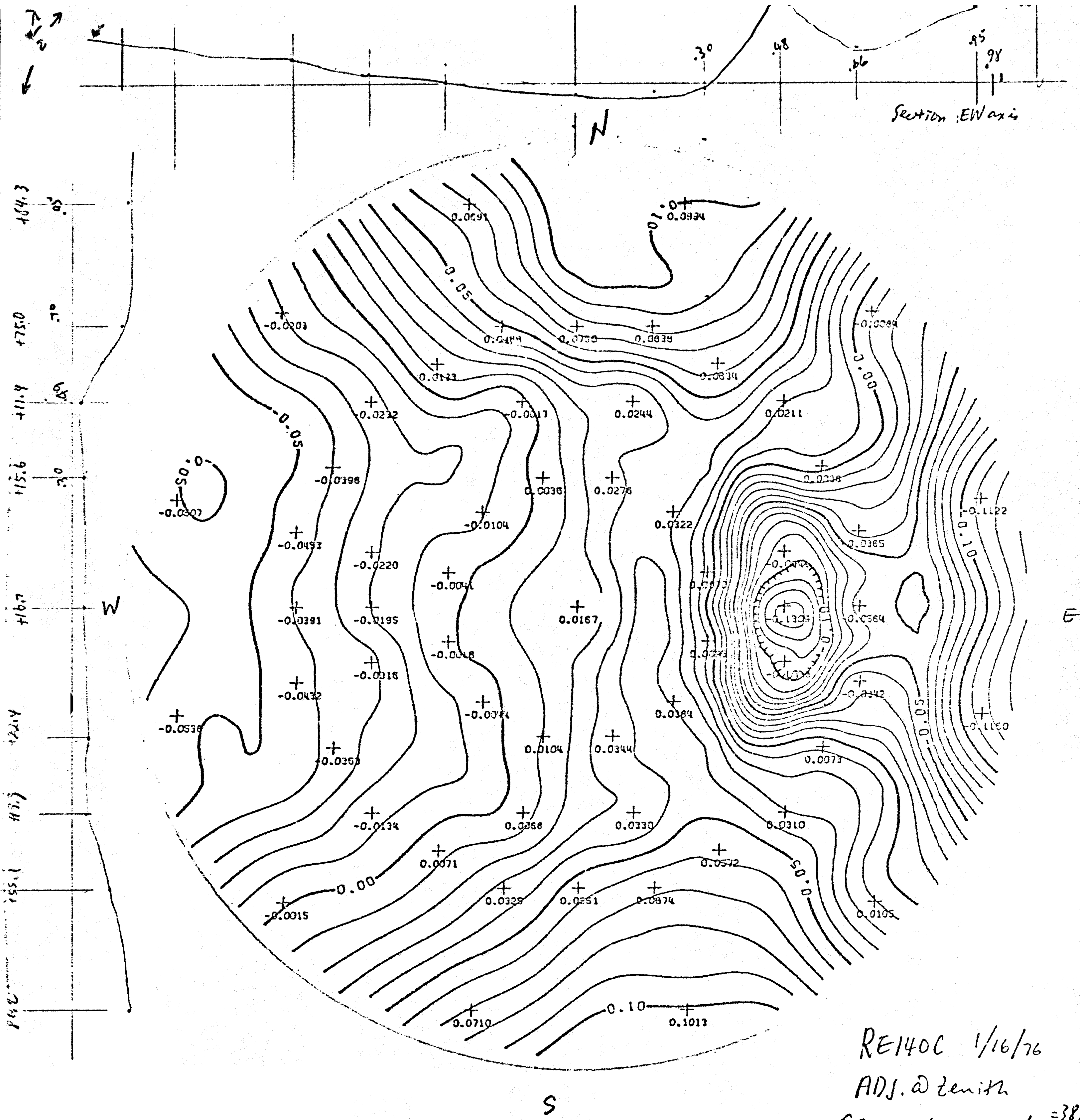
ΔY = .175 in

ΔZ = .053 in

θ_x = 145.6×10^{-5} rad

θ_y = $-.01 \times 10^{-5}$ rad

f = 719.613 in



RE140C 1/16/76

ADJ. @ Zenith

Posit { Dec = 0 / Elev = 20° / Zenith = 38.
HA = 63.7°

15 db Taper

Looking East

Surface = 46.9×10^{-3}

ΔX = 2.69" $\theta_x = 91.3 \times 10^{-5}$ rad

ΔY = 1.16" $\theta_y = -208.8 \times 10^{-5}$ rad

ΔZ = 0.05" $\Delta F'$ = 719.616"

deformable sub-reflector

looking South