## HLAENGINEERS, INC.

## FINITE ELEMENT RADIATION AND STRUCTURAL ANALYSIS OF AN ANTENNA

## PURPOSE: Evaluate the thermal and structural deflection of an antenna due to radiation and wind loads

Radiation analysis is a non-linear thermal solution. View factor matrices need to be developed between the various parts of the structure. A steady-state non-linear thermal analysis was performed to compute the temperature distributions due to radiation from a uniform temperature radiating body at various incidence orientation angles. The temperature distributions were then used as a load step in the linear structural analysis. The coupled thermal-structural analysis provided deflections of the parabolic dish, based on which a signal distortion analysis can be performed. The analysis is also used in computing thermal fatigue of the structure.



O Deg - Temp Distribution



12:44:35 PLOT NO. 7 NODAL SOLUTION SUB =3 TIME=1 TEMP TOP DMX =.409695 SMN =530 SMX =608.914 530 538.768 547.536 556.305 565.073 573.841 582.609 591.378 600.146 608.914

ANSYS 5.6 MAY 17 2000



PATH ALONG 15 DEG - O DEG RADIATION



14.441 STEP=1