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**COMPUTERIZED VISIBILITY CALCULATIONS
MAXIMUM SIGHTING RANGE PROGRAM**

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SIO Ref. 67-23
July 1967

Department of the Navy
Naval Ship Systems Command
Contract NObs-92058, Task III
NASA Interagency Fund Transfer R-139

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COMPUTERIZED VISIBILITY CALCULATIONS

MAXIMUM SIGHTING RANGE PROGRAM

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I. INTRODUCTION

The distance at which an object can be detected is a complex function of the properties of the object, the background, the lighting geometry, the transmission medium, and the human visual system. The science of predicting detection range is termed *visibility*, and a specific numerical treatment of the pertinent factors to obtain a quantitative prediction is termed *visibility calculation*. The history and present state of the art of visibility calculations are well summarized in existing literature.¹

The data on objects, backgrounds, lighting geometries, transmission media, and the visual system are far from complete. However, sufficient data are in existence to allow calculations to be made for a large number of important cases of practical interest. The large number of important variables involved in a visibility calculation creates a situation in which a modest quantity of input data permutes into an extremely large number of individual prediction calculations. In the most prevalent application of visibility calculations the user is unable to state a specific set of conditions under which the observations will be made, but instead, is interested in exploring the sensitivity of the predictions to the variables. This means that an extremely large number of calculations are frequently required.

The numerical operations involved in visibility calculations are well established, and within the limitations of the existing environmental and vision data, such calculations can be performed in a straightforward manner. However, visibility calculations performed with tables, hand calculators, graphical overlays, etc., are so slow that it is impractical to make a sufficient number of calculations to allow a reasonable exploration of the variables.

The program of research which is described in this progress report has as a goal, the development of computer programs which allow the use of high-speed digital computers for performing visibility calculations. The research is funded by a NASA transfer of funds to Bureau of Ships Contract NObs-92058 between the Naval Ship Systems Command and the University of California.

This report deals specifically with the first step of this research which treats the case of maximum sighting range calculations for circular objects. The case is defined by stating that the observer knows where to look, i.e., no search is involved, and he has unlimited time for his observations. The output from the calculation is the numerical definition of the boundary of the volume within which the object can be detected. In many ways this represents the most simple type of visibility calculation and as such represents the logical starting point for the research in developing computer solutions for visibility calculations.

¹S. Q. Duntley, et al. Appl. Opt., 3, 550 (1964).

Continuing research effort is being directed toward the more complex cases involving dynamic viewing geometries where visual search is required. The case of visual search is beyond the scope of this report, but will be the subject of future reports which will be issued upon the completion of logical units of the computer program development.

Sec. II. of the present report gives a brief non-mathematical description of the calculation and gives illustrative examples of calculations which have been made with the program, Sec. III. presents the mathematics of the calculation, Sec. IV. describes the details of the computer program (aided by several appendices), and Sec. V. offers conclusions and a brief description of the future work.

II. SUMMARY AND ILLUSTRATIVE EXAMPLES

II.1 Brief Description of the Calculation

A maximum sighting range calculation combines data on the object, background, lighting geometry, transmission medium, and the human visual system to predict the maximum range at which the particular object in its specific environment can be visually detected. As indicated in Sec. I., the calculations reported here are limited to circular objects. The extension of the program to include complex non-circular objects is discussed in Sec. II.3.

The calculation begins by determining the inherent contrast of the object for a selected path of sight. Throughout this report contrast is defined as the luminance of the object minus the luminance of the background, divided by the luminance of the background. Inherent contrast means the contrast which would exist in the absence of any contrast reduction. The computer program allows the inherent contrast to be specified directly in the input data or calculated from a specification of the directional reflectance properties of the object and background and a numerical value for the illuminance associated with the scene.

The next step in the calculation is to compute the contrast reduction associated with the path of sight. This calculation, which uses appropriate input data, includes the contrast transmittance of the atmosphere, window, and optical system (if any). Where an atmosphere is present the contrast transmittance will change with the range to the object. When the inherent contrast is multiplied by the contrast transmittance, the *apparent contrast* is obtained. This is the contrast available to the eye of the observer. A typical plot of apparent contrast as a function of range is shown in Fig. 2-1.

The next step is to introduce the visual threshold data. The Tiffany data which is used in this program defines contrast threshold as a function of the angular subtense of circular, uniform luminance objects viewed against a uniform background. The conditions under which the data were acquired included the fact that the observer knew where to look, i.e., no visual search was required, and that the observer had as much time to make the observation as he required. It is in the sense of these conditions that the calculation produces a *maximum* sighting range.

Since the Tiffany data are given in terms of angular subtense, the first step in the computer calculation is to transform the contrast threshold values into functions of range for a specified object size. A plot of the vision data can then be superimposed on Fig. 2-1 to give the result shown in Fig. 2-2.

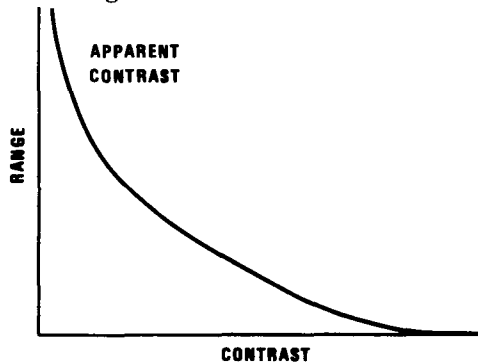


Figure 2-1

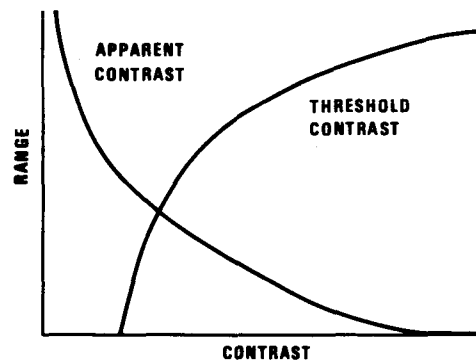


Figure 2-2

From this simultaneous plot of contrast *required* (contrast threshold) and contrast *available* (apparent contrast) it is clear that detection can occur at any range less than that associated with the intersection of these two curves, i.e., in the region where there is more contrast available than is required. The computer calculation determines this point of intersection and tabulates the detection range for this path of sight. Fig. 2-2 shows a single threshold contrast curve. Actually there is a family of such curves, one for each specific probability of detection associated with the threshold data. The computer program determines the detection range for whichever value or values of detection probability which are specified by the user.

The calculation described above defines the detection range for one particular path of sight. The program repeats the calculation for the necessary number of paths of sight required to adequately define the detection volume. The volume is defined by four vertical planes whose azimuths with respect to the sun are 0° , 45° , 90° , and 135° . The planes are sketched in Fig. 2-3. For each of these vertical planes fifteen paths of sight are calculated corresponding to zenith angles (measured from the vertical) of $\pm 95^\circ$, $\pm 100^\circ$, $\pm 105^\circ$, $\pm 120^\circ$, $\pm 135^\circ$, $\pm 150^\circ$, $\pm 165^\circ$, and 180° .

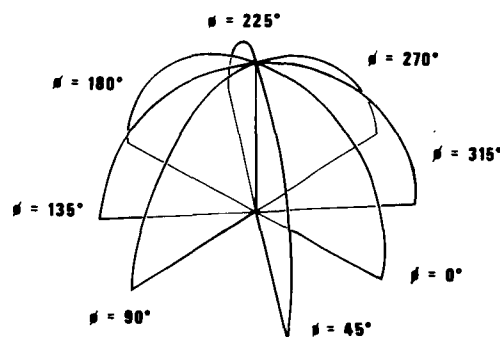


Figure 2-3

The computer output consists of tabular data and automatic plots of the fifteen detection ranges corresponding to the fifteen paths of sight for each of the four azimuth planes shown in Fig. 2-3. Examples of these plots are shown in Sec. II.2.

II.2 Illustrative Examples

Figs. 2-4 through 2-11 are direct photographic reproductions of the computer plots for a series of trial calculations. A detailed description of these calculations is given in Appendix C. The calculations utilized measured atmospheric, object reflectance, and background reflectance data specifically referenced in Appendix C.

A summary of the distinguishing features of the calculations is as follows:

Fig. 2-4 was calculated using specific atmospheric data for a solar zenith angle of 41.5° . The background was assumed to be pine trees and used measured directional reflectance data. The object was a 100-foot-diameter circular object always oriented perpendicular to the path of sight, i.e., always appearing to be circular. Its directional reflectance properties were assumed to be those of data for a specific haze gray paint. Detection probability was chosen to be 50%, i.e., the contrast thresholds were adjusted to a 50% level.

Fig. 2-5 is the same case as 2-4, but with a probability of 70%.

Fig. 2-6 is the same case as 2-4, but with a probability of 90%.

Fig. 2-7 is the same case as 2-4, but with an object diameter of 10 feet.

Fig. 2-8 is the same case as 2-4, but with an object diameter of 1 foot.

Fig. 2-9 is the same case as 2-4, but with an object diameter of 1 foot and with the directional reflectance properties of calm water.

Fig. 2-10 is the same case as 2-4, but includes the transmission properties of an optical system. The optical system data is purely artificial. The example was run for the purpose of testing the optical system subroutine.

Fig. 2-11 is the same case as 2-10, but with no atmosphere. The example was run for the purpose of testing the ability to bypass the atmospheric data subroutine for those cases where an atmosphere is not involved.

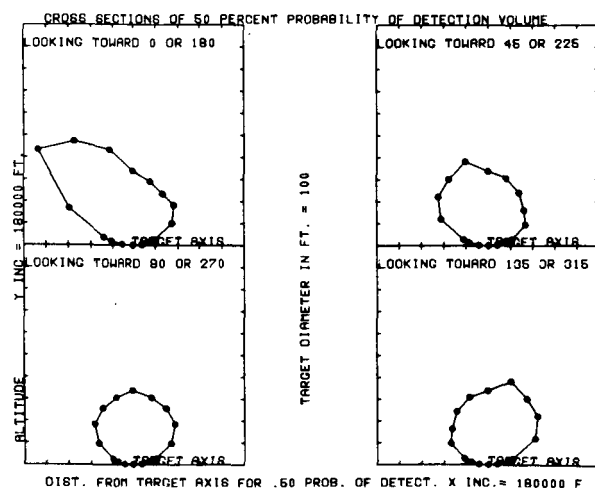


Figure 2-4

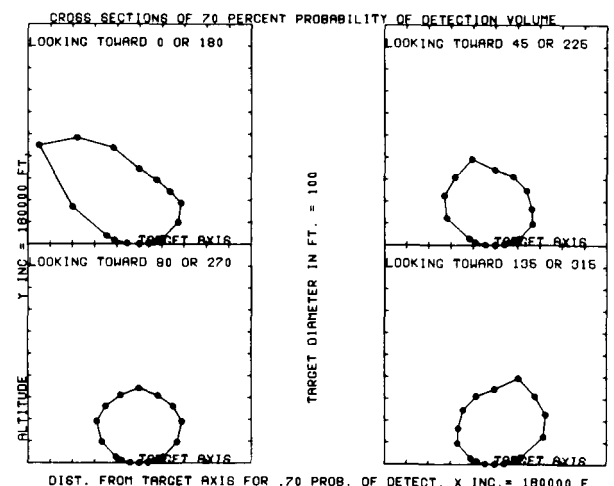


Figure 2-5

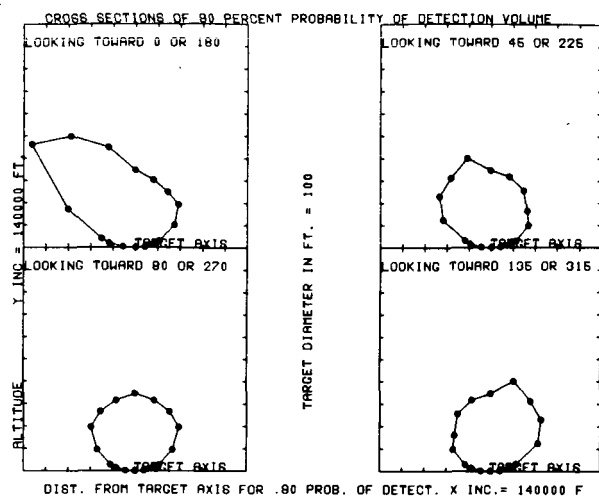


Figure 2-6

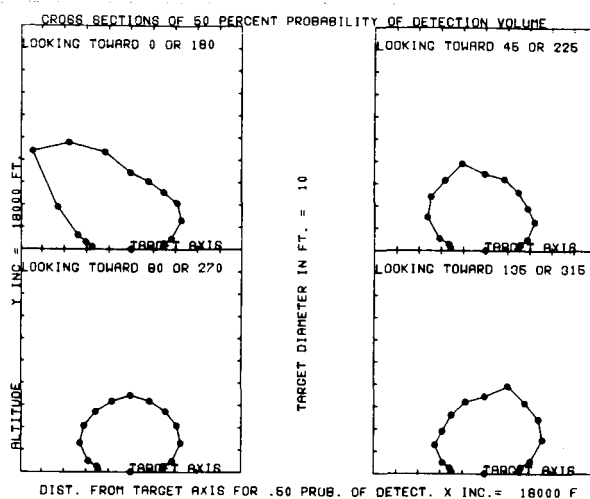


Figure 2-7

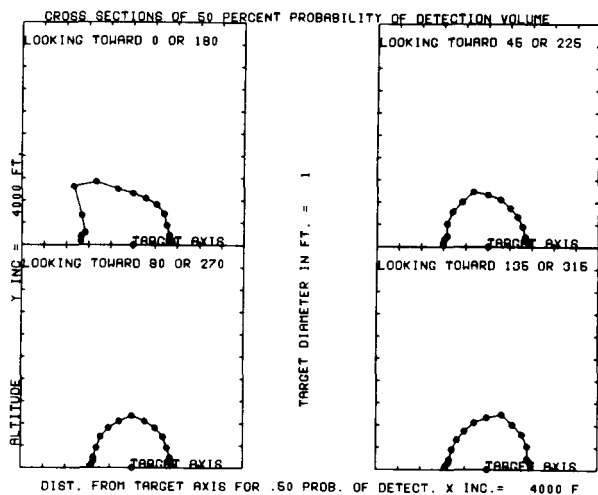


Figure 2-8

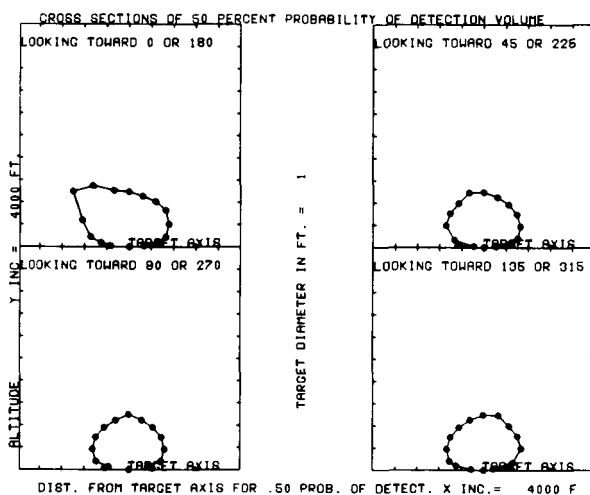


Figure 2-9

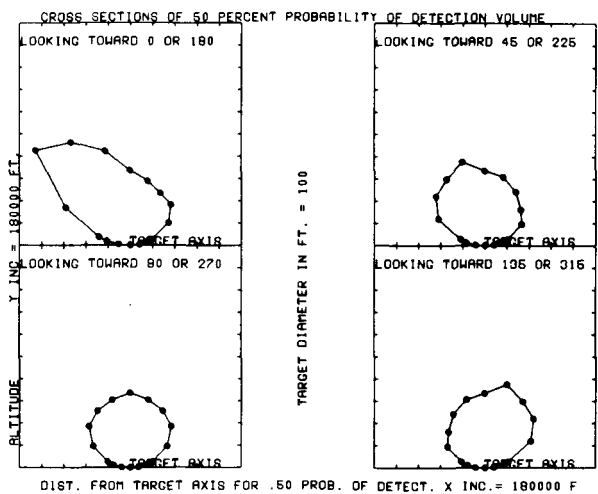


Figure 2-10

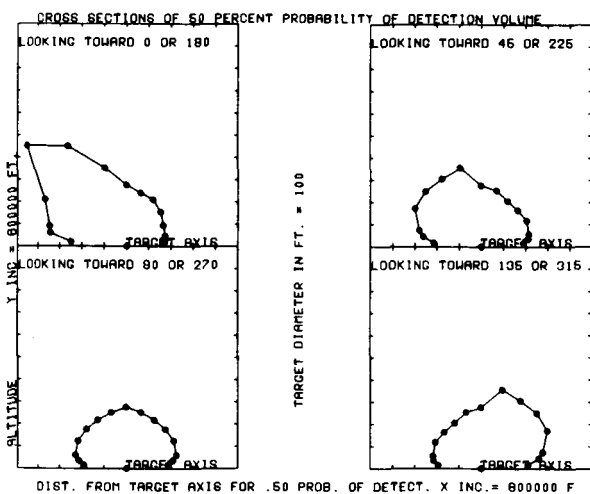


Figure 2-11

II.3 Extension to Non-Circular Objects

Although considerable insight can be gained as to the relative importance of the various factors involved in a visibility calculation by making such calculations for circular objects, the fact remains that most objects of interest are not circular nor of uniform luminance. The general case of calculations for non-circular, nonuniform objects has been studied extensively by this Laboratory.²

Previous studies have indicated that under threshold conditions, the human visual system may be approximated as a linear system. This means that the characteristics of the visual system may be described by a spatial weighting function, variously called a summative function, element contribution function, etc. This function, which can be determined from threshold data for circular objects, when convolved with the luminance map of a complex object allows prediction of the threshold for the complex object. During the program of research described in reference 2, computer programs were developed which (1) derive the summative function from appropriate circular object threshold data and (2) perform the convolution of the summative function with the luminance map of the object and (3) numerically specify the detectability of the complex object as a function of visual range.

These previously developed computer programs, when coupled with the newly developed computational tools described in this report, will allow ready extension of the maximum sighting range calculation to the case of complex objects. The two programs are not presently compatible, and considerable rewriting of the earlier program will be required before the combination can be used efficiently. This conversion will be accomplished in the near future.

III. CALCULATIONS

III.1 Object Definition

The maximum sighting range program as described in this report assumes that the object to be detected is projected into the path of sight as a uniform luminance circle. The photometric properties of the circle are specified by indicating *either* (a) the luminance, (b) the contrast with respect to the background, or (c) the directional reflectance for each path of sight.¹ The object must be defined in this way for paths of sight corresponding to azimuth angles with respect to the sun of 0° , $\pm 45^\circ$, $\pm 90^\circ$, $\pm 135^\circ$, and 180° with zenith angles of the path of sight of 95° , 100° , 105° , 120° , 135° , 150° , 165° , and 180° for each azimuth. The program as presently written assumes symmetry about the azimuth of the sun.

²J. L. Harris, Appl. Opt. 3, 587

III.2 Background Definition

The background specification is similar to that required for the object. The photometric properties of the background are specified by indicating *either* (a) the luminance, or (b) the directional reflectance for each path of sight. The background must be defined for paths of sight corresponding to azimuth angles with respect to the sun of $0^\circ, \pm 45^\circ, \pm 90^\circ, \pm 135^\circ$, and 180° with zenith angles of the path of sight of $95^\circ, 100^\circ, 105^\circ, 120^\circ, 135^\circ, 150^\circ, 165^\circ$, and 180° for each azimuth.

The computer program utilizes vision data derived from detection experiments of circular objects viewed against a uniform background. The present program is therefore restricted to the case in which the object to be detected is located on a background which, at least immediately surrounding the object is "reasonably" uniform. "Reasonably" may be defined as meaning that in the luminance map which represents the object and background, any non-uniformities or structure in the background surrounding the object is of low contrast compared to the luminance structure of the object itself.

III.2.1 Directional Luminous Reflectance of the Object

The measured directional luminous reflectance values for the object are provided as a table with values for the same zeniths and azimuths of path of sight. The samples of program output in Appendix C use reflectance values for a background of pine trees, or reflectance values for a background of clear water of infinite optical depth. Both examples use target reflectance values for haze gray paint. The data for the paint was taken with a goniophotometer for similar lighting conditions to those during Flight 74. The reflectance data for the water were computed from equations by Duntley (1952) for lighting conditions similar to Flight 74.

III.3 Reflectance Data

III.3.1 Inherent Background Luminance

Flight 74 was flown over a background of small uniformly spaced pine trees. A table of Directional Luminous Reflectance values (${}_bR_o$) for pine trees was computed for thetas of $180^\circ, 165^\circ, 150^\circ, 135^\circ, 120^\circ, 105^\circ, 100^\circ$, and 95° , and phis of $0^\circ, 45^\circ, 90^\circ, 135^\circ$, and 180° . The pre-subscript, b, denotes background and the post-subscript, o, indicates inherent, i.e., zero range. The computer program has used this table for one background, and a similar table of reflectance values for calm water with infinite optical depth for another background. The equation for inherent background luminance in foot lamberts is

$${}_bB_o(0, \theta, \phi) = (5940) {}_bR_o(0, \theta, \phi)$$

where 5940 lumens per square foot was the total illuminance on a fully exposed horizontal plane at sea level during Flight 74. The parenthetic attachments (z, θ, ϕ) define the path of sight. The altitude of the observer, zero in this case, is denoted by z . The zenith of path of sight is denoted by θ , and the azimuth of path of sight by ϕ .

III.4 Calculation of Inherent Contrast

The *inherent luminance of the object* is that object luminance which would be measured in the absence of any contrast reduction mechanism such as atmosphere or an optical system. The symbol for inherent object luminance is ${}_T B_o$, where the pre-subscript, T, indicates object (or target) and the post-subscript, o, indicates inherent, i.e., zero range. In a similar manner the *inherent background luminance* is ${}_b B_o$ where the pre-subscript b indicates background. The inherent contrast of the object is defined by the equation

$$C_o = \frac{{}_T B_o - {}_b B_o}{{}_b B_o} \quad (3-1)$$

The luminance of the object and background will in general be different for each path of sight.

Due to the fact that the inherent contrast between a target and a background may change sign, the program uses the absolute value of C_o . However, the correct sign of C_o is shown on the printed output.

III.5 Calculation of Apparent Contrast

As the optical signal generated by the object and background is propagated to the observer, two mechanisms act to reduce the contrast. The first of these mechanisms is the attenuation of flux from the scene due to scattering and absorption. The attenuation is quantitatively defined by the beam transmittance T_r , the subscript indicating transmission over a path length r . The second mechanism is the flux which is scattered into the path of sight from the lighting environment, i.e., sun, sky, earthshine, etc. This component of the contrast reduction is quantitatively defined by the path luminance B_r^* .

The *apparent contrast* is obtained directly by application of the two components of the contrast reduction, i.e., the *apparent luminance of the object* is

$${}_T B_r = {}_T B_o T_r + B_r^* \quad (3-2)$$

and the apparent luminance of the background is

$${}_b B_r = {}_b B_o T_r + B_r^* \quad (3-3)$$

The apparent contrast of the object is by definition

$$C_r = \frac{tB_r - bB_r}{bB_r} \quad (3-4)$$

By substitution for the apparent luminance

$$C_r = \frac{(tB_o T_r + B_r^*) - (bB_o T_r + B_r^*)}{bB_o T_r + B_r^*} \quad (3-5)$$

The contrast transmittance is the ratio of the apparent and inherent contrast, so that

$$T_c = \frac{C_r}{C_o} = \frac{\frac{(tB_o - bB_o) T_r}{bB_o T_r + B_r^*}}{\frac{(tB_o - bB_o)}{bB_o}} \quad (3-6)$$

This reduces to

$$T_c = \frac{bB_o T_r}{bB_o T_r + B_r^*} \quad (3-7)$$

or

$$T_c = \frac{1}{1 + \frac{B_r^*}{bB_o T_r}} \quad (3-8)$$

other formulations of contrast transmittance appear in the literature.³ This basic equation for contrast transmittance applies to an atmosphere, an optical system, a window, or any combination of the three. The calculation must use the beam transmittance and path luminance associated with the total path of sight. The apparent contrast is calculated by the equation

$$C_r = C_o T_c.$$

Where atmospheric attenuation is involved, the apparent contrast will be a function of range.

³S. Q. Duntley, A. R. Boileau, and R. W. Preisendorfer (1957), J. Opt. Soc. Am. 47 499.

III.6 Atmospheric Optical Data

III.6.1 Transmission Media

The calculation includes the contrast reduction resulting from (1) atmospheric transmission properties and/or (2) optical instrument or windshield transmission properties. These two types of contrast reduction mechanisms are handled in separate subroutines so that either (1) or (2), (1) and (2), or neither can be included as appropriate to the particular problem being considered.

The specification of the transmission media is identical for (1) and (2) and consists of specifying the beam transmittance (transmission of image forming rays from object) and the path luminance (flux scattered into the path of sight). These two parameters must be numerically specified for each of the paths of sight corresponding to the 8 azimuths with respect to the sun and the 8 zenith angles as indicated in paragraphs III.1 and III.2.

III.6.2 General

The present package of atmospheric optical data used by the computer program was compiled from the output of the Visibility Laboratory's airborne instrument system used in a B-29 aircraft. The particular data used were taken on Flight 74 over an area south of Crestview, Florida about mid-day on 28 February 1956.⁴ The day was cloudless, but with a pronounced haze in the first 4 000 feet of altitude. The airborne photometers started taking data at 20 000 feet and continued at descending increments to 1 000 feet. Data were recorded simultaneously at sea level by photometers in an instrument van beneath the flight pattern. The average solar zenith angle during the flight was 41.5°.

III.6.3 Atmospheric Beam Transmittance

Beam transmittance is calculated in three ways, depending on the altitude. From zero through 20 000 feet ${}^aT_r(z, \theta)$ is calculated by a summation of measured attenuation lengths $L_{(z)}$. The attenuation lengths are in nautical miles and were obtained every 100 feet from 1 000 feet to 20 000 feet. The $L_{(z)}$ values were extrapolated from 1 000 feet down to ground level. The equation is

$${}^aT_r(z, \theta) = \exp - \left[\left(\sum_{2}^{n-1} \frac{1}{L_{(z)}} \Delta z \right) + \left(\frac{1}{L_{(z)_1}} + \frac{1}{L_{(z)_n}} \right) \frac{\Delta z}{2} \right] f(z, \theta)$$

⁴ A. R. Boileau, Visibility, Section VI Atmospheric Properties, Applied Optics 3, No. 5 (1964), pp. 570-581.

where Δz , in nautical miles is the distance between the altitudes for the consecutive attenuation lengths, and n is the number of 100-foot increments for the desired altitude. The term $f(z, \theta)$ is a geometric correction for path length for paths of sight other than the straight downward-looking case. This term $f(z, \theta)$ is equal to $\sec(180^\circ - \theta)$ for all values of θ greater than 100° . For thetas of 100° and 95° , i.e., near horizontal paths of sight, $f(z, \theta)$ is poorly approximated by the secant function and is therefore estimated from optical air mass tables for the given altitude and theta.⁵ These relative optical air mass values are incorporated in the program as a table of constants. From 20 000 feet through 60 000 feet ${}^aT_r(z, \theta)$ is found by interpolating a table of extrapolated values of atmospheric beam transmittance ${}^aT_{r_{ext}}(z, 180^\circ)$ based on optical standard atmosphere. For paths of sight other than $\theta = 180^\circ$,

$${}^aT_r(z, \theta) = [{}^aT_{r_{ext}}(z, 180^\circ)]^{f(z, \theta)}$$

Above 60 000 feet beam transmittance is found by the equation

$${}^aT_r(z, \theta) = \left\{ {}^aT_r(60\,000, 180^\circ) \left[\exp - \frac{4.94}{L_{z_{60\,000}}} \left(1 - \exp \left(\frac{z - 60\,000}{30\,000} \right) \right) \right] \right\}^{f(z, \theta)}$$

The values 4.94 N.Mi. and 30 000 feet are constants from the optical standard atmosphere. $L_{z_{60\,000}}$ is the extrapolated attenuation length for 60 000 feet.

III.6.4 Path Luminance

The atmospheric path luminance values of ${}^aB_r^*(z, \theta, \phi)$ derived from Flight 74 were compiled into tables. Altitude values range from 1 000 feet through 20 000 feet with extrapolations to 60 000 feet. The tables have path luminance values for thetas of 180° , 165° , 150° , 135° , 120° , 105° , 100° , and 95° . There is a table of ${}^aB_r^*(z, \theta)$ values for each of five different azimuths, ϕ .

Path luminance values used by the program from 0 to 60 000 feet for all values of θ , except $\theta = 95^\circ$, are found by linear interpolation of ${}^aB_r^*(z, \theta, \phi)$ table values. When $\theta = 95^\circ$, path luminance values are found by linear interpolation of ${}^aB_r^*(z, \theta, \phi)$ table values up to 20 000 feet. For a θ of 95° above 20 000 feet path luminance is calculated by the equation

$${}^aB_r^*(z, 95^\circ, \phi) = \frac{{}^aB_r^*(20\,000, 95^\circ, \phi) \{ 1 - {}^aT_r(z, 180^\circ)^{\secant(180^\circ - 95^\circ)} \}}{1 - {}^aT_r(20\,000, 180^\circ)^{\secant(180^\circ - 95^\circ)}}$$

⁵F. Kasten, "A New Table and Approximation Formula for the Relative Optical Air Mass." Cold Regions Research and Engineering Laboratory, U.S. Army Materiel Command, Hanover, New Hampshire (1964).

For altitudes above 60 000 feet, for thetas other than 95°, path luminance is calculated by the equation

$${}^aB_r^*(z, \theta, \phi) = \frac{{}^aB_r^*(60\,000, \theta, \phi) \left(1 - {}^aT_r(z, 180^\circ) \sec \text{ant} (180^\circ - \theta) \right)}{1 - {}^aT_r(60\,000, 180^\circ) \sec \text{ant} (180^\circ - \theta)}$$

III.6.5 Apparent Background Luminance B

The apparent background luminance for any path of sight and altitude is calculated from the equation

$${}_bB_r(z, \theta, \phi) = {}_bB_o(0, \theta, \phi) T_r(z, \theta) + B_r^*(z, \theta, \phi).$$

$T_r(z, \theta)$ and $B_r^*(z, \theta, \phi)$ are the values of beam transmittance for the path of sight from the eye of the observer to the target. Assuming the path of sight is viewed through an atmosphere only, then

$$T_r(z, \theta) = {}^aT_r(z, \theta) \text{ and } B_r^*(z, \theta, \phi) = {}^aB_r^*(z, \theta, \phi).$$

For a path of sight through an optical system and an atmosphere, then

$$T_r(z, \theta) = {}^aT_r(z, \theta, \phi) \circ T_r(\theta) \text{ and } B_r^*(z, \theta, \phi) = {}^aB_r^*(z, \theta, \phi) \circ T_r(\theta) + {}^oB_r^*(\theta, \phi).$$

For a path of sight through an optical system and no atmosphere, then

$$T_r(z, \theta) = {}^oT_r(\theta) \text{ and } B_r^* = {}^oB_r^*(\theta, \phi).$$

The equation for apparent background luminance enables the computer program to interpolate for the correct value of contrast threshold from the nine levels of Tiffany inherent background luminance. This is important because as an observer's altitude increases, the value of apparent background luminance changes. This means that to obtain all twenty values of contrast threshold used to represent a C_T versus altitude curve, that the C_T values may come from more than one level of apparent background luminance.

III.7 Vision Data

III.7.1 General

The computer program uses Tiffany vision data for liminal contrast, i.e., a detection probability of fifty percent. These data show the contrast thresholds for specified visual angles α subtended by circular targets when the exact location of each target is known and the time of search is essentially unlimited.⁶ The Tiffany data covers values of α ranging from a maximum of 358.9 minutes of arc to a minimum of 0.129 minutes of arc. For each value of α there are nine values of contrast threshold, one value for each of the nine levels of apparent background luminance (see Appendix A). Alpha is related to the target diameter and the distance from the target to the observer by the formula

$$\alpha = \frac{D}{r} (3437.760),$$

where the diameter (D) of the target is in feet, and r is the perpendicular distance from the target to the observer in feet. The factor of 3437.760 converts α from radians to minutes of arc. From this formula the minimum and maximum distances to the targets covered by the Tiffany data are 96 feet and 26 000 feet for a one-foot-diameter target.

The Tiffany data does not have contrast threshold values at the smaller angular subtense values for all nine levels of apparent background luminance. The missing threshold values are for small enough α 's to allow Ricco's law to be used.⁷ Ricco's law states that $C_r = \frac{K}{\alpha^2}$, where K is a constant for a given level of inherent background luminance.⁸ This "law" amounts to a statement that the object is too small to be resolved and that detection is a function of the total energy from the object.

Hand calculations were made for an object projecting an area one foot in diameter. The intersections of the C_T and C_r curves indicated that twenty C_T values would cover the range of intersection points from minimum through maximum altitude. These contrast threshold values correspond to altitudes of 20, 40, 60, 80, 100, 200, 400, 600, 800, 1000, 2000, 4000, 6000, 8000, 10 000, 15 000, 20 000, and 25 000 feet. Computer program ACI1 (Apparent Contrast Interpolator number 1) was written to solve for twenty values of contrast threshold corresponding to the altitudes previously mentioned. Program ACI1 solves, by straight line interpolation of the Tiffany data in Appendix A, for twenty values of contrast threshold for each of the nine levels of background luminance. These are the C_T values used by the computer program.

⁶ Visibility Studies and Some Applications in the Field of Camouflage, Summary Technical Report of Division 16, Vol. 2, National Defense Research Committee, Washington, D.C., (1946), p. 58.

⁷ Ibid., p. 128.

⁸ Internal Visibility Laboratory Memorandum to Dr. S. Q. Duntley, 24 July 1959, Table 1.

III.7.2 Change in Target Diameter

The computer program uses the contrast threshold for a one-foot target, for each of the twenty altitudes listed in the preceding paragraph. For targets other than one foot in diameter, the same twenty contrast threshold values correspond to twenty altitude values larger by an amount directly proportional to the target diameter in feet. If the target diameter is increased from one foot to 100 feet, then all twenty of the original altitude values are multiplied by 100.

III.7.3 Probability of Detection other than 50%

The Tiffany data is for liminal detection with a probability of target detection of fifty percent. Blackwell found that this type of threshold probability data conforms well to normal ogives.⁹ He found that there appears to be a constant ratio of the standard deviation divided by the mean, for all foveal conditions varying over five log units. From experimental data this ratio was found to be .390.¹⁰ The factor K in the equation

$$K = 1 + (f_a)(.390)$$

is the conversion factor by which contrast threshold should be modified in order to convert the Tiffany data to the desired probability of detection. The factor f_a is derived from standard tables of the normal probability functions and is numerically dependent on the probability which is desired. For example, if the desired probability of detection is 90%, f_a is equal to 1.29 and

$$K = 1 + (1.29)(.390) \approx 1.50.$$

Therefore, the Tiffany values for liminal contrast threshold should be multiplied by the constant 1.50 to obtain threshold values for a probability level of 90%.

⁹ H. Richard Blackwell, J. Opt. Soc. Am. 53, 131 (1963).

¹⁰ H. R. Blackwell and D. W. McCready, Jr., "Foveal Contrast Thresholds for Various Durations of Single Pulses," USN BuShips Contract NObs-72038, Index No. 2455-13-F, University of Michigan Engineering Research Institute, June 1958.

IV. THE COMPUTER PROGRAM

IV.1 General

The general computer program PODVI (Probability of Detection Volumes Phase 1) has evolved out of several earlier programs with more simplifying restrictions. The program is heuristic in that its output provides a tool for making future versions of the program more analytic in function and more general in scope. The program has purposely been split into subroutines and functions to facilitate continuing modification. The combined factors of low-cost, high-speed automatic computing and the uncertainty of the best form for input and output data have dictated the loose coding of the program.

The limited input data for atmospheres and reflectance properties has prevented the complete check-out of all the data ranges of the present program. Actual examples have been run using only background luminances greater than or equal to 100 foot lamberts, and the contrasts of objects and backgrounds used have been fairly low. As new data become available it is possible that some of the variables used in the program may overflow their bounds and cause error.

Program ACI1, and PODVI are written in Control Data Corporation's Fortran 63 language. The programs were developed and run on a Control Data 3600 computer controlled by the University of California's own PRESTO monitor.

IV.2 Description of PODVI

The computer program consists of a calling program with linked processing subroutines and functions. This linkage is represented by Fig. 4-1. Program ACI1 is included, as it was developed to calculate contrast threshold values from Tiffany data.

IV.2.1 Program ACI1

Program ACI1 (Apparent Contrast Interpolator No. 1) was written to obtain twenty values of contrast threshold for each of the nine levels of background luminance from the Tiffany data. This program prints nine columns of contrast threshold values for twenty altitudes. These are the contrast thresholds used by the program PODVI. A description and listing of Program ACI1 is given in Appendix B1.

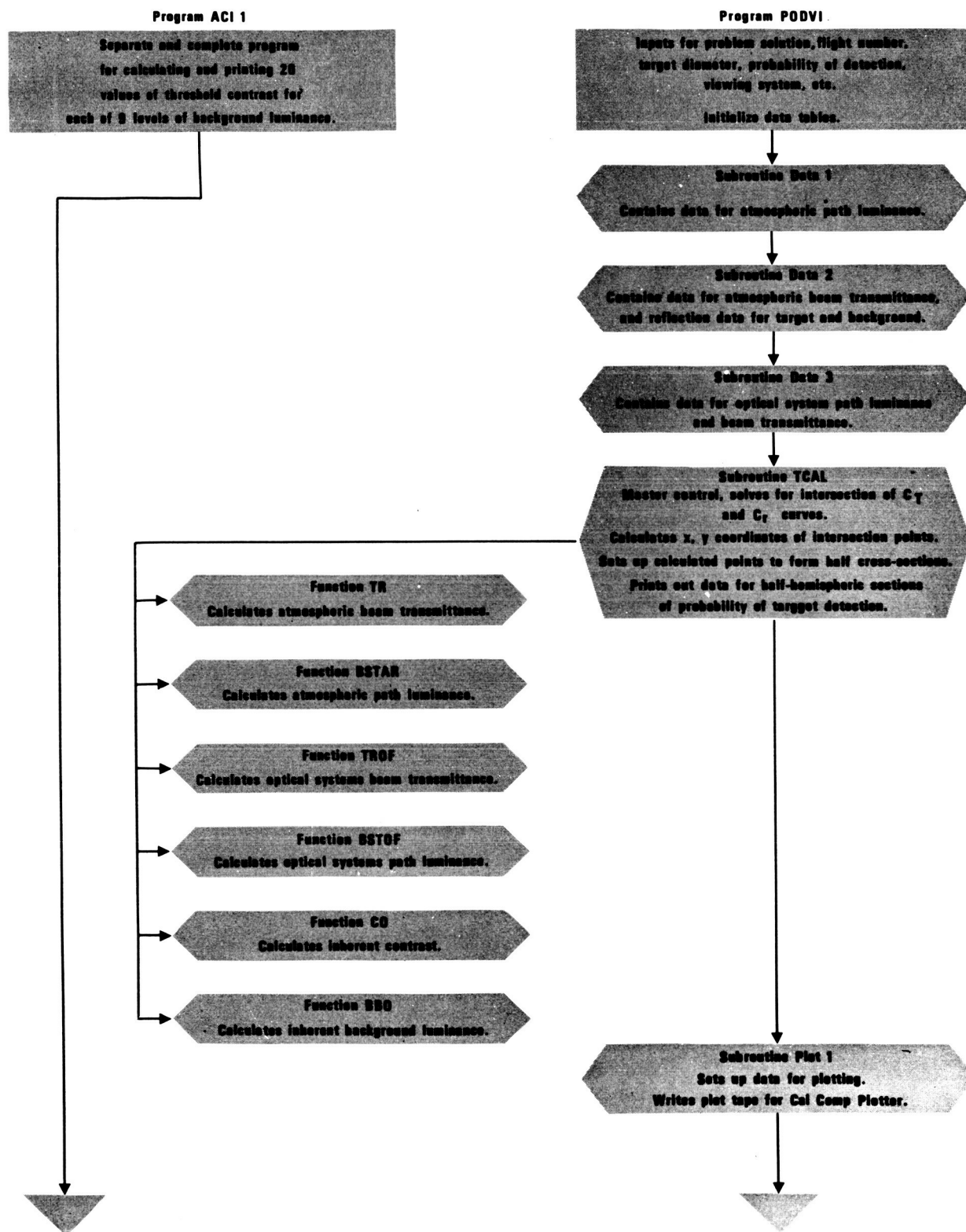


Figure 4-1. Computer program linkage for determining probability of target detection volumes.

IV.2.2 Program PODVI

Program PODVI is the program that provides input data and triggers the computer solution of the detection volume. These inputs are:

1. Option for viewing system, atmosphere only, atmosphere and optical system, or optical system and no atmosphere.
2. Flight number for the appropriate atmospheric data package.
3. Target diameter.
4. Index number for the object reflectance.
5. Index number for background reflectance.
6. Constant for converting 50% Tiffany data to the desired probability.
7. Desired probability as integers.
8. Switch for printing cross-section data.
9. Switch for plotting cross-sections.

The program initializes the atmospheric and reflectance data tables, then calls in the main calculating and control subroutine TCAL. A description and listing of program PODVI is given in Appendix B2.

IV.2.3 Subroutine Data 1

Subroutine Data 1 is a data package. This routine contains one large three-dimensional array BS(8, 18, 5) of all the atmospheric path luminance values for a given flight. Each of the five planes represents one azimuth of path of sight. The eight columns represent zeniths of path of sight, and the 18 rows represent altitudes from 1 000 feet to 60 000 feet. A description and listing of this routine is given in Appendix B3.

IV.2.4 Subroutine Data 2

This subroutine is also a data package. The routine contains five blocks of data. There is a one-dimensional array R(201) of atmospheric attenuation lengths. There is a two-dimensional array AMV(6, 2) of twelve optical air mass values. The array RB(5, 8, 2) is a three-dimensional array of background directional reflectance values. The two planes provide for two separate backgrounds. The five rows represent the azimuths of path of sight, and the eight columns represent the zeniths of path of sight. Array RO(5, 8, 1) is a similar array but it contains directional reflectance values for one target. Array CR(20, 9) is a two-dimensional array of 20 rows and 9 columns of threshold contrast values derived from program ACI1. A description and listing of Subroutine Data 2 is given in Appendix B4.

IV.2.5 Subroutine Data 3

This subroutine is a dummy data package. It is provided to hold data for path luminance and beam transmittance for an optical system when such data become available. A listing is given in Appendix B5.

IV.2.6 Subroutine TCAL

This subroutine is the main processing and calling routine in the program. This routine prints given information concerning the problem, then calculates internally or calls in function routines as it iterates the solutions of the various C_T and C_r curve intersections. If the switch indicating printed output is set, this routine prints the values of the variables used in calculating the approach and intersections of the C_T and C_r curves. This allows the user to determine at a glance the values of the variables that determine the shape of a half-hemispheric cross-section of target detection probability. The subroutine prints the x and y coordinate values for each of the eight calculated points for a half-hemispheric cross-section.

If the switch indicating plotting is set, subroutine TCAL calls on the two plot preparation subroutines PLTSU and PLOT 1. A description and listing of subroutine TCAL is given in Appendix B6.

IV.2.7 Subroutine PLTSU

This routine sets up the x and y coordinates used for plotting the four complete hemispheric cross-sections. The routine also sets up the boundary, scaling, and comment format for the cross-section plots. The description and listing for this subroutine is given in Appendix B13.

IV.2.8 Subroutine PLOT 1

This subroutine calls computer center library routines PREP 1 through PREP 9. The calls to these routines prepare the plot data for being written on magnetic tape. PREP 1 through PREP 9 compose the computer center's library routine Q9Q plot. The call to PREP 9 causes a magnetic tape to be written containing data to be plotted. This tape is then sent to another building where the tape is read into a Control Data 160-A computer which in turn drives a Cal Comp 165 incremental plotter. The call to PREP 9 is actually the next to the last instruction in program PODVI. A description and listing of subroutine PLOT 1 is given in Appendix B14.

IV. 2.9 Function Routines

Variables that require repeated calculations have been set up as separate function routines. Function BBOF calculates inherent background luminance. Function TRF calculates atmospheric beam transmittance. Function BSTRF calculates atmospheric path luminance, and function COF calculates inherent contrast. Function TROF is a dummy function to calculate beam transmittance for an optical system. Until an actual function is provided, function TROF returns a value of .9 for calls for optical system beam transmittance. Function BSTOF is a dummy function to calculate path luminance for an optical system. Until an actual function is provided, BSTOF returns a value of 11.111 for calls for optical system path luminance.

Descriptions and listings of functions TROF through BSTOF are given in Appendices B7 through B12.

V. CONCLUSIONS

Program PODVI, while somewhat limited in scope, does provide a real and valuable breakthrough with respect to the barrier imposed by hand calculation methods for computing maximum sighting range volumes. The computer program provides rapid analysis of data and output of results at a reasonable cost. The addition of optical system functions and data, as well as the addition of new atmospheric and reflectance data will increase the usefulness of the present program and at the same time probably point out areas where modifications may be needed. The heuristic nature of the problem and program indicate that as more data become available, more analytic methods of calculating results may become apparent.

Work is progressing on computer programs to handle maximum sighting range calculations for irregularly shaped, nonluminous targets and to solve problems where visual search is involved. These programs will use short stimulus duration vision data and off-axis vision data. It is hoped these new programs will greatly extend the computerized solution of actual visibility problems.

APPENDIX A

Vision Data

This appendix was taken directly from Appendix A of *Visibility Studies and Some Applications in the Field of Camouflage*.⁶ This book is the second volume of a summary technical report produced by division 16 of the National Defense Research Council in 1946. The appendix shows Tiffany data for the liminal contrast values of circular targets. Liminal contrast is the value of contrast for which the probability of an observer making a correct response is 50 percent greater than chance. These liminal contrasts or interpolations of them are used as Apparent Contrasts by the computer program.

Angular subtense of target (minutes)	L I M I N A L C O N T R A S T (F O O T - L A M B E R T S)								
	1,000	100	10	1	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵
358.9	0.00272	0.00272	0.00277	0.00334	0.00534		0.0303	0.0624	0.136
340.4	0.00272	0.00272	0.00277	0.00334	0.00536	0.0112	0.0308	0.0637	0.140
340.0	0.00272	0.00272	0.00277	0.00334	0.00537	0.0112	0.0308	0.0638	0.140
323.0	0.00272	0.00272	0.00277	0.00335	0.00539	0.0114	0.0314	0.0652	0.144
302.6	0.00272	0.00272	0.00277	0.00335	0.00542	0.0116	0.0320	0.0664	0.147
293.6	0.00272	0.00272	0.00277	0.00335	0.00544	0.0117	0.0325	0.0678	0.151
291.8	0.00272	0.00272	0.00277	0.00335	0.00544	0.0117	0.0328	0.0679	0.152
280.9	0.00272	0.00272	0.00278	0.00335	0.00547	0.0119	0.0330	0.0690	0.155
269.2	0.00272	0.00272	0.00278	0.00335	0.00550	0.0120	0.0335	0.0703	0.159
258.4	0.00272	0.00272	0.00278	0.00335	0.00553	0.0121	0.0340	0.0716	0.164
255.3	0.00272	0.00272	0.00278	0.00335	0.00553	0.0122	0.0341	0.0720	0.164
234.9	0.00272	0.00272	0.00278	0.00336	0.00558	0.0124	0.0352	0.0748	0.172
226.9	0.00272	0.00272	0.00278	0.00336	0.00562	0.0126	0.0356	0.0760	0.176
215.3	0.00272	0.00272	0.00279	0.00336	0.00565	0.0128	0.0364	0.0780	0.182
204.3	0.00272	0.00272	0.00279	0.00336	0.00569	0.0129	0.0370	0.0800	0.188
198.8	0.00272	0.00272	0.00279	0.00337	0.00570	0.0130	0.0376	0.0811	0.191
185.7	0.00272	0.00272	0.00279	0.00338	0.00575	0.0133	0.0386	0.0840	0.200
184.6	0.00272	0.00272	0.00279	0.00338	0.00577	0.0133	0.0386	0.0842	0.201
172.3	0.00273	0.00273	0.00279	0.00339	0.00581	0.0136	0.0398	0.0875	0.210
170.2	0.00273	0.00273	0.00279	0.00339	0.00582	0.0136	0.0401	0.0880	0.212
161.5	0.00273	0.00273	0.00279	0.00340	0.00588	0.0138	0.0410	0.0907	0.220
157.1	0.00273	0.00273	0.00279	0.00340	0.00589	0.0140	0.0415	0.0922	0.224
152.0	0.00274	0.00274	0.00279	0.00340	0.00593	0.0141	0.0422	0.0940	0.230
145.9	0.00274	0.00274	0.00279	0.00341	0.00596	0.0143	0.0430	0.0963	0.237
143.6	0.00274	0.00274	0.00279	0.00341	0.00597	0.0144	0.0434	0.0973	0.240
136.2	0.00274	0.00274	0.00279	0.00342	0.00603	0.0146	0.0446	0.101	0.250
136.0	0.00274	0.00274	0.00280	0.00342	0.00603	0.0146	0.0446	0.101	0.250
129.2	0.00275	0.00275	0.00280	0.00343	0.00608	0.0149	0.0459	0.104	0.259
127.7	0.00275	0.00275	0.00280	0.00343	0.00608	0.0150	0.0461	0.104	0.263
120.1	0.00275	0.00275	0.00280	0.00344	0.00615	0.0153	0.0476	0.109	0.274
117.5	0.00276	0.00276	0.00280	0.00345	0.00617	0.0154	0.0482	0.110	0.280
113.5	0.00276	0.00276	0.00280	0.00345	0.00621	0.0156	0.0493	0.113	0.287
107.7	0.00276	0.00276	0.00281	0.00347	0.00627	0.0159	0.0508	0.118	0.301
107.5	0.00277	0.00277	0.00281	0.00347	0.00627	0.0160	0.0508	0.118	0.301
102.1	0.00277	0.00277	0.00281	0.00348	0.00634	0.0163	0.0523	0.122	0.315
99.38	0.00277	0.00277	0.00281	0.00349	0.00638	0.0165	0.0536	0.125	0.323
97.26	0.00277	0.00277	0.00281	0.00349	0.00639	0.0166	0.0540	0.127	0.328
92.84	0.00278	0.00278	0.00282	0.00351	0.00646	0.0169	0.0562	0.132	0.344
92.29	0.00278	0.00278	0.00282	0.00351	0.00646	0.0169	0.0562	0.132	0.344
88.80	0.00278	0.00278	0.00282	0.00352	0.00652	0.0172	0.0572	0.136	0.356
86.13	0.00278	0.00278	0.00283	0.00352	0.00656	0.0175	0.0581	0.139	0.366
85.10	0.00278	0.00278	0.00283	0.00352	0.00659	0.0176	0.0586	0.140	0.371

Angular subtense of target (minutes)	L I M I N A L C O N T R A S T (F O O T - L A M B E R T S)								
	1.000	100	10	1	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵
81.70	0.00279	0.00279	0.00283	0.00353	0.00664	0.0179	0.0605	0.145	0.386
80.75	0.00279	0.00279	0.00284	0.00355	0.00667	0.0180	0.0607	0.146	0.389
76.00	0.00279	0.00279	0.00284	0.00358	0.00675	0.0184	0.0632	0.154	0.413
74.28	0.00279	0.00279	0.00284	0.00358	0.00679	0.0187	0.0643	0.157	0.422
71.78	0.00280	0.00280	0.00285	0.00360	0.00685	0.0190	0.0658	0.162	0.436
68.08	0.00280	0.00280	0.00286	0.00361	0.00695	0.0194	0.0684	0.169	0.462
68.00	0.00280	0.00280	0.00286	0.00361	0.00696	0.0195	0.0686	0.170	0.462
64.60	0.00281	0.00281	0.00286	0.00365	0.00705	0.0200	0.0710	0.177	0.485
62.85	0.00281	0.00281	0.00287	0.00366	0.00710	0.0202	0.0725	0.182	0.501
58.73	0.00282	0.00282	0.00289	0.00369	0.00724	0.0209	0.0764	0.194	0.537
58.36	0.00282	0.00282	0.00289	0.00369	0.00725	0.0210	0.0767	0.194	0.541
54.47	0.00284	0.00284	0.00290	0.00374	0.00741	0.0218	0.0809	0.208	0.583
53.83	0.00284	0.00284	0.00290	0.00374	0.00743	0.0220	0.0818	0.210	0.591
51.06	0.00285	0.00285	0.00292	0.00378	0.00756	0.0225	0.0850	0.222	0.627
49.69	0.00286	0.00286	0.00293	0.00380	0.00763	0.0229	0.0874	0.228	0.649
48.06	0.00286	0.00286	0.00294	0.00382	0.00771	0.0233	0.0897	0.236	0.673
46.14	0.00287	0.00287	0.00295	0.00385	0.00782	0.0238	0.0926	0.246	0.708
45.39	0.00288	0.00288	0.00296	0.00386	0.00785	0.0240	0.0940	0.250	0.721
43.07	0.00290	0.00290	0.00298	0.00390	0.00802	0.0248	0.0982	0.265	0.767
43.00	0.00290	0.00290	0.00298	0.00390	0.00802	0.0249	0.0984	0.265	0.768
40.85	0.00292	0.00292	0.00301	0.00394	0.00815	0.0256	0.103	0.280	0.818
40.38	0.00292	0.00292	0.00301	0.00395	0.00820	0.0258	0.104	0.283	0.831
38.00	0.00294	0.00294	0.00304	0.00402	0.00840	0.0267	0.110	0.303	0.896
37.14	0.00295	0.00295	0.00305	0.00404	0.00845	0.0271	0.112	0.312	0.925
36.91	0.00295	0.00295	0.00306	0.00405	0.00848	0.0272	0.113	0.314	0.930
35.89	0.00296	0.00296	0.00307	0.00407	0.00857	0.0277	0.116	0.324	0.967
34.04	0.00299	0.00299	0.00310	0.00413	0.00876	0.0286	0.122	0.344	1.04
34.00	0.00299	0.00299	0.00310	0.00413	0.00881	0.0287	0.122	0.345	1.04
32.30	0.00302	0.00302	0.00313	0.00420	0.00895	0.0297	0.128	0.367	1.12
31.42	0.00304	0.00304	0.00314	0.00422	0.00904	0.0302	0.131	0.380	1.16
30.76	0.00305	0.00305	0.00316	0.00425	0.00913	0.0306	0.134	0.389	1.20
29.36	0.00307	0.00307	0.00320	0.00432	0.00933	0.0316	0.141	0.412	1.28
29.18	0.00308	0.00308	0.00321	0.00432	0.00934	0.0317	0.142	0.416	1.30
28.71	0.00309	0.00309	0.00321	0.00434	0.00942	0.0321	0.144	0.425	1.33
28.09	0.00310	0.00310	0.00323	0.00438	0.00954	0.0326	0.148	0.436	1.37
27.23	0.00312	0.00312	0.00327	0.00442	0.00966	0.0332	0.153	0.454	1.44
26.92	0.00313	0.00313	0.00327	0.00444	0.00970	0.0335	0.154	0.460	1.46
25.84	0.00316	0.00316	0.00330	0.00452	0.00991	0.0346	0.161	0.486	1.56
25.53	0.00316	0.00316	0.00331	0.00453	0.00994	0.0348	0.163	0.494	1.58
24.03	0.00321	0.00321	0.00337	0.00462	0.0103	0.0364	0.175	0.537	1.74
23.49	0.00323	0.00323	0.00340	0.00469	0.0104	0.0371	0.179	0.555	1.80
22.69	0.00326	0.00326	0.00344	0.00474	0.0106	0.0381	0.186	0.581	1.91
21.53	0.00330	0.00330	0.00350	0.00485	0.0110	0.0397	0.198	0.625	2.07
21.50	0.00330	0.00330	0.00350	0.00486	0.0110	0.0398	0.199	0.628	2.09
20.43	0.00335	0.00335	0.00357	0.00498	0.0113	0.0414	0.211	0.676	2.27
19.88	0.00337	0.00337	0.00361	0.00506	0.0115	0.0423	0.218	0.703	2.38
18.57	0.00344	0.00344	0.00371	0.00524	0.0120	0.0449	0.237	0.781	2.68
18.46	0.00345	0.00345	0.00371	0.00526	0.0120	0.0452	0.239	0.787	2.71
17.23	0.00352	0.00352	0.00383	0.00547	0.0126	0.0479	0.262	0.877	3.08
17.02	0.00354	0.00354	0.00386	0.00551	0.0127	0.0485	0.266	0.891	3.15
16.15	0.00360	0.00360	0.00395	0.00569	0.0132	0.0508	0.286	0.972	3.44
15.71	0.00364	0.00364	0.00401	0.00581	0.0135	0.0522	0.297	1.02	3.64
15.20	0.00368	0.00368	0.00409	0.00593	0.0138	0.0540	0.312	1.08	3.89
14.59	0.00374	0.00370	0.00417	0.00611	0.0143	0.0562	0.330	1.15	4.21
14.36	0.00376	0.00372	0.00420	0.00618	0.0144	0.0571	0.337	1.19	4.34
13.62	0.00384	0.00382	0.00434	0.00643	0.0151	0.0604	0.365	1.30	4.83
13.60	0.00384	0.00382	0.00436	0.00644	0.0152	0.0605	0.366	1.30	4.84
12.92	0.00392	0.00391	0.00449	0.00668	0.0158	0.0639	0.393	1.43	5.36
12.77	0.00394	0.00394	0.00453	0.00678	0.0160	0.0649	0.401	1.46	5.47
12.01	0.00406	0.00407	0.00473	0.00713	0.0170	0.0695	0.439	1.64	6.18
11.75	0.00410	0.00412	0.00481	0.00728	0.0172	0.0713	0.455	1.71	6.47
11.67	0.00411	0.00413	0.00484	0.00733	0.0174	0.0719	0.460	1.73	6.52
11.35	0.00417	0.00419	0.00493	0.00750	0.0179	0.0742	0.480	1.82	6.93

Angular subtense of target (minutes)	L I M I N A L C O N T R A S T (F O O T - L A M B E R T S)								
	1,000	100	10	1	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵
10.77	0.00430	0.00434	0.00518	0.00791	0.0189	0.0794	0.522	2.03	7.73
10.75	0.00430	0.00436	0.00520	0.00792	0.0189	0.0796	0.524	2.03	7.74
10.21	0.00443	0.00450	0.00542	0.00836	0.0200	0.0847	0.569	2.24	8.55
9.938	0.00451	0.00460	0.00558	0.00861	0.0206	0.0879	0.593	2.37	9.01
9.726	0.00456	0.00468	0.00572	0.00883	0.0212	0.0904	0.616	2.47	9.45
9.284	0.00470	0.00485	0.00598	0.00931	0.0224	0.0965	0.667	2.71	10.3
9.229	0.00472	0.00489	0.00603	0.00940	0.0226	0.0966	0.674	2.74	10.5
9.078	0.00478	0.00494	0.00612	0.00957	0.0231	0.0988	0.692	2.82	10.8
8.880	0.00485	0.00506	0.00629	0.00984	0.0237	0.102	0.720	2.95	11.4
8.613	0.00496	0.00519	0.00649	0.0103	0.0248	0.107	0.758	3.13	12.0
8.510	0.00500	0.00525	0.00659	0.0104	0.0251	0.108	0.774	3.21	12.3
8.170	0.00518	0.00544	0.00696	0.0110	0.0266	0.116	0.838	3.49	13.4
8.075	0.00522	0.00552	0.00703	0.0112	0.0272	0.117	0.852	3.55	13.6
7.600	0.00550	0.00589	0.00763	0.0122	0.0298	0.129	0.956	4.01	15.5
7.430	0.00562	0.00605	0.00787	0.0126	0.0309	0.133	0.995	4.20	16.1
7.178	0.00579	0.00627	0.00824	0.0133	0.0327	0.140	1.06	4.49	17.3
6.808	0.00611	0.00673	0.00891	0.0145	0.0358	0.153	1.19	5.00	19.2
6.800	0.00611	0.00675	0.00892	0.0146	0.0359	0.154	1.19	5.01	19.3
6.460	0.00646	0.00720	0.00962	0.0158	0.0393	0.167	1.31	5.55	21.4
6.290	0.00667	0.00745	0.0100	0.0166	0.0413	0.175	1.38	5.82	22.6
5.873	0.00721	0.00824	0.0113	0.0188	0.0468	0.197	1.57	6.68	25.9
5.836	0.00728	0.00828	0.0113	0.0190	0.0472	0.199	1.60	6.76	26.2
5.447	0.00794	0.00923	0.0127	0.0216	0.0534	0.226	1.83	7.78	30.0
5.383	0.00807	0.00943	0.0130	0.0220	0.0546	0.230	1.88	7.97	30.7
5.106	0.00869	0.0102	0.0143	0.0243	0.0603	0.254	2.07	8.83	34.2
4.969	0.00906	0.0107	0.0149	0.0256	0.0639	0.268	2.19	9.35	36.1
4.806	0.00955	0.0114	0.0159	0.0275	0.0681	0.286	2.34	9.98	38.6
4.614	0.0101	0.0123	0.0171	0.0297	0.0736	0.309	2.55	10.80	41.9
4.539	0.0104	0.0126	0.0175	0.0307	0.0759	0.319	2.63	11.2	43.2
4.307	0.0114	0.0137	0.0193	0.0339	0.0840	0.354	2.93	12.4	47.9
4.300	0.0115	0.0138	0.0194	0.0339	0.0845	0.355	2.94	12.4	48.2
4.085	0.0124	0.0151	0.0213	0.0375	0.0933	0.391	3.26	13.8	53.5
4.038	0.0127	0.0154	0.0217	0.0383	0.0948	0.402	3.33	14.1	54.4
3.800	0.0140	0.0172	0.0244	0.0430	0.107	0.451	3.74	16.0	61.7
3.714	0.0146	0.0179	0.0255	0.0450	0.112	0.470	3.93	16.8	64.4
3.691	0.0148	0.0182	0.0257	0.0455	0.113	0.479	4.00	17.0	65.1
3.589	0.0156	0.0191	0.0272	0.0480	0.119	0.502	4.21	18.0	69.1
3.404	0.0171	0.0211	0.0301	0.0531	0.132	0.560	4.67	20.0	77.0
3.400	0.0171	0.0211	0.0302	0.0533	0.133	0.560	4.70	20.0	77.4
3.230	0.0187	0.0232	0.0333	0.0589	0.147	0.617	5.19	22.2	85.4
3.142	0.0196	0.0243	0.0350	0.0622	0.154	0.653	5.47	23.3	89.6
3.076	0.0203	0.0253	0.0364	0.0645	0.161	0.678	5.72	24.4	94.1
2.936	0.0221	0.0276	0.0397	0.0706	0.177	0.746	6.27	26.9	103.
2.918	0.0222	0.0277	0.0403	0.0716	0.178	0.752	6.35	27.2	104.
2.871	0.0229	0.0287	0.0414	0.0736	0.184	0.776	6.55	28.0	108.
2.809	0.0237	0.0298	0.0432	0.0770	0.192	0.814	6.84	29.2	113.
2.723	0.0251	0.0316	0.0461	0.0818	0.204	0.863	7.26	31.3	120.
2.692	0.0257	0.0322	0.0471	0.0838	0.207	0.883	7.46	31.9	122.
2.584	0.0277	0.0348	0.0508	0.0910	0.226	0.964	8.13	34.8	133.
2.553	0.0283	0.0355	0.0519	0.0929	0.231	0.977	8.30	35.4	136.
2.403	0.0313	0.0398	0.0583	0.104	0.260	1.11	9.34	40.0	154.
2.349	0.0328	0.0413	0.0607	0.109	0.272	1.18	9.75	42.0	161.
2.269	0.0350	0.0442	0.0652	0.116	0.291	1.25	10.5	44.9	173.
2.153	0.0384	0.0488	0.0718	0.129	0.321	1.38	11.7	49.9	192.0
2.150	0.0384	0.0489	0.0721	0.130	0.322	1.39	11.7	50.0	193.0
2.043	0.0423	0.0538	0.0794	0.143	0.355	1.53	12.9	55.5	213.
1.988	0.0444	0.0566	0.0838	0.150	0.376	1.61	13.6	58.3	225.
1.857	0.0502	0.0644	0.0954	0.171	0.430	1.85	15.6	66.7	258.
1.846	0.0506	0.0653	0.0964	0.173	0.432	1.88	15.8	67.6	261.0
1.723	0.0574	0.0740	0.110	0.198	0.496	2.15	18.1	77.6	299.
1.702	0.0588	0.0757	0.113	0.202	0.507	2.20	18.5	79.4	306.
1.615	0.0643	0.0840	0.125	0.224	0.562	2.44	20.6	88.1	340.0
1.571	0.0680	0.0882	0.132	0.236	0.594	2.59	21.8	93.3	361.

Angular subtense of target (minutes)	L I M I N A L C O N T R A S T (F O O T - L A M B E R T S)								
	1,000	100	10	1	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵
1.520	0.0720	0.0944	0.141	0.251	0.638	2.77	23.3	100.0	386.
1.459	0.0776	0.101	0.152	0.272	0.684	2.99	25.2	108.	417.
1.436	0.0798	0.105	0.157	0.281	0.703	3.09	26.1	112.	432.
1.362	0.0877	0.116	0.174	0.311	0.783	3.43	28.9	124.	479.
1.300	0.0881	0.116	0.175	0.312	0.785	3.45	29.0	125.	480.
1.292	0.0906	0.128	0.193	0.345	0.868	3.82	32.2	138.	535.
1.277	0.0986	0.131	0.197	0.352	0.885	3.90	32.9		544.
1.201	0.110	0.148	0.222	0.395	0.995	4.45	37.1		617.
1.175	0.115	0.154	0.232	0.413	1.05	4.58	38.7		643.
1.167	0.117	0.155	0.234	0.419	1.06	4.63	39.3		652.
1.135	0.123	0.164	0.248	0.442	1.12	4.91	41.4		687.
1.077	0.135	0.182	0.274	0.491	1.24	5.48	46.0		766.
1.075	0.136	0.182	0.275	0.492	1.25	5.50	46.2		770.
1.021	0.149	0.200	0.304	0.542	1.38	6.09	51.3		851.
0.9938	0.157	0.210	0.319	0.572	1.45	6.41	53.6		893.
0.9726	0.168	0.219	0.333	0.596	1.52	6.67	56.1		941.
0.9284	0.177	0.239	0.364	0.652	1.66	7.33	61.6		1030.
0.9229	0.180	0.242	0.368	0.662	1.68	7.41	62.4		1042.
0.9078	0.185	0.250	0.381	0.682	1.74	7.66	69.5		1080.
0.8880	0.192	0.260	0.395	0.714	1.82	7.98	67.4		1130.
0.8613	0.203	0.277	0.420	0.758	1.93	8.49	71.2		
0.8510	0.209	0.284	0.432	0.776	1.98	8.70	73.3		
0.8170	0.225	0.306	0.463	0.841	2.14	9.44	79.4		1330.
0.8075	0.232	0.313	0.476	0.859	2.20	9.66	81.3		
0.7600	0.258	0.352	0.538	0.967	2.48	11.0	92.0		
0.7428	0.271	0.367	0.562	1.01	2.61	11.5	96.2		
0.7178	0.290	0.392	0.598	1.08	2.79	12.4	104.		
0.6808	0.320	0.434	0.664	1.20	3.10	13.8	116.		
0.6800	0.322	0.436	0.667	1.22	3.12		116.		
0.6460	0.355	0.480	0.740	1.34	3.43		129.		
0.6285	0.374	0.512	0.783	1.41	3.64		136.		
0.5873	0.426	0.582	0.898	1.61	4.16				
0.5836	0.432	0.586	0.912	1.64	4.21				
0.5447	0.497	0.676	1.04	1.88	4.82				
0.5383	0.507	0.692	1.07	1.92	4.96				
0.5106	0.562	0.766	1.19	2.14	5.45				
0.4969	0.596	0.807	1.26	2.26	5.77				
0.4806	0.637	0.871	1.34	2.42	6.19				
0.4614	0.687	0.935	1.46	2.62	6.68				
0.4539	0.714	0.975	1.50	2.71	6.92				
0.4307	0.787	1.08	1.67	3.01	7.67				
0.4300	0.793	1.08	1.68	3.01	7.74				
0.4085	0.881	1.20	1.85	3.34	8.52				
0.4038	0.902	1.23	1.90	3.42	8.70				
0.3800	1.02	1.38	2.14	3.85	9.86				
0.3714	1.06	1.44	2.24	4.04	10.4				
0.3691	1.08	1.46	2.27	4.09	10.5				
0.3589	1.14	1.55	2.40	4.32	11.1				
0.3404	1.28	1.73	2.68	4.82	12.4				
0.3400	1.28	1.73	2.68	4.83	12.4				
0.3230	1.40	1.91	2.96	5.31	13.7				
0.3142	1.49	2.02	3.14	5.62					
0.3076	1.55	2.11	3.26	5.85					
0.2936	1.70	2.32	3.58	6.43					
0.2918	1.73	2.33	3.63	6.53					
0.2871	1.77	2.42	3.76	6.74					
0.2809	1.86	2.54	3.91	7.02					
0.2723	1.99	2.69	4.17	7.50	19.3				
0.2692	2.03	2.75	4.27	7.67					
0.2584	2.19	2.98	4.63	8.32					
0.2553	2.25	3.07	4.74	8.55					
0.2403	2.52	3.43	5.36	9.55					
0.2349	2.66	3.62	5.60	10.0					

Angular subtense of target (minutes)	L I M I N A L C O N T R A S T (F O O T - L A M B E R T S)								
	1,000	100	10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}
0.2269	2.86	3.88	6.01	10.8					
0.2153	3.16	4.28	6.68	12.0					
0.2150	3.19	4.32	6.68	12.0					
0.2043	3.53	4.78	7.40	13.3					
0.1988	3.72	5.04	7.81	14.1					
0.1857	4.26	5.76	8.97						
0.1846	4.32	5.82	9.06						
0.1723	4.96	6.67	10.3						
0.1702	5.08	6.86	10.6						
0.1615	5.62	7.62	11.9						
0.1571	5.96	8.04	12.5						
0.1520	6.38	8.61	13.4						
0.1459	6.91	9.31	14.5						
0.1436	7.14	9.66							
0.1362	7.74	10.7							
0.1360	7.95	10.7							
0.1292	8.83	11.9							

APPENDIX B

This appendix contains fourteen programs and subroutines as follows:

	Title
B1	PROGRAM ACII and SUBROUTINE TIFIN
B2	PROGRAM PODV1
B3	SUBROUTINE DATA 1
B4	SUBROUTINE DATA 2
B5	SUBROUTINE DATA 3
B6	SUBROUTINE TCAL
B7	FUNCTION TRF
B8	FUNCTION BSTRF
B9	FUNCTION TROF
B10	FUNCTION BSTOF
B11	FUNCTION BBOF
B12	FUNCTION COF
B13	SUBROUTINE PLTSU
B14	SUBROUTINE PLOT 1

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	PROGRAM AC11 and SUBROUTINE TIFIN
Category	CVC
Programmer	Barkdoll
Date	1 November 1965
Type	Fortran 63

B. DESCRIPTION

This program calculates 20 values of contrast threshold from each of the nine levels of background luminance from the Tiffany data. The calculated contrast thresholds are found by using 20 given values of altitude. The values of contrast threshold calculated by this program are used as inputs to program PODVI.

C. USAGE

1. Calling Sequence

Program AC11
TIFIN (IBAC, Z, CCR, CALPH)

2. Arguments or Parameters

IBAC = 1 of 9 levels of background luminance from Tiffany data.
Z = The altitude value to be used in the interpolation procedure.
CCR = The interpolation result for contrast threshold.
CALPH = The calculated value of alpha.

3. Storage Requirements (Decimal)	338 words
4. Temporary Storage Requirements	Not Applicable
5. Alarms, Print-Outs	Prints out values of apparent contrast.
6. Error Returns	None
7. Error Stops	None
8. Input and Output Tape Mountings	Not Applicable
9. Input and Output Formats	Not Applicable
10. Selective Jump and Stop Settings	Not Applicable
11. Machine Time	
12. Accuracy	Not Applicable
13. Cautions to User	None
14. Equipment Configuration	CDC 3600
15. References	

D. METHOD

- (1) Interpolation of table values

$$CCR = CR(I) + \frac{[CALPH - ALPH(I)] [CR(I+1) - CR(I)]}{[ALPH(I+1) - ALPH(I)]}$$

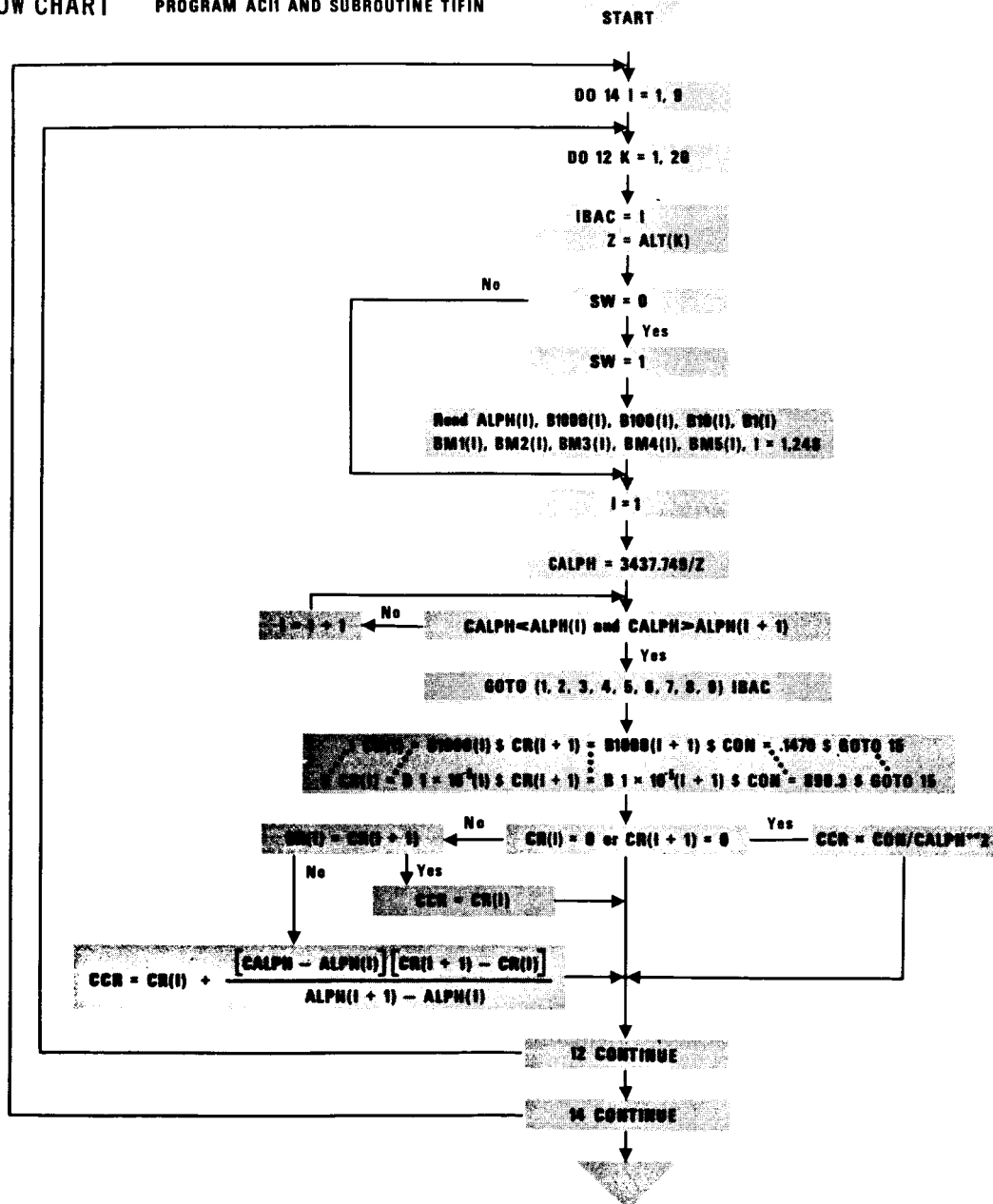
- (2) Ricco's Law, where $CR(I) = 0$

$$CCR = \frac{CON}{(ALPHA)} 2$$

CON is a constant for a given level of background luminance.

ALPHA must be less than a given maximum angular size for each level of inherent background luminance.

E. FLOW CHART



PROGRAM ACI1

PROGRAM ACI1	ACI 0000
C PROGRAM ACI1...1NOV,65...BARKDOLL...VISLAB...UCSD	ACI 0010
C ***ACI1=THRESHOLD CONTRAST INTERPOLATER NO 1.	ACI 0020
C ***THIS PROGRAM CONTAINS THE ALTITUDE VALUES USED BY SUBROUTINE	ACI 0030
C ***TIFIN FOR INTERPOLATION OF TIFFANY DATA TO	ACI 0040
C ***GIVE THRESHOLD CONTRAST VALUES.	ACI 0050
C ***INPUT DATA ARRAY=ALT(20) THIS ARRAY CONTAINS THE ALTITUDES	ACI 0060
C ***FOR WHICH THRESHOLD CONTRASTS ARE DESIRED.	ACI 0070
C	ACI 0080
C ...OUTPUT=THIS PROGRAM PRINTS OUT ARRAY ALT=20 GIVEN	ACI 0090
C ...VALUES OF ALTITUDE, ARRAY VALPH=20 CALCULATED	ACI 0100
C ...VALUES OF ALPHA, AND ARRAY VCR=20 VALUES OF THRESHOLD	ACI 0110
C ...CONTRAST FOR EACH OF 9 VALUES OF BACKGROUND LUMINANCE.	ACI 0120
C	ACI 0130
C ***NOTE CCR=THRESHOLD CONTRAST VALUE	ACI 0140
C	ACI 0150
C ...SUBROUTINES CALLED TIFIN	ACI 0160
C	ACI 0170
DIMENSION ALT(20),VALPH(20),VCR(20,9)	ACI 0180
DATA(ALT=20.,40.,60.,80.,100.,200.,400.,600.,800.,1000.,	ACI 0190
12000.,4000.,6000.,8000.,10000.,15000.,20000.,25000.,30000.,40000.)	ACI 0200
DO 14 I=1,9	ACI 0210
DO 12 K=1,20	ACI 0220
IBAC=I \$ Z=ALT(K)	ACI 0230
CALL TIFIN(IBAC,Z,CCR,ALPH)	ACI 0240
VCR(K,I)=CCR \$ VALPH(K)=ALPH	ACI 0250
12 CONTINUE	ACI 0260
14 CONTINUE	ACI 0270
PRINT 100	ACI 0280
100 FORMAT(1H1,40X,36HBACKGROUND LUMINANCE IN FT. LAMBERTS)	ACI 0290
PRINT 120	ACI 0300
120 FORMAT(//1X,8HALTITUDE,3X,5HALPHA,5X,5H1000.,4X,4H100.,6X,3H10.,6X	ACI 0310
1,2H1.,8X,2H.1,7X,3H.01,7X,4H.001,7X,5H.0001,7X,6H.00001)	ACI 0320
PRINT 125	ACI 0330
125 FORMAT (//50X,19HTHRESHOLD CONTRASTS)	ACI 0340
PRINT 130,(ALT(L),VALPH(L),(VCR(L,M),M=1,9),L=1,20)	ACI 0350
130 FORMAT(//3X,F7.1,F10.5,4F9.5,2F10.5,F11.5,F12.5,F13.5)	ACI 0360
END	ACI 0370

SUBROUTINE TIFIN(IBAC,Z,CCR,CALPH)

SUBROUTINE TIFIN(IBAC,Z,CCR,CALPH)	TIF 0000
C SUBROUTINE TIFIN...1NOV,65...BARKDOLL...VISLAB...UCSD	TIF 0010
C ***THIS SUBROUTINE WILL INTERPOLATE FOR THRESHOLD	TIF 0020
C ***CONTRAST VALUE FROM ONE OF 9 ADAPTION	TIF 0030
C ***LEVELS OF TIFFANY DATA.	TIF 0040
C ***INPUT DATA IBAC = 1 OF 9 LEVELS OF BACKGROUND LUMINANCE	TIF 0050
C ***Z = THE ALTITUDE VALUE TO BE USED IN INTERPOLATION	TIF 0060
C	TIF 0070
C ***OUTPUT CCR=INTERPOLATED VALUE FOR THRESHOLD CONTRAST.	TIF 0080
C ***CALPH = THE CALCULATED VALUE OF ALPHA.	TIF 0090
C ***PROGRAMS CALLED NONE.	TIF 0100
C	TIF 0110
DIMENSION ALPH(253),B1000(253),B100(253),B10(253),	TIF 0120
1B1(253),BM1(253),BM2(253),BM3(253),BM4(253),BM5(253),CR(253)	TIF 0130
IF(SW.EQ.0)10,30	TIF 0140
10 SW=1	TIF 0150
READ 20,(ALPH(I),B1000(I),B100(I),B10(I),B1(I),BM1(I),	TIF 0160
1BM2(I),BM3(I),BM4(I),BM5(I),I=1,248)	TIF 0170
20 FORMAT(10F6)	TIF 0180
30 I=1	TIF 0190
CALPH=3437.749/Z	TIF 0200
40 IF(CALPH.LT.ALPH(I).AND.CALPH.GT.ALPH(I+1))50,60	TIF 0210

50 GO TO(70,80,90,100,110,120,130,140,150)IBAC	TIF 0220
60 I=I+1	TIF 0230
GO TO 40	TIF 0240
70 CR(I)=B1000(I) \$ CR(I+1)=B1000(I+1) \$ CON=.1470 \$ GO TO 160	TIF 0250
80 CR(I)=B100(I) \$ CR(I+1)=B100(I+1) \$ CON=.1995 \$ GO TO 160	TIF 0260
90 CR(I)=B10(I) \$ CR(I+1)=B10(I+1) \$ CON=.30925 \$ GO TO 160	TIF 0270
100 CR(I)=B1(I) \$ CR(I+1)=B1(I+1) \$ CON=.5571 \$ GO TO 160	TIF 0280
110 CR(I)=BM1(I) \$ CR(I+1)=BM1(I+1) \$ CON=1.434 \$ GO TO 160	TIF 0290
120 CR(I)=BM2(I) \$ CR(I+1)=BM2(I+1) \$ CON=6.367 \$ GO TO 160	TIF 0300
130 CR(I)=BM3(I) \$ CR(I+1)=BM3(I+1) \$ CON=53.87 \$ GO TO 160	TIF 0310
140 CR(I)=BM4(I) \$ CR(I+1)=BM4(I+1) \$ CON=231.0 \$ GO TO 160	TIF 0320
150 CR(I)=BM5(I) \$ CR(I+1)=BM5(I+1) \$ CON=890.3 \$ GO TO 160	TIF 0330
160 IF(CR(I).EQ.0.OR.CR(I+1).EQ.0) 170,180	TIF 0340
170 CCR=CON/CALPH**2	TIF 0350
GO TO 210	TIF 0360
180 IF(CR(I).EQ.CR(I+1))190,200	TIF 0370
190 CCR=CR(I)	TIF 0380
GO TO 210	TIF 0390
200 CCR=CR(I)+(((CALPH-ALPH(I))*(CR(I+1)-CR(I)))/(ALPH(I+1)-ALPH(I)))	TIF 0400
210 CONTINUE	TIF 0410
END	TIF 0420

*****TIFFANY THRESHOLD CONTRAST DATA*****

358.90.00272.00272.00277.00334.00534.01120.03030.06240.13600	001
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323.00.00272.00272.00277.00335.00539.01140.03140.06520.14400	004
302.60.00272.00272.00277.00335.00542.01160.03200.06640.14700	005
293.60.00272.00272.00277.00335.00544.01170.03250.06780.15100	006
291.80.00272.00272.00277.00335.00544.01170.03260.06790.15200	007
280.90.00272.00272.00278.00335.00547.01190.03300.06900.15500	008
269.20.00272.00272.00278.00335.00550.01200.03350.07030.15900	009
258.40.00272.00272.00278.00335.00553.01210.03400.07160.16400	010
255.30.00272.00272.00278.00335.00553.01220.03410.07200.16400	011
234.90.00272.00272.00278.00336.00558.01240.03520.07480.17200	012
226.90.00272.00272.00278.00336.00562.01260.03560.07600.17600	013
215.30.00272.00272.00279.00336.00565.01280.03640.07800.18200	014
204.30.00272.00272.00279.00336.00569.01290.03700.08000.18800	015
198.80.00272.00272.00279.00337.00570.01300.03760.08110.19100	016
185.70.00272.00272.00279.00338.00575.01330.03860.08400.20000	017
184.60.00272.00272.00279.00338.00577.01330.03860.08420.20100	018
172.30.00273.00273.00279.00339.00581.01360.03980.08750.21000	019
170.20.00273.00273.00279.00339.00582.01360.04010.08800.21200	020
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.240302.52003.43005.36009.5500	230
.234902.66003.62005.600010.000	231
.226902.86003.88006.010010.800	232
.215303.16004.28006.680012.000	233
.215003.19004.32006.680012.000	234
.204303.53004.78007.400013.300	235
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.185704.26005.76008.9700	237

•184604.32005.82009.0600	238
•172304.96006.670010.300	239
•170205.08006.860010.600	240
•161505.62007.620011.900	241
•157105.96008.040012.500	242
•152006.38008.610013.400	243
•145906.91009.310014.500	244
•143607.14009.6600	245
•136207.740010.700	246
•136007.950010.700	247
•129208.830011.900	248

330 CARDS

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	PROGRAM PODV1
Category	CVC
Programmer	Barkdoll
Date	1 September 1965
Type	F-63 Calling Program

B. DESCRIPTION

Provides input data and calls the sequence of programs that will solve for a probability of target detection volumn.

C. USAGE

1. Calling Sequence

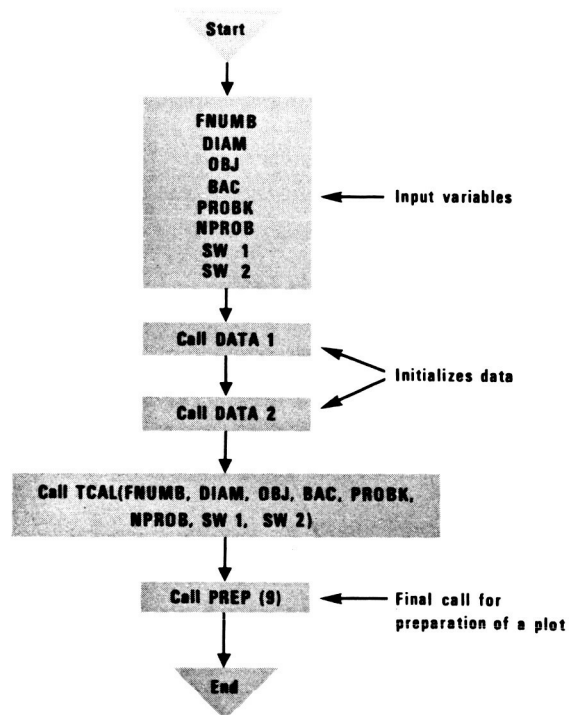
Calling Program

2. Arguments or Parameters

FNUMB = flight number used for atmospheric data.
 DIAM = target diameter in feet -- not to exceed 100 ft.
 OBJ = index for directional reflectance properties of target object.
 BAC = index for directional reflectance properties of the background.
 PROBK = constant for deviation from 50% probability of detection.
 NPROB = integer representing probability of detection.
 SW2 = switch for plotting; 1 if plot is desired, 0 if no plot is desired.
 SW1 = switch for output printing; 1 for calculations and coordinates, 0 for coordinates only.

3. Storage Requirements (Decimal)	37 words
4. Temporary Storage Requirements	(a) Not Applicable (b) Not Applicable
5. Alarms, or Print-Outs	None
6. Error Returns	None
7. Error Stops	None
8. Input and Output Tape Mountings	Not Applicable
9. Input and Output Formats	Not Applicable
10. Selective Jump and Stop Settings	Not Applicable
11. Machine Time	Approximately one minute
12. Accuracy	Not Applicable
13. Cautions to User	None
14. Equipment Configuration	CDC 3600 Fortran 63
15. References	

E. FLOW CHART



PROGRAM PODV1

PROGRAM PODV1	POD 0000
C ...PROGRAM PODV1...INOV.65...HARKDOLL...VISLAB...UCSD	POD 0010
C ...PODV1= PROBABILITY OF DETECTION VOLUME PHASE 1	POD 0020
C ...THIS PROGRAM PROVIDES INPUT DATA FOR THE	POD 0030
C ...SOLUTION OF A PROBABILITY OF TARGET DETECTION VOLUME.	POD 0040
C ...THE CALLED SEQUENCE OF PROGRAMS WILL PRINT THE	POD 0050
C ...ALTITUDE AND DISTANCE FROM THE TARGET AXIS FOR	POD 0060
C ...8 DOWNWARD LOOKING ZENITHS OF PATH OF SIGHT,	POD 0070
C ...THETA=180,165,150,135,120,105,100,95 DEGREES AND	POD 0080
C ...FOR 5 AZIMUTHS OF PATH OF SIGHT WITH RESPECT	POD 0090
C ...TO THE SUN, PHI=0,45,90,135,180 DEGREES.	POD 0100
C ...THE PROGRAM WILL ALSO PLOT THESE POINTS AS	POD 0110
C ...4 HEMISPHERIC CROSS SECTIONS.	POD 0120
C	POD 0130
C ...VARIABLE INPUTS...	POD 0140
C ...OPT=OPTION FOR ATMOSPHERIC AND OPTICAL SYSTEM	POD 0150
COPT=0 FOR VIEWING THROUGH ATMOSPHERE ONLY	POD 0160
COPT=-1 FOR OPTICS AND NO ATMOSPHERE	POD 0170
COPT=+1 FOR OPTICS AND AN ATMOSPHERE	POD 0180
C ...FNUMB=FLIGHT NUMBER FOR ATMOSPHERIC DATA	POD 0190
C ...OPTNU=OPTICAL SYSTEM INDEX NUMBER	POD 0200
C ...DIAM=TARGET DIAMETER IN FT.,NOT TO EXCEED 100 FT.	POD 0210
C ...OBJ=INDEX FOR DIRECTIONAL REFLECTANCE PROPERTIES	POD 0220
C ...OF TARGET OBJECT	POD 0230
C ...BAC=INDEX FOR DIRECTIONAL REFLECTANCE PROPERTIES	POD 0240
C ...OF BACKGROUND	POD 0250
C ...PROBK=CONSTANT FOR DEVIATION FROM 50 PERCENT	POD 0260
C ...PROBABILITY,1. FOR 50,1.206 FOR 70, 1.50 FOR 90, AND	POD 0270
C ...1.91 FOR 99 PERCENT PROBABILITY OF DETECTION	POD 0280
C ...NPROB=INTEGER REPRESENTING PROBABILITY	POD 0290
C ...SW1=SWITCH FOR OUTPUT PRINTING, 1 FOR CALCULATIONS	POD 0300
C ...AND COORDINATES, 0 FOR COORDINATES ONLY	POD 0310
C ...SW2=SWITCH FOR PLOTTING, 1 IF PLOT IS DESIRED	POD 0320
C ...0 FOR NO PLOT	POD 0330
C ...	POD 0340
C ...CALLED PROGRAMS=TCAL	POD 0350
C	POD 0360
OPT=0.	POD 0370
FNUMB=74.	POD 0380
DIAM=10.	
OBJ=1.	POD 0400
BAC=1.	POD 0410
PROBK=1.	POD 0420
NPROB=50	POD 0430
SW1=1.	POD 0440
SW2=1.	POD 0450
C ***INITIALIZE DATA TABLES.	POD 0455
CALL DATA1	POD 0460
CALL DATA2	POD 0470
CALL DATA 3	POD 0480
C ***CALL MAIN PROCESSING ROUTINE	POD 0485
CALL TCAL(OPT,FNUMB,OPTNU,DIAM,OBJ,BAC,PROBK,NPROB,	POD 0490
1SW1,SW2)	POD 0500
C ***INITIATE PLOTTING OUT DATA	POD 0505
CALL PREP(9)	POD 0510
END	POD 0520

56 CARDS

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	SUBROUTINE DATA 1
Category	CVC
Programmer	Barkdoll
Date	29 September 1965
Type	F-63 Subroutine

B. DESCRIPTION

Data package containing a three dimensional array (8, 18, 5) of Path Luminance values for a given flight. The eight columns represent zeniths of path of sight, the eighteen rows represent altitudes from 1,000 feet to 60,000 feet, and the five planes represent azimuths of path of sight.

C. USAGE

- | | |
|--------------------------------------|--|
| 1. Calling Sequence | Called by PODV1, data used by BSTRF |
| 2. Arguments or Parameters | ARRAY BS gives Path Luminance values
COMMON /A/ BS(8,18,5)
COMMON WITH BSTRF |
| 3. Storage Requirements (Decimal) | 720 words |
| 4. Temporary Storage Requirements | Not Applicable |
| 5. Alarms, or Print-Outs | None |
| 6. Error Returns | None |
| 7. Error Stops | None |
| 8. Input and Output Tape Mountings | Not Applicable |
| 9. Input and Output Formats | Not Applicable |
| 10. Selective Jump and Stop Settings | Not Applicable |
| 11. Machine Time | Not Applicable |
| 12. Accuracy | Not Applicable |
| 13. Cautions to User | None |
| 14. Equipment Configuration | CDC 3600 FORTRAN 63 |
| 15. References | |

D. METHOD

Data package only

E. FLOW CHART

Not applicable

SUBROUTINE DATA1

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SUBROUTINE DATA1
C   ...SUBROUTINE DATA1...1NOV.65...BARKDOLL...VISLAB...UCSD
C   ...THIS SUBROUTINE IS A DATA PACKAGE FOR PATH
C   ...LUMINANCE VALUES,ARRAY BS(8,18,5)USED BY BSTRF
C   ...TABLE OF BSTAR PATH LUMINANCE VALUES FOR FLIGHT 74
C   ***NOTE DATA STORED IN THIS WAY FOR PILOT DEBUGGING ONLY.
C
COMMON/A/BS(8,18,5)
C   ...PATH LUMINANCE VALUES.
BS(1,1,1)=0$ BS(1,2,1)=60.9$ BS(1,3,1)=134.$ BS(1,4,1)=192.
BS(1,5,1)=233.$ BS(1,6,1)=264.$ BS(1,7,1)=291.$ BS(1,8,1)=313.
BS(1,9,1)=341.$BS(1,10,1)=367.$BS(1,11,1)=388.$BS(1,12,1)=484.
BS(1,13,1)=603.$BS(1,14,1)=710.$BS(1,15,1)=798.$BS(1,16,1)=928.
BS(1,17,1)=1010.$BS(1,18,1)=1060.
BS(2,1,1)=0$ BS(2,2,1)=60.9$ BS(2,3,1)=132.$ BS(2,4,1)=204.
BS(2,5,1)=259.$ BS(2,6,1)=281.$ BS(2,7,1)=301.$ BS(2,8,1)=327.
BS(2,9,1)=366.$BS(2,10,1)=388.$BS(2,11,1)=399.$BS(2,12,1)=457.
BS(2,13,1)=510.$BS(2,14,1)=557.$BS(2,15,1)=596.$BS(2,16,1)=653.
BS(2,17,1)=689.$BS(2,18,1)=710.
BS(3,1,1)=0$ BS(3,2,1)=81.8$ BS(3,3,1)=158.$ BS(3,4,1)=229.
BS(3,5,1)=298.$ BS(3,6,1)=318.$ BS(3,7,1)=344.$ BS(3,8,1)=377.
BS(3,9,1)=419.$BS(3,10,1)=445.$BS(3,11,1)=459.$BS(3,12,1)=532.
BS(3,13,1)=604.$BS(3,14,1)=674.$BS(3,15,1)=731.$BS(3,16,1)=815.
BS(3,17,1)=867.$BS(3,18,1)=899.
BS(4,1,1)=0$ BS(4,2,1)=88.7$ BS(4,3,1)=163.$ BS(4,4,1)=236.
BS(4,5,1)=305.$ BS(4,6,1)=340.$ BS(4,7,1)=381.$ BS(4,8,1)=434.
BS(4,9,1)=496.$BS(4,10,1)=531.$BS(4,11,1)=545.$BS(4,12,1)=610.
BS(4,13,1)=672.$BS(4,14,1)=731.$BS(4,15,1)=779.$BS(4,16,1)=848.
BS(4,17,1)=891.$BS(4,18,1)=917.
BS(5,1,1)=0$ BS(5,2,1)=123.$ BS(5,3,1)=214.$ BS(5,4,1)=298.
BS(5,5,1)=371.$ BS(5,6,1)=414.$ BS(5,7,1)=469.$ BS(5,8,1)=545.
BS(5,9,1)=671.$BS(5,10,1)=732.$BS(5,11,1)=749.$BS(5,12,1)=823.
BS(5,13,1)=896.$BS(5,14,1)=967.$BS(5,15,1)=1020.$BS(5,16,1)=1110.
BS(5,17,1)=1150.$BS(5,18,1)=1180.
BS(6,1,1)=0$ BS(6,2,1)=223.$ BS(6,3,1)=461.$ BS(6,4,1)=676.
BS(6,5,1)=868.$ BS(6,6,1)=973.$ BS(6,7,1)=1070.$ BS(6,8,1)=1180.
BS(6,9,1)=1290.$BS(6,10,1)=1360.$BS(6,11,1)=1380.$BS(6,12,1)=1510.
BS(6,13,1)=1660.$BS(6,14,1)=1790.$BS(6,15,1)=1890.$BS(6,16,1)=2040
1.
BS(6,17,1)=2120.$BS(6,18,1)=2170.
BS(7,1,1)=0$ BS(7,2,1)=398.$ BS(7,3,1)=727.$ BS(7,4,1)=998.
BS(7,5,1)=1210.$ BS(7,6,1)=1300.$ BS(7,7,1)=1390.$ BS(7,8,1)=1470.
BS(7,9,1)=1530.$BS(7,10,1)=1580.$BS(7,11,1)=1610.$BS(7,12,1)=1780.
BS(7,13,1)=1980.$BS(7,14,1)=2150.$BS(7,15,1)=2270.$BS(7,16,1)=2440
1.
BS(7,17,1)=2540.$BS(7,18,1)=2590.
BS(8,1,1)=0$ BS(8,2,1)=750.$ BS(8,3,1)=1140.$ BS(8,4,1)=1400.
BS(8,5,1)=1590.$ BS(8,6,1)=1690.$ BS(8,7,1)=1780.$ BS(8,8,1)=1890.
BS(8,9,1)=2020.$BS(8,10,1)=2110.$BS(8,11,1)=2140.$BS(8,12,1)=2310.
BS(8,13,1)=2500.
BS(1,1,2)=0 $BS(1,2,2)=86.2 $BS(1,3,2)=159. $BS(1,4,2)=220.
BS(1,5,2)=267. $BS(1,6,2)=299. $BS(1,7,2)=324. $BS(1,8,2)=340.
BS(1,9,2)=375.$BS(1,10,2)=401.$BS(1,11,2)=417.$BS(1,12,2)=495.
BS(1,13,2)=587.$BS(1,14,2)=671.$BS(1,15,2)=740.$BS(1,16,2)=841.
BS(1,17,2)=903.$BS(1,18,2)=941.
BS(2,1,2)=0 $BS(2,2,2)=103. $BS(2,3,2)=183. $BS(2,4,2)=252.
BS(2,5,2)=308. $BS(2,6,2)=335. $BS(2,7,2)=356. $BS(2,8,2)=371.
BS(2,9,2)=417.$BS(2,10,2)=447.$BS(2,11,2)=463.$BS(2,12,2)=541.
BS(2,13,2)=628.$BS(2,14,2)=707.$BS(2,15,2)=772.$BS(2,16,2)=866.
BS(2,17,2)=925.$BS(2,18,2)=961.
BS(3,1,2)=0 $BS(3,2,2)=110. $BS(3,3,2)=192. $BS(3,4,2)=262.
BS(3,5,2)=318. $BS(3,6,2)=365. $BS(3,7,2)=406. $BS(3,8,2)=441.
BS(3,9,2)=487.$BS(3,10,2)=518.$BS(3,11,2)=534.$BS(3,12,2)=607.
BS(3,13,2)=689.$BS(3,14,2)=763.$BS(3,15,2)=824.$BS(3,16,2)=912.

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BS(3,17,2)=967.\$BS(3,18,2)=1000. DA1 0620
 BS(4,1,2)=0 \$BS(4,2,2)=128. \$BS(4,3,2)=244. \$BS(4,4,2)=331. DA1 0630
 BS(4,5,2)=391. \$BS(4,6,2)=444. \$BS(4,7,2)=484. \$BS(4,8,2)=525. DA1 0640
 BS(4,9,2)=606.\$BS(4,10,2)=645.\$BS(4,11,2)=678.\$BS(4,12,2)=755. DA1 0650
 BS(4,13,2)=856.\$BS(4,14,2)=947.\$BS(4,15,2)=1020.\$BS(4,16,2)=1130. DA1 0660
 BS(4,17,2)=1190.\$BS(4,18,2)=1230. DA1 0670
 BS(5,1,2)=0 \$BS(5,2,2)=259. \$BS(5,3,2)=473. \$BS(5,4,2)=639. DA1 0680
 BS(5,5,2)=771. \$BS(5,6,2)=854. \$BS(5,7,2)=935. \$BS(5,8,2)=956. DA1 0690
 BS(5,9,2)=1020.\$BS(5,10,2)=1070.\$BS(5,11,2)=1100.\$BS(5,12,2)=1280.DA1 0700
 BS(5,13,2)=1470.\$BS(5,14,2)=1630.\$BS(5,15,2)=1760.\$BS(5,16,2)=1930DA1 0710
 BS(5,17,2)=2040.\$BS(5,18,2)=2110. DA1 0720
 BS(6,1,2)=0 \$BS(6,2,2)=359. \$BS(6,3,2)=692. \$BS(6,4,2)=837. DA1 0730
 BS(6,5,2)=1100. \$BS(6,6,2)=1180. \$BS(6,7,2)=1270. \$BS(6,8,2)=1320.DA1 0740
 BS(6,9,2)=1390.\$BS(6,10,2)=1450.\$BS(6,11,2)=1480.\$BS(6,12,2)=1600.DA1 0750
 BS(6,13,2)=1760.\$BS(6,14,2)=1910.\$BS(6,15,2)=2010.\$BS(6,16,2)=2160DA1 0760
 1. DA1 0770
 BS(6,17,2)=2240.\$BS(6,18,2)=2280. DA1 0780
 BS(7,1,2)=0 \$BS(7,2,2)=650. \$BS(7,3,2)=964. \$BS(7,4,2)=1190. DA1 0790
 BS(7,5,2)=1310. \$BS(7,6,2)=1450. \$BS(7,7,2)=1570. \$BS(7,8,2)=1640.DA1 0800
 BS(7,9,2)=1700.\$BS(7,10,2)=1780.\$BS(7,11,2)=1800.\$BS(7,12,2)=1920.DA1 0810
 BS(7,13,2)=2100. DA1 0820
 BS(1,1,3)=0 \$BS(1,2,3)=69.7 \$BS(1,3,3)=138. \$BS(1,4,3)=195. DA1 0830
 BS(1,5,3)=238. \$BS(1,6,3)=268. \$BS(1,7,3)=293. \$BS(1,8,3)=321. DA1 0840
 BS(1,9,3)=351.\$BS(1,10,3)=376.\$BS(1,11,3)=393.\$BS(1,12,3)=479. DA1 0850
 BS(1,13,3)=582.\$BS(1,14,3)=675.\$BS(1,15,3)=751.\$BS(1,16,3)=864. DA1 0860
 BS(1,17,3)=934.\$BS(1,18,3)=976. DA1 0870
 BS(2,1,3)=0 \$BS(2,2,3)=77.8 \$BS(2,3,3)=156. \$BS(2,4,3)=226. DA1 0880
 BS(2,5,3)=279. \$BS(2,6,3)=306. \$BS(2,7,3)=328. \$BS(2,8,3)=344. DA1 0890
 BS(2,9,3)=383.\$BS(2,10,3)=409.\$BS(2,11,3)=426.\$BS(2,12,3)=516. DA1 0900
 BS(2,13,3)=609.\$BS(2,14,3)=694.\$BS(2,15,3)=763.\$BS(2,16,3)=864. DA1 0910
 BS(2,17,3)=926.\$BS(2,18,3)=964. DA1 0920
 BS(3,1,3)=0 \$BS(3,2,3)=82.8 \$BS(3,3,3)=174. \$BS(3,4,3)=245. DA1 0930
 BS(3,5,3)=298. \$BS(3,6,3)=339. \$BS(3,7,3)=372. \$BS(3,8,3)=403. DA1 0940
 BS(3,9,3)=439.\$BS(3,10,3)=463.\$BS(3,11,3)=481.\$BS(3,12,3)=571. DA1 0950
 BS(3,13,3)=670.\$BS(3,14,3)=759.\$BS(3,15,3)=831.\$BS(3,16,3)=936. DA1 0960
 BS(3,17,3)=1000.\$BS(3,18,3)=1040. DA1 0970
 BS(4,1,3)=0 \$BS(4,2,3)=109. \$BS(4,3,3)=226. \$BS(4,4,3)=325. DA1 0980
 BS(4,5,3)=404. \$BS(4,6,3)=462. \$BS(4,7,3)=508. \$BS(4,8,3)=549. DA1 0990
 BS(4,9,3)=580.\$BS(4,10,3)=607.\$BS(4,11,3)=628.\$BS(4,12,3)=739. DA1 1000
 BS(4,13,3)=873.\$BS(4,14,3)=993.\$BS(4,15,3)=1090.\$BS(4,16,3)=1230. DA1 1010
 BS(4,17,3)=1314.\$BS(4,18,3)=1370. DA1 1020
 BS(5,1,3)=0 \$BS(5,2,3)=203. \$BS(5,3,3)=389. \$BS(5,4,3)=540. DA1 1030
 BS(5,5,3)=665. \$BS(5,6,3)=744. \$BS(5,7,3)=810. \$BS(5,8,3)=881. DA1 1040
 BS(5,9,3)=932.\$BS(5,10,3)=963.\$BS(5,11,3)=1000.\$BS(5,12,3)=1160. DA1 1050
 BS(5,13,3)=1310.\$BS(5,14,3)=1450.\$BS(5,15,3)=1560.\$BS(5,16,3)=1710DA1 1060
 1. DA1 1070
 BS(5,17,3)=1800.\$BS(5,18,3)=1860. DA1 1080
 BS(6,1,3)=0 \$BS(6,2,3)=359. \$BS(6,3,3)=562. \$BS(6,4,3)=722. DA1 1090
 BS(6,5,3)=867. \$BS(6,6,3)=975. \$BS(6,7,3)=1090. \$BS(6,8,3)=1170. DA1 1100
 BS(6,9,3)=1190.\$BS(6,10,3)=1240.\$BS(6,11,3)=1270.\$BS(6,12,3)=1420.DA1 1110
 BS(6,13,3)=1580.\$BS(6,14,3)=1730.\$BS(6,15,3)=1830.\$BS(6,16,3)=1980DA1 1120
 1. DA1 1130
 BS(6,17,3)=2060.\$BS(6,18,3)=2100. DA1 1140
 BS(7,1,3)=0 \$BS(7,2,3)=595. \$BS(7,3,3)=833. \$BS(7,4,3)=990. DA1 1150
 BS(7,5,3)=1110. \$BS(7,6,3)=1100. \$BS(7,7,3)=1260. \$BS(7,8,3)=1310.DA1 1160
 BS(7,9,3)=1380.\$BS(7,10,3)=1410.\$BS(7,11,3)=1450.\$BS(7,12,3)=1600.DA1 1170
 BS(7,13,3)=1800. DA1 1180
 BS(1,1,4)=0 \$BS(1,2,4)=93.4 \$BS(1,3,4)=161. \$BS(1,4,4)=218. DA1 1190
 BS(1,5,4)=259. \$BS(1,6,4)=292. \$BS(1,7,4)=323. \$BS(1,8,4)=344. DA1 1200
 BS(1,9,4)=364.\$BS(1,10,4)=395.\$BS(1,11,4)=417.\$BS(1,12,4)=531. DA1 1210
 BS(1,13,4)=634.\$BS(1,14,4)=725.\$BS(1,15,4)=802.\$BS(1,16,4)=915. DA1 1220
 BS(1,17,4)=986.\$BS(1,18,4)=1030. DA1 1230
 BS(2,1,4)=0 \$BS(2,2,4)=120. \$BS(2,3,4)=207. \$BS(2,4,4)=278. DA1 1240
 BS(2,5,4)=326. \$BS(2,6,4)=358. \$BS(2,7,4)=385. \$BS(2,8,4)=401. DA1 1250
 BS(2,9,4)=427.\$BS(2,10,4)=458.\$BS(2,11,4)=485.\$BS(2,12,4)=620. DA1 1260
 BS(2,13,4)=724.\$BS(2,14,4)=818.\$BS(2,15,4)=895.\$BS(2,16,4)=1010. DA1 1270

BS(2,17,4)=1080.\$BS(2,18,4)=1120. DA1 1280
 BS(3,1,4)=0 \$BS(3,2,4)=137. \$BS(3,3,4)=241. \$BS(3,4,4)=315. DA1 1290
 BS(3,5,4)=375. \$BS(3,6,4)=414. \$BS(3,7,4)=440. \$BS(3,8,4)=466. DA1 1300
 BS(3,9,4)=497.\$BS(3,10,4)=523.\$BS(3,11,4)=560.\$BS(3,12,4)=691. DA1 1310
 BS(3,13,4)=856.\$BS(3,14,4)=1000.\$BS(3,15,4)=1130.\$BS(3,16,4)=1300.DA1 1320
 BS(3,17,4)=1410.\$BS(3,18,4)=1480. DA1 1330
 BS(4,1,4)=0 \$BS(4,2,4)=137. \$BS(4,3,4)=282. \$BS(4,4,4)=385. DA1 1340
 BS(4,5,4)=462. \$BS(4,6,4)=525. \$BS(4,7,4)=573. \$BS(4,8,4)=609. DA1 1350
 BS(4,9,4)=630.\$BS(4,10,4)=652.\$BS(4,11,4)=694.\$BS(4,12,4)=861. DA1 1360
 BS(4,13,4)=995.\$BS(4,14,4)=1120.\$BS(4,15,4)=1220.\$BS(4,16,4)=1360.DA1 1370
 BS(4,17,4)=1440.\$BS(4,18,4)=1490. DA1 1380
 BS(5,1,4)=0 \$BS(5,2,4)=336. \$BS(5,3,4)=494. \$BS(5,4,4)=625. DA1 1390
 BS(5,5,4)=729. \$BS(5,6,4)=804. \$BS(5,7,4)=885. \$BS(5,8,4)=936. DA1 1400
 BS(5,9,4)=1040.\$BS(5,10,4)=1140.\$BS(5,11,4)=1170.\$BS(5,12,4)=1350.DA1 1410
 BS(5,13,4)=1470.\$BS(5,14,4)=1590.\$BS(5,15,4)=1670.\$BS(5,16,4)=1790DA1 1420
 1. DA1 1430
 BS(5,17,4)=1860.\$BS(5,18,4)=1900. DA1 1440
 BS(6,1,4)=0 \$BS(6,2,4)=486. \$BS(6,3,4)=677. \$BS(6,4,4)=813. DA1 1450
 BS(6,5,4)=910. \$BS(6,6,4)=1000. \$BS(6,7,4)=1090. \$BS(6,8,4)=1170. DA1 1460
 BS(6,9,4)=1290.\$BS(6,10,4)=1390.\$BS(6,11,4)=1450.\$BS(6,12,4)=1660.DA1 1470
 BS(6,13,4)=1780.\$BS(6,14,4)=1890.\$BS(6,15,4)=1980.\$BS(6,16,4)=2090DA1 1480
 1. DA1 1490
 BS(6,17,4)=2150.\$BS(6,18,4)=2180. DA1 1500
 BS(7,1,4)=0 \$BS(7,2,4)=693. \$BS(7,3,4)=951. \$BS(7,4,4)=1100. DA1 1510
 BS(7,5,4)=1230. \$BS(7,6,4)=1290. \$BS(7,7,4)=1310. \$BS(7,8,4)=1400.DA1 1520
 BS(7,9,4)=1520.\$BS(7,10,4)=1650.\$BS(7,11,4)=1700.\$BS(7,12,4)=1910.DA1 1530
 BS(7,13,4)=2050. DA1 1540
 BS(1,1,5)=0 \$BS(1,2,5)=65.9 \$BS(1,3,5)=138. \$BS(1,4,5)=198. DA1 1550
 BS(1,5,5)=241. \$BS(1,6,5)=264. \$BS(1,7,5)=285. \$BS(1,8,5)=316. DA1 1560
 BS(1,9,5)=387.\$BS(1,10,5)=448.\$BS(1,11,5)=472.\$BS(1,12,5)=575. DA1 1570
 BS(1,13,5)=699.\$BS(1,14,5)=816.\$BS(1,15,5)=912.\$BS(1,16,5)=1050. DA1 1580
 BS(1,17,5)=1140.\$BS(1,18,5)=1190. DA1 1590
 BS(2,1,5)=0 \$BS(2,2,5)=94.3 \$BS(2,3,5)=193. \$BS(2,4,5)=276. DA1 1600
 BS(2,5,5)=341. \$BS(2,6,5)=364. \$BS(2,7,5)=386. \$BS(2,8,5)=417. DA1 1610
 BS(2,9,5)=453.\$BS(2,10,5)=485.\$BS(2,11,5)=509.\$BS(2,12,5)=637. DA1 1620
 BS(2,13,5)=792.\$BS(2,14,5)=943.\$BS(2,15,5)=1070.\$BS(2,16,5)=1250. DA1 1630
 BS(2,17,5)=1360.\$BS(2,18,5)=1430. DA1 1640
 BS(3,1,5)=0 \$BS(3,2,5)=106. \$BS(3,3,5)=227. \$BS(3,4,5)=327. DA1 1650
 BS(3,5,5)=407. \$BS(3,6,5)=450. \$BS(3,7,5)=484. \$BS(3,8,5)=515. DA1 1660
 BS(3,9,5)=539.\$BS(3,10,5)=558.\$BS(3,11,5)=583.\$BS(3,12,5)=721. DA1 1670
 BS(3,13,5)=867.\$BS(3,14,5)=997.\$BS(3,15,5)=1100.\$BS(3,16,5)=1260. DA1 1680
 BS(3,17,5)=1350.\$BS(3,18,5)=1410. DA1 1690
 BS(4,1,5)=0 \$BS(4,2,5)=144. \$BS(4,3,5)=274. \$BS(4,4,5)=382. DA1 1700
 BS(4,5,5)=451. \$BS(4,6,5)=512. \$BS(4,7,5)=570. \$BS(4,8,5)=617. DA1 1710
 BS(4,9,5)=659.\$BS(4,10,5)=681.\$BS(4,11,5)=705.\$BS(4,12,5)=816. DA1 1720
 BS(4,13,5)=944.\$BS(4,14,5)=1060.\$BS(4,15,5)=1160.\$BS(4,16,5)=1300.DA1 1730
 BS(4,17,5)=1380.\$BS(4,18,5)=1430. DA1 1740
 BS(5,1,5)=0 \$BS(5,2,5)=228. \$BS(5,3,5)=496. \$BS(5,4,5)=682. DA1 1750
 BS(5,5,5)=815. \$BS(5,6,5)=867. \$BS(5,7,5)=920. \$BS(5,8,5)=987. DA1 1760
 BS(5,9,5)=1110.\$BS(5,10,5)=1220.\$BS(5,11,5)=1250.\$BS(5,12,5)=1420.DA1 1770
 BS(5,13,5)=1620.\$BS(5,14,5)=1810.\$BS(5,15,5)=1960.\$BS(5,16,5)=2160DA1 1780
 1. DA1 1790
 BS(5,17,5)=2280.\$BS(5,18,5)=2350. DA1 1800
 BS(6,1,5)=0 \$BS(6,2,5)=485. \$BS(6,3,5)=763. \$BS(6,4,5)=935. DA1 1810
 BS(6,5,5)=1040. \$BS(6,6,5)=1130. \$BS(6,7,5)=1230. \$BS(6,8,5)=1360.DA1 1820
 BS(6,9,5)=1450.\$BS(6,10,5)=1500.\$BS(6,11,5)=1540.\$BS(6,12,5)=1750.DA1 1830
 BS(6,13,5)=1970.\$BS(6,14,5)=2170.\$BS(6,15,5)=2330.\$BS(6,16,5)=2530DA1 1840
 1. DA1 1850
 BS(6,17,5)=2650.\$BS(6,18,5)=2710. DA1 1860
 BS(7,1,5)=0 \$BS(7,2,5)=860. \$BS(7,3,5)=1140. \$BS(7,4,5)=1270. DA1 1870
 BS(7,5,5)=1330. \$BS(7,6,5)=1380. \$BS(7,7,5)=1450. \$BS(7,8,5)=1480.DA1 1880
 BS(7,9,5)=1680.\$BS(7,10,5)=1770.\$BS(7,11,5)=1800.\$BS(7,12,5)=2000.DA1 1890
 BS(7,13,5)=2200. DA1 1900
 END DA1 1910

194 CARDS

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	SUBROUTINE DATA 2
Category	CVC
Programmer	Barkdoll
Date	29 September 1965
Type	

B. DESCRIPTION

Data package containing seven blocks of data.

- (1) R(201) = attenuation lengths used by TRF
- (2) AMV(6,2) = optical air mass values used by TRF.
- (3) TILLH = total illuminance on horizontal ground or seaplane for reflectance data.
- (4) RB(5,8,2) = background directional reflectance values used by BBOF and COF.
- (5) RO(5,8,1) = target directional reflectance values used by COF.
- (6) CR(20,9) = threshold contrast values used by TCAL.
- (7) TRV(7) = beam transmittance values from 20,000 to 60,000 feet, used by TRF.

C. USAGE

1. Calling Sequence

Called by PODVI

2. Arguments or Parameters

COMMON/B/RB(5,8,2), RO(5,8,1)	- common with COF and BBOF
COMMON/C/CR(20,9)	- common with TCAL
COMMON/D/R(201), AMV(6,2), TRV(7)	- common with TRF

- | | |
|--------------------------------------|---------------------|
| 3. Storage Requirements (Decimal) | 520 |
| 4. Temporary Storage Requirements | Not Applicable |
| 5. Alarms, Print-Outs | Not Applicable |
| 6. Error Returns | None |
| 7. Error Stops | None |
| 8. Input and Output Tape Mountings | Not Applicable |
| 9. Input and Output Formats | Not Applicable |
| 10. Selective Jump and Stop Settings | Not Applicable |
| 11. Machine Time | Not Applicable |
| 12. Accuracy | Not Applicable |
| 13. Cautions to User | None |
| 14. Equipment Configuration | CDC 3600 FORTRAN 63 |
| 15. References | |

D. METHOD

Data package only

E. FLOW CHART

Not Applicable

SUBROUTINE DATA2

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SUBROUTINE DATA2
C ...SUBROUTINE DATA2...1NOV,65...BARKDOLL...VISLAB...UCSD DA2 0000
C ...THIS SUBROUTINE IS A DATA PACKAGE DA2 0010
C ...ARRAY CR= THRESHOLD CONTRAST VALUES FROM TIFFANY DATA. DA2 0020
C ...USED BY TCAL DA2 0030
C ...ARRAY AMV=AIR MASS VALUES DA2 0040
C ...USED BY TRF DA2 0050
C ...ARRAY R=ATTENUATION LENGTHS DA2 0060
C ...USED BY TRF DA2 0070
C ...DATA TRV=BEAM TRANSMITTANCE VALUES 20K TO 60K DA2 0080
C ...USED BY TRF DA2 0090
C ...ARRAY RB=DIRECTIONAL LUMINOUS REFLECTANCE OF BACKGROUNDS DA2 0100
C ...USED BY COF AND BBOF DA2 0110
C ...ARRAY RO=DIRECTIONAL LUMINOUS REFLECTANCE OF OBJECTS DA2 0120
C ...USED BY COF DA2 0130
C DA2 0140
C DA2 0150
COMMON /B/ RB(5,8,2),RO(5,8,1),TILLH DA2 0160
COMMON /C/ CR(20,9) DA2 0170
COMMON /D/ R(201),AMV(6,2),TRV(7) DA2 0180
C ...THIS DATA IS FOR FLIGHT 74 DA2 0190
C ...EXTRAPOLATED BEAM TRANSMITTANCE VALUES DA2 0195
DATA (TRV=.641,.628,.618,.610,.603,.593,.587) DA2 0200
C ...ATTENUATION LENGTHS DA2 0205
R( 1)=4.6 $R( 2)=4.3 $R( 3)=4.0 $R( 4)=3.5 $R( 5)=3.3 DA2 0210
R( 6)=3.0 $R( 7)=2.6 $R( 8)=2.3 $R( 9)=2.0 $R(10)=1.8 DA2 0220
R(11)=1.5 $R(12)=1.25 $R(13)=1.2 $R(14)=1.2 $R(15)=1.35 DA2 0230
R(16)=1.6 $R(17)=2.5 $R(18)=3.0 $R(19)=1.8 $R(20)=1.2 DA2 0240
R( 21)=0.4 $R( 22)=0.75 $R( 23)=1.5 $R( 24)=2.1 $R( 25)=2.4 DA2 0250
R( 26)=2.6 $R( 27)=2.75 $R( 28)=2.9 $R( 29)=3.0 $R( 30)=3.0 DA2 0260
R( 31)=3.1 $R( 32)=3.1 $R( 33)=3.0 $R( 34)=2.9 $R( 35)=2.9 DA2 0270
R( 36)=3.1 $R( 37)=3.3 $R( 38)=4.6 $R( 39)=5.3 $R( 40)=6.4 DA2 0280
R( 41)=7. $R( 42)=6.1 $R( 43)=6.1 $R( 44)=9.0 $R( 45)=7.4 DA2 0290
R( 46)=7.8 $R( 47)=9. $R( 48)=12. $R( 49)=18. $R( 50)=20. DA2 0300
R( 51)=22. $R( 52)=25. $R( 53)=26.5 $R( 54)=27. $R( 55)=28. DA2 0310
R( 56)=28.5 $R( 57)=29.5 $R( 58)=28. $R( 59)=26. $R( 60)=26. DA2 0320
R( 61)=28.5 $R( 62)=32. $R( 63)=33. $R( 64)=33.5 $R( 65)=33.5 DA2 0330
R( 66)=34. $R( 67)=35. $R( 68)=36. $R( 69)=33. $R( 70)=31. DA2 0340
R( 71)=31. $R( 72)=23. $R( 73)=23.5 $R( 74)=24. $R( 75)=25. DA2 0350
R( 76)=26.5 $R( 77)=30. $R( 78)=32.5 $R( 79)=34. $R( 80)=34. DA2 0360
R( 81)=34. $R( 82)=35. $R( 83)=35. $R( 84)=36. $R( 85)=37. DA2 0370
R( 86)=34. $R( 87)=22. $R( 88)=20. $R( 89)=19. $R( 90)=18. DA2 0380
R( 91)=17.5 $R( 92)=17.5 $R( 93)=17.5 $R( 94)=17.5 $R( 95)=17.5 DA2 0390
R( 96)=17.5 $R( 97)=17.5 $R( 98)=17.5 $R( 99)=18. $R(100)=19. DA2 0400
R(101)=19.5 $R(102)=21. $R(103)=22. $R(104)=22. $R(105)=21.5 DA2 0410
R(106)=21.5 $R(107)=22. $R(108)=22.5 $R(109)=22.5 $R(110)=21.5 DA2 0420
R(111)=21.5 $R(112)=21. $R(113)=20.5 $R(114)=21. $R(115)=21. DA2 0430
R(116)=21. $R(117)=21.5 $R(118)=22. $R(119)=22.5 $R(120)=22.5 DA2 0440
R(121)=22.5 $R(122)=21.5 $R(123)=22. $R(124)=23. $R(125)=23.5 DA2 0450
R(126)=24. $R(127)=24. $R(128)=24.5 $R(129)=25. $R(130)=26. DA2 0460
R(131)=26.5 $R(132)=26.5 $R(133)=26.5 $R(134)=27.5 $R(135)=28.5 DA2 0470
R(136)=25. $R(137)=25.5 $R(138)=26. $R(139)=28. $R(140)=31. DA2 0480
R(141)=31.5 $R(142)=30. $R(143)=29.5 $R(144)=28.5 $R(145)=29.5 DA2 0490
R(146)=32. $R(147)=33.5 $R(148)=35. $R(149)=35.5 $R(150)=33.5 DA2 0500
R(151)=30. $R(152)=29. $R(153)=31. $R(154)=32. $R(155)=32.5 DA2 0510
R(156)=32.5 $R(157)=32.5 $R(158)=33. $R(159)=33. $R(160)=34. DA2 0520
R(161)=34.5 $R(162)=34. $R(163)=32.5 $R(164)=31.5 $R(165)=31.5 DA2 0530
R(166)=32.5 $R(167)=32.5 $R(168)=33. $R(169)=33.5 $R(170)=34. DA2 0540
R(171)=34. $R(172)=34. $R(173)=36. $R(174)=37.5 $R(175)=37.5 DA2 0550
R(176)=37.5 $R(177)=38. $R(178)=38. $R(179)=38. $R(180)=38. DA2 0560
R(181)=38. $R(182)=38. $R(183)=38. $R(184)=37. $R(185)=38. DA2 0570
R(186)=38. $R(187)=38. $R(188)=37. $R(189)=37. $R(190)=37. DA2 0580
R(191)=39. $R(192)=40. $R(193)=40. $R(194)=40. $R(195)=39. DA2 0590
R(196)=40. $R(197)=40. $R(198)=38. $R(199)=36. $R(200)=37. DA2 0600
R(201)=35. DA2 0610

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C	...AIR MASS VALUES	DA2 0615
	AMV(1,1)=5.7588 \$ AMV(1,2)=11.4740	DA2 0620
	AMV(2,1)=5.7281 \$ AMV(2,2)=11.0000	DA2 0630
	AMV(3,1)=5.6975 \$ AMV(3,2)=10.8400	DA2 0640
	AMV(4,1)=5.6405 \$ AMV(4,2)=10.6400	DA2 0650
	AMV(5,1)=5.6075 \$ AMV(5,2)=10.3450	DA2 0660
	AMV(6,1)=5.5851 \$ AMV(6,2)=10.3224	DA2 0670
C	...TOTAL ILLUM. ON A HORIZONTAL GROUND PLANE FOR FLIGHT 74	DA2 0680
	TILLH=5940.	DA2 0690
C	...REFLECTANCE DATA FOR PINE TREES FLIGHT 74	DA2 0700
	RB(1,1,1)=.0333\$RB(1,2,1)=.0241\$RB(1,3,1)=.0214\$RB(1,4,1)=.0214	DA2 0710
	RB(1,5,1)=.0261\$RB(1,6,1)=.0379\$RB(1,7,1)=.0463\$RB(1,8,1)=.0859	DA2 0720
	RB(2,1,1)=.0333\$RB(2,2,1)=.0222\$RB(2,3,1)=.0202\$RB(2,4,1)=.0194	DA2 0730
	RB(2,5,1)=.0210\$RB(2,6,1)=.0303\$RB(2,7,1)=.0387\$RB(2,8,1)=.0549	DA2 0740
	RB(3,1,1)=.0333\$RB(3,2,1)=.0315\$RB(3,3,1)=.0311\$RB(3,4,1)=.0317	DA2 0750
	RB(3,5,1)=.0317\$RB(3,6,1)=.0337\$RB(3,7,1)=.0387\$RB(3,8,1)=.0463	DA2 0760
	RB(4,1,1)=.0333\$RB(4,2,1)=.0335\$RB(4,3,1)=.0382\$RB(4,4,1)=.0392	DA2 0770
	RB(4,5,1)=.0387\$RB(4,6,1)=.0438\$RB(4,7,1)=.0463\$RB(4,8,1)=.0572	DA2 0780
	RB(5,1,1)=.0333\$RB(5,2,1)=.0402\$RB(5,3,1)=.0444\$RB(5,4,1)=.0578	DA2 0790
	RB(5,5,1)=.0640\$RB(5,6,1)=.0711\$RB(5,7,1)=.0758\$RB(5,8,1)=.0825	DA2 0800
C	...REFLECTANCE DATA FOR HAZE GRAY PAINT FLIGHT 74	DA2 0810
	RO(1,1,1)=.198\$RO(1,2,1)=.235\$RO(1,3,1)=.410\$RO(1,4,1)=.61	DA2 0820
	RO(1,5,1)=.325\$RO(1,6,1)=.334\$RO(1,7,1)=.382\$RO(1,8,1)=.382	DA2 0830
	RO(2,1,1)=.198\$RO(2,2,1)=.224\$RO(2,3,1)=.190\$RO(2,4,1)=.184	DA2 0840
	RO(2,5,1)=.187\$RO(2,6,1)=.193\$RO(2,7,1)=.210\$RO(2,8,1)=.210	DA2 0850
	RO(3,1,1)=.198\$RO(3,2,1)=.170\$RO(3,3,1)=.159\$RO(3,4,1)=.157	DA2 0860
	RO(3,5,1)=.156\$RO(3,6,1)=.153\$RO(3,7,1)=.152\$RO(3,8,1)=.151	DA2 0870
	RO(4,1,1)=.198\$RO(4,2,1)=.182\$RO(4,3,1)=.175\$RO(4,4,1)=.173	DA2 0880
	RO(4,5,1)=.175\$RO(4,6,1)=.180\$RO(4,7,1)=.182\$RO(4,8,1)=.187	DA2 0890
	RO(5,1,1)=.198\$RO(5,2,1)=.195\$RO(5,3,1)=.206\$RO(5,4,1)=.228	DA2 0900
	RO(5,5,1)=.207\$RO(5,6,1)=.211\$RO(5,7,1)=.215\$RO(5,8,1)=.222	DA2 0910
C	...REFLECTANCE DATA FOR INF. OPT. DEPTH WATER FLIGHT 74	DA2 0920
	RB(1,1,2)=.0222\$RB(1,2,2)=.0234\$RB(1,3,2)=.0297\$RB(1,4,2)=.0438	DA2 0930
	RB(1,5,2)=.0569\$RB(1,6,2)=.139\$RB(1,7,2)=.267\$RB(1,8,2)=.461	DA2 0940
	RB(2,1,2)=.0222\$RB(2,2,2)=.0230\$RB(2,3,2)=.0240\$RB(2,4,2)=.0272	DA2 0950
	RB(2,5,2)=.0357\$RB(2,6,2)=.107\$RB(2,7,2)=.199\$RB(2,8,2)=.325	DA2 0960
	RB(3,1,2)=.0222\$RB(3,2,2)=.0221\$RB(3,3,2)=.0222\$RB(3,4,2)=.0234	DA2 0970
	RB(3,5,2)=.0293\$RB(3,6,2)=.0711\$RB(3,7,2)=.121\$RB(3,8,2)=.214	DA2 0980
	RB(4,1,2)=.0222\$RB(4,2,2)=.0213\$RB(4,3,2)=.0212\$RB(4,4,2)=.0220	DA2 0990
	RB(4,5,2)=.0270\$RB(4,6,2)=.0665\$RB(4,7,2)=.113\$RB(4,8,2)=.203	DA2 1000
	RB(5,1,2)=.0222\$RB(5,2,2)=.0214\$RB(5,3,2)=.0212\$RB(5,4,2)=.0216	DA2 1010
	RB(5,5,2)=.0267\$RB(5,6,2)=.0718\$RB(5,7,2)=.125\$RB(5,8,2)=.254	DA2 1020
C	...THRESHOLD CONTRAST VALUES FROM THE TIFFANY DATA	DA2 1025
	CR(1,1)=.00273\$CR(1,2)=.00273\$CR(1,3)=.00279\$CR(1,4)=.00339	DA2 1030
	CR(1,5)=.00581\$CR(1,6)=.01360\$CR(1,7)=.03986\$CR(1,8)=.0876	DA2 1040
	CR(1,9)=.21039	DA2 1050
	CR(2,1)=.00278\$CR(2,2)=.00278\$CR(2,3)=.00283\$CR(2,4)=.00352	DA2 1060
	CR(2,5)=.00657\$CR(2,6)=.01752\$CR(2,7)=.05819\$CR(2,8)=.13918	DA2 1070
	CR(2,9)=.36690	DA2 1080
	CR(3,1)=.00283\$CR(3,2)=.00283\$CR(3,3)=.00289\$CR(3,4)=.00370	DA2 1090
	CR(3,5)=.00729\$CR(3,6)=.02122\$CR(3,7)=.07785\$CR(3,8)=.19783	DA2 1100
	CR(3,9)=.55249	DA2 1110
	CR(4,1)=.00290\$CR(4,2)=.00290\$CR(4,3)=.00298\$CR(4,4)=.00390\$	DA2 1120
	CR(4,5)=.00802\$CR(4,6)=.02491\$CR(4,7)=.09846\$CR(4,8)=.26520	DA2 1130
	CR(4,9)=.76865	DA2 1140
	CR(5,1)=.00298\$CR(5,2)=.00298\$CR(5,3)=.00309\$CR(5,4)=.00412	DA2 1150
	CR(5,5)=.00873\$CR(5,6)=.02844\$CR(5,7)=.12091\$CR(5,8)=.34035	DA2 1160
	CR(5,9)=1.02668	DA2 1170
	CR(6,1)=.00352\$CR(6,2)=.00352\$CR(6,3)=.00384\$CR(6,4)=.00548	DA2 1180
	CR(6,5)=.01262\$CR(6,6)=.04802\$CR(6,7)=.26279\$CR(6,8)=.87975	DA2 1190
	CR(6,9)=3.09375	DA2 1200
	CR(7,1)=.00497\$CR(7,2)=.00520\$CR(7,3)=.00651\$CR(7,4)=.01032	DA2 1210
	CR(7,5)=.02485\$CR(7,6)=.10718\$CR(7,7)=.76089\$CR(7,8)=3.14447	DA2 1220
	CR(7,9)=12.05425	DA2 1230
	CR(8,1)=.00746\$CR(8,2)=.00854\$CR(8,3)=.01168\$CR(8,4)=.01971	DA2 1240
	CR(8,5)=.04890\$CR(8,6)=.20639\$CR(8,7)=1.66292\$CR(8,8)=7.03904	DA2 1250

CR(8,9)=27.23956			DA2 1260
CR(9,1)=.01151	CR(9,2)=.01382	CR(9,3)=.01942	CR(9,4)=.03395
CR(9,5)=.08462	CR(9,6)=.35547	CR(9,7)=2.94419	CR(9,8)=12.41832
CR(9,9)=48.26936			
CR(10,1)=.01683	CR(10,2)=.02074	CR(10,3)=.02957	
CR(10,4)=.05217	CR(10,5)=.12963	CR(10,6)=.54942	
CR(10,7)=4.58608	CR(10,8)=19.63515	CR(10,9)=75.55883	
CR(11,1)=.05768	CR(11,2)=.07433	CR(11,3)=.11059	
CR(11,4)=.19879	CR(11,5)=.49816	CR(11,6)=2.15982	
CR(11,7)=18.17858	CR(11,8)=77.95361	CR(11,9)=300.37517	
CR(12,1)=.20409	CR(12,2)=.27827	CR(12,3)=.42217	
CR(12,4)=.76126	CR(12,5)=1.93904	CR(12,6)=8.52798	
CR(12,7)=71.57978	CR(12,8)=312.74015	CR(12,9)=1205.3357	
CR(13,1)=.44978	CR(13,2)=.61062	CR(13,3)=.94702	
CR(13,4)=1.70566	CR(13,5)=4.37688	CR(13,6)=19.39497	
CR(13,7)=164.09719	CR(13,8)=703.66533	CR(13,9)=2712.00537	
CR(14,1)=.79415	CR(14,2)=1.08157	CR(14,3)=1.68222	
CR(14,4)=3.01432	CR(14,5)=7.75021	CR(14,6)=34.47994	
CR(14,7)=291.72834	CR(14,8)=1250.9606	CR(14,9)=4821.34288	
CR(15,1)=1.25446	CR(15,2)=1.69716	CR(15,3)=2.62892	
CR(15,4)=4.72879	CR(15,5)=12.16284	CR(15,6)=53.87491	
CR(15,7)=455.82553	CR(15,8)=1954.6259	CR(15,9)=7533.34825	
CR(16,1)=2.80292	CR(16,2)=3.80579	CR(16,3)=5.89298	
CR(16,4)=10.57167	CR(16,5)=27.30130	CR(16,6)=121.21854	
CR(16,7)=1025.60754	CR(16,8)=4397.9083	CR(16,9)=16950.03357	
CR(17,1)=4.98357	CR(17,2)=6.70733	CR(17,3)=10.35894	
CR(17,4)=18.85579	CR(17,5)=48.53565	CR(17,6)=215.49962	
CR(17,7)=1823.30212	CR(17,8)=7818.5036	CR(17,9)=30133.39301	
CR(18,1)=7.63379	CR(18,2)=10.51590	CR(18,3)=16.35201	
CR(18,4)=29.46218	CR(18,5)=75.83695	CR(18,6)=336.71816	
CR(18,7)=2848.90957	CR(18,8)=12216.4119	CR(18,9)=47083.42658	
CR(19,1)=11.19468	CR(19,2)=15.19277	CR(19,3)=23.54690	
CR(19,4)=42.42554	CR(19,5)=109.20520	CR(19,6)=484.87415	
CR(19,7)=4102.42978	CR(19,8)=17591.6332	CR(19,9)=67800.13428	
CR(20,1)=19.90165	CR(20,2)=27.00938	CR(20,3)=41.86115	
CR(20,4)=75.42318	CR(20,5)=194.14258	CR(20,6)=861.99849	
CR(20,7)=7293.20850	CR(20,8)=31274.0145	CR(20,9)=120533.57205	
END			

168 CARDS

VISIBILITY LABORATORY U.C.S.D.
PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	SUBROUTINE DATA 3
Category	CVC
Programmer	Barkdoll
Date	28 January 1966
Type	F-63 SUBROUTINE

B. DESCRIPTION

Data package to contain data for optical system beam transmittance and path luminance when this information becomes available.

C. USAGE

1. Calling Sequence

Called by PODVI, data to be used by TROF and BSTOF.

2. Arguments or Parameters

None at present.

COMMON F TROV (1) COMMON WITH TROF
COMMON E BSOV (1) COMMON WITH BSTOF

3. Storage Requirements (Decimal)	Unknown at present
4. Temporary Storage Requirements	Not Applicable
5. Alarms, or Print-Outs	None
6. Error Returns	None
7. Error Stops	None
8. Input and Output Tape Mountings	Not Applicable
9. Input and Output Formats	Not Applicable
10. Selective Jump and Stop Settings	Not Applicable
11. Machine Time	
12. Accuracy	Not Applicable
13. Cautions to User	None
14. Equipment Configuration	CDC 3600 FORTRAN 63
15. References	

D. METHOD

Dummy data package.

E. FLOW CHART

Not Applicable

SUBROUTINE DATA 3

	SUBROUTINE DATA 3	DA3 0000
C	...DATA 3...14JAN,65...BARKDOLL...VISLAB...UCSD	0010
C	...THIS SUBROUTINE IS A DATA PACKAGE OF PATH	0020
C	...LUMINANCE VALUES AND BEAM TRANSMITTANCE VALUES	0030
C	...FOR OPTICAL SYSTEM NO. XXX	0040
	COMMON/E/BSTOV(1)	0050
	COMMON/F/TROV(1)	0060
	RETURN	0070
	END	0080

9 CARDS

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	SUBROUTINE TCAL
Category	CVC
Programmer	Barkdoll
Date	29 September 1965
Type	FORTTRAN 63

B. DESCRIPTION

SUBROUTINE TCAL is the main processing and calling routine. It provides for the solution of a probability of target detection volume. It will give the altitude and distance to the target axis for eight downward looking zeniths of path of sight ($\text{THETA} = 180^\circ, 165^\circ, 150^\circ, 135^\circ, 120^\circ, 105^\circ, 100^\circ, \text{ and } 95^\circ$) and for five azimuth of path of sight with respect to the sun ($\text{PHI} = 0^\circ, 45^\circ, 90^\circ, 135^\circ, 180^\circ$). If desired, these points can be plotted as four hemispheric cross sections.

C. USAGE

1. Calling Sequence

TCAL(FNUMB, DIAM, OBJ, BAC, PROBK, NPROB, SW 1, SW 2)

2. Arguments or Parameters

FNUMB = flight number used for atmospheric data package.
 DIAM = target diameter in feet -- not to exceed 100 feet.
 OBJ = index for table of directional reflectance properties of target object.
 BAC = index for table of directional reflectance properties of background.
 PROBK = constant for deviation from 50% probability of detection.
 NPROB = integer representing probability of detection.
 SW 1 = switch for output printing; 1 for calculation and coordinates, 0 for coordinates only.
 SW 2 = switch for plotting; 1 if plot is desired, 0 for no plot.
 Shares common Block C with Subroutine Data 2.

3. Storage Requirements (Decimal) 1050 words

4. Temporary Storage Requirements Not Applicable

5. Alarms, or Print-Outs

- (1) Target diameter exceeds limits.
- (2) Warning is printed out when $T_C \cdot |C_O| > 30$.
- (3) $AY = 1$. If cross-over of TC and CR curves does not occur within given ALTITUDE range covered by program.

6. Error Returns None

7. Error Stops None

8. Input and Output Tape Mountings Not Applicable

9. Input and Output Formats Not Applicable

10. Selective Jump and Stop Settings Not Applicable

11. Machine Time Not Applicable

12. Accuracy Not Applicable

13. Cautions to User (a) None (b) Target diameter not to exceed 100 ft.

Results of values of $T_C \cdot |C_O| > 30$ have not been checked.

14. Equipment Configuration CDC 3600 FORTRAN 63

15. References

D. METHOD

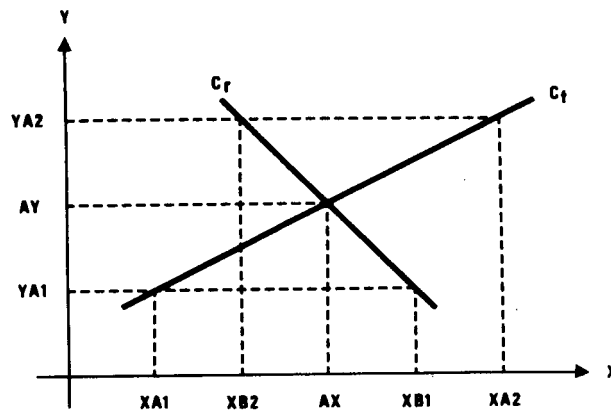
(1) TABLES in COMMON BLOCK C are values of C_T (threshold contrast)

$$(2) T_c \cdot C_o = \left[\frac{1}{\text{BSTAR} + \frac{\text{BSTAR}}{(T_r)(B_o)}} \right]$$

T_c = contrast transmittance
 C_o = inherent contrast
 BSTAR = path luminance
 T_r = beam transmittance
 B_o = inherent background luminance

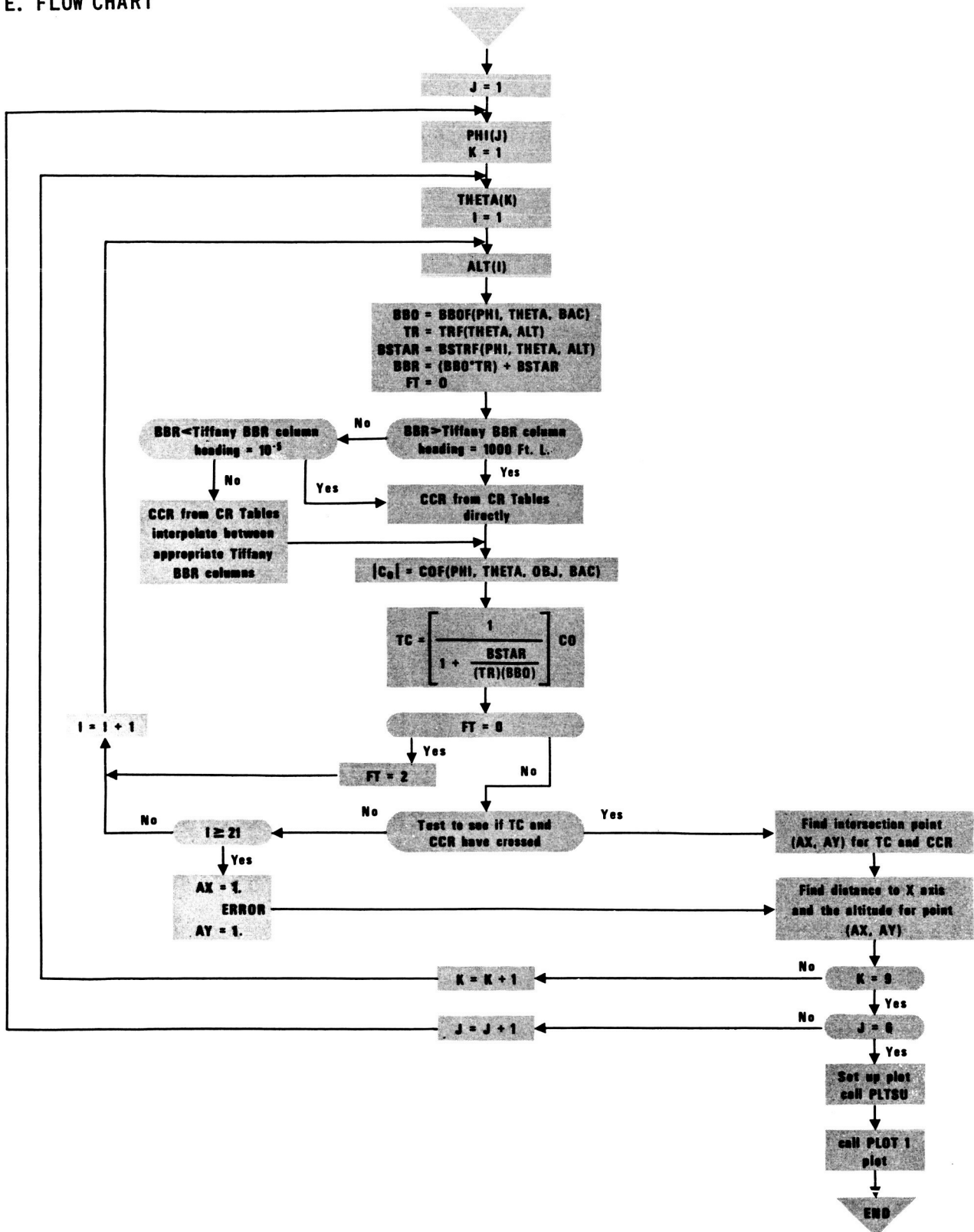
(3) Point of Intersection: C_r and C_T curves are broken up into straight line segments.

$$AX = \left[\frac{(XB1)(XA2) - (XA1)(XB2)}{(XA2 + XB1 - XA1 - XB2)} \right] \quad AY = \left[\frac{(YA2 - YA1)(XA1 - XB1)}{(XB2 + XA1 - XB1 - XA2)} \right] + YA1$$



C_r = Apparent contrast
 C_T = Threshold contrast

E. FLOW CHART



SUBROUTINE TCAL

```

SUBROUTINE TCAL(OPT,FNUMB,OPTNU,DIAM,OBJ,BAC,PROBK,NPROB,SW1,SW2) TCA 0000
C ...SUBROUTINE TCAL...1 NOV, 65...BARKDOLL...VISLAB...UCSD TCA 0010
C ...THIS IS THE MAIN PROCESSING AND CONTROL ROUTINE TCA 0020
C ...IT SOLVES FOR THE PROBABILITY OF DETECTION VOLUME TCA 0030
C ...AND PRINTS OUT THE RESULTS. TCA 0040
C TCA 0050
C ...INPUTS TCA 0060
C ...OPT=OPTION FOR VIEWING THROUGH ATMOSPHERE ONLY TCA 0070
C .....=0 FOR ATMOSPHERE ONLY,=-1 FOR OPTICS WITHOUT TCA 0080
C .....ATMOSPHERE,=+1 FOR OPTICS AND AN ATMOSPHERE TCA 0090
C ...FNUMB=FLIGHT NUMBER FOR ATMOSPHERIC DATA TCA 0100
C ...OPTNU=OPTICAL SYSTEM NUMBER TCA 0110
C ...DIAM=TARGET DIAMETER IN FEET TCA 0120
C ...OBJ=INDEX FOR TABLE OF TARGET OBJECT REFLECTANCE TCA 0130
C ...BAC=INDEX FOR TABLE OF BACKGROUND REFLECTANCE PROPERTIES TCA 0140
C ...PROBK=CONSTANT FOR DEVIATION FROM 50 PERCENT PROBABILITY OF TCA 0150
C ...DETECTION. NPROB=INTEGER REPRESENTING PROB. OF DETECTION TCA 0160
C ...SW1=SWITCH FOR PLOTTING, 1 FOR PLOT, 0 FOR NO PLOT TCA 0170
C ...SW2=SWITCH FOR OUTPUT PRINTING, 1 FOR CALCULATIONS TCA 0180
C ...AND COORDINATES, 0 FOR COORDINATES ONLY. TCA 0190
C ... TCA 0200
C ...FUNCTIONS CALLED=BBDF,TRF,BSTRF,COF TCA 0210
C ...SUBROUTINES CALLED=PLTSU,PLOT1 TCA 0220
C TCA 0230
C ***NOTE IN THIS PROGRAM TIFFANY THRESHOLD CONTRAST VALUES MAY BE TCA 0231
C ...REFERED TO AS CCR OR CT VALUES. TCA 0232
C ...CR APPARENT CONTRAST VALUES ARE EQUAL TO TC*CO TCA 0233
C TCA 0234
C DIMENSION TPHE(5),TETA(8),ZALT(20),ALT*(20),SAX(48), SAY(48) TCA 0240
C ...ZALT AND ALT* = 20 ALTITUDE VALUES TO COVER PROBLEM TCA 0250
C ...SAX AND SAY = X AND Y COORDINATES OF DISTANCE TCA 0260
C ...FROM TARGET. TCA 0270
C DIMENSION X1(15),X2(15),X3(15),X4(15),Z1(15),Z2(15),Z3(15),Z4(15) TCA 0280
C ...X1 TO X4 AND Z1 TO Z4 = COORDINATES FOR 4 CROSS SECTIONS TCA 0290
C DIMENSION TFBBR(9) TCA 0300
C COMMON/CZCR(20,9) TCA 0310
C TCA 0315
C DATA(TFBBR=1000.,100.,10.,1.,.1.,.01.,.001.,.0001.,.00001) TCA 0320
C ...TFBBR = 9 LEVELS OF TIFFANY DATA BACKGROUND ILLUMINATION TCA 0330
C DATA(TPHE=0.,.7854,1.5708,2.3562,3.14159) TCA 0340
C ...TPHE=PHI,AZIMUTHS OF PATH OF SIGHT WITH RESPECT TO SUN TCA 0350
C DATA(TETA=3.14159,2.8797,2.6180,2.3562,2.0944, TCA 0360
11.8326,1.7453,1.6580) TCA 0370
C ...TETA=THETA,ZENITHS OF PATH OF SIGHT FROM OBSERVER TCA 0380
C DATA(ZALT=20.,40.,60.,80.,100.,200.,400.,600.,800., TCA 0390
11000.,2000.,4000.,6000.,8000.,10000.,15000.,20000.,25000.,
230000.,40000.) TCA 0400
C TCA 0410
C TCA 0415
C INC=0 TCA 0420
C PRINT 10 TCA 0430
10 FORMAT(1H1,8X,42HTARGET DETECTION FOR INFINITE VIEWING TIME) TCA 0440
C IF(OPT.NE.0.)GO TO 30 TCA 0450
C PRINT 20 TCA 0460
20 FORMAT(//,12X,37HPATH OF SIGHT THROUGH ATMOSPHERE ONLY) TCA 0470
C GO TO 70 TCA 0480
30 IF(OPT.NE.-1.)GO TO 50 TCA 0490
C PRINT 40 TCA 0500
40 FORMAT(//,12X,54HPATH OF SIGHT THROUGH OPTICAL SYSTEM AND NO ATMOSPHERE TCA 0510
1PHERE) TCA 0520
C GO TO 70 TCA 0530
50 IF(OPT.NE.+1.)GO TO 840 TCA 0540
C PRINT 60 TCA 0550
60 FORMAT(//,12X,51HPATH OF SIGHT THROUGH OPTICAL SYSTEM AND ATMOSPHERE TCA 0560
1RF) TCA 0570

```

70	PRINT 80 ,FNUMH	TCA 0580
80	FORMAT(///,12X,31HPROGRAM DATA FROM FLIGHT NUMBERF4.0)	TCA 0590
	PRINT 90 ,NPROB	TCA 0600
90	FORMAT(///12X,28HPROBABILITY OF DETECTION IS ,12,1X,7HPERCENT)	TCA 0610
	PRINT 100,DIAM	TCA 0620
100	FORMAT (///,12X,25HTARGET DIAMETER IN FT. = F3.0)	TCA 0630
	IF(BAC.EQ.1.)110,130	TCA 0640
110	PRINT 120	TCA 0650
120	FORMAT(/// 12X, 35HBACKGROUND FOR TARGET IS PINE TREES)	TCA 0660
	GO TO 160	TCA 0670
130	IF(BAC.EQ.2.)140,840	TCA 0680
140	PRINT 150	TCA 0690
150	FORMAT(///12X,35HBACKGROUND FOR TARGET IS CALM WATER)	TCA 0700
160	IF(OBJ.EQ.1.)170,840	TCA 0710
170	PRINT 180	TCA 0720
180	FORMAT(///,12X,36HTARGET IS SPHERICAL AND PAINTED GRAY)	TCA 0730
	IF(DIAM.EQ.0.OR.DIAM.GT.100)190,210	TCA 0740
190	PRINT 200	TCA 0750
200	FORMAT(///30HTARGET DIAMETER EXCEEDS LIMITS)	TCA 0760
	GO TO 840	TCA 0770
210	DO 750J=1,5	TCA 0780
	PHI=TPHE(J)*57.29578	TCA 0790
	PRINT 220,PHI	TCA 0800
220	FORMAT(1H1,8X,48HAZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS ,	TCA 0810
	IF3.0,1X,7HDEGREES)	TCA 0820
	DO 230N=1,20	TCA 0830
C	...CONVERTS TO PROPER VALUES OF ALTITUDE FOR TARGET DIAMETER.	TCA 0840
	ALTW(N)=ZALT(N)*DIAM	TCA 0850
230	CONTINUE	TCA 0860
	KK=0 \$ LL=0 \$ K=1	TCA 0870
240	FT=0 \$ I=1	TCA 0880
	PHI=TPHE(J)	TCA 0890
	THETA=TETA(K)	TCA 0900
250	ALT=ALTW(I)	TCA 0910
C	...SOLVE FOR INHERENT BACKGROUND LUMINANCE	TCA 0920
	BBO=BBOF(PHI,THETA,BAC)	TCA 0930
C	...SOLVE FOR BEAM TRANSMITTANCE	TCA 0940
C	...SOLVE FOR PATH LUMINANCE	TCA 0950
	IF(OPT.EQ.-1.)GO TO 270	TCA 0960
	IF(OPT.EQ.0.)GO TO 280	TCA 0970
	IF(OPT.EQ.+1.)GO TO 290	TCA 0980
	PRINT 260 ,OPT	TCA 0990
260	FORMAT(///,12X,6HOPT = ,F3.2)	TCA 1000
	GO TO 840	TCA 1010
270	TR=TROF(THETA)	TCA 1020
	BSTAR=BSTOF(PHI,THETA)	TCA 1030
	GO TO 300	TCA 1040
280	TR=TRF(THETA,ALT)	TCA 1050
	BSTAR=BSTRF(PHI,THETA,ALT)	TCA 1060
	GO TO 300	TCA 1070
290	TV1=TROF(THETA)	TCA 1080
	TR=TRF(THETA,ALT)*TV1	TCA 1090
	BSTAR=BSTRF(PHI,THETA,ALT)*TV1+BSTOF(PHI,THETA)	TCA 1100
C	...SOLVE FOR APPARENT BACKGROUND LUMINANCE	TCA 1110
300	BBR=(BBO*TR)+BSTAR	TCA 1120
	IF(BBR.GT.IFBBR(1).OR.BBR.EQ.IFBBR(1))340,310	TCA 1130
310	DO 320 N=2,9	TCA 1140
C	...INTERPOLATE FOR THRESHOLD CONTRAST ASSOCIATED	TCA 1150
C	...WITH CALCULATED APPARENT BACKGROUND LUMINANCE	TCA 1160
C	...AND CORRECT FOR DEVIATION FROM 50 PERCENT	TCA 1170
C	...PROBABILITY OF DETECTION.	TCA 1180
	IF(BBR.GT.IFBBR(N))330,320	TCA 1190
320	CONTINUE	TCA 1200
	NN=9	TCA 1210
	GO TO 350	TCA 1220
330	NN2=N-1\$ NN1=N	TCA 1230

C	...SOLVE FOR THRESHOLD CONTRAST (CCR) OR (CT)	TCA 1240
	CCR=((BBR-TFBBR(NN1))/(TFBBR(NN2)-TFBBR(NN1))*(CR(I,NN2)-CR(I,NN1))	TCA 1250
	1)+CR(I,NN1))*PROBK	TCA 1260
	GO TO 360	TCA 1270
340	NN=1	TCA 1280
350	CCR=CR(I,NN)*PROBK	TCA 1290
360	C0=COF(PHI,THETA,OBJ,BAC)	TCA 1300
C	...NOTE WHETHER THE INHERENT CONTRAST IS POSITIVE OR NEGATIVE.	TCA 1310
	IF(C0.LT.0)380,370	TCA 1320
370	CON=+1.	TCA 1330
	GO TO 390	TCA 1340
380	CON=-1.	TCA 1350
	C0=ABS(C0)	TCA 1360
C	...CALCULATE CONTRAST TRANSMITTANCE	TCA 1370
390	TC=(1./(1.+(BSTAR/(TR*BBR))))*C0	TCA 1380
	CAT=THETA*57.29578	TCA 1390
	CT=CCR	TCA 1400
	C0=C0*CON	TCA 1410
	IF(SW1.EQ.1)400,440	TCA 1420
C	...PRINT DATA FOR THE CONVERGENCE OF THE APPARENT CONTRAST	TCA 1430
C	...AND THRESHOLD CONTRAST CURVES.	TCA 1440
C	...CR APPARENT CONTRAST VALUES ARE EQUAL TO TC*C0	TCA 1445
400	PRINT 410,CAT,ALT,BSTAR,TR,BBR,C0,TC,CT,I,BBR	TCA 1450
410	FORMAT (1X,6H"THETA=",F5.1,1X,4H"Z*D=",F9.1,1X,6H"BSTAR=",F8.2,1X,3H"TR=",	TCA 1460
	1F5.3,1X,4H"BBR=",F8.2,1X,3H"C0=",F6.2,1X,6H"TC*C0=",F6.3,1X,5H"CT*P=",F5.2,	TCA 1470
	21X,2HI=",I2,1X,4H"BBR=",F7.2)	TCA 1480
	IF (TC.GT.30.)420,440	TCA 1490
420	PRINT 430	TCA 1500
430	FORMAT(/78X,39H"WATCH OUT TC*C0 IS NOW GREATER THAN 30.")	TCA 1510
440	IF(FT.EQ.0)450,470	TCA 1520
450	FT=2	TCA 1530
460	XA1=CCR \$ YA1=ALTW(I)	TCA 1540
	XB1=TC	TCA 1550
	I=I+1	TCA 1560
	GO TO 250	TCA 1570
470	XA2=CCR \$ YA2=ALTW(I)	TCA 1580
	XB2=TC	TCA 1590
C	...HAVE THE CURVES INTERSECTED.	TCA 1600
	IF(TC-CCR)480,520,490	TCA 1610
C	...CALCULATE X AND Y COORDINATES	TCA 1620
480	AX=((XB1*XA2)-(XA1*XB2))/(XA2+XB1-XA1-XB2)	TCA 1630
	AY=((YA2-YA1)*(XA1-XB1))/(XB2+XA1-XB1-XA2))+YA1	TCA 1640
	GO TO 550	TCA 1650
490	IF(I.EQ.21)500,460	TCA 1660
500	AX=1. \$ AY=1.	TCA 1670
	PRINT 510	TCA 1680
510	FORMAT (/78X,95H"THE CT AND TC*C0 CURVES HAVE NOT INTERSECTED WITH	TCA 1690
	1IN THE ALTITUDE RANGE COVERED BY THIS PROGRAM)	TCA 1700
	GO TO 550	TCA 1710
520	AX=CCR \$ AY=ALTW(I)	TCA 1720
	IF(SW1.EQ.1)530,580	TCA 1730
530	PRINT 540	TCA 1740
540	FORMAT (/78X,5H"CT=CR)	TCA 1750
550	PRINT 560,AX,AY	TCA 1760
560	FORMAT(/78X,20H"CURVES INTERSECT AT ,3HAX=F15.5,2X,3HAY=F15.5)	TCA 1770
	PRINT 570	TCA 1780
570	FORMAT(1H0)	TCA 1790
580	KK=KK+1	TCA 1800
	LL=LL+1	TCA 1810
	IF(C0.LT.0.)590,600	TCA 1820
590	AY=-AY	TCA 1830
C	...SAVE THE INTERSECTION POINT	TCA 1840
600	SAX(KK)=AX	TCA 1850
	SAY(LL)=AY	TCA 1860
	K=K+1	TCA 1870
	IF(K.EQ.9)630,610	TCA 1880

610	DO 620, IZ=1, 2	TCA 1890
C	...MODIFY ALTITUDES FOR NEW ZENITH OF PATH OF SIGHT.	TCA 1900
	ALTW(IZ)=ZALT(IZ)*COSF(3.14159-TETA(K))*DIAM	TCA 1910
620	CONTINUE	TCA 1920
	GO TO 240	TCA 1930
630	DO 660 JK=1, 8	TCA 1940
	IF (SAY(JK).EQ.0164), 660	TCA 1950
640	HZ=0.5CX=0.	TCA 1960
	PRINT 650, HZ, CX, IZ	TCA 1970
650	FORMAT(//10X, 5HERROR, 2X, 3HIZ=F3.2, 2X, 3HCX=F3.2, 2X, 3HIZ=1I2)	TCA 1980
	GO TO 750	TCA 1990
660	CONTINUE	TCA 1995
	DO 670 JK=2, 8	TCA 2000
C	...CONVERT X COORDINATE TO DISTANCE FROM TARGET AXIS.	TCA 2010
	SAX(JK)=SAY(JK)/TANF(TETA(JK)-1.57077)	TCA 2020
670	CONTINUE	TCA 2030
	AZM=TPHE(J)*57.29578	TCA 2040
	PRINT 680, AZM	TCA 2050
680	FORMAT(//8X, 48HAZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS, F3TCA 2060	
	1.0, 1X, 7HDEGREES)	TCA 2070
	DO 730 LJ=1, 8	TCA 2080
	ANGLE=TETA(LJ)*57.29578	TCA 2090
C	...TEST FOR PRINTING CONTRAST, POS. OR NEG.	TCA 2100
	IF(SAY(LJ).LT.0) 690, 710	TCA 2110
690	SAY(LJ)=SAY(LJ)*(-1.)	TCA 2120
	SAX(LJ)=SAX(LJ)*(-1.)	TCA 2130
	PRINT 700, ANGLE, SAX(LJ), SAY(LJ)	TCA 2140
700	FORMAT(//2X, 25HZENITH OF PATH OF SIGHT =, F4.0, 2X, 25HDISTANCE TO TATCA 2150	
	1RGET AXIS =, F8.0, 2X, 1HALTITUDE =, F8.0, 2X, 24HCONTRAST IS NOW NEGATTCA 2160	
	2IVE)	TCA 2170
	GO TO 730	TCA 2180
710	PRINT 720, ANGLE, SAX(LJ), SAY(LJ)	TCA 2190
720	FORMAT(//2X, 25HZENITH OF PATH OF SIGHT =, F4.0, 2X, 25HDISTANCE TO TATCA 2200	
	1RGET AXIS =, F8.0, 2X, 1HALTITUDE =, F8.0, 2X, 24HCONTRAST IS POSITIVE)TCA 2210	
730	CONTINUE	TCA 2220
	INC=INC+8	TCA 2230
	DO 740 JK=1, 8	TCA 2240
C	...SAVE COORDINATES FOR PLOTTING	TCA 2250
	SAX(JK+INC)=SAX(JK)	TCA 2260
	SAY(JK+INC)=SAY(JK)	TCA 2270
740	CONTINUE	TCA 2280
750	CONTINUE	TCA 2290
	JK=40	TCA 2300
	JJ=15	TCA 2310
	NTGDM=DIAM	TCA 2320
C	...SET UP VALUES FOR PLOTTING	TCA 2330
	CALL PLTSU(SAX, SAY, JK, X1, X2, X3, X4, Z1, Z2, Z3, Z4, JJ, AXSL, CSLX,	TCA 2340
	1CSLY, AXLY, NIGDY, NAINC, NPROB)	TCA 2350
	IF(SW1.EQ.1) 760, 820	TCA 2360
760	PRINT 770	TCA 2370
C	...PRINT OUT VALUES FOR PLOTTING CROSS SECTIONS	TCA 2380
770	FORMAT(//2X, 70HCOORDINATES FOR PLOTTING 4 CROSS SECTIONS. X = HORTCA 2390	
	IZONTAL Z = VERTICAL)	TCA 2400
	PRINT 780	TCA 2410
780	FORMAT(//5X, 2HX1, 6X, 2HZ1, 6X, 2HX2, 6X, 2HZ2, 6X, 2HX3, 6X, 2HZ3, 6X, 2HX4, 6TCA 2420	
	1X, 2HZ4)	TCA 2430
	PRINT 790, (X1(I), Z1(I), X2(I), Z2(I), X3(I), Z3(I), X4(I), Z4(I), I=1, 15)TCA 2440	
790	FORMAT(//, 2X, 8F8.0)	TCA 2450
C	...PRINT OUT VALUES FOR CHECKING OUTPUT OF 09Q PLOT	TCA 2460
	PRINT 800, AXSL, CSLX, CSLY, AXLY, AXLY	TCA 2470
800	FORMAT(//, 2X, 5HAXSL=F10.1, 2X, 5HCSLX=F10.1, 2X, 5HCSLY=F10.1, 2X,	TCA 2480
	15HAXLY=F10.1, 2X, 5HAXLY=F10.1)	TCA 2490
	PRINT 810, NTGDM, NAINC, NPROB	TCA 2500
810	FORMAT(//, 2X, 6HNTGDM=I4, 2X, 6HNAINC=I8, 2X, 6HNPROB=I3)	TCA 2510
820	IF(SW2.EQ.1) 830, 840	TCA 2520
C	...SET UP INPUT FOR 09Q PLOT ROUTINE.	TCA 2530

830 CALL PLOT1(X1,X2,X3,X4,Z1,Z2,Z3,Z4,JJ,AXSL,CSLX,CSLY,
1AXLX,AXLY,NTGDM,NAINC,NPROB)
840 END

TCA 2540
TCA 2550
TCA 2560

265 CARDS

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	FUNCTION TRF
Category	CVC
Programmer	Barkdoll
Date	1 September 1965
Type	FORTRAN 63

B. DESCRIPTION

This function calculates the value of Beam Transmittance (TR) for a given THETA and ALT by means of TABLES.

1. R — attenuation lengths for indicated flight.
2. AMV — air mass values.
3. TRV — extrapolated values of Beam Transmittance for $20\,000 < \text{ALT} < 60\,000$ and specified formulas for the desired altitude.

C. USAGE

- | | |
|--------------------------------------|---|
| 1. Calling Sequence | TRF (THETA, ALT) |
| 2. Arguments or Parameters | THETA — Zenith of path of sight from observer
ALT — Altitude of observer
Shares COMMON BLOCK D with SUBROUTINE DATA 2 |
| 3. Storage Requirements (Decimal) | 270 |
| 4. Temporary Storage Requirements | Not Applicable |
| 5. Alarms, or Print-Outs | If $\text{ALT} < 1$ ft or $\text{ALT} > 4000000$ ft, then ALT is out of the indicated range for FUNCTION TRF. Program also checks THETA to see if it is in the required range for FUNCTION TRF. |
| 6. Error Returns | None |
| 7. Error Stops | None |
| 8. Input and Output Tape Mountings | Not Applicable |
| 9. Input and Output Formats | Not Applicable |
| 10. Selective Jump and Stop Settings | Not Applicable |
| 11. Machine Time | Not Applicable |
| 12. Accuracy | Not Applicable |
| 13. Cautions to User | (a) None
(b) The values used from TABLE R (attenuation length) must be those for the particular flight's atmospheric data. |
| 14. Equipment Configuration | CDC 3600 FORTRAN 63 |
| 15. References | |

D. METHOD

(1) 0 ft. ALT 20 000 ft.

$$TR = \exp - \left[\sum_{2}^{N-1} \left(\frac{1}{L_N} \Delta z \right) + \left(\frac{1}{L} + \frac{1}{L_N} \right) \frac{\Delta z}{2} \right] \left[\frac{1}{\cos(180^\circ - \theta)} \right]$$

If $\theta \leq 100^\circ$ interpolate Air Mass Value Table for indicated altitude and substitute this value for

$$\left[\frac{1}{\cos(180^\circ - \theta)} \right]$$

(2) 20 000 ft. < ALT $\leq$ 60 000 ft.

$$TR = TRV_{180^\circ}(ALT) \left(\frac{1}{\cos(180^\circ - \theta)} \right)_{\text{for } \theta > 100^\circ}.$$

If $\theta = 100^\circ$ or 95° , interpolate Air Mass Value Table for desired altitude and substitute this value for

$$\left[\frac{1}{\cos(180^\circ - \theta)} \right]$$

(3) 60 000 ft. ALT $\rightarrow$ 00 t.

$$TR = \left[TR(60\,000\text{ ft.}, 180^\circ) \left(\exp - \frac{4.94}{214} \left[1 - e^{\left(\frac{ALT - 60\,000}{30\,000} \right)} \right] \right) \right] \left(\frac{1}{\cos(180^\circ - \theta)} \right)$$

for $\theta > 100^\circ$.

If $\theta = 100^\circ$ or 95° interpolate Air Mass Table for desired altitude and substitute this value for

$$\frac{1}{\cos(180^\circ - \theta)}$$

TR = Beam Transmittance

N = Number of terms

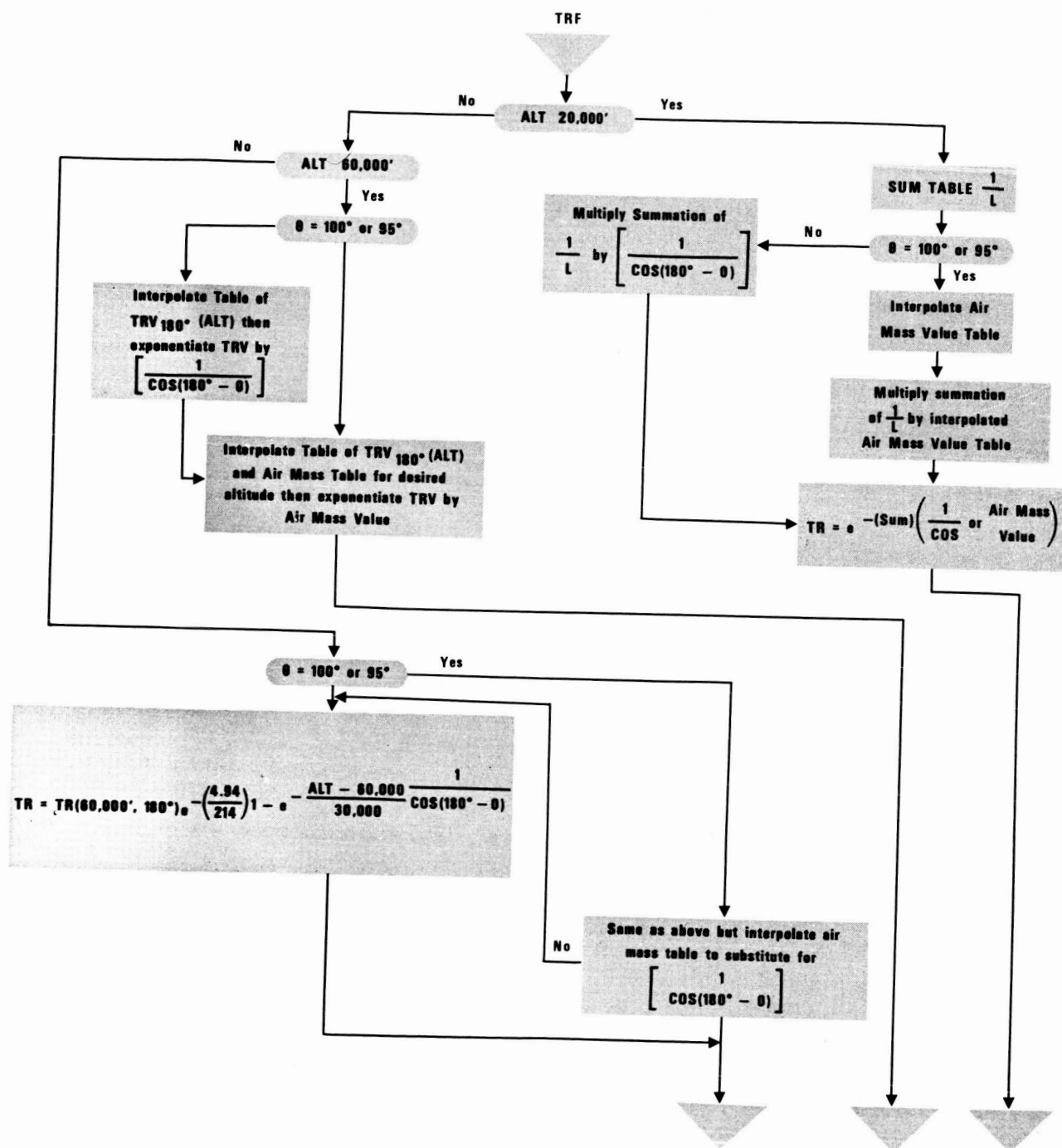
L_N = Value of L (attenuation length) at altitude N

Δz = Altitude increment (100 ft.)

ALT = Altitude

TRV = Extrapolated values of beam transmittance for $20\,000^\circ < ALT < 60\,000$.

E. FLOW CHART



FUNCTION TRF (THETA,ALT)

	FUNCTION TRF(THETA,ALT)	TRF 0000
C	...FUNCTION TRF...1 NOV, 65...BARKDOLL...VISLAB...UCSD	TRF 0010
C	...THIS FUNCTION CALCULATES THE VALUE OF BEAM TRANSMITTANCE.	TRF 0020
C		TRF 0030
C	...INPUTS...THETA=ZENITH OF PATH OF SIGHT	TRF 0040
C	...ALT=ALTITUDE OF OBSERVER	TRF 0050
C	...	TRF 0060
C	...OUTPUT...THIS FUNCTION RETURNS THE CALCULATED	TRF 0070
C	...VALUE OF BEAM TRANSMITTANCE TR	TRF 0080
C		TRF 0090
C	...SHARES COMMON BLOCK D WITH SUBROUTINE DATA 2	TRF 0100
C		TRF 0110
C	...ROUTINES CALLED=NONE	TRF 0120
C		TRF 0130
	DIMENSION AMALT(6),ALTS(7)	TRF 0140
	COMMON/D/R(201),AMV(6,2),TRV(7)	TRF 0150
C		TRF 0155
	DATA(AMALT=0.,10000.,20000.,40000.,100000.,200000.)	TRF 0160
	DATA(ALTS=20000.,25000.,30000.,35000.,40000.,50000.,60000.)	TRF 0170
C		TRF 0175
	IF(THETA.GT.3.14165.OR.THETA.LT.1.6575) 10,30	TRF 0180
	10 PRINT 20 ,THETA	TRF 0190
	20 FORMAT(/,12X,32HTHETA OUT OF RANGE IN FUNCT. TRF,2X,F10.5)	TRF 0200
	GO TO 530	TRF 0210
	30 IF(ALT.LT.1..OR.ALT.GT.4000000.)40,60	TRF 0220
	40 PRINT 50 ,ALT	TRF 0230
	50 FORMAT(/,2X,30HALT OUT OF RANGE IN FUNCT. TRF,2X,F10.1)	TRF 0240
	GO TO 530	TRF 0250
	60 Z=ALT \$ THET=THETA \$ S=0 \$ DZ=100./6080.	TRF 0260
	TR=0	TRF 0270
	IF(Z.LT.20000..OR.Z.EQ.20000.)70,250	TRF 0280
	70 A=20000.	TRF 0290
	IF(Z-A)90,100,80	TRF 0300
	80 GO TO 40	TRF 0310
	90 IF(Z-(A-100.))140,160,100	TRF 0320
	100 Y1=A-100. \$ I=(A/100.) \$ X1=1./R(I)	TRF 0330
	Y2=A \$ I=(I+1) \$ X2=1./R(I)	TRF 0340
	IF(X2-X1.EQ.0)110,120	TRF 0350
	110 BN=X2	TRF 0360
	GO TO 130	TRF 0370
	120 M=(Y2-Y1)/(X2-X1)	TRF 0380
	BN=((Z-Y1)/M)+X1	TRF 0390
	130 K=I-1	TRF 0400
	GO TO 170	TRF 0410
	140 A=A-200.	TRF 0420
	IF(Z-A)90,100,150	TRF 0430
	150 A=A+100.	TRF 0440
	GO TO 100	TRF 0450
	160 A=A-100.	TRF 0460
	I=(A/100.)+1	TRF 0470
	BN=1./R(I)	TRF 0480
	GO TO 130	TRF 0490
	170 DO 180 I=2,K	TRF 0500
	S=S+(1./R(I))*DZ	TRF 0510
	180 CONTINUE	TRF 0520
	IF (THET.EQ.1.6580)190,200	TRF 0530
	190 ASSIGN 230 TO IRETN	TRF 0540
	INTP=2	TRF 0550
	GO TO 450	TRF 0560
	200 IF(THET.EQ.1.7453)210,220	TRF 0570
	210 ASSIGN 230 TO IRETN	TRF 0580
	INTP=1	TRF 0590

GO TO 450	TRF 0600
220 VALM=1./COSF(3.14159-THET)	TRF 0610
230 V=(S+((1./R(1))+(1./R(N)))*(DZ/2.))*VALM	TRF 0620
TR=2.71828**(-V)	TRF 0630
240 TRF=TR	TRF 0640
GO TO 530	TRF 0650
250 IF(Z.LT.60000..OR.Z.EQ.60000.)260,390	TRF 0660
260 N=7	TRF 0670
270 IF(Z.EQ.ALTS(N))300,280	TRF 0680
280 IF(Z-ALTS (N-1))290,310,320	TRF 0690
290 N=N-1 \$ GO TO 270	TRF 0700
300 TR=TRV(N) \$ GO TO 330	TRF 0710
310 TR=TRV(N-1) \$ GO TO 330	TRF 0720
320 X1=TRV(N-1) \$ Y1=ALTS(N-1)	TRF 0730
X2=TRV(N) \$ Y2=ALTS(N)	TRF 0740
SL=(Y2-Y1)/(X2-X1)	TRF 0750
TR=((Z-Y1)/SL)+X1	TRF 0760
330 IF(THET.EQ.1.6580)340,350	TRF 0770
340 ASSIGN 380 TO IRETN	TRF 0780
INTP=2	TRF 0790
GO TO 450	TRF 0800
350 IF(THET.EQ.1.7453)360,370	TRF 0810
360 ASSIGN 380 TO IRETN	TRF 0820
INTP=1	TRF 0830
GO TO 450	TRF 0840
370 VALM=1./COSF(3.14159 -THET)	TRF 0850
380 TR=TR**VALM	TRF 0860
GO TO 240	TRF 0870
390 IF(THET.EQ.1.6580)400,410	TRF 0880
400 ASSIGN 440 TO IRETN	TRF 0890
INTP=2	TRF 0900
GO TO 450	TRF 0910
410 IF(THET.EQ.1.7453)420,430	TRF 0920
420 ASSIGN 440 TO IRETN	TRF 0930
INTP=1	TRF 0940
GO TO 450	TRF 0950
430 VALM=1./COSF(3.14159-THET)	TRF 0960
440 E2=1,-(2.71828**(-(Z-60000.)/30000.))	TRF 0970
E1=2.71828**(-(4.94/214.)*E2)	TRF 0980
TR=TRV(7)*E1	TRF 0990
TR=TR**VALM	TRF 1000
GO TO 240	TRF 1010
450 N=6	TRF 1020
IF(Z.GT.200000.)460,470	TRF 1030
460 VALM=AMV(6,INTP)\$ GO TO IRETN	TRF 1040
470 IF(Z.EQ.AMALT(N))500,480	TRF 1050
480 IF(Z-AMALT(N-1))490,510,520	TRF 1060
490 N=N-1 \$ GO TO 470	TRF 1070
500 VALM=AMV(N,INTP)\$ GO TO IRETN	TRF 1080
510 VALM=AMV(N-1,INTP)\$ GO TO IRETN	TRF 1090
520 X1=AMV(N-1,INTP) \$ Y1=AMALT(N-1)	TRF 1100
X2=AMV(N,INTP) \$ Y2=AMALT(N)	TRF 1110
SL=(Y2-Y1)/(X2-X1)	TRF 1120
VALM=((Z-Y1)/SL)+X1	TRF 1130
GO TO IRETN	TRF 1140
530 END	TRF 1150

VISIBILITY LABORATORY U.C.S.D

PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	FUNCTION BSTRF
Category	CVC
Programmer	Barkdoll
Date	18 August 1965
Type	FORTRAN 63

B. DESCRIPTION

This subroutine calculates the Path Luminance (B*) for given, PHI, THETA, ALT by means of table values and specified formulas.

Uses TABLE BS in COMMON BLOCK A

C. USAGE

- | | |
|--------------------------------------|---|
| 1. Calling Sequence | BSTRF (PHI, THETA, ALT) |
| 2. Arguments or Parameters | <p>PHI = Azimuth of path of sight of observer with respect to the sun.</p> <p>THETA = Zenith of path of sight from observer.</p> <p>ALT = Altitude of observer.</p> <p>Shares COMMON BLOCK A with SUBROUTINE DATA 1</p> |
| 3. Storage Requirements (Decimal) | 276 |
| 4. Temporary Storage Requirements | Not Applicable |
| 5. Alarms, or Print-Outs | <p>(1) Indicates if ALT < 1 ft or ALT > 4 000 000 (i.e., out of given range).</p> <p>(2) Checks both THETA and PHI to make sure they are one of the values given in the DATA statements for those angles.</p> |
| 6. Error Returns | None |
| 7. Error Stops | None |
| 8. Input and Output Tape Mountings | Not Applicable |
| 9. Input and Output Formats | Not Applicable |
| 10. Selective Jump and Stop Settings | Not Applicable |
| 11. Machine Time | Not Applicable |
| 12. Accuracy | Not Applicable |
| 13. Cautions to User | <p>This routine calls FUNCTION TRF for Tr values. The table of BS (Path Luminance) values must be for the particular flight's atmospheric data.</p> |
| 14. Equipment Configuration | CDC 3600 FORTRAN 63 |
| 15. References | |

D. METHOD

- (1) $0 \text{ ft.} < \text{ALT} \leq 20\,000 \text{ ft.}$ for all THETAS

Interpolate TABLE BS (COMMON BLOCK A) for indicated ALT, THETA, PHI.

- (2) $20\,000 \text{ ft.} < \text{ALT} \leq 60\,000 \text{ ft.}$ for all THETAS except $\text{THETA} = 95^\circ$

Interpolate TABLE BS (COMMON BLOCK A) for indicated ALT, THETA, PHI.

- (3) $60\,000 < \text{ALT} < \infty$ for all THETAS except $\text{THETA} = 95^\circ$

$$B^* = \frac{B^*(60\,000 \text{ ft.}, \theta, \phi) \left(1 - [\text{TR}(Z, 180^\circ)] \left[\frac{1}{\cos(180^\circ - \theta)} \right] \right)}{1 - [\text{TR}(60\,000 \text{ ft.}, 180^\circ)] \left[\frac{1}{\cos(180^\circ - \theta)} \right]}$$

- (4) $20\,000 \text{ ft.} < \text{ALT} < \infty$ $\text{THETA} = 95^\circ$

$$B^* = \frac{B^*(20\,000 \text{ ft.}, 95^\circ, \phi) \left(1 - [\text{TR}(Z, 180^\circ)] \left[\frac{1}{\cos(180^\circ - 95^\circ)} \right] \right)}{1 - [\text{TR}(20\,000 \text{ ft.}, 180^\circ)] \left[\frac{1}{\cos(180^\circ - 95^\circ)} \right]}$$

B^* = Path Luminance

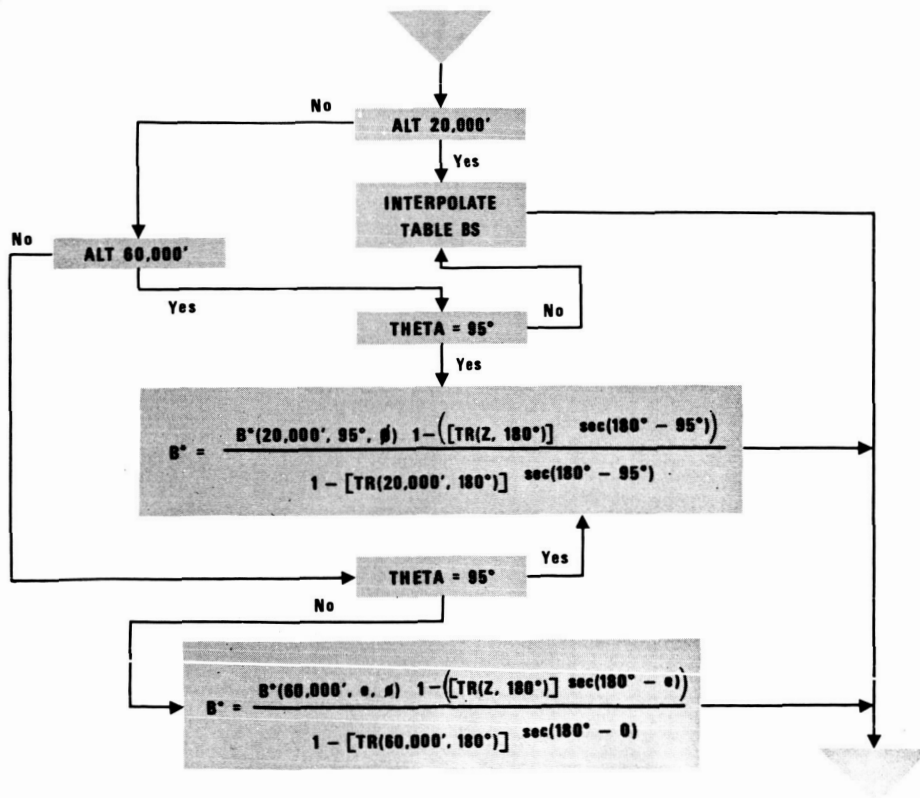
TR = Beam Transmittance

θ = Zenith of path of sight from observer

ϕ = Azimuth of path of sight

z = Altitude of observer

E. FLOW CHART



FUNCTION BSTRF (PHI,THETA,ALT)

C	FUNCTION BSTRF(PHI,THETA,ALT)	BST 0000
C	...FUNCTION BSTRF...1 NOV: 65...BARKDOLL...VISLAB...UCSD	BST 0010
C	...THIS FUNCTION CALCULATES PATH LUMINANCE BY	BST 0020
C	...LINEAR INTERPOLATION OF TABLE BS(THE VALUES OF	BST 0030
C	...PATH LUMINANCE FOR THE PARTICULAR FLIGHT).	BST 0040
C		BST 0050
C	...INPUTS...PHI=AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN	BST 0060
C	...THETA=ZENITH OF PATH OF SIGHT FROM OBSERVER	BST 0070
C	...ALT=ALTITUDE OF OBSERVER	BST 0080
C	...	BST 0090
C	...OUTPUT...THIS FUNCTION RETURNS THE CALCULATED VALUE OF	BST 0100
C	...PATH LUMINANCE B*	BST 0110
C		BST 0120
C	...SHARES COMMON BLOCK A WITH SUBROUTINE DATA 1	BST 0130
C		BST 0140
C	...ROUTINES CALLED=TRF	BST 0150
C		BST 0160
C	DIMENSION Y(18)	BST 0170
C	DIMENSION PHE(5),THET (8)	BST 0180
C	COMMON/A/BS(8,18,5)	BST 0190
C		BST 0195
C	DATA(PHE=0.,.7854,1.5708,2.3562,3.14159)	BST 0200
C	DATA(THET=2.8797,2.6180,2.3562,2.0944,1.8326,1.7453,1.6580)	BST 0210
C	DATA(Y=0.,1000.,2000.,3000.,4000.,5000.,6000.,7000.,8000.,	BST 0220
C	19000.,10000.,15000.,20000.,25000.,30000.,40000.,50000.,60000.)	BST 0230
C		BST 0240
C	IF (ALT.LT.1..OR.ALT.GT.4000000.)10 ,30	BST 0250
C	10 PRINT 20 ,ALT	BST 0260
C	20 FORMAT (//,12X,32HALT OUT OF RANGE IN FUNCT. BSTRF,2X,F10.1)	BST 0270
C	GO TO 310	BST 0280
C	30 Z=ALT	BST 0290
C	STR=0	BST 0300
C	DO 40 J=1,5	BST 0310
C	IF(PHI.EQ.PHE(J))60,40	BST 0320
C	40 CONTINUE	BST 0330
C	PRINT 50 ,PHI	BST 0340
C	50 FORMAT(//,12X,42HPhi IS NOT A CORRECT VALUE IN FUNCT. BSTRF,2X,F10.1	BST 0350
C	1.5)	BST 0360
C	GO TO 310	BST 0370
C	60 L=J	BST 0380
C	IF(THETA.EQ.3.14159)70,80	BST 0390
C	70 M=1	BST 0400
C	L=1	BST 0410
C	GO TO 120	BST 0420
C	80 DO 90 I=1,7	BST 0430
C	IF(THETA.EQ.THET(I))110,90	BST 0440
C	90 CONTINUE	BST 0450
C	PRINT 100,THETA	BST 0460
C	100 FORMAT(//,12X,44HTheta IS NOT A CORRECT VALUE IN FUNCT. BSTRF,2X,F10.1	BST 0470
C	110.5)	BST 0480
C	GO TO 310	BST 0490
C	110 M=M+1	BST 0500
C	120 IF(PHI.NE.0.AND.THETA.NE.3.14159)130,140	BST 0510
C	130 M=M-1	BST 0520
C	140 N=18	BST 0530
C	DC=3.14159	BST 0540
C	IF(Z.LT.20000..OR.Z.EQ.20000.)150,160	BST 0550
C	150 ASSIGN 300 TO IRETN	BST 0560
C	GO TO 230	BST 0570
C	160 IF(Z.LT.60000..OR.Z.EQ.60000.)170,200	BST 0580
C	170 IF(THETA.EQ.1.6580)180,150	BST 0590
C	180 ASSIGN 190 TO IRETN	BST 0600

ZZ=Z\$Z=20000.	BST 0610
GO TO 230	BST 0620
190 STR=X*(1.-(TRF(DC,ZZ)**(1./COSF(3.14159-1.6580))))/	BST 0630
1(1.-(TRF(DC,Z)**(1./COSF(3.14159-1.6580))))	BST 0640
X=STR	BST 0650
GO TO 300	BST 0660
200 IF(THETA.EQ.1.6580)180,210	BST 0670
210 ASSIGN 220 TO IRETN	BST 0680
ZZ=Z \$ Z=60000.	BST 0690
GO TO 230	BST 0700
220 STR=X*(1.-(TRF(DC,ZZ)**(1./COSF(3.14159-THETA))))/	BST 0710
1(1.-(TRF(DC,Z)**(1./COSF(3.14159-THETA))))	BST 0720
X=STR	BST 0730
GO TO 300	BST 0740
230 IF(Y(N)-Z)280,250,240	BST 0750
240 IF(Z-Y(N-1))270,260,290	BST 0760
250 X=BS(M,N,L)	BST 0770
GO TO IRETN	BST 0780
260 X=BS(M,N-1,L) \$ GO TO IRETN	BST 0790
270 N=N-1	BST 0800
IF(N.EQ.0)280,230	BST 0810
280 ALT=7777.	BST 0820
GO TO 10	BST 0830
290 X1=BS(M,N-1,L) \$ Y1=Y(N-1)	BST 0840
X2=BS(M,N,L) \$ Y2=Y(N)	BST 0850
SL=(Y2-Y1)/(X2-X1)	BST 0860
X=((Z-Y1)/SL)+X1	BST 0870
GO TO IRETN	BST 0880
300 BSTRF=X	BST 0890
310 END	BST 0900

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	FUNCTION TROF
Category	CVC
Programmer	Barkdoll
Date	28 February 1966
Type	FORTTRAN 63

B. DESCRIPTION

This function returns a value of .9 for calls for optical ~~system~~ beam transmittance.

Can use table TROV in common block F.

This function will be used to return values of optical ~~system~~ beam transmittance when data becomes available.

C. USAGE

1. Calling Sequence	TROF (THETA)
2. Arguments or Parameters	THETA = zenith of path of sight from observer.
3. Storage Requirements (Decimal)	Unknown
4. Temporary Storage Requirements	Not Applicable
5. Alarms, or Print-Outs	None
6. Error Returns	None
7. Error Stops	None
8. Input and Output Tape Mountings	Not Applicable
9. Input and Output Formats	Not Applicable
10. Selective Jump and Stop Settings	Not Applicable
11. Machine Time	
12. Accuracy	Not Applicable
13. Cautions to User	None
14. Equipment Configuration	CDC 3600
15. References	None

D. METHOD

Dummy function, always returns TROF = .9.

E. FLOW CHART

Not Applicable

FUNCTION TROF(THETA)

	FUNCTION TROF(THETA)	TRO 0000
C	...THIS FUNCTION CALCULATES BEAM TRANSMITTANCE	TRO 0010
C	...THROUGH AN OPTICAL SYSTEM	TRO 0020
	COMMON/F/TROV(1)	TRO 0030
	TROF=.9	TRO 0040
	END	TRO 0050

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	FUNCTION BSTOF
Category	CVC
Programmer	Barkdoll
Date	28 February 1966
Type	FORTAN 63

B. DESCRIPTION

This function returns a value of 11.11111 for calls for optical system path luminance. Can use table BSOV in common block E. This function will be used to return values of optical system path luminance when data becomes available.

C. USAGE

1. Calling Sequence BSTOF (PHI, THETA)
2. Arguments or Parameters

PHI = azimuth of path of sight of observer with respect to sun.
THETA = zenith of path of sight from observer.

- | | |
|--------------------------------------|--------------------|
| 3. Storage Requirements (Decimal) | Unknown at present |
| 4. Temporary Storage Requirements | Not Applicable |
| 5. Alarms, or Print-Outs | None |
| 6. Error Returns | None |
| 7. Error Stops | None |
| 8. Input and Output Tape Mountings | Not Applicable |
| 9. Input and Output Formats | Not Applicable |
| 10. Selective Jump and Stop Settings | Not Applicable |
| 11. Machine Time | |
| 12. Accuracy | Not Applicable |
| 13. Cautions to User | None |
| 14. Equipment Configuration | CDC 3600 |
| 15. References | None |

D. METHOD Dummy function, always returns BSTOF = 11.111111.

E. FLOW CHART Not Applicable

FUNCTION BSTOF(PHI,THETA)

	FUNCTION BSTOF(PHI,THETA)	BSO 0000
C	...THIS FUNCTION CALCULATES PATH LUMINANCE IN AN	BSO 0010
C	...OPTICAL SYSTEM	BSO 0020
	COMMON/E/BSTOV(1)	BSO 0030
	BSTOF=11.11111	BSO 0040
	END	BSO 0050

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	FUNCTION BBOF
Category	CVC Problem 1
Programmer	Barkdoll
Date	18 August 1965
Type	

B. DESCRIPTION

This function calculates the Inherent Background Luminance, ${}_bB_o$, for specified values of PHI, THETA, and BAC.

C. USAGE

1. Calling Sequence BBOF (PHI, THETA, BAC)
2. Arguments or Parameters
 - PHI — Azimuth angle of path of sight with respect to the sun.
 - THETA — Zenith of path of sight from the observer.
 - BAC — Index for particular table of background directional luminous reflectances.

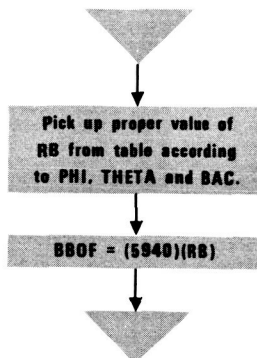
Shares COMMON BLOCK B with SUBROUTINE DATA 2.
3. Storage Requirements (Decimal) 101
4. Temporary Storage Requirements Not Applicable
5. Alarms, or Print-Outs
 - (a) None
 - (b) Checks THETA and PHI to ascertain if they are correct values in Function COF.
6. Error Returns None
7. Error Stops None
8. Input and Output Tape Mountings Not Applicable
9. Input and Output Formats Not Applicable
10. Selective Jump and Stop Settings Not Applicable
11. Machine Time Not Applicable
12. Accuracy Not Applicable
13. Cautions to User
 - (a) None
 - (b) (1) Uses Table (RB) which contains the values for Directional Luminous Reflectance of Terrain Background for given PHI, THETA, and BAC.
 - (2) Total Background Illuminance = 5940 lumens/ft.
14. Equipment Configuration 3600, FORTRAN 63
15. References None

D. METHOD

The proper value of Directional Luminous Reflectance corresponding to the given PHI, THETA, and BAC, is multiplied by the Total Background illuminance. This product is in Foot Lamberts.

$${}_bB_o = (5940) {}_bR_o (\theta, \phi)$$

E. FLOW CHART



FUNCTION BBOF (PHI,THETA,BAC)

	FUNCTION BBOF (PHI,THETA,BAC)	BBO 0000
C	...FUNCTION BBOF...1 NOV. 65...BARKDOLL...VISLAB...UCSD	BBO 0010
C	...FUNCTION BBOF CALCULATES THE INHERENT BACKGROUND	BBO 0020
C	...LUMINANCE BBO FOR A GIVEN VALUE OF PHI AND THETA	BBO 0030
C		BBO 0040
C	...INPUTS...PHI=AZIMUTH OF PATH OF SIGHT WITH RESPECT	BBO 0050
C	...TO SUN...THETA= ZENITH OF PATH OF SIGHT FROM OBSERVER	BBO 0060
C	...BAC=INDEX FOR PARTICULAR TABLE OF BACKGROUND	BBO 0070
C	...DIRECTIONAL LUMINOUS REFLECTANCES	BBO 0080
C		BBO 0090
C	...SHARES COMMON BLOCK B WITH SUBROUTINE DATA 2	BBO 0100
C	...TABLES USED=TABLE(RB),VALUES OF DIRECTIONAL	BBO 0110
C	...LUMINOUS REFLECTANCE. BAC=1= PINE TREES	BBO 0120
C		BBO 0130
C	...ROUTINES CALLED=NONE	BBO 0140
C		BBO 0150
	DIMENSION PHE(5),THET(8)	BBO 0160
	COMMON /B/ RB(5,8,2),RO(5,8,1),TILLH	BBO 0170
C		BBO 0175
	DATA (PHE=0,.7854,1.5708,2.3562,3.14159)	BBO 0180
	DATA (THET=3.14159,2.8797,2.6180,2.3562,2.0944,1.8326,	BBO 0190
	11.7453,1.6580)	BBO 0200
C		BBO 0205
	JJ=BAC	BBO 0210
	DO 20 I=1,5	BBO 0220
	IF (PHI.EQ.PHE(I))10,20	BBO 0230
10	L=I	BBO 0240
	GO TO 40	BBO 0250
20	CONTINUE	BBO 0260
	PRINT 30 ,PHI	BBO 0270
30	FORMAT(8X,39H PHI IS NOT CORRECT VALUE IN FUNCT. BBOF,2X,F10.5)	BBO 0280
40	DO 60 I=1,8	BBO 0290
	IF (THETA.EQ.THET(I))50,60	BBO 0300
50	M=I	BBO 0310
	GO TO 80	BBO 0320
60	CONTINUE	BBO 0330
	PRINT 70 ,THETA	BBO 0340
70	FORMAT(8X,41H THETA IS NOT CORRECT VALUE IN FUNCT. BBOF,2X,F10.5)	BBO 0350
C	...TILLH = TOTAL ILLUMINANCE ON A HORIZONTAL PLANE AT GROUND OR	BBO 0360
C	...SEA LEVEL FOR THE REFLECTANCE DATA	BBO 0370
80	BBOF=TILLH*RB(L,M,JJ)	BBO 0380
	END	BBO 0390

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	FUNCTION COF
Category	CVC
Programmer	Barkdoll
Date	18 August 1965
Type	FORTRAN 63

B. DESCRIPTION

This function calculates the value of the Inherent Contrast (C_o) for given THETA, PHI, and BAC.

C. USAGE

1. Calling Sequence COF (PHI, THETA, OBJ, BAC)
2. Arguments or Parameters
 - PHI = Azimuth of path of sight of observer with respect to sun.
 - THETA = Zenith of path of sight from observer.
 - OBJ = Index of proper table of object reflectance.
 - BAC = Index of proper table of background reflectance.

Shares common Block B with Subroutine Data 2.
3. Storage Requirements (Decimal) 121
4. Temporary Storage Requirements Not Applicable
5. Alarms, or Print-Outs Checks both THETA and PHI to ascertain if they are correct values in the FUNCTION COF.
6. Error Returns None
7. Error Stops None
8. Input and Output Tape Mountings Not Applicable
9. Input and Output Formats Not Applicable
10. Selective Jump and Stop Settings Not Applicable
11. Machine Time Not Applicable
12. Accuracy Not Applicable
13. Cautions to User None

Shares common block B with subroutine Data 2. This block contains the table of object and background reflectances.
14. Equipment Configuration CDC 3600 FORTRAN 63
15. References

D. METHOD

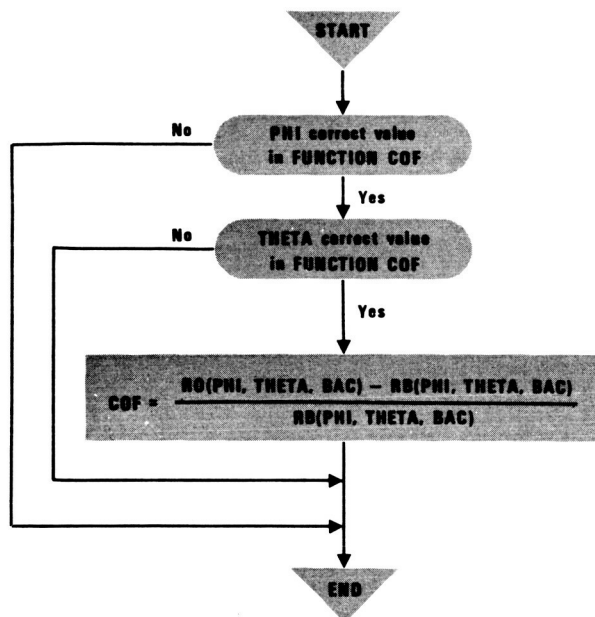
$$CO = \frac{RO(PHI, THETA, BAC) - RB(PHI, THETA, BAC)}{RB(PHI, THETA, BAC)}$$

CO = Inherent contrast

RO = Reflectance of target

RB = Reflectance of background

E. FLOW CHART



FUNCTION COF (PHI,THETA,OBJ,BAC)

C	FUNCTION COF (PHI,THETA,OBJ,BAC)	COF 0000
C	...FUNCTION COF... 1 NOV, 65...BARKDOLL...VISLAB...UCSD	COF 0010
C	...THIS FUNCTION CALCULATES THE VALUE OF INHERENT CONTRAST	COF 0020
C		COF 0030
C	...INPUTS...PHI=AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN	COF 0040
C	...THETA=ZENITH OF PATH OF SIGHT FROM OBSERVER	COF 0050
C	...OBJ=INDEX OF PROPER TABLE OF OBJECT REFLECTANCE	COF 0060
C	...BAC=INDEX OF PROPER TABLE OF BACKGROUND REFLECTANCE	COF 0070
C		COF 0080
C	...OUTPUT...THIS FUNCTION RETURNS THE CALCULATED VALUE	COF 0090
C	...OF INHERENT CONTRAST CO	COF 0100
C		COF 0110
C	...SHARES COMMON BLOCK B WITH SUBROUTINE DATA 2	COF 0120
C		COF 0130
C	...ROUTINES CALLED=NONE	COF 0140
C		COF 0150
	DIMENSION PHE(5), THET(8)	COF 0160
	COMMON/B/RB(5,8,2),RO(5,8,1),TILLH	COF 0170
C		COF 0175
	DATA(PHE=0,.7854,1.5708,2.3562,3.14159)	COF 0180
	DATA(THET=3.14159,2.8797,2.6180,2.3562,2.0944,1.8326,1.7453,1.6580	COF 0190
	1)	COF 0200
C		COF 0205
	KK=OBJ\$JJ=BAC	COF 0210
	DO 20 I=1,5	COF 0220
	IF (PHI.EQ.PHE(I))10,20	COF 0230
10	L=I	COF 0240
	GO TO 40	COF 0250
20	CONTINUE	COF 0260
	PRINT 30,PHI	COF 0270
30	FORMAT(8X,38PHI IS NOT CORRECT VALUE IN FUNCT. COF,2X,F10.5)	COF 0280
	GO TO 90	COF 0290
40	DO 60 I=1,8	COF 0300
	IF (THETA.EQ.THET(I))50,60	COF 0310
50	M=I	COF 0320
	GO TO 80	COF 0330
60	CONTINUE	COF 0340
	PRINT 70,THETA	COF 0350
70	FORMAT(8X,40THETA IS NOT CORRECT VALUE IN FUNCT. COF,2X,F10.5)	COF 0360
	GO TO 90	COF 0370
80	COF=(RO(L,M,KK)-RB(L,M,JJ))/RB(L,M,JJ)	COF 0380
90	CONTINUE	COF 0390
	END	COF 0400

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	SUBROUTINE PLTSU
Category	CVC
Programmer	Barkdoll
Date	
Type	FORTRAN 63

B. DESCRIPTION

This routine takes data used in printing coordinates of cross sections of probability of detection hemispheres and formats this data to be used for plotting. The data processed by this routine is used by subroutine PLOT 1.

C. USAGE

1. Calling Sequence

SUBROUTINE PLTSU (SAX, SAY, JK, X1, X2, X3, X4, Z1, Z2, Z3, Z4, JJ, AXSL, CSLX, CSLY, AXLX, AXLY, NTGDM, NAINC, NPROB)

2. Arguments or Parameters

INPUTS:

SAX = Distance to axis array.
SAY = Altitude array.
JK = Length of dimension of array SAX.

OUTPUTS:

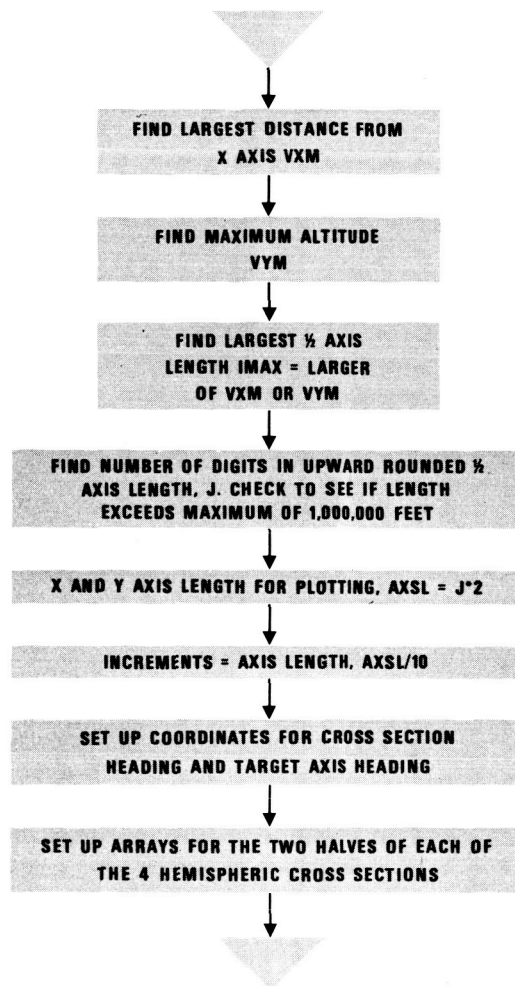
X1, X2, X3, X4 array names of X axis distances of 4 cross sections to be plotted.
Z1, Z2, Z3, Z4 array names of Y axis altitudes for 4 cross sections.
JJ = Length of dimension of X and Z arrays.
AXSL = X and Y axis lengths for each plot.
CSLX and CSLY are the X and Y cross section heading coordinates.
AXLX and AXLY are the X and Y coordinates of target axis heading.
NTGDM = Target diameter.
NAINC = Axis increment value.
NPROB = Probability of detection.

- | | |
|--------------------------------------|---|
| 3. Storage Requirements (Decimal) | 250 |
| 4. Temporary Storage Requirements | Not Applicable |
| 5. Alarms, or Print-Outs | Print out value if X or Y axis length exceeds maximum of 10,000,000 ft. |
| 6. Error Returns | None |
| 7. Error Stops | None |
| 8. Input and Output Tape Mountings | Not Applicable |
| 9. Input and Output Formats | Not Applicable |
| 10. Selective Jump and Stop Settings | Not Applicable |
| 11. Machine Time | |
| 12. Accuracy | Not Applicable |
| 13. Cautions to User | None |
| 14. Equipment Configuration | CDC 3600 FORTRAN 63 |
| 15. References | None |

D. METHOD

Not Applicable

E. FLOW CHART



SUBROUTINE PLTSU

	SUBROUTINE PLTSU(SAX,SAY,JK,X1,X2,X3,X4,Z1,Z2,Z3,Z4,JJ,	PSU 0000
	1AXSL,CSLX,CSLY,AXLX,AXLY,NTGDM,NAINC,NPROB)	PSU 0010
C	...SUBROUTINE PLTSU...1 NOV, 65...BARKDOLL...VISLAB...UCSD	PSU 0020
C	...THIS SUBROUTINE TAKES THE DATA USED IN PRINTING THE 5	PSU 0030
C	...1/2 HEMISPHERIC CROSS SECTIONS ALTITUDES AND	PSU 0040
C	...DISTANCES TO THE AXIS, AND TRANSFORMS THIS DATA	PSU 0050
C	...INTO 4 HEMISPHERIC CROSS SECTIONS TO BE	PSU 0060
C	...PLOTTED BY SUBROUTINE PLOT1. PLTSU IS AN	PSU 0070
C	...AUTOMATIC FORMATTING ROUTINE.	PSU 0080
C	...NOTE...TO SOLVE FOR SEVERAL DIFFERENT DETECTION	PSU 0090
C	...VOLUMES ADDITIONAL CALLS TO SUBROUTINE TCAL	PSU 0100
C	...WITH THE APPROPRIATE DATA PRECEEDING EACH	PSU 0110
C	...CALL, CAN BE MADE. THE CARD PRECEEDING THE	PSU 0120
C	...END CARD MUST BE THE ONLY CALL TO PREP(9)	PSU 0130
C	...USED IN THE ENTIRE SEQUENCE OF PROGRAMS.	PSU 0140
C	...THIS CALL ENABLES WRITING MAGNETIC TAPE WHICH WILL	PSU 0150
C	...BE USED BY THE CDC 160A TO DRIVE THE PLOTTER.	PSU 0160
C		PSU 0170
C	...INPUTS...SAX=NAME OF DISTANCE TO AXIS ARRAY.	PSU 0180
C	...SAY=NAME OF ALTITUDE ARRAY. JK=LENGTH DIMENSION	PSU 0190
C	...OF ARRAY SAX OR SAY.	PSU 0200
C		PSU 0210
C	...OUTPUTS...X1,X2,X3,X4=ARRAY NAMES OF	PSU 0220
C	...X AXIS DISTANCE VALUES FOR THE 4 CROSS SECTIONS	PSU 0230
C	...TO BE PLOTTED. Z1,Z2,Z3,Z4,ARRAY NAMES OF Y AXIS	PSU 0240
C	...ALTITUDES FOR THE 4 CROSS SECTIONS TO BE PLOTTED.	PSU 0250
C	...AXSL=X AND Y AXIS LENGTHS FOR EACH PLOT	PSU 0260
C	...CSLX,CSLY=X AND Y COORDINATES OF CROSS SECTION HEADING	PSU 0270
C	...AXLX,AXLY=X AND Y COORDINATES OF TARGET AXIS HEADING	PSU 0280
C	...NTGDM=TARGET DIAMETER	PSU 0290
C	...NAINC=AXIS INCREMENT VALUE	PSU 0300
C	...NPROB=PROBABILITY OF DETECTION	PSU 0310
C		PSU 0320
C		PSU 0330
C	...OUTPUT = NONE	PSU 0340
C		PSU 0350
C	...SUBROUTINES CALLED=NONE	PSU 0360
C		PSU 0370
	DIMENSION X1(JJ),Z1(JJ),X2(JJ),Z2(JJ),X3(JJ),Z3(JJ),X4(JJ),Z4(JJ)	PSU 0380
	DIMENSION SAX(JK),SAY(JK)	PSU 0390
C		PSU 0395
	VXM=0	PSU 0400
	DO 20 I=1,32	PSU 0410
	IF (SAX(I+8).GT.VXM)10,20	PSU 0420
	10 VXM=SAX(I+8)	PSU 0430
	20 CONTINUE	PSU 0440
	IMAX=VXM	PSU 0450
	VYM=0	PSU 0460
	DO 40 I=1,32	PSU 0470
	IF (SAY(I+8).GT.VYM)30,40	PSU 0480
	30 VYM=SAY(I+8)	PSU 0490
	40 CONTINUE	PSU 0500
	IF (IMAX.GT.VYM)60,50	PSU 0510
	50 IMAX=VYM	PSU 0520
	60 IF (IMAX.LT.100)70,80	PSU 0530
	70 ND=2 \$ GO TO 200	PSU 0540
	80 IF (IMAX.LT.1000)90,100	PSU 0550
	90 ND=3 \$ GO TO 200	PSU 0560
	100 IF (IMAX.LT.10000)110,120	PSU 0570
	110 ND=4 \$ GO TO 200	PSU 0580
	120 IF (IMAX.LT.100000)130,140	PSU 0590
	130 ND=5 \$ GO TO 200	PSU 0600
	140 IF (IMAX.LT.1000000)150,160	PSU 0610
	150 ND=6 \$ GO TO 200	PSU 0620

160 IF(IMAX.LT.10000000)170,180	PSU 0630
170 ND=7 \$ GO TO 200	PSU 0640
180 PRINT 190,IMAX	PSU 0650
190 FORMAT(/7X,50HMAXIMUM X VALUE EXCEEDS 10000000 FT. IN SUB. PLTSH,	PSU 0660
12X,F15.1)	PSU 0670
GO TO 290	PSU 0680
200 NN=10**(ND-1)	PSU 0690
J=(IMAX/NN)*NN+NN	PSU 0700
AXSL=2*J	PSU 0710
NAINC=AXSL/10.	PSU 0720
CSLX=NAINC/10.	PSU 0730
CSLY=9.*NAINC	PSU 0740
AXLX=J	PSU 0750
AXLY=0	PSU 0760
DO 210I=1,8	PSU 0770
X1(I)=AXLX-SAX(17-I)	PSU 0780
Z1(I)=SAY(17-I)	PSU 0790
210 CONTINUE	PSU 0800
DO 220I=1,8	PSU 0810
X2(I)=AXLX-SAX(25-I)	PSU 0820
Z2(I)=SAY(25-I)	PSU 0830
220 CONTINUE	PSU 0840
DO 230I=1,8	PSU 0850
X3(I)=AXLX-SAX(33-I)	PSU 0860
Z3(I)=SAY(33-I)	PSU 0870
230 CONTINUE	PSU 0880
DO 240I=1,8	PSU 0890
X4(I)=AXLX-SAX(41-I)	PSU 0900
Z4(I)=SAY(41-I)	PSU 0910
240 CONTINUE	PSU 0920
DO 250I=9,15	PSU 0930
K=I-8	PSU 0940
X1(I)=SAX(K+1)+AXLX	PSU 0950
Z1(I)=SAY(K+1)	PSU 0960
250 CONTINUE	PSU 0970
DO 260I=9,15	PSU 0980
K=I-8	PSU 0990
X2(I)=SAX(K+33)+AXLX	PSU 1000
Z2(I)=SAY(K+33)	PSU 1010
260 CONTINUE	PSU 1020
DO 270I=9,15	PSU 1030
K=I-8	PSU 1040
X3(I)=SAX(K+25)+AXLX	PSU 1050
Z3(I)=SAY(K+25)	PSU 1060
270 CONTINUE	PSU 1070
DO 280 J=9,15	PSU 1080
K=I-8	PSU 1090
X4(I)=SAX(K+17)+AXLX	PSU 1100
Z4(I)=SAY(K+17)	PSU 1110
280 CONTINUE	PSU 1120
290 END	PSU 1130

VISIBILITY LABORATORY U.C.S.D. PROGRAM OR SUBROUTINE DESCRIPTION

A. IDENTIFICATION

Title	SUBROUTINE PLOT 1
Category	CVC
Programmer	Barkdoll
Date	1 November 1965
Type	FORTRAN 63

B. DESCRIPTION

This subroutine sets up probability of detection cross section data and format data for plotting. This is done by making calls to the UCSD Q9Q plot program PREP 1 through PREP 9. PLOT 1 enables Q9Q PLOT to write a magnetic tape for data to be plotted by a Cal Comp 165 incrementor plotter.

C. USAGE

1. Calling Sequence

PLOT 1 (X1, X2, X3, X4, Z1, Z2, Z3, Z4, JJ, AXSL, CSLX, CSLY, AXLX, AXCX, NTGDM, NAINC, NPROB)

2. Arguments or Parameters

INPUTS:

X1, X2, X3, X4	= Arrays of X coordinate points.
Z1, Z2, Z3, Z4	= Arrays of Y coordinate points.
JJ	= Length of each X and Y array.
AXSL	= Length of X and Y axis.
CSLX and CSLY	= Cross section heading coordinates.
AXCX and AXCX	= Target axis heading coordinates.
NTGDM	= Target diameter in feet.
NAINC	= X and Y axis increment values in feet.
NPROB	= Heading probability value (absolute).

3. Storage Requirements (Decimal)

4. Temporary Storage Requirements	Not Applicable
5. Alarms, or Print-Outs	None
6. Error Returns	None
7. Error Stops	None
8. Input and Output Tape Mountings	Not Applicable
9. Input and Output Formats	Not Applicable
10. Selective Jump and Stop Settings	Not Applicable
11. Machine Time	
12. Accuracy	Not Applicable
13. Cautions to User	None

This program makes calls to UCSD Q9Q PLOT program subroutine PREP 1 through PREP 9.

14. Equipment Configuration

CDC 3600 with Fortran 63

15. References

See write-up for Q9Q Plot

D. METHOD

Not Applicable

SUBROUTINE PLOT1

```

SUBROUTINE PLOT1(X1,X2,X3,X4,Z1,Z2,Z3,Z4,JJ,AXSL,CSLX,CSLY,AXLX,AXPT1 0000
1LY,NTGDM,NAINC,NPROB) PT1 0010
C ...SUBROUTINE PLOT1...1 NOV, 65...BARKDOLL...VISLAR...UCSD PT1 0020
C ...THIS SUBROUTINE SETS UP CROSS SECTION DATA AND PT1 0030
C ...FORMAT DATA FOR WRITING ON PLOT MAGNETIC PT1 0040
C ...TAPE. THE PLOT TAPE IS PROCESSED BY A CDC 160A PT1 0050
C ...COMPUTER THAT DRIVES A CAL COMP165A PLOTTER. PT1 0060
C ...PLOT 1 USES UCSD Q90PLOT PROGRAM(CALLS PT1 0070
C ...TO PREP 1 THROUGH 9). PT1 0080
C PT1 0090
C ...INPUTS... PT1 0100
C ...X1,X2,X3,X4 ARE ARRAYS OF X COORDINATE POINTS PT1 0110
C ...Z1,Z2,Z3,Z4 ARE ARRAYS OF Y COORDINATE POINTS PT1 0120
C ...JJ IS THE LENGTH OF EXCH X AND Y ARRAY PT1 0130
C ...AXSL=LENGTH OF THE X AND Y AXIS PT1 0140
C ...CSLX=X CROSS SECTION HEADING COORDINATE PT1 0150
C ...CSLY=Y CROSS SECTION HEADING COORDINATE PT1 0160
C ...AXLX=X TARGET AXIS HEADING COORDINATE PT1 0170
C ...AXLY=Y TARGET AXIS HEADING COORDINATE PT1 0180
C ...NTGDM=TARGET DIAMETER IN FT. PT1 0190
C ...NAINC=X AND Y AXIS INCREMENT VALUES IN FT. PT1 0200
C ...NPROB=HEADING PROBABILITY VALUE (ABSOLUTE) PT1 0210
C PT1 0220
C ...OUTPUT = NONE PT1 0230
C ...SUBROUTINES CALLED=PREP1 THROUGH 9 FROM UCSD Q90 PLOT PROGRAM. PT1 0240
C PT1 0250
DIMENSION X1(JJ),X2(JJ),X3(JJ),X4(JJ),Z1(JJ),Z2(JJ),Z3(JJ),Z4(JJ) PT1 0260
DIMENSION II(4),KK(5),LL(8),MM(8) PT1 0270
C PT1 0275
DATA(KK=8HALTITUDE,0,8H Y INC =,0,3HFT.) PT1 0280
DATA(LL=8HCROSS SE,8HCTIONS 0,0,8HCENT PRO,8HBABILITY,8H OF DETE,8PT1 0290
1HCTION VO,4HLUME) PT1 0300
DATA (MM=8HDIST. FR,8HOM TARGE,8HT AXIS F,0,8HROB. OF ,8HDETECT. ,PT1 0310
18HX INC.= ,0,2H1.) PT1 0320
DATA(II=8HTARGET D,8HIAMETER ,8HIN FT. =,0) PT1 0330
C PT1 0335
X=0$ Y=0 PT1 0340
Z=0$ W=0 PT1 0350
ENCODE(8,10,KK(4))NAINC PT1 0360
10 FORMAT(1X,I6,1X) PT1 0370
ENCODE(8,20,LL(3))NPROB PT1 0380
20 FORMAT(2HF ,I2,4H PER) PT1 0390
ENCODE(8,30,MM(4))NPROB PT1 0400
30 FORMAT (4HOR ,I2,2H P) PT1 0410
ENCODE (8,40,MM(8)) NAINC PT1 0420
40 FORMAT (I6,2H F) PT1 0430
ENCODE(8,50,II(4))NTGDM PT1 0440
50 FORMAT(1X,I3,4X) PT1 0450
CALL PREP(1,74,1,,60,14,,10.) PT1 0460
CALL PREP(3,0,1,1,0,0,0,0) PT1 0470
CALL PREP(4,1,1,X,Y) PT1 0480
CALL PREP(5,0,,0,,1,,1.) PT1 0490
CALL PREP(8,4,5,KK) PT1 0500
CALL PREP(8,1,8,LL) PT1 0510
CALL PREP(8,3,9,MM) PT1 0520
CALL PREP (2,1,1,,5,6,5,,5.) PT1 0530
CALL PREP(3,0,2,6,0,0,0,0) PT1 0540
CALL PREP(4,15,15,X1,Z1) PT1 0550
CALL PREP(5,0,,0,,AXSL,AXSL) PT1 0560
CALL PREP(6,CSLX,CSLY,0,3,23HLOOKING TOWARD 0 OR 180) PT1 0570
CALL PREP(6,AXLX,AXLY,7,2,11HTARGET AXIS) PT1 0580
CALL PREP(7,-0,-0,0) PT1 0590
CALL PREP(2,2,9,,5,6,5,,5.) PT1 0600
CALL PREP(3,0,2,6,,,,) PT1 0610

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CALL PREP(4,15,15,X2,Z2)	PT1 0620
CALL PREP(5,0,0,AXSL,AXSL)	PT1 0630
CALL PREP(6,CSLX,CSLY,0,3,24HLOOKING TOWARD 45 OR 225)	PT1 0640
CALL PREP(6,AXLX,AXLY,7,2,11HTARGET AXIS)	PT1 0650
CALL PREP(7,-0,-0,0)	PT1 0660
CALL PREP(2,5,7.5,1.5,5,8.)	PT1 0670
CALL PREP(3,0,1,1,0,0,0,0)	PT1 0680
CALL PREP(4,1,1,Z,W)	PT1 0690
CALL PREP(5,0,0,0,4,8.)	PT1 0700
CALL PREP(8,4,4,11)	PT1 0710
CALL PREP(2,3,1,6,5,5.)	PT1 0720
CALL PREP(3,0,2,6,0,0,0,0)	PT1 0730
CALL PREP(4,15,15,X3,Z3)	PT1 0740
CALL PREP(5,0,0,AXSL,AXSL)	PT1 0750
CALL PREP(6,CSLX,CSLY,0,3,24HLOOKING TOWARD 90 OR 270)	PT1 0760
CALL PREP(6,AXLX,AXLY,7,2,11HTARGET AXIS)	PT1 0770
CALL PREP(7,-0,-0,0)	PT1 0780
CALL PREP(2,4,9,6,5,5.)	PT1 0790
CALL PREP(3,0,2,6,0,0,0,0)	PT1 0800
CALL PREP(4,15,15,X4,Z4)	PT1 0810
CALL PREP(5,0,0,AXSL,AXSL)	PT1 0820
CALL PREP(6,CSLX,CSLY,0,4,25HLOOKING TOWARD 135 OR 315)	PT1 0830
CALL PREP(6,AXLX,AXLY,7,2,11HTARGET AXIS)	PT1 0840
CALL PREP(7,-0,-0,0)	PT1 0850
END	PT1 0860

APPENDIX C

Input and Output Examples from PODVI

This appendix contains a copy of the computer listing from a run of PODVI (Probability of Target Detection Volumes.) This program was run using data from Flight 74. The given data includes:

1. Atmospheric data from Flight 74.
(No optical system used.)
2. Average solar zenith angle of 41.5° .
3. Pine tree background.
4. Target object is painted haze grey.
5. Target diameter is 100 feet.
6. Detection probability is 50%.

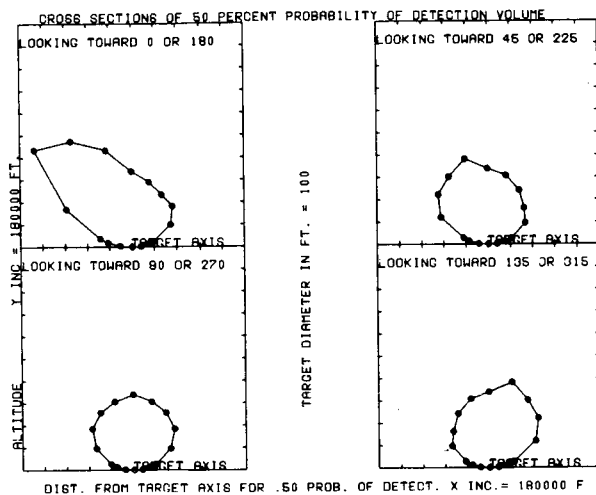


Figure C-1. Plot of data produced by this program.

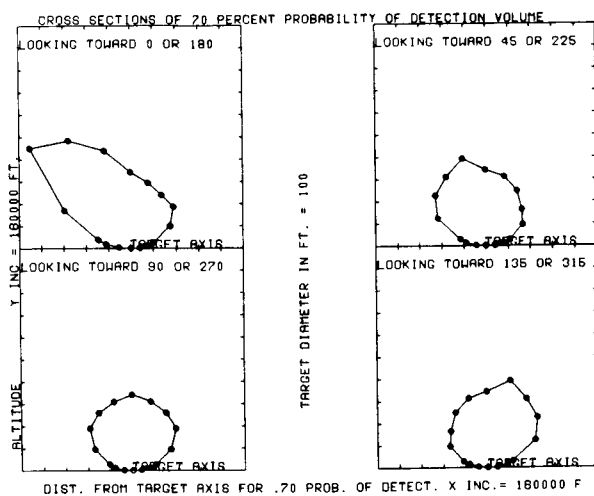


Figure C-2. Plot of data produced by this program, when probabilities of target = 70%.

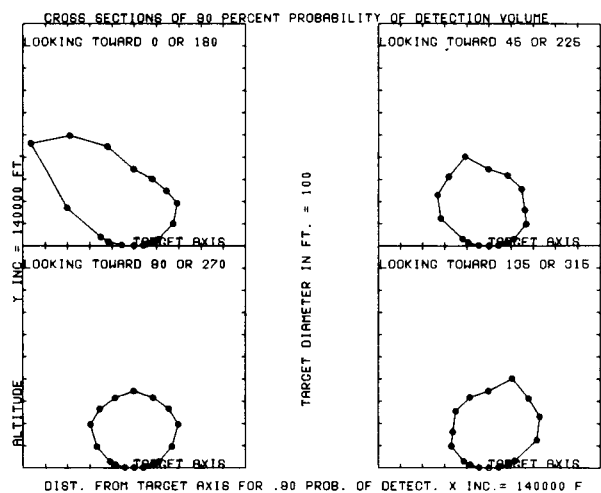


Figure C-3. Plot of data produced by this program, when probabilities of target = 90%.

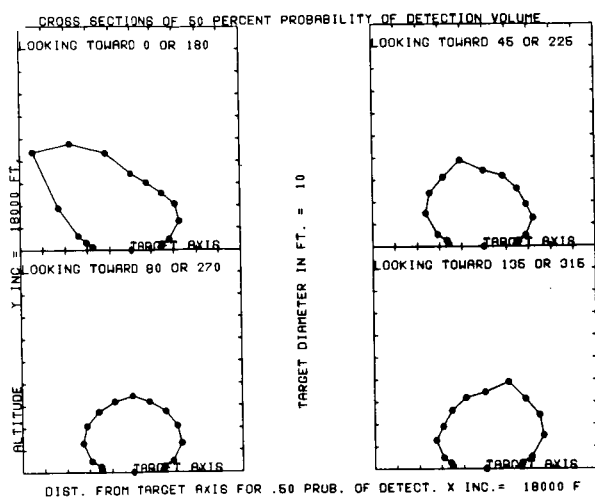


Figure C-4. Plot of data produced by this program, when target diameter = 10 feet and probabilities of target detection = 50%.

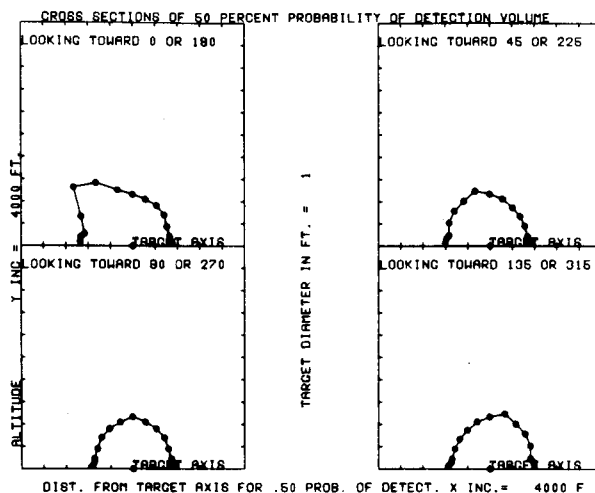


Figure C-5. Plot of data produced by this program, when target diameter = 1 foot and probabilities of target detection = 50%.

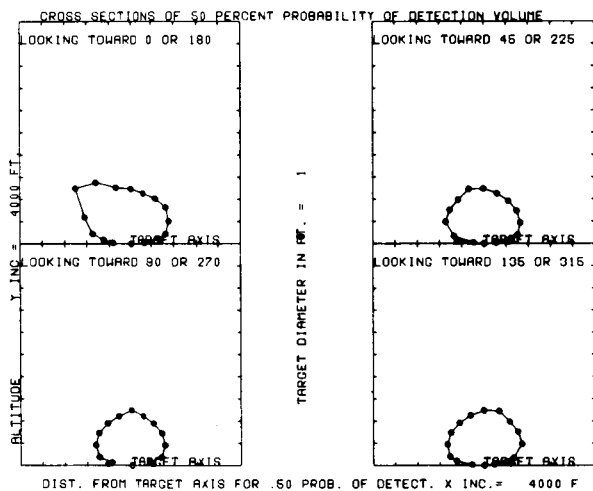


Figure C-6. Plot of data produced by this program, when background reflectance data is for clear water with infinite optical depth.

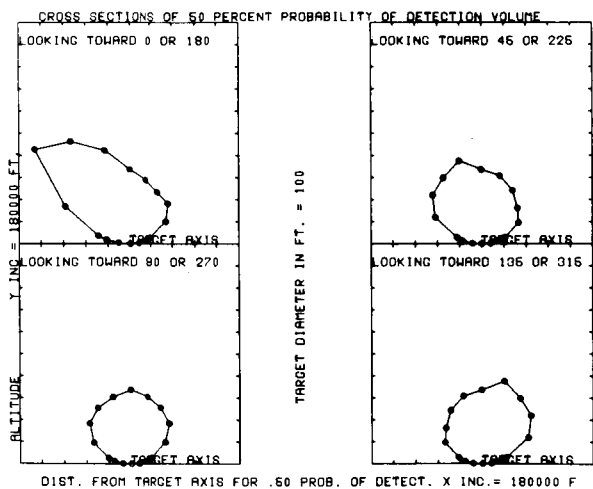


Figure C-7. Plot of data produced by this program, when simulated optical system was used in conjunction with an atmosphere.

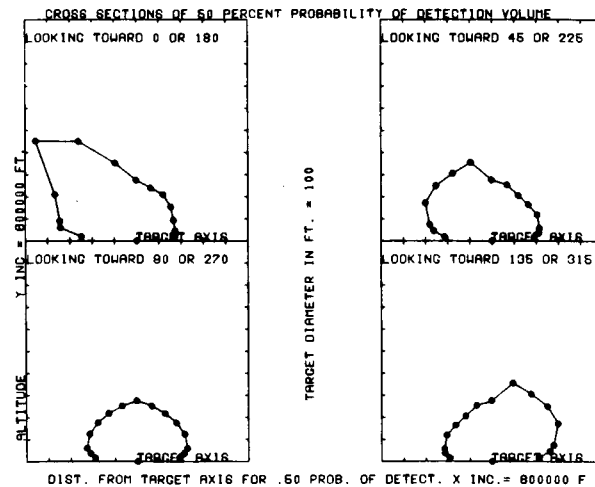


Figure C-8. Plot of data produced by this program, when no atmosphere and a simulated optical system was utilized.

PROGRAM PODV1

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PROGRAM PODV1

```
C ...PROGRAM PODV1...1NOV,65...BARKDOLL...VISLAR...UCSD
C ...PODV1= PROBABILITY OF DETECTION VOLUME PHASE 1
C ...THIS PROGRAM PROVIDES INPUT DATA FOR THE
C ...SOLUTION OF A PROBABILITY OF TARGET DETECTION VOLUME.
C ...THE CALLED SEQUENCE OF PROGRAMS WILL PRINT THE
C ...ALTITUDE AND DISTANCE FROM THE TARGET AXIS FOR
C ...8 DOWNWARD LOOKING ZENITHS OF PATH OF SIGHT,
C ...THETA=180,165,150,135,120,105,100,95 DEGREES AND
C ...FOR 5 AZIMUTHS OF PATH OF SIGHT WITH RESPECT
C ...TO THE SUN, PHI=0,45,90,135,180 DEGREES.
C ...THE PROGRAM WILL ALSO PLOT THESE POINTS AS
C ...4 HEMISPHERIC CROSS SECTIONS.
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C
C ...VARIABLE INPUTS...
C ...OPT=OPTION FOR ATMOSPHERIC AND OPTICAL SYSTEM
C .....OPT=0 FOR VIEWING THROUGH ATMOSPHERE ONLY
C .....OPT=-1 FOR OPTICS AND NO ATMOSPHERE
C .....OPT=+1 FOR OPTICS AND AN ATMOSPHERE
C ...FNUMB=FLIGHT NUMBER FOR ATMOSPHERIC DATA
C ...OPTNU=OPTICAL SYSTEM INDEX NUMBER
C ...DIAM=TARGET DIAMETER IN FT.,NOT TO EXCEED 100 FT.
C ...OBJ=INDEX FOR DIRECTIONAL REFLECTANCE PROPERTIES
C ...OF TARGET OBJECT
C ...BAC=INDEX FOR DIRECTIONAL REFLECTANCE PROPERTIES
C ...OF BACKGROUND
C ...PROBK=CONSTANT FOR DEVIATION FROM 50 PERCENT
C ...PROBABILITY,1. FOR 50,1.206 FOR 70, 1.50 FOR 90, AND
C ...1.91 FOR 99 PERCENT PROBABILITY OF DETECTION
C ...NPROB=INTEGER REPRESENTING PROBABILITY
C ...SW1=SWITCH FOR OUTPUT PRINTING, 1 FOR CALCULATIONS
C ...AND COORDINATES, 0 FOR COORDINATES ONLY
C ...SW2=SWITCH FOR PLOTTING, 1 IF PLOT IS DESIRED
C ...0 FOR NO PLOT
C
C ...
C ...CALLED PROGRAMS=TCAL
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OPT=0.
FNUMB=74.
DIAM=100.
OBJ=1.
BAC=1.
PROBK=1.
NPROB=50
SW1=1.
SW2=1.
CALL DATA1
CALL DATA2
CALL DATA 3
CALL TCAL(OPT,FNUMB,OPTNU,DIAM,OBJ,BAC,PROBK,NPROB,
1SW1,SW2)
CALL PREP(9)
END
```

TARGET DETECTION FOR INFINITE VIEWING TIME

PATH OF SIGHT THROUGH ATMOSPHERE ONLY

PROGRAM DATA FROM FLIGHT NUMBER 74

PROBABILITY OF DETECTION IS 50 PERCENT

TARGET DIAMETER IN FT. = 100

BACKGROUND FOR TARGET IS PINE TREES

TARGET IS SPHERICAL AND PAINTED GRAY

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS		0 DEGREES	
THETA=180.0 Z=D=	2000.0 3STAR=	134.00 T=	.848 880=
THETA=180.0 Z=D=	4000.0 3STAR=	233.00 T=	.719 880=
THETA=180.0 Z=D=	6000.0 3STAR=	291.00 T=	.702 880=
THETA=180.0 Z=D=	8000.0 3STAR=	341.00 T=	.694 880=
THETA=180.0 Z=D=	10000.0 3STAR=	388.00 T=	.683 880=
THETA=180.0 Z=D=	20000.0 3STAR=	603.00 T=	.646 880=
THETA=180.0 Z=D=	40000.0 3STAR=	928.00 T=	.603 880=
THETA=180.0 Z=D=	60000.0 3STAR=	1060.00 T=	.587 880=
THETA=180.0 Z=D=	80000.0 3STAR=	1076.83 T=	.580 880=
THETA=180.0 Z=D=	100000.0 3STAR=	1085.39 T=	.577 880=
THETA=180.0 Z=D=	200000.0 3STAR=	1094.06 T=	.574 880=
THETA=180.0 Z=D=	400000.0 3STAR=	1094.38 T=	.574 880=
THETA=180.0 Z=D=	600000.0 3STAR=	1094.38 T=	.574 880=
THETA=180.0 Z=D=	800000.0 3STAR=	1094.38 T=	.574 880=

CURVES INTERSECT AT AX= .46460 AY= 608609.64926

THETA=165.0 Z=D=	1931.8 3STAR=	127.15 T=	.841 880=
THETA=165.0 Z=D=	3863.6 3STAR=	251.50 T=	.711 880=
THETA=165.0 Z=D=	5795.4 3STAR=	296.91 T=	.692 880=
THETA=165.0 Z=D=	7727.2 3STAR=	355.36 T=	.684 880=
THETA=165.0 Z=D=	9659.0 3STAR=	395.25 T=	.674 880=
THETA=165.0 Z=D=	19318.0 3STAR=	502.77 T=	.635 880=
THETA=165.0 Z=D=	38636.1 3STAR=	645.23 T=	.594 880=
THETA=165.0 Z=D=	57954.1 3STAR=	785.70 T=	.577 880=
THETA=165.0 Z=D=	77272.2 3STAR=	720.04 T=	.570 880=
THETA=165.0 Z=D=	96590.2 3STAR=	726.11 T=	.566 880=
THETA=165.0 Z=D=	193180.5 3STAR=	732.52 T=	.563 880=
THETA=165.0 Z=D=	386360.9 3STAR=	732.78 T=	.562 880=
THETA=165.0 Z=D=	579541.4 3STAR=	732.78 T=	.562 880=
THETA=165.0 Z=D=	772721.9 3STAR=	732.78 T=	.562 880=
THETA=165.0 Z=D=	965902.4 3STAR=	732.78 T=	.562 880=

CURVES INTERSECT AT AX= .86637 AY= 777662.12134

THETA=150.0 Z=D=	1732.1 3STAR=	137.58 T=	.846 880=
THETA=150.0 Z=D=	3464.1 3STAR=	261.02 T=	.697 880=
THETA=150.0 Z=D=	5196.2 3STAR=	323.10 T=	.666 880=
THETA=150.0 Z=D=	6928.2 3STAR=	374.63 T=	.658 880=
THETA=150.0 Z=D=	8660.3 3STAR=	436.17 T=	.651 880=
THETA=150.0 Z=D=	17320.6 3STAR=	565.42 T=	.609 880=
THETA=150.0 Z=D=	34641.2 3STAR=	769.99 T=	.566 880=
THETA=150.0 Z=D=	51961.8 3STAR=	873.28 T=	.546 880=
THETA=150.0 Z=D=	69282.4 3STAR=	906.48 T=	.537 880=
THETA=150.0 Z=D=	86603.0 3STAR=	915.45 T=	.532 880=
THETA=150.0 Z=D=	173206.0 3STAR=	926.19 T=	.527 880=
THETA=150.0 Z=D=	346411.9 3STAR=	926.82 T=	.526 880=
THETA=150.0 Z=D=	519617.9 3STAR=	926.82 T=	.526 880=
THETA=150.0 Z=D=	692823.8 3STAR=	926.82 T=	.526 880=
THETA=150.0 Z=D=	866029.8 3STAR=	926.82 T=	.526 880=

CURVES INTERSECT AT AX= 1.22262 AY= 852920.47382

THETA=135.0 Z=D=	1414.2 3STAR=	119.48 T=	.841 880=
THETA=135.0 Z=D=	2828.4 3STAR=	223.48 T=	.673 880=
THETA=135.0 Z=D=	4242.7 3STAR=	313.49 T=	.618 880=
THETA=135.0 Z=D=	5656.9 3STAR=	366.93 T=	.605 880=
THETA=135.0 Z=D=	7071.1 3STAR=	438.41 T=	.598 880=
THETA=135.0 Z=D=	14142.3 3STAR=	598.85 T=	.557 880=
THETA=135.0 Z=D=	28284.5 3STAR=	762.53 T=	.510 880=
THETA=135.0 Z=D=	42426.8 3STAR=	858.44 T=	.486 880=
THETA=135.0 Z=D=	56569.0 3STAR=	908.08 T=	.473 880=
THETA=135.0 Z=D=	70711.3 3STAR=	924.96 T=	.466 880=
THETA=135.0 Z=D=	141422.5 3STAR=	941.49 T=	.457 880=
THETA=135.0 Z=D=	282845.0 3STAR=	943.18 T=	.456 880=
THETA=135.0 Z=D=	424267.5 3STAR=	943.20 T=	.456 880=
THETA=135.0 Z=D=	565690.0 3STAR=	943.20 T=	.456 880=
THETA=135.0 Z=D=	707112.6 3STAR=	943.20 T=	.456 880=
THETA=135.0 Z=D=	1060668.8 3STAR=	943.20 T=	.456 880=

CURVES INTERSECT AT AX= 1.59129 AY= 784021.24614

THETA=120.0 Z=D=	1000.0 3STAR=	123.00 T=	.870 880=
THETA=120.0 Z=D=	2000.0 3STAR=	214.00 T=	.658 880=
THETA=120.0 Z=D=	3000.0 3STAR=	298.00 T=	.559 880=
THETA=120.0 Z=D=	4000.0 3STAR=	371.00 T=	.512 880=
THETA=120.0 Z=D=	5000.0 3STAR=	414.00 T=	.495 880=
THETA=120.0 Z=D=	10000.0 3STAR=	749.00 T=	.483 880=
THETA=120.0 Z=D=	20000.0 3STAR=	896.00 T=	.411 880=
THETA=120.0 Z=D=	30000.0 3STAR=	1020.00 T=	.382 880=
THETA=120.0 Z=D=	40000.0 3STAR=	1110.00 T=	.364 880=
THETA=120.0 Z=D=	50000.0 3STAR=	1150.00 T=	.352 880=

THETA=120.0	Z=D=	100001.3	3STAR=	1200.74	Tq=	.333	880=	155.03	C0=	11.45	TC+C0=	.472	CT=P=	.06	I=11	BBR=1252.37
THETA=120.0	Z=D=	200002.6	3STAR=	1207.75	Tq=	.329	880=	155.03	C0=	11.45	TC+C0=	.464	CT=P=	.20	I=12	BBR=1258.76
THETA=120.0	Z=D=	300003.9	3STAR=	1207.98	Tq=	.329	880=	155.03	C0=	11.45	TC+C0=	.464	CT=P=	.45	I=13	BBR=1258.99
THETA=120.0	Z=D=	400005.2	3STAR=	1207.99	Tq=	.329	880=	155.03	C0=	11.45	TC+C0=	.464	CT=P=	.79	I=14	BBR=1259.08

CURVES INTERSECT AT AX= .46401 AY= 304136.33726

THETA=105.0	Z=D=	517.7	3STAR=	115.44	Tq=	.097	880=	225.13	C0=	7.81	TC+C0=	4.972	CT=P=	.00	I=1	BBR=317.44
THETA=105.0	Z=D=	1035.3	3STAR=	231.40	Tq=	.763	880=	225.13	C0=	7.81	TC+C0=	3.330	CT=P=	.00	I=2	BBR=403.28
THETA=105.0	Z=D=	1553.0	3STAR=	354.60	Tq=	.598	880=	225.13	C0=	7.81	TC+C0=	2.151	CT=P=	.00	I=3	BBR=489.33
THETA=105.0	Z=D=	2070.6	3STAR=	476.18	Tq=	.446	880=	225.13	C0=	7.81	TC+C0=	1.361	CT=P=	.00	I=4	BBR=576.61
THETA=105.0	Z=D=	2588.3	3STAR=	587.48	Tq=	.362	880=	225.13	C0=	7.81	TC+C0=	.952	CT=P=	.00	I=5	BBR=669.03
THETA=105.0	Z=D=	5176.5	3STAR=	990.12	Tq=	.256	880=	225.13	C0=	7.81	TC+C0=	.430	CT=P=	.00	I=6	BBR=1047.76
THETA=105.0	Z=D=	10353.0	3STAR=	1389.18	Tq=	.224	880=	225.13	C0=	7.81	TC+C0=	.274	CT=P=	.00	I=7	BBR=1339.66
THETA=105.0	Z=D=	15529.5	3STAR=	1525.89	Tq=	.197	880=	225.13	C0=	7.81	TC+C0=	.221	CT=P=	.01	I=8	BBR=1570.21
THETA=105.0	Z=D=	20706.1	3STAR=	1678.36	Tq=	.177	880=	225.13	C0=	7.81	TC+C0=	.182	CT=P=	.01	I=9	BBR=1718.30
THETA=105.0	Z=D=	25882.6	3STAR=	1807.65	Tq=	.164	880=	225.13	C0=	7.81	TC+C0=	.156	CT=P=	.02	I=10	BBR=1844.56
THETA=105.0	Z=D=	51765.1	3STAR=	2128.83	Tq=	.132	880=	225.13	C0=	7.81	TC+C0=	.107	CT=P=	.06	I=11	BBR=2158.58
THETA=105.0	Z=D=	103530.3	3STAR=	2190.96	Tq=	.119	880=	225.13	C0=	7.81	TC+C0=	.095	CT=P=	.20	I=12	BBR=2217.81

CURVES INTERSECT AT AX= .10343 AY= 67941.16234

THETA=100.0	Z=D=	347.2	3STAR=	138.20	Tq=	.910	880=	275.02	C0=	7.25	TC+C0=	4.672	CT=P=	.00	I=1	BBR=388.94
THETA=100.0	Z=D=	694.5	3STAR=	276.41	Tq=	.826	880=	275.02	C0=	7.25	TC+C0=	3.272	CT=P=	.00	I=2	BBR=583.68
THETA=100.0	Z=D=	1041.7	3STAR=	411.73	Tq=	.674	880=	275.02	C0=	7.25	TC+C0=	2.250	CT=P=	.00	I=3	BBR=597.03
THETA=100.0	Z=D=	1389.0	3STAR=	525.97	Tq=	.534	880=	275.02	C0=	7.25	TC+C0=	1.581	CT=P=	.00	I=4	BBR=672.70
THETA=100.0	Z=D=	1736.2	3STAR=	640.22	Tq=	.437	880=	275.02	C0=	7.25	TC+C0=	1.147	CT=P=	.00	I=5	BBR=760.53
THETA=100.0	Z=D=	3472.4	3STAR=	1098.16	Tq=	.167	880=	275.02	C0=	7.25	TC+C0=	.291	CT=P=	.00	I=6	BBR=1144.02
THETA=100.0	Z=D=	6944.9	3STAR=	1465.39	Tq=	.126	880=	275.02	C0=	7.25	TC+C0=	.167	CT=P=	.00	I=7	BBR=1500.21
THETA=100.0	Z=D=	10417.3	3STAR=	1624.19	Tq=	.109	880=	275.02	C0=	7.25	TC+C0=	.132	CT=P=	.01	I=8	BBR=1654.23
THETA=100.0	Z=D=	13889.8	3STAR=	1742.25	Tq=	.096	880=	275.02	C0=	7.25	TC+C0=	.108	CT=P=	.01	I=9	BBR=1768.56
THETA=100.0	Z=D=	17362.2	3STAR=	1874.49	Tq=	.087	880=	275.02	C0=	7.25	TC+C0=	.091	CT=P=	.02	I=10	BBR=1898.37
THETA=100.0	Z=D=	34724.4	3STAR=	2350.31	Tq=	.061	880=	275.02	C0=	7.25	TC+C0=	.052	CT=P=	.06	I=11	BBR=2367.18

CURVES INTERSECT AT AX= .05462 AY= 33425.39875

THETA= 95.0	Z=D=	174.2	3STAR=	130.64	Tq=	.917	880=	510.25	C0=	3.45	TC+C0=	2.695	CT=P=	.00	I=1	BBR=598.71
THETA= 95.0	Z=D=	348.4	3STAR=	261.29	Tq=	.829	880=	510.25	C0=	3.45	TC+C0=	2.131	CT=P=	.00	I=2	BBR=684.43
THETA= 95.0	Z=D=	522.6	3STAR=	391.93	Tq=	.736	880=	510.25	C0=	3.45	TC+C0=	1.686	CT=P=	.00	I=3	BBR=767.34
THETA= 95.0	Z=D=	696.8	3STAR=	522.58	Tq=	.685	880=	510.25	C0=	3.45	TC+C0=	1.381	CT=P=	.00	I=4	BBR=871.85
THETA= 95.0	Z=D=	871.0	3STAR=	653.22	Tq=	.574	880=	510.25	C0=	3.45	TC+C0=	1.068	CT=P=	.00	I=5	BBR=946.28
THETA= 95.0	Z=D=	1741.9	3STAR=	1039.35	Tq=	.195	880=	510.25	C0=	3.45	TC+C0=	.301	CT=P=	.00	I=6	BBR=1138.63
THETA= 95.0	Z=D=	3483.8	3STAR=	1491.93	Tq=	.029	880=	510.25	C0=	3.45	TC+C0=	.034	CT=P=	.00	I=7	BBR=1506.97
THETA= 95.0	Z=D=	5225.8	3STAR=	1710.32	Tq=	.019	880=	510.25	C0=	3.45	TC+C0=	.020	CT=P=	.01	I=8	BBR=1720.12
THETA= 95.0	Z=D=	6967.7	3STAR=	1886.44	Tq=	.018	880=	510.25	C0=	3.45	TC+C0=	.017	CT=P=	.01	I=9	BBR=1895.56
THETA= 95.0	Z=D=	8709.6	3STAR=	2083.96	Tq=	.016	880=	510.25	C0=	3.45	TC+C0=	.014	CT=P=	.02	I=10	BBR=2092.24

CURVES INTERSECT AT AX= .01484 AY= 8057.16557

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 0 DEGREES

ZENITH OF PATH OF SIGHT = 180	DISTANCE TO TARGET AXIS =	0	ALTITUDE =	608610	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 165	DISTANCE TO TARGET AXIS =	208430	ALTITUDE =	777662	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 150	DISTANCE TO TARGET AXIS =	492397	ALTITUDE =	852920	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 135	DISTANCE TO TARGET AXIS =	783971	ALTITUDE =	784021	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 120	DISTANCE TO TARGET AXIS =	526742	ALTITUDE =	304136	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 105	DISTANCE TO TARGET AXIS =	253529	ALTITUDE =	67941	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 100	DISTANCE TO TARGET AXIS =	189568	ALTITUDE =	33425	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 95	DISTANCE TO TARGET AXIS =	92133	ALTITUDE =	8057	CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 45 DEGREES											
THETA=180.0	Z=0	2000.0	3STAR=134.00	Y=1847	880	197.80	C0=4.95	YC=C0=2.747	CT=P= .00	I=1	88R=301.46
THETA=180.0	Z=0	4000.0	3STAR=233.00	Y=1718	880	197.80	C0=4.95	YC=C0=1.873	CT=P= .00	I=2	88R=375.04
THETA=180.0	Z=0	6000.0	3STAR=291.00	Y=1700	880	197.80	C0=4.95	YC=C0=1.595	CT=P= .00	I=3	88R=429.53
THETA=180.0	Z=0	8000.0	3STAR=341.00	Y=1693	880	197.80	C0=4.95	YC=C0=1.418	CT=P= .00	I=4	88R=478.02
THETA=180.0	Z=0	10000.0	3STAR=388.00	Y=1682	880	197.80	C0=4.95	YC=C0=1.276	CT=P= .00	I=5	88R=522.92
THETA=180.0	Z=0	20000.0	3STAR=603.00	Y=1644	880	197.80	C0=4.95	YC=C0=.883	CT=P= .00	I=6	88R=730.47
THETA=180.0	Z=0	40000.0	3STAR=928.00	Y=1603	880	197.80	C0=4.95	YC=C0=.563	CT=P= .00	I=7	88R=1047.27
THETA=180.0	Z=0	60000.0	3STAR=1060.00	Y=1587	880	197.80	C0=4.95	YC=C0=.488	CT=P= .01	I=8	88R=1176.11
THETA=180.0	Z=0	80000.0	3STAR=1076.93	Y=1580	880	197.80	C0=4.95	YC=C0=.477	CT=P= .01	I=9	88R=1191.64
THETA=180.0	Z=0	100000.0	3STAR=1085.39	Y=1577	880	197.80	C0=4.95	YC=C0=.471	CT=P= .02	I=10	88R=1199.55
THETA=180.0	Z=0	200000.0	3STAR=1094.06	Y=1574	880	197.80	C0=4.95	YC=C0=.465	CT=P= .06	I=11	88R=1207.55
THETA=180.0	Z=0	400000.0	3STAR=1094.38	Y=1574	880	197.80	C0=4.95	YC=C0=.465	CT=P= .20	I=12	88R=1207.64
THETA=180.0	Z=0	600000.0	3STAR=1094.38	Y=1574	880	197.80	C0=4.95	YC=C0=.465	CT=P= .45	I=13	88R=1207.84
THETA=180.0	Z=0	800000.0	3STAR=1094.38	Y=1574	880	197.80	C0=4.95	YC=C0=.465	CT=P= .79	I=14	88R=1207.84

CURVES INTERSECT AT AX= .46460 AY= 608609.64926

THETA=165.0	Z=0	1931.8	3STAR=154.04	Y=1841	880	131.87	C0=9.09	YC=C0=3.804	CT=P= .00	I=1	88R=264.87
THETA=165.0	Z=0	3863.6	3STAR=260.59	Y=1711	880	131.87	C0=9.09	YC=C0=2.404	CT=P= .00	I=2	88R=384.31
THETA=165.0	Z=0	5795.4	3STAR=318.59	Y=1692	880	131.87	C0=9.09	YC=C0=2.022	CT=P= .00	I=3	88R=430.00
THETA=165.0	Z=0	7727.2	3STAR=365.45	Y=1684	880	131.87	C0=9.09	YC=C0=1.799	CT=P= .00	I=4	88R=485.00
THETA=165.0	Z=0	9659.0	3STAR=411.54	Y=1674	880	131.87	C0=9.09	YC=C0=1.614	CT=P= .00	I=5	88R=530.42
THETA=165.0	Z=0	19318.0	3STAR=574.45	Y=1635	880	131.87	C0=9.09	YC=C0=1.157	CT=P= .00	I=6	88R=658.24
THETA=165.0	Z=0	38636.1	3STAR=827.22	Y=1594	880	131.87	C0=9.09	YC=C0=.787	CT=P= .00	I=7	88R=955.59
THETA=165.0	Z=0	57954.1	3STAR=933.23	Y=1577	880	131.87	C0=9.09	YC=C0=.686	CT=P= .01	I=8	88R=1089.35
THETA=165.0	Z=0	77272.2	3STAR=954.31	Y=1570	880	131.87	C0=9.09	YC=C0=.664	CT=P= .01	I=9	88R=1029.48
THETA=165.0	Z=0	96590.2	3STAR=962.35	Y=1566	880	131.87	C0=9.09	YC=C0=.655	CT=P= .02	I=10	88R=1037.05
THETA=165.0	Z=0	193180.5	3STAR=970.84	Y=1563	880	131.87	C0=9.09	YC=C0=.645	CT=P= .06	I=11	88R=1045.04
THETA=165.0	Z=0	386360.9	3STAR=971.20	Y=1562	880	131.87	C0=9.09	YC=C0=.645	CT=P= .20	I=12	88R=1045.37
THETA=165.0	Z=0	579541.4	3STAR=971.20	Y=1562	880	131.87	C0=9.09	YC=C0=.645	CT=P= .45	I=13	88R=1045.37
THETA=165.0	Z=0	772721.9	3STAR=971.20	Y=1562	880	131.87	C0=9.09	YC=C0=.645	CT=P= .79	I=14	88R=1045.37

CURVES INTERSECT AT AX= .64496 AY= 689029.00374

THETA=150.0	Z=0	1732.1	3STAR=161.56	Y=1846	880	119.99	C0=8.41	YC=C0=3.243	CT=P= .00	I=1	88R=263.06
THETA=150.0	Z=0	3464.1	3STAR=277.99	Y=1697	880	119.99	C0=8.41	YC=C0=1.944	CT=P= .00	I=2	88R=361.60
THETA=150.0	Z=0	5196.2	3STAR=339.12	Y=1666	880	119.99	C0=8.41	YC=C0=1.602	CT=P= .00	I=3	88R=418.97
THETA=150.0	Z=0	6928.2	3STAR=369.92	Y=1658	880	119.99	C0=8.41	YC=C0=1.479	CT=P= .00	I=4	88R=468.88
THETA=150.0	Z=0	8660.3	3STAR=436.81	Y=1651	880	119.99	C0=8.41	YC=C0=1.275	CT=P= .00	I=5	88R=514.90
THETA=150.0	Z=0	17320.6	3STAR=581.38	Y=1609	880	119.99	C0=8.41	YC=C0=.939	CT=P= .00	I=6	88R=654.48
THETA=150.0	Z=0	34641.2	3STAR=815.63	Y=1566	880	119.99	C0=8.41	YC=C0=.646	CT=P= .00	I=7	88R=883.51
THETA=150.0	Z=0	51961.8	3STAR=932.06	Y=1546	880	119.99	C0=8.41	YC=C0=.552	CT=P= .01	I=8	88R=987.94
THETA=150.0	Z=0	69282.4	3STAR=968.99	Y=1537	880	119.99	C0=8.41	YC=C0=.524	CT=P= .01	I=9	88R=1033.40
THETA=150.0	Z=0	86603.0	3STAR=978.58	Y=1532	880	119.99	C0=8.41	YC=C0=.515	CT=P= .02	I=10	88R=1042.44
THETA=150.0	Z=0	173206.0	3STAR=990.07	Y=1527	880	119.99	C0=8.41	YC=C0=.504	CT=P= .06	I=11	88R=1053.26
THETA=150.0	Z=0	346411.9	3STAR=990.74	Y=1526	880	119.99	C0=8.41	YC=C0=.504	CT=P= .20	I=12	88R=1053.89
THETA=150.0	Z=0	519617.9	3STAR=990.74	Y=1526	880	119.99	C0=8.41	YC=C0=.504	CT=P= .45	I=13	88R=1053.90
THETA=150.0	Z=0	692823.8	3STAR=990.74	Y=1526	880	119.99	C0=8.41	YC=C0=.504	CT=P= .79	I=14	88R=1053.90

CURVES INTERSECT AT AX= .50373 AY= 546752.86415

THETA=135.0	Z=0	1414.2	3STAR=143.97	Y=1841	880	115.24	C0=8.48	YC=C0=3.413	CT=P= .00	I=1	88R=280.86
THETA=135.0	Z=0	2828.5	3STAR=249.99	Y=1673	880	115.24	C0=8.48	YC=C0=2.009	CT=P= .00	I=2	88R=327.55
THETA=135.0	Z=0	4242.7	3STAR=329.41	Y=1618	880	115.24	C0=8.48	YC=C0=1.509	CT=P= .00	I=3	88R=400.64
THETA=135.0	Z=0	5656.9	3STAR=391.93	Y=1605	880	115.24	C0=8.48	YC=C0=1.281	CT=P= .00	I=4	88R=461.63
THETA=135.0	Z=0	7071.1	3STAR=444.27	Y=1598	880	115.24	C0=8.48	YC=C0=1.140	CT=P= .00	I=5	88R=513.24
THETA=135.0	Z=0	14142.3	3STAR=594.48	Y=1557	880	115.24	C0=8.48	YC=C0=.827	CT=P= .00	I=6	88R=658.71
THETA=135.0	Z=0	28284.5	3STAR=803.07	Y=1510	880	115.24	C0=8.48	YC=C0=.579	CT=P= .01	I=7	88R=861.67
THETA=135.0	Z=0	42426.8	3STAR=925.35	Y=1486	880	115.24	C0=8.48	YC=C0=.484	CT=P= .01	I=8	88R=981.38
THETA=135.0	Z=0	56569.0	3STAR=988.68	Y=1473	880	115.24	C0=8.48	YC=C0=.443	CT=P= .01	I=9	88R=1043.28
THETA=135.0	Z=0	70711.3	3STAR=1008.68	Y=1466	880	115.24	C0=8.48	YC=C0=.429	CT=P= .02	I=10	88R=1062.40
THETA=135.0	Z=0	141422.5	3STAR=1026.71	Y=1457	880	115.24	C0=8.48	YC=C0=.414	CT=P= .06	I=11	88R=1079.33
THETA=135.0	Z=0	282845.0	3STAR=1028.55	Y=1456	880	115.24	C0=8.48	YC=C0=.412	CT=P= .20	I=12	88R=1081.86
THETA=135.0	Z=0	424267.5	3STAR=1028.57	Y=1456	880	115.24	C0=8.48	YC=C0=.412	CT=P= .45	I=13	88R=1081.88

CURVES INTERSECT AT AX= .41209 AY= 402572.37890

THETA=120.0	Z=0	1000.0	3STAR=128.00	Y=1870	880	124.74	C0=7.90	YC=C0=3.626	CT=P= .00	I=1	88R=236.48
THETA=120.0	Z=0	2000.0	3STAR=244.00	Y=1658	880	124.74	C0=7.90	YC=C0=1.991	CT=P= .00	I=2	88R=326.14
THETA=120.0	Z=0	3000.0	3STAR=331.00	Y=1559	880	124.74	C0=7.90	YC=C0=1.376	CT=P= .00	I=3	88R=400.74
THETA=120.0	Z=0	4000.1	3STAR=391.00	Y=1512	880	124.74	C0=7.90	YC=C0=1.110	CT=P= .00	I=4	88R=494.06
THETA=120.0	Z=0	5000.1	3STAR=444.00	Y=1495	880	124.74	C0=7.90	YC=C0=.954	CT=P= .00	I=5	88R=585.70
THETA=120.0	Z=0	10000.1	3STAR=678.00	Y=1463	880	124.74	C0=7.90	YC=C0=.621	CT=P= .00	I=6	88R=735.70
THETA=120.0	Z=0	20000.3	3STAR=856.00	Y=1411	880	124.74	C0=7.90	YC=C0=.447	CT=P= .00	I=7	88R=907.28
THETA=120.0	Z=0	30000.4	3STAR=1020.00	Y=1382	880	124.74	C0=7.90	YC=C0=.353	CT=P= .01	I=8	88R=1067.68
THETA=120.0	Z=0	40000.5	3STAR=1130.00	Y=1354	880	124.74	C0=7.90	YC=C0=.305	CT=P= .01	I=9	88R=1179.36
THETA=120.0	Z=0	50000.7	3STAR=1190.00	Y=1352	880	124.74	C0=7.90	YC=C0=.281	CT=P= .02	I=10	88R=1233.87
THETA=120.0	Z=0	100001.3	3STAR=1251.62	Y=1333	880	124.74	C0=7.90	YC=C0=.254	CT=P= .06	I=11	88R=1293.16
THETA=120.0	Z=0	200002.6	3STAR=1258.91	Y=1329	880	124.74	C0=7.90	YC=C0=.250	CT=P= .20	I=12	88R=1299.97
THETA=120.0	Z=0	300003.9	3STAR=1259.17	Y=1329	880	124.74	C0=7.90	YC=C0=.250	CT=P= .45	I=13	88R=1300.21

CURVES INTERSECT AT AX= .24965 AY= 218547.05849

THETA=105.0 Z=D=	517.7	BSTAR=	134.07	YR=	.897	BB0=	179.98	C0=	5.37	YC=C0=	2.934	CT=P=	.00	I=	1	BBR=	295.57
THETA=105.0 Z=D=	1035.3	BSTAR=	266.55	YR=	.763	BB0=	179.98	C0=	5.37	YC=C0=	1.826	CT=P=	.00	I=	2	BBR=	403.96
THETA=105.0 Z=D=	1553.8	BSTAR=	377.33	YR=	.598	BB0=	179.98	C0=	5.37	YC=C0=	1.192	CT=P=	.00	I=	3	BBR=	485.04
THETA=105.0 Z=D=	2070.6	BSTAR=	484.72	YR=	.446	BB0=	179.98	C0=	5.37	YC=C0=	.763	CT=P=	.00	I=	4	BBR=	565.02
THETA=105.0 Z=D=	2588.3	BSTAR=	570.65	YR=	.362	BB0=	179.98	C0=	5.37	YC=C0=	.551	CT=P=	.00	I=	5	BBR=	635.88
THETA=105.0 Z=D=	5176.5	BSTAR=	868.30	YR=	.256	BB0=	179.98	C0=	5.37	YC=C0=	.271	CT=P=	.00	I=	6	BBR=	914.38
THETA=105.0 Z=D=	10353.0	BSTAR=	1112.71	YR=	.224	BB0=	179.98	C0=	5.37	YC=C0=	.188	CT=P=	.00	I=	7	BBR=	1153.06
THETA=105.0 Z=D=	15529.5	BSTAR=	1300.12	YR=	.197	BB0=	179.98	C0=	5.37	YC=C0=	.142	CT=P=	.01	I=	8	BBR=	1335.56
THETA=105.0 Z=D=	20706.1	BSTAR=	1492.59	YR=	.177	BB0=	179.98	C0=	5.37	YC=C0=	.112	CT=P=	.01	I=	9	BBR=	1524.52
THETA=105.0 Z=D=	25882.6	BSTAR=	1652.95	YR=	.164	BB0=	179.98	C0=	5.37	YC=C0=	.094	CT=P=	.02	I=	10	BBR=	1682.45
THETA=105.0 Z=D=	51765.1	BSTAR=	2052.36	YR=	.132	BB0=	179.98	C0=	5.37	YC=C0=	.061	CT=P=	.06	I=	11	BBR=	2076.09
THETA=105.0 Z=D=	103530.3	BSTAR=	2130.39	YR=	.119	BB0=	179.98	C0=	5.37	YC=C0=	.054	CT=P=	.20	I=	12	BBR=	2191.85

CURVES INTERSECT AT AX= .05120 AY= 93018.42546

THETA=100.0 Z=D=	347.2	BSTAR=	124.66	YR=	.910	BB0=	229.88	C0=	4.43	YC=C0=	2.774	CT=P=	.00	I=	1	BBR=	333.98
THETA=100.0 Z=D=	694.5	BSTAR=	249.32	YR=	.826	BB0=	229.88	C0=	4.43	YC=C0=	1.914	CT=P=	.00	I=	2	BBR=	439.29
THETA=100.0 Z=D=	1041.7	BSTAR=	372.90	YR=	.674	BB0=	229.88	C0=	4.43	YC=C0=	1.299	CT=P=	.00	I=	3	BBR=	527.78
THETA=100.0 Z=D=	1389.0	BSTAR=	488.53	YR=	.534	BB0=	229.88	C0=	4.43	YC=C0=	.888	CT=P=	.00	I=	4	BBR=	611.17
THETA=100.0 Z=D=	1736.2	BSTAR=	604.16	YR=	.437	BB0=	229.88	C0=	4.43	YC=C0=	.632	CT=P=	.00	I=	5	BBR=	704.72
THETA=100.0 Z=D=	3472.4	BSTAR=	951.25	YR=	.167	BB0=	229.88	C0=	4.43	YC=C0=	.170	CT=P=	.00	I=	6	BBR=	999.58
THETA=100.0 Z=D=	6944.9	BSTAR=	1317.24	YR=	.126	BB0=	229.88	C0=	4.43	YC=C0=	.095	CT=P=	.00	I=	7	BBR=	1346.18
THETA=100.0 Z=D=	10417.3	BSTAR=	1490.82	YR=	.109	BB0=	229.88	C0=	4.43	YC=C0=	.073	CT=P=	.01	I=	8	BBR=	1515.13
THETA=100.0 Z=D=	13889.6	BSTAR=	1573.35	YR=	.096	BB0=	229.88	C0=	4.43	YC=C0=	.061	CT=P=	.01	I=	9	BBR=	1595.34
THETA=100.0 Z=D=	17362.2	BSTAR=	1675.59	YR=	.087	BB0=	229.88	C0=	4.43	YC=C0=	.052	CT=P=	.02	I=	10	BBR=	1695.55
THETA=100.0 Z=D=	34724.4	BSTAR=	2080.87	YR=	.061	BB0=	229.88	C0=	4.43	YC=C0=	.030	CT=P=	.06	I=	11	BBR=	2094.97

CURVES INTERSECT AT AX= .03964 AY= 27057.83110

THETA= 95.0 Z=D=	174.2	BSTAR=	113.22	YR=	.917	BB0=	326.11	C0=	2.83	YC=C0=	2.049	CT=P=	.00	I=	1	BBR=	412.37
THETA= 95.0 Z=D=	348.4	BSTAR=	226.45	YR=	.829	BB0=	326.11	C0=	2.83	YC=C0=	1.538	CT=P=	.00	I=	2	BBR=	496.89
THETA= 95.0 Z=D=	522.6	BSTAR=	339.67	YR=	.736	BB0=	326.11	C0=	2.83	YC=C0=	1.169	CT=P=	.00	I=	3	BBR=	579.60
THETA= 95.0 Z=D=	696.8	BSTAR=	452.90	YR=	.685	BB0=	326.11	C0=	2.83	YC=C0=	.933	CT=P=	.00	I=	4	BBR=	676.13
THETA= 95.0 Z=D=	871.0	BSTAR=	566.12	YR=	.574	BB0=	326.11	C0=	2.83	YC=C0=	.702	CT=P=	.00	I=	5	BBR=	783.42
THETA= 95.0 Z=D=	1741.9	BSTAR=	882.96	YR=	.195	BB0=	326.11	C0=	2.83	YC=C0=	.189	CT=P=	.00	I=	6	BBR=	946.41
THETA= 95.0 Z=D=	3483.8	BSTAR=	1248.06	YR=	.029	BB0=	326.11	C0=	2.83	YC=C0=	.022	CT=P=	.00	I=	7	BBR=	1257.67
THETA= 95.0 Z=D=	5225.8	BSTAR=	1477.09	YR=	.019	BB0=	326.11	C0=	2.83	YC=C0=	.012	CT=P=	.01	I=	8	BBR=	1483.36
THETA= 95.0 Z=D=	6967.7	BSTAR=	1637.74	YR=	.018	BB0=	326.11	C0=	2.83	YC=C0=	.010	CT=P=	.01	I=	9	BBR=	1643.56

CURVES INTERSECT AT AX= .01049 AY= 6530.52735

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 45 DEGREES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 0 ALTITUDE = 608610 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 184674 ALTITUDE = 689029 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 315644 ALTITUDE = 546753 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 402547 ALTITUDE = 402572 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 378507 ALTITUDE = 218547 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 197813 ALTITUDE = 53010 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 153455 ALTITUDE = 27058 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 74676 ALTITUDE = 6531 CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 90 DEGREES									
THETA=180.0 Z=D=	2000.0	3STAR=	134.00	Y=	.847	BB=	197.80	C=	4.95 TC=C0= 2.747 CT=P= .00 I= 1 BBR= 381.46
THETA=180.0 Z=D=	4000.0	3STAR=	233.00	Y=	.718	BB=	197.80	C=	4.95 TC=C0= 1.873 CT=P= .00 I= 2 BBR= 375.04
THETA=180.0 Z=D=	6000.0	3STAR=	291.00	Y=	.700	BB=	197.80	C=	4.95 TC=C0= 1.595 CT=P= .00 I= 3 BBR= 429.53
THETA=180.0 Z=D=	8000.0	3STAR=	341.00	Y=	.693	BB=	197.80	C=	4.95 TC=C0= 1.418 CT=P= .00 I= 4 BBR= 478.02
THETA=180.0 Z=D=	10000.0	3STAR=	388.00	Y=	.682	BB=	197.80	C=	4.95 TC=C0= 1.276 CT=P= .00 I= 5 BBR= 522.92
THETA=180.0 Z=D=	20000.0	3STAR=	603.00	Y=	.644	BB=	197.80	C=	4.95 TC=C0= .863 CT=P= .00 I= 6 BBR= 730.47
THETA=180.0 Z=D=	40000.0	3STAR=	928.00	Y=	.603	BB=	197.80	C=	4.95 TC=C0= .563 CT=P= .00 I= 7 BBR= 1047.27
THETA=180.0 Z=D=	60000.0	3STAR=	1060.00	Y=	.587	BB=	197.80	C=	4.95 TC=C0= .488 CT=P= .01 I= 8 BBR= 1176.11
THETA=180.0 Z=D=	80000.0	3STAR=	1076.83	Y=	.580	BB=	197.80	C=	4.95 TC=C0= .477 CT=P= .01 I= 9 BBR= 1191.64
THETA=180.0 Z=D=	100000.0	3STAR=	1085.39	Y=	.577	BB=	197.80	C=	4.95 TC=C0= .471 CT=P= .02 I= 10 BBR= 1199.59
THETA=180.0 Z=D=	200000.0	3STAR=	1094.06	Y=	.574	BB=	197.80	C=	4.95 TC=C0= .465 CT=P= .06 I= 11 BBR= 1207.59
THETA=180.0 Z=D=	400000.0	3STAR=	1094.38	Y=	.574	BB=	197.80	C=	4.95 TC=C0= .465 CT=P= .20 I= 12 BBR= 1207.84
THETA=180.0 Z=D=	600000.0	3STAR=	1094.38	Y=	.574	BB=	197.80	C=	4.95 TC=C0= .465 CT=P= .45 I= 13 BBR= 1207.84
THETA=180.0 Z=D=	800000.0	3STAR=	1094.38	Y=	.574	BB=	197.80	C=	4.95 TC=C0= .465 CT=P= .79 I= 14 BBR= 1207.84

CURVES INTERSECT AT AX= .46460 AY= 608609.64926

THETA=165.0 Z=D=	1931.8	3STAR=	133.34	Y=	.841	BB=	187.11	C=	4.40 TC=C0= 2.379 CT=P= .00 I= 1 BBR= 290.61
THETA=165.0 Z=D=	3863.6	3STAR=	232.14	Y=	.711	BB=	187.11	C=	4.40 TC=C0= 1.601 CT=P= .00 I= 2 BBR= 365.12
THETA=165.0 Z=D=	5795.4	3STAR=	287.89	Y=	.692	BB=	187.11	C=	4.40 TC=C0= 1.363 CT=P= .00 I= 3 BBR= 437.20
THETA=165.0 Z=D=	7727.2	3STAR=	342.82	Y=	.684	BB=	187.11	C=	4.40 TC=C0= 1.195 CT=P= .00 I= 4 BBR= 470.72
THETA=165.0 Z=D=	9659.0	3STAR=	387.20	Y=	.674	BB=	187.11	C=	4.40 TC=C0= 1.080 CT=P= .00 I= 5 BBR= 513.31
THETA=165.0 Z=D=	19318.0	3STAR=	567.95	Y=	.635	BB=	187.11	C=	4.40 TC=C0= .761 CT=P= .00 I= 6 BBR= 686.84
THETA=165.0 Z=D=	38636.1	3STAR=	848.59	Y=	.594	BB=	187.11	C=	4.40 TC=C0= .509 CT=P= .00 I= 7 BBR= 959.78
THETA=165.0 Z=D=	57954.1	3STAR=	967.41	Y=	.577	BB=	187.11	C=	4.40 TC=C0= .442 CT=P= .01 I= 8 BBR= 1075.43
THETA=165.0 Z=D=	77272.2	3STAR=	989.80	Y=	.570	BB=	187.11	C=	4.40 TC=C0= .428 CT=P= .01 I= 9 BBR= 1086.47
THETA=165.0 Z=D=	96590.2	3STAR=	998.15	Y=	.566	BB=	187.11	C=	4.40 TC=C0= .422 CT=P= .02 I= 10 BBR= 1104.14
THETA=165.0 Z=D=	193180.5	3STAR=	1006.95	Y=	.563	BB=	187.11	C=	4.40 TC=C0= .416 CT=P= .06 I= 11 BBR= 1112.23
THETA=165.0 Z=D=	386360.9	3STAR=	1007.32	Y=	.562	BB=	187.11	C=	4.40 TC=C0= .416 CT=P= .20 I= 12 BBR= 1112.56
THETA=165.0 Z=D=	579541.4	3STAR=	1007.32	Y=	.562	BB=	187.11	C=	4.40 TC=C0= .416 CT=P= .45 I= 13 BBR= 1112.56

CURVES INTERSECT AT AX= .41591 AY= 552913.44362

THETA=150.0 Z=D=	1732.1	3STAR=	135.05	Y=	.846	BB=	184.73	C=	4.11 TC=C0= 2.206 CT=P= .00 I= 1 BBR= 291.31
THETA=150.0 Z=D=	3464.1	3STAR=	250.60	Y=	.697	BB=	184.73	C=	4.11 TC=C0= 1.396 CT=P= .00 I= 2 BBR= 379.32
THETA=150.0 Z=D=	5196.2	3STAR=	310.32	Y=	.666	BB=	184.73	C=	4.11 TC=C0= 1.167 CT=P= .00 I= 3 BBR= 433.26
THETA=150.0 Z=D=	6928.2	3STAR=	342.85	Y=	.658	BB=	184.73	C=	4.11 TC=C0= 1.076 CT=P= .00 I= 4 BBR= 464.41
THETA=150.0 Z=D=	8660.3	3STAR=	400.17	Y=	.651	BB=	184.73	C=	4.11 TC=C0= .950 CT=P= .00 I= 5 BBR= 520.40
THETA=150.0 Z=D=	17320.6	3STAR=	559.16	Y=	.609	BB=	184.73	C=	4.11 TC=C0= .689 CT=P= .00 I= 6 BBR= 671.67
THETA=150.0 Z=D=	34641.2	3STAR=	809.88	Y=	.566	BB=	184.73	C=	4.11 TC=C0= .470 CT=P= .00 I= 7 BBR= 914.38
THETA=150.0 Z=D=	51961.8	3STAR=	933.45	Y=	.546	BB=	184.73	C=	4.11 TC=C0= .401 CT=P= .01 I= 8 BBR= 1034.26
THETA=150.0 Z=D=	69282.4	3STAR=	972.02	Y=	.537	BB=	184.73	C=	4.11 TC=C0= .381 CT=P= .01 I= 9 BBR= 1071.17
THETA=150.0 Z=D=	86603.0	3STAR=	981.64	Y=	.532	BB=	184.73	C=	4.11 TC=C0= .374 CT=P= .02 I= 10 BBR= 1079.95
THETA=150.0 Z=D=	173206.0	3STAR=	993.16	Y=	.527	BB=	184.73	C=	4.11 TC=C0= .367 CT=P= .06 I= 11 BBR= 1090.45
THETA=150.0 Z=D=	346411.9	3STAR=	993.83	Y=	.526	BB=	184.73	C=	4.11 TC=C0= .367 CT=P= .20 I= 12 BBR= 1091.07
THETA=150.0 Z=D=	519617.9	3STAR=	993.83	Y=	.526	BB=	184.73	C=	4.11 TC=C0= .367 CT=P= .45 I= 13 BBR= 1091.07

CURVES INTERSECT AT AX= .36650 AY= 460909.34851

THETA=135.0 Z=D=	1414.2	3STAR=	120.58	Y=	.841	BB=	188.30	C=	3.95 TC=C0= 2.244 CT=P= .00 I= 1 BBR= 278.98
THETA=135.0 Z=D=	2828.5	3STAR=	232.82	Y=	.673	BB=	188.30	C=	3.95 TC=C0= 1.393 CT=P= .00 I= 2 BBR= 359.56
THETA=135.0 Z=D=	4242.7	3STAR=	307.95	Y=	.618	BB=	188.30	C=	3.95 TC=C0= 1.084 CT=P= .00 I= 3 BBR= 424.34
THETA=135.0 Z=D=	5656.9	3STAR=	360.68	Y=	.605	BB=	188.30	C=	3.95 TC=C0= .949 CT=P= .00 I= 4 BBR= 474.56
THETA=135.0 Z=D=	7071.1	3STAR=	405.36	Y=	.598	BB=	188.30	C=	3.95 TC=C0= .860 CT=P= .00 I= 5 BBR= 518.29
THETA=135.0 Z=D=	14142.3	3STAR=	555.36	Y=	.557	BB=	188.30	C=	3.95 TC=C0= .628 CT=P= .00 I= 6 BBR= 660.51
THETA=135.0 Z=D=	28284.5	3STAR=	806.30	Y=	.510	BB=	188.30	C=	3.95 TC=C0= .421 CT=P= .00 I= 7 BBR= 982.38
THETA=135.0 Z=D=	42426.8	3STAR=	951.53	Y=	.486	BB=	188.30	C=	3.95 TC=C0= .347 CT=P= .01 I= 8 BBR= 1043.09
THETA=135.0 Z=D=	56569.0	3STAR=	1026.28	Y=	.473	BB=	188.30	C=	3.95 TC=C0= .316 CT=P= .01 I= 9 BBR= 1115.36
THETA=135.0 Z=D=	70711.3	3STAR=	1049.02	Y=	.466	BB=	188.30	C=	3.95 TC=C0= .305 CT=P= .02 I= 10 BBR= 1136.88
THETA=135.0 Z=D=	141422.5	3STAR=	1067.77	Y=	.457	BB=	188.30	C=	3.95 TC=C0= .295 CT=P= .06 I= 11 BBR= 1193.76
THETA=135.0 Z=D=	282845.0	3STAR=	1069.70	Y=	.456	BB=	188.30	C=	3.95 TC=C0= .293 CT=P= .20 I= 12 BBR= 1195.50
THETA=135.0 Z=D=	424267.5	3STAR=	1069.71	Y=	.456	BB=	188.30	C=	3.95 TC=C0= .293 CT=P= .45 I= 13 BBR= 1195.51

CURVES INTERSECT AT AX= .29350 AY= 334308.40981

THETA=120.0 Z=D=	1000.0	3STAR=	109.00	Y=	.870	BB=	188.30	C=	3.92 TC=C0= 2.354 CT=P= .00 I= 1 BBR= 272.79
THETA=120.0 Z=D=	2000.0	3STAR=	226.00	Y=	.658	BB=	188.30	C=	3.92 TC=C0= 1.389 CT=P= .00 I= 2 BBR= 349.99
THETA=120.0 Z=D=	3000.0	3STAR=	325.00	Y=	.559	BB=	188.30	C=	3.92 TC=C0= .959 CT=P= .00 I= 3 BBR= 430.28
THETA=120.0 Z=D=	4000.1	3STAR=	404.00	Y=	.512	BB=	188.30	C=	3.92 TC=C0= .755 CT=P= .00 I= 4 BBR= 500.40
THETA=120.0 Z=D=	5000.1	3STAR=	462.00	Y=	.495	BB=	188.30	C=	3.92 TC=C0= .658 CT=P= .00 I= 5 BBR= 555.14
THETA=120.0 Z=D=	10000.1	3STAR=	620.00	Y=	.463	BB=	188.30	C=	3.92 TC=C0= .478 CT=P= .00 I= 6 BBR= 715.24
THETA=120.0 Z=D=	20000.3	3STAR=	875.01	Y=	.411	BB=	188.30	C=	3.92 TC=C0= .319 CT=P= .00 I= 7 BBR= 950.38
THETA=120.0 Z=D=	30000.4	3STAR=	1090.01	Y=	.382	BB=	188.30	C=	3.92 TC=C0= .243 CT=P= .01 I= 8 BBR= 1161.92
THETA=120.0 Z=D=	40000.3	3STAR=	1230.00	Y=	.364	BB=	188.30	C=	3.92 TC=C0= .207 CT=P= .01 I= 9 BBR= 1290.47
THETA=120.0 Z=D=	50000.7	3STAR=	1314.00	Y=	.352	BB=	188.30	C=	3.92 TC=C0= .188 CT=P= .02 I= 10 BBR= 1380.22
THETA=120.0 Z=D=	100001.3	3STAR=	1394.08	Y=	.333	BB=	188.30	C=	3.92 TC=C0= .169 CT=P= .06 I= 11 BBR= 1450.79
THETA=120.0 Z=D=	200002.6	3STAR=	1402.20	Y=	.329	BB=	188.30	C=	3.92 TC=C0= .166 CT=P= .20 I= 12 BBR= 1464.10

CURVES INTERSECT AT AX= .18671 AY= 174470.20861

THETA=105.0 Z=D=	517.7	BSTAR=	105.08	TA=	.897	BBO=	200.18	C0=	3.54	TC=C0=	2.233	CT=P=	.00	I=	1	BBR=	284.70
THETA=105.0 Z=D=	1035.3	BSTAR=	259.57	TA=	.763	BBO=	200.18	C0=	3.54	TC=C0=	1.493	CT=P=	.00	I=	2	BBR=	382.30
THETA=105.0 Z=D=	1553.0	BSTAR=	305.85	TA=	.598	BBO=	200.18	C0=	3.54	TC=C0=	.996	CT=P=	.00	I=	3	BBR=	425.64
THETA=105.0 Z=D=	2070.8	BSTAR=	399.66	TA=	.446	BBO=	200.18	C0=	3.54	TC=C0=	.647	CT=P=	.00	I=	4	BBR=	488.97
THETA=105.0 Z=D=	2588.3	BSTAR=	477.83	TA=	.362	BBO=	200.18	C0=	3.54	TC=C0=	.466	CT=P=	.00	I=	5	BBR=	550.34
THETA=105.0 Z=D=	3176.5	BSTAR=	755.65	TA=	.256	BBO=	200.18	C0=	3.54	TC=C0=	.225	CT=P=	.00	I=	6	BBR=	806.90
THETA=105.0 Z=D=	10353.0	BSTAR=	1011.30	TA=	.224	BBO=	200.18	C0=	3.54	TC=C0=	.150	CT=P=	.00	I=	7	BBR=	1096.10
THETA=105.0 Z=D=	15529.5	BSTAR=	1175.89	TA=	.197	BBO=	200.18	C0=	3.54	TC=C0=	.115	CT=P=	.01	I=	8	BBR=	1235.10
THETA=105.0 Z=D=	20706.1	BSTAR=	1329.77	TA=	.177	BBO=	200.18	C0=	3.54	TC=C0=	.092	CT=P=	.01	I=	9	BBR=	1365.20
THETA=105.0 Z=D=	25882.6	BSTAR=	1469.42	TA=	.164	BBO=	200.18	C0=	3.54	TC=C0=	.077	CT=P=	.02	I=	10	BBR=	1502.23
THETA=105.0 Z=D=	51765.1	BSTAR=	1810.59	TA=	.132	BBO=	200.18	C0=	3.54	TC=C0=	.051	CT=P=	.06	I=	11	BBR=	1836.99

CURVES INTERSECT AT AX= .09355 AY= 49147.92366

THETA=100.0 Z=D=	347.2	BSTAR=	124.66	TA=	.910	BBO=	229.88	C0=	2.93	TC=C0=	1.835	CT=P=	.00	I=	1	BBR=	333.90
THETA=100.0 Z=D=	694.5	BSTAR=	249.32	TA=	.826	BBO=	229.88	C0=	2.93	TC=C0=	1.266	CT=P=	.00	I=	2	BBR=	439.20
THETA=100.0 Z=D=	1041.7	BSTAR=	367.47	TA=	.674	BBO=	229.88	C0=	2.93	TC=C0=	.868	CT=P=	.00	I=	3	BBR=	522.36
THETA=100.0 Z=D=	1389.0	BSTAR=	437.96	TA=	.534	BBO=	229.88	C0=	2.93	TC=C0=	.640	CT=P=	.00	I=	4	BBR=	590.61
THETA=100.0 Z=D=	1736.2	BSTAR=	508.48	TA=	.437	BBO=	229.88	C0=	2.93	TC=C0=	.483	CT=P=	.00	I=	5	BBR=	669.01
THETA=100.0 Z=D=	3472.4	BSTAR=	790.50	TA=	.167	BBO=	229.88	C0=	2.93	TC=C0=	.135	CT=P=	.00	I=	6	BBR=	828.64
THETA=100.0 Z=D=	6944.9	BSTAR=	1165.59	TA=	.126	BBO=	229.88	C0=	2.93	TC=C0=	.071	CT=P=	.00	I=	7	BBR=	1194.43
THETA=100.0 Z=D=	10417.3	BSTAR=	1282.52	TA=	.109	BBO=	229.88	C0=	2.93	TC=C0=	.056	CT=P=	.01	I=	8	BBR=	1307.63
THETA=100.0 Z=D=	13889.8	BSTAR=	1386.69	TA=	.096	BBO=	229.88	C0=	2.93	TC=C0=	.046	CT=P=	.01	I=	9	BBR=	1408.60
THETA=100.0 Z=D=	17362.2	BSTAR=	1495.59	TA=	.087	BBO=	229.88	C0=	2.93	TC=C0=	.039	CT=P=	.02	I=	10	BBR=	1515.55
THETA=100.0 Z=D=	34724.4	BSTAR=	1900.87	TA=	.061	BBO=	229.88	C0=	2.93	TC=C0=	.022	CT=P=	.06	I=	11	BBR=	1914.97

CURVES INTERSECT AT AX= .03217 AY= 23882.19111

THETA= 95.0 Z=D=	174.2	BSTAR=	103.64	TA=	.917	BBO=	275.02	C0=	2.26	TC=C0=	1.603	CT=P=	.00	I=	1	BBR=	355.93
THETA= 95.0 Z=D=	348.4	BSTAR=	207.29	TA=	.829	BBO=	275.02	C0=	2.26	TC=C0=	1.185	CT=P=	.00	I=	2	BBR=	435.36
THETA= 95.0 Z=D=	522.6	BSTAR=	310.93	TA=	.736	BBO=	275.02	C0=	2.26	TC=C0=	.891	CT=P=	.00	I=	3	BBR=	513.28
THETA= 95.0 Z=D=	696.8	BSTAR=	414.58	TA=	.665	BBO=	275.02	C0=	2.26	TC=C0=	.706	CT=P=	.00	I=	4	BBR=	602.84
THETA= 95.0 Z=D=	871.0	BSTAR=	518.22	TA=	.574	BBO=	275.02	C0=	2.26	TC=C0=	.528	CT=P=	.00	I=	5	BBR=	676.18
THETA= 95.0 Z=D=	1741.9	BSTAR=	771.58	TA=	.195	BBO=	275.02	C0=	2.26	TC=C0=	.147	CT=P=	.00	I=	6	BBR=	825.09
THETA= 95.0 Z=D=	3483.8	BSTAR=	1048.06	TA=	.029	BBO=	275.02	C0=	2.26	TC=C0=	.017	CT=P=	.00	I=	7	BBR=	1056.17
THETA= 95.0 Z=D=	5225.8	BSTAR=	1205.80	TA=	.019	BBO=	275.02	C0=	2.26	TC=C0=	.010	CT=P=	.01	I=	8	BBR=	1211.09
THETA= 95.0 Z=D=	6967.7	BSTAR=	1308.38	TA=	.018	BBO=	275.02	C0=	2.26	TC=C0=	.008	CT=P=	.01	I=	9	BBR=	1313.29

CURVES INTERSECT AT AX= .00925 AY= 5993.98175

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 90 DEGREES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 0 ALTITUDE = 608610 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 148192 ALTITUDE = 552913 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 266086 ALTITUDE = 460909 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 334287 ALTITUDE = 334308 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 302169 ALTITUDE = 174470 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 183400 ALTITUDE = 49148 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 135445 ALTITUDE = 23882 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 68540 ALTITUDE = 5994 CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 135 DEGREES										
THETA=180.0	Z=0	2000.0	3STAR=134.00	TR=.847	BB0=197.80	CO=4.95	TC=CO=2.747	CT=P=.00	I=1	BBN=381.46
THETA=180.0	Z=0	4000.0	3STAR=233.00	TR=.718	BB0=197.80	CO=4.95	TC=CO=1.873	CT=P=.00	I=2	BBN=375.84
THETA=180.0	Z=0	6000.0	3STAR=291.00	TR=.700	BB0=197.80	CO=4.95	TC=CO=1.595	CT=P=.00	I=3	BBN=429.93
THETA=180.0	Z=0	8000.0	3STAR=341.00	TR=.593	BB0=197.80	CO=4.95	TC=CO=1.418	CT=P=.00	I=4	BBN=478.02
THETA=180.0	Z=0	10000.0	3STAR=388.00	TR=.682	BB0=197.80	CO=4.95	TC=CO=1.276	CT=P=.00	I=5	BBN=522.92
THETA=180.0	Z=0	20000.0	3STAR=603.00	TR=.644	BB0=197.80	CO=4.95	TC=CO=.863	CT=P=.00	I=6	BBN=730.47
THETA=180.0	Z=0	40000.0	3STAR=928.00	TR=.603	BB0=197.80	CO=4.95	TC=CO=.563	CT=P=.00	I=7	BBN=1047.27
THETA=180.0	Z=0	60000.0	3STAR=1060.00	TR=.587	BB0=197.80	CO=4.95	TC=CO=.488	CT=P=.01	I=8	BBN=1176.11
THETA=180.0	Z=0	80000.0	3STAR=1076.83	TR=.580	BB0=197.80	CO=4.95	TC=CO=.477	CT=P=.01	I=9	BBN=1191.64
THETA=180.0	Z=0	100000.0	3STAR=1085.39	TR=.577	BB0=197.80	CO=4.95	TC=CO=.471	CT=P=.02	I=10	BBN=1199.93
THETA=180.0	Z=0	200000.0	3STAR=1094.06	TR=.574	BB0=197.80	CO=4.95	TC=CO=.465	CT=P=.06	I=11	BBN=1207.59
THETA=180.0	Z=0	400000.0	3STAR=1094.38	TR=.574	BB0=197.80	CO=4.95	TC=CO=.465	CT=P=.20	I=12	BBN=1207.84
THETA=180.0	Z=0	600000.0	3STAR=1094.38	TR=.574	BB0=197.80	CO=4.95	TC=CO=.465	CT=P=.45	I=13	BBN=1207.84
THETA=180.0	Z=0	800000.0	3STAR=1094.38	TR=.574	BB0=197.80	CO=4.95	TC=CO=.465	CT=P=.79	I=14	BBN=1207.84

CURVES INTERSECT AT AX= .46460 AY= 608609.64926

THETA=165.0	Z=0	1931.8	3STAR=156.39	TR=.841	BB0=198.99	CO=4.43	TC=CO=2.291	CT=P=.00	I=1	BBN=323.89
THETA=165.0	Z=0	3863.6	3STAR=253.41	TR=.711	BB0=198.99	CO=4.43	TC=CO=1.588	CT=P=.00	I=2	BBN=394.83
THETA=165.0	Z=0	5795.4	3STAR=316.66	TR=.692	BB0=198.99	CO=4.43	TC=CO=1.343	CT=P=.00	I=3	BBN=484.28
THETA=165.0	Z=0	7727.2	3STAR=358.54	TR=.684	BB0=198.99	CO=4.43	TC=CO=1.219	CT=P=.00	I=4	BBN=494.57
THETA=165.0	Z=0	9659.0	3STAR=409.50	TR=.674	BB0=198.99	CO=4.43	TC=CO=1.094	CT=P=.00	I=5	BBN=543.61
THETA=165.0	Z=0	19318.0	3STAR=619.95	TR=.635	BB0=198.99	CO=4.43	TC=CO=.751	CT=P=.00	I=6	BBN=746.38
THETA=165.0	Z=0	38636.0	3STAR=899.59	TR=.594	BB0=198.99	CO=4.43	TC=CO=.515	CT=P=.00	I=7	BBN=1017.84
THETA=165.0	Z=0	57954.1	3STAR=1021.00	TR=.577	BB0=198.99	CO=4.43	TC=CO=.448	CT=P=.01	I=8	BBN=1135.88
THETA=165.0	Z=0	77272.2	3STAR=1044.56	TR=.570	BB0=198.99	CO=4.43	TC=CO=.434	CT=P=.01	I=9	BBN=1158.88
THETA=165.0	Z=0	96590.2	3STAR=1053.37	TR=.566	BB0=198.99	CO=4.43	TC=CO=.428	CT=P=.02	I=10	BBN=1166.09
THETA=165.0	Z=0	193180.3	3STAR=1062.67	TR=.563	BB0=198.99	CO=4.43	TC=CO=.423	CT=P=.06	I=11	BBN=1174.42
THETA=165.0	Z=0	386360.9	3STAR=1063.05	TR=.562	BB0=198.99	CO=4.43	TC=CO=.422	CT=P=.20	I=12	BBN=1174.98
THETA=165.0	Z=0	579541.4	3STAR=1063.05	TR=.562	BB0=198.99	CO=4.43	TC=CO=.422	CT=P=.49	I=13	BBN=1174.98

CURVES INTERSECT AT AX= .42226 AY= 557899.46853

THETA=150.0	Z=0	1732.1	3STAR=183.89	TR=.846	BB0=226.91	CO=3.58	TC=CO=1.830	CT=P=.00	I=1	BBN=375.83
THETA=150.0	Z=0	3464.1	3STAR=300.28	TR=.697	BB0=226.91	CO=3.58	TC=CO=1.235	CT=P=.00	I=2	BBN=498.30
THETA=150.0	Z=0	5196.2	3STAR=363.30	TR=.666	BB0=226.91	CO=3.58	TC=CO=1.051	CT=P=.00	I=3	BBN=554.31
THETA=150.0	Z=0	6928.2	3STAR=399.85	TR=.658	BB0=226.91	CO=3.58	TC=CO=.974	CT=P=.00	I=4	BBN=549.16
THETA=150.0	Z=0	8660.3	3STAR=447.47	TR=.651	BB0=226.91	CO=3.58	TC=CO=.889	CT=P=.00	I=5	BBN=595.13
THETA=150.0	Z=0	17320.6	3STAR=668.27	TR=.609	BB0=226.91	CO=3.58	TC=CO=.614	CT=P=.00	I=6	BBN=886.46
THETA=150.0	Z=0	34641.2	3STAR=948.37	TR=.568	BB0=226.91	CO=3.58	TC=CO=.427	CT=P=.00	I=7	BBN=1076.74
THETA=150.0	Z=0	51961.8	3STAR=1087.85	TR=.546	BB0=226.91	CO=3.58	TC=CO=.366	CT=P=.01	I=8	BBN=1211.67
THETA=150.0	Z=0	69282.4	3STAR=1129.31	TR=.537	BB0=226.91	CO=3.58	TC=CO=.349	CT=P=.01	I=9	BBN=1251.11
THETA=150.0	Z=0	86603.0	3STAR=1140.49	TR=.532	BB0=226.91	CO=3.58	TC=CO=.343	CT=P=.02	I=10	BBN=1261.24
THETA=150.0	Z=0	173206.0	3STAR=1153.88	TR=.527	BB0=226.91	CO=3.58	TC=CO=.336	CT=P=.06	I=11	BBN=1273.38
THETA=150.0	Z=0	346411.9	3STAR=1154.66	TR=.526	BB0=226.91	CO=3.58	TC=CO=.336	CT=P=.20	I=12	BBN=1274.09
THETA=150.0	Z=0	519617.9	3STAR=1154.66	TR=.526	BB0=226.91	CO=3.58	TC=CO=.336	CT=P=.49	I=13	BBN=1274.09

CURVES INTERSECT AT AX= .33569 AY= 439189.72300

THETA=135.0	Z=0	1414.2	3STAR=180.08	TR=.841	BB0=232.85	CO=3.41	TC=CO=1.778	CT=P=.00	I=1	BBN=375.86
THETA=135.0	Z=0	2828.5	3STAR=302.31	TR=.673	BB0=232.85	CO=3.41	TC=CO=1.165	CT=P=.00	I=2	BBN=499.83
THETA=135.0	Z=0	4242.7	3STAR=384.46	TR=.618	BB0=232.85	CO=3.41	TC=CO=.930	CT=P=.00	I=3	BBN=598.48
THETA=135.0	Z=0	5656.9	3STAR=431.08	TR=.605	BB0=232.85	CO=3.41	TC=CO=.840	CT=P=.00	I=4	BBN=571.98
THETA=135.0	Z=0	7071.1	3STAR=468.20	TR=.598	BB0=232.85	CO=3.41	TC=CO=.783	CT=P=.00	I=5	BBN=607.56
THETA=135.0	Z=0	14142.3	3STAR=668.53	TR=.557	BB0=232.85	CO=3.41	TC=CO=.535	CT=P=.00	I=6	BBN=798.31
THETA=135.0	Z=0	28284.5	3STAR=1085.40	TR=.510	BB0=232.85	CO=3.41	TC=CO=.337	CT=P=.00	I=7	BBN=1204.22
THETA=135.0	Z=0	42426.8	3STAR=1326.69	TR=.486	BB0=232.85	CO=3.41	TC=CO=.268	CT=P=.01	I=8	BBN=1489.91
THETA=135.0	Z=0	56569.0	3STAR=1455.98	TR=.473	BB0=232.85	CO=3.41	TC=CO=.240	CT=P=.01	I=9	BBN=1566.16
THETA=135.0	Z=0	70711.3	3STAR=1492.84	TR=.466	BB0=232.85	CO=3.41	TC=CO=.231	CT=P=.02	I=10	BBN=1601.39
THETA=135.0	Z=0	141422.3	3STAR=1519.52	TR=.457	BB0=232.85	CO=3.41	TC=CO=.223	CT=P=.06	I=11	BBN=1605.69
THETA=135.0	Z=0	282845.0	3STAR=1522.26	TR=.456	BB0=232.85	CO=3.41	TC=CO=.222	CT=P=.20	I=12	BBN=1608.36
THETA=135.0	Z=0	424267.5	3STAR=1522.28	TR=.456	BB0=232.85	CO=3.41	TC=CO=.222	CT=P=.45	I=13	BBN=1608.36

CURVES INTERSECT AT AX= .22240 AY= 293382.99972

THETA=120.0	Z=0	1000.0	3STAR=137.00	TR=.870	BB0=229.88	CO=3.52	TC=CO=2.090	CT=P=.00	I=1	BBN=336.91
THETA=120.0	Z=0	2000.0	3STAR=282.00	TR=.658	BB0=229.88	CO=3.52	TC=CO=1.230	CT=P=.00	I=2	BBN=483.37
THETA=120.0	Z=0	3000.0	3STAR=385.00	TR=.559	BB0=229.88	CO=3.52	TC=CO=.881	CT=P=.00	I=3	BBN=513.92
THETA=120.0	Z=0	4000.1	3STAR=462.00	TR=.512	BB0=229.88	CO=3.52	TC=CO=.715	CT=P=.00	I=4	BBN=596.60
THETA=120.0	Z=0	5000.1	3STAR=525.00	TR=.495	BB0=229.88	CO=3.52	TC=CO=.627	CT=P=.00	I=5	BBN=656.70
THETA=120.0	Z=0	10000.1	3STAR=694.00	TR=.463	BB0=229.88	CO=3.52	TC=CO=.469	CT=P=.00	I=6	BBN=880.51
THETA=120.0	Z=0	20000.3	3STAR=995.01	TR=.411	BB0=229.88	CO=3.52	TC=CO=.305	CT=P=.00	I=7	BBN=1389.46
THETA=120.0	Z=0	30000.4	3STAR=1220.01	TR=.382	BB0=229.88	CO=3.52	TC=CO=.236	CT=P=.01	I=8	BBN=1307.88
THETA=120.0	Z=0	40000.5	3STAR=1360.00	TR=.364	BB0=229.88	CO=3.52	TC=CO=.204	CT=P=.01	I=9	BBN=1448.99
THETA=120.0	Z=0	50000.7	3STAR=1440.00	TR=.352	BB0=229.88	CO=3.52	TC=CO=.187	CT=P=.02	I=10	BBN=1528.84
THETA=120.0	Z=0	100001.3	3STAR=1516.18	TR=.333	BB0=229.88	CO=3.52	TC=CO=.168	CT=P=.06	I=11	BBN=1592.75
THETA=120.0	Z=0	200002.6	3STAR=1525.02	TR=.329	BB0=229.88	CO=3.52	TC=CO=.166	CT=P=.20	I=12	BBN=1608.60

CURVES INTERSECT AT AX= .16728 AY= 174805.80669

THETA=105.0 Z=D=	517.7	BSTAR=	173.93	TR=	.897	BB=	260.17	C0=	3.11	TC=C0=	1.782	CT=P=	.00	I=	1	BBR=	407.38
THETA=105.0 Z=D=	1035.3	BSTAR=	341.58	TR=	.763	BB=	260.17	C0=	3.11	TC=C0=	1.143	CT=P=	.05	I=	2	BBR=	588.21
THETA=105.0 Z=D=	1553.0	BSTAR=	423.37	TR=	.998	BB=	260.17	C0=	3.11	TC=C0=	.836	CT=P=	.00	I=	3	BBR=	579.06
THETA=105.0 Z=D=	2070.6	BSTAR=	503.25	TR=	.448	BB=	260.17	C0=	3.11	TC=C0=	.583	CT=P=	.00	I=	4	BBR=	619.38
THETA=105.0 Z=D=	2588.3	BSTAR=	571.06	TR=	.362	BB=	260.17	C0=	3.11	TC=C0=	.441	CT=P=	.00	I=	5	BBR=	665.31
THETA=105.0 Z=D=	3176.5	BSTAR=	618.30	TR=	.258	BB=	260.17	C0=	3.11	TC=C0=	.234	CT=P=	.00	I=	6	BBR=	884.91
THETA=105.0 Z=D=	10353.0	BSTAR=	1102.71	TR=	.224	BB=	260.17	C0=	3.11	TC=C0=	.146	CT=P=	.00	I=	7	BBR=	1241.85
THETA=105.0 Z=D=	13529.5	BSTAR=	1382.71	TR=	.197	BB=	260.17	C0=	3.11	TC=C0=	.113	CT=P=	.01	I=	8	BBR=	1413.94
THETA=105.0 Z=D=	20706.1	BSTAR=	1486.95	TR=	.177	BB=	260.17	C0=	3.11	TC=C0=	.094	CT=P=	.01	I=	9	BBR=	1583.18
THETA=105.0 Z=D=	25882.6	BSTAR=	1604.12	TR=	.164	BB=	260.17	C0=	3.11	TC=C0=	.081	CT=P=	.02	I=	10	BBR=	1646.77
THETA=105.0 Z=D=	31765.1	BSTAR=	1867.06	TR=	.132	BB=	260.17	C0=	3.11	TC=C0=	.056	CT=P=	.06	I=	11	BBR=	1901.37

CURVES INTERSECT AT AX= .05670 AY= 51144.15125

THETA=100.0 Z=D=	347.2	BSTAR=	168.76	TR=	.918	BB=	275.02	C0=	2.93	TC=C0=	1.751	CT=P=	.00	I=	1	BBR=	419.09
THETA=100.0 Z=D=	694.5	BSTAR=	337.58	TR=	.824	BB=	275.02	C0=	2.93	TC=C0=	1.179	CT=P=	.00	I=	2	BBR=	564.79
THETA=100.0 Z=D=	1041.7	BSTAR=	493.97	TR=	.674	BB=	275.02	C0=	2.93	TC=C0=	.800	CT=P=	.00	I=	3	BBR=	679.27
THETA=100.0 Z=D=	1389.0	BSTAR=	580.29	TR=	.934	BB=	275.02	C0=	2.93	TC=C0=	.608	CT=P=	.00	I=	4	BBR=	707.02
THETA=100.0 Z=D=	1736.2	BSTAR=	626.62	TR=	.437	BB=	275.02	C0=	2.93	TC=C0=	.472	CT=P=	.00	I=	5	BBR=	746.93
THETA=100.0 Z=D=	3472.4	BSTAR=	858.83	TR=	.187	BB=	275.02	C0=	2.93	TC=C0=	.149	CT=P=	.00	I=	6	BBR=	984.89
THETA=100.0 Z=D=	6944.9	BSTAR=	1165.59	TR=	.126	BB=	275.02	C0=	2.93	TC=C0=	.085	CT=P=	.00	I=	7	BBR=	1200.21
THETA=100.0 Z=D=	10417.3	BSTAR=	1467.53	TR=	.100	BB=	275.02	C0=	2.93	TC=C0=	.059	CT=P=	.01	I=	8	BBR=	1407.97
THETA=100.0 Z=D=	13889.8	BSTAR=	1613.37	TR=	.096	BB=	275.02	C0=	2.93	TC=C0=	.047	CT=P=	.01	I=	9	BBR=	1589.68
THETA=100.0 Z=D=	17362.2	BSTAR=	1718.89	TR=	.087	BB=	275.02	C0=	2.93	TC=C0=	.040	CT=P=	.02	I=	10	BBR=	1740.97
THETA=100.0 Z=D=	34724.4	BSTAR=	2031.97	TR=	.061	BB=	275.02	C0=	2.93	TC=C0=	.024	CT=P=	.06	I=	11	BBR=	2049.84

CURVES INTERSECT AT AX= .03360 AY= 24491.84310

THETA= 95.0 Z=D=	174.2	BSTAR=	120.71	TR=	.917	BB=	339.77	C0=	2.27	TC=C0=	1.636	CT=P=	.00	I=	1	BBR=	432.40
THETA= 95.0 Z=D=	348.4	BSTAR=	241.43	TR=	.829	BB=	339.77	C0=	2.27	TC=C0=	1.222	CT=P=	.00	I=	2	BBR=	583.20
THETA= 95.0 Z=D=	522.6	BSTAR=	362.14	TR=	.736	BB=	339.77	C0=	2.27	TC=C0=	.927	CT=P=	.00	I=	3	BBR=	612.13
THETA= 95.0 Z=D=	696.8	BSTAR=	482.86	TR=	.685	BB=	339.77	C0=	2.27	TC=C0=	.738	CT=P=	.00	I=	4	BBR=	715.44
THETA= 95.0 Z=D=	871.0	BSTAR=	603.57	TR=	.574	BB=	339.77	C0=	2.27	TC=C0=	.554	CT=P=	.00	I=	5	BBR=	798.72
THETA= 95.0 Z=D=	1741.9	BSTAR=	884.41	TR=	.195	BB=	339.77	C0=	2.27	TC=C0=	.158	CT=P=	.00	I=	6	BBR=	990.52
THETA= 95.0 Z=D=	3483.8	BSTAR=	1162.90	TR=	.029	BB=	339.77	C0=	2.27	TC=C0=	.019	CT=P=	.00	I=	7	BBR=	1172.91
THETA= 95.0 Z=D=	5225.8	BSTAR=	1294.52	TR=	.019	BB=	339.77	C0=	2.27	TC=C0=	.011	CT=P=	.01	I=	8	BBR=	1301.04
THETA= 95.0 Z=D=	6967.7	BSTAR=	1397.09	TR=	.018	BB=	339.77	C0=	2.27	TC=C0=	.010	CT=P=	.01	I=	9	BBR=	1403.16

CURVES INTERSECT AT AX= .01029 AY= 6442.18191

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 135 DEGREES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 0 ALTITUDE = 808610 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 149529 ALTITUDE = 557899 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 253547 ALTITUDE = 439190 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 293364 ALTITUDE = 293383 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 302951 ALTITUDE = 174806 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 190849 ALTITUDE = 51144 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 138903 ALTITUDE = 24492 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 73665 ALTITUDE = 6442 CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 180 DEGREES											
THETA=180.0 Z=D=	2000.0	3STAR=	134.00	TR=	.847	880=	197.80	CO=	4.95	TC*CO=	2.747
THETA=180.0 Z=D=	4000.0	3STAR=	233.00	TR=	.718	880=	197.80	CO=	4.95	TC*CO=	1.873
THETA=180.0 Z=D=	6000.0	3STAR=	291.00	TR=	.700	880=	197.80	CO=	4.95	TC*CO=	1.595
THETA=180.0 Z=D=	8000.0	3STAR=	341.00	TR=	.693	880=	197.80	CO=	4.95	TC*CO=	1.418
THETA=180.0 Z=D=	10000.0	3STAR=	388.00	TR=	.682	880=	197.80	CO=	4.95	TC*CO=	1.276
THETA=180.0 Z=D=	20000.0	3STAR=	603.00	TR=	.644	880=	197.80	CO=	4.95	TC*CO=	.863
THETA=180.0 Z=D=	40000.0	3STAR=	928.00	TR=	.603	880=	197.80	CO=	4.95	TC*CO=	.563
THETA=180.0 Z=D=	60000.0	3STAR=	1060.00	TR=	.587	880=	197.80	CO=	4.95	TC*CO=	.488
THETA=180.0 Z=D=	80000.0	3STAR=	1076.83	TR=	.580	880=	197.80	CO=	4.95	TC*CO=	.477
THETA=180.0 Z=D=	100000.0	3STAR=	1085.39	TR=	.577	880=	197.80	CO=	4.95	TC*CO=	.471
THETA=180.0 Z=D=	200000.0	3STAR=	1094.06	TR=	.574	880=	197.80	CO=	4.95	TC*CO=	.465
THETA=180.0 Z=D=	400000.0	3STAR=	1094.38	TR=	.574	880=	197.80	CO=	4.95	TC*CO=	.465
THETA=180.0 Z=D=	600000.0	3STAR=	1094.38	TR=	.574	880=	197.80	CO=	4.95	TC*CO=	.465
THETA=180.0 Z=D=	800000.0	3STAR=	1094.38	TR=	.574	880=	197.80	CO=	4.95	TC*CO=	.465

CURVES INTERSECT AT AX= .46460 AY= 608609.64926

THETA=165.0 Z=D=	1931.8	3STAR=	133.08	TR=	.841	880=	238.79	CO=	3.85	TC*CO=	2.315
THETA=165.0 Z=D=	3863.6	3STAR=	235.14	TR=	.711	880=	238.79	CO=	3.85	TC*CO=	1.614
THETA=165.0 Z=D=	5795.4	3STAR=	280.70	TR=	.692	880=	238.79	CO=	3.85	TC*CO=	1.426
THETA=165.0 Z=D=	7727.2	3STAR=	367.63	TR=	.684	880=	238.79	CO=	3.85	TC*CO=	1.184
THETA=165.0 Z=D=	9659.0	3STAR=	463.82	TR=	.674	880=	238.79	CO=	3.85	TC*CO=	.992
THETA=165.0 Z=D=	19318.0	3STAR=	682.09	TR=	.635	880=	238.79	CO=	3.85	TC*CO=	.701
THETA=165.0 Z=D=	38636.1	3STAR=	1031.18	TR=	.594	880=	238.79	CO=	3.85	TC*CO=	.466
THETA=165.0 Z=D=	57954.1	3STAR=	1179.77	TR=	.577	880=	238.79	CO=	3.85	TC*CO=	.403
THETA=165.0 Z=D=	77272.2	3STAR=	1206.83	TR=	.570	880=	238.79	CO=	3.85	TC*CO=	.390
THETA=165.0 Z=D=	96590.2	3STAR=	1217.00	TR=	.566	880=	238.79	CO=	3.85	TC*CO=	.385
THETA=165.0 Z=D=	193180.5	3STAR=	1227.74	TR=	.563	880=	238.79	CO=	3.85	TC*CO=	.380
THETA=165.0 Z=D=	386360.9	3STAR=	1228.19	TR=	.562	880=	238.79	CO=	3.85	TC*CO=	.380
THETA=165.0 Z=D=	579541.4	3STAR=	1228.19	TR=	.562	880=	238.79	CO=	3.85	TC*CO=	.380

CURVES INTERSECT AT AX= .37959 AY= 524351.98720

THETA=150.0 Z=D=	1732.1	3STAR=	166.35	TR=	.846	880=	263.74	CO=	3.64	TC*CO=	2.084
THETA=150.0 Z=D=	3464.1	3STAR=	306.17	TR=	.697	880=	263.74	CO=	3.64	TC*CO=	1.365
THETA=150.0 Z=D=	5196.2	3STAR=	368.32	TR=	.666	880=	263.74	CO=	3.64	TC*CO=	1.175
THETA=150.0 Z=D=	6928.2	3STAR=	414.78	TR=	.658	880=	263.74	CO=	3.64	TC*CO=	1.074
THETA=150.0 Z=D=	8660.3	3STAR=	474.13	TR=	.651	880=	263.74	CO=	3.64	TC*CO=	.967
THETA=150.0 Z=D=	17320.6	3STAR=	708.94	TR=	.609	880=	263.74	CO=	3.64	TC*CO=	.672
THETA=150.0 Z=D=	34641.2	3STAR=	1153.54	TR=	.566	880=	263.74	CO=	3.64	TC*CO=	.417
THETA=150.0 Z=D=	51961.8	3STAR=	1373.73	TR=	.546	880=	263.74	CO=	3.64	TC*CO=	.345
THETA=150.0 Z=D=	69282.4	3STAR=	1441.89	TR=	.537	880=	263.74	CO=	3.64	TC*CO=	.325
THETA=150.0 Z=D=	86603.0	3STAR=	1456.17	TR=	.532	880=	263.74	CO=	3.64	TC*CO=	.320
THETA=150.0 Z=D=	173206.0	3STAR=	1473.25	TR=	.527	880=	263.74	CO=	3.64	TC*CO=	.314
THETA=150.0 Z=D=	346411.9	3STAR=	1474.25	TR=	.526	880=	263.74	CO=	3.64	TC*CO=	.313
THETA=150.0 Z=D=	519617.9	3STAR=	1474.26	TR=	.526	880=	263.74	CO=	3.64	TC*CO=	.313

CURVES INTERSECT AT AX= .31322 AY= 423344.62403

THETA=135.0 Z=D=	1414.2	3STAR=	156.12	TR=	.841	880=	343.33	CO=	2.94	TC*CO=	1.911
THETA=135.0 Z=D=	2828.5	3STAR=	309.85	TR=	.673	880=	343.33	CO=	2.94	TC*CO=	1.258
THETA=135.0 Z=D=	4242.7	3STAR=	417.44	TR=	.618	880=	343.33	CO=	2.94	TC*CO=	.992
THETA=135.0 Z=D=	5656.9	3STAR=	472.33	TR=	.605	880=	343.33	CO=	2.94	TC*CO=	.899
THETA=135.0 Z=D=	7071.1	3STAR=	516.71	TR=	.598	880=	343.33	CO=	2.94	TC*CO=	.838
THETA=135.0 Z=D=	14142.3	3STAR=	697.33	TR=	.557	880=	343.33	CO=	2.94	TC*CO=	.634
THETA=135.0 Z=D=	28284.5	3STAR=	1064.66	TR=	.510	880=	343.33	CO=	2.94	TC*CO=	.416
THETA=135.0 Z=D=	42426.8	3STAR=	1281.84	TR=	.486	880=	343.33	CO=	2.94	TC*CO=	.339
THETA=135.0 Z=D=	56569.0	3STAR=	1389.41	TR=	.473	880=	343.33	CO=	2.94	TC*CO=	.308
THETA=135.0 Z=D=	70711.3	3STAR=	1422.23	TR=	.466	880=	343.33	CO=	2.94	TC*CO=	.298
THETA=135.0 Z=D=	141422.5	3STAR=	1447.66	TR=	.457	880=	343.33	CO=	2.94	TC*CO=	.288
THETA=135.0 Z=D=	282845.0	3STAR=	1450.26	TR=	.456	880=	343.33	CO=	2.94	TC*CO=	.287
THETA=135.0 Z=D=	424267.5	3STAR=	1450.28	TR=	.456	880=	343.33	CO=	2.94	TC*CO=	.287

CURVES INTERSECT AT AX= .28671 AY= 330402.68397

THETA=120.0 Z=D=	1000.0	3STAR=	144.00	TR=	.870	880=	380.16	CO=	2.23	TC*CO=	1.556
THETA=120.0 Z=D=	2000.0	3STAR=	274.00	TR=	.658	880=	380.16	CO=	2.23	TC*CO=	1.067
THETA=120.0 Z=D=	3000.0	3STAR=	382.00	TR=	.559	880=	380.16	CO=	2.23	TC*CO=	.799
THETA=120.0 Z=D=	4000.1	3STAR=	451.00	TR=	.512	880=	380.16	CO=	2.23	TC*CO=	.674
THETA=120.0 Z=D=	5000.1	3STAR=	512.00	TR=	.495	880=	380.16	CO=	2.23	TC*CO=	.600
THETA=120.0 Z=D=	10000.1	3STAR=	705.00	TR=	.463	880=	380.16	CO=	2.23	TC*CO=	.447
THETA=120.0 Z=D=	20000.3	3STAR=	944.01	TR=	.411	880=	380.16	CO=	2.23	TC*CO=	.317
THETA=120.0 Z=D=	30000.4	3STAR=	1160.01	TR=	.382	880=	380.16	CO=	2.23	TC*CO=	.249
THETA=120.0 Z=D=	40000.5	3STAR=	1300.00	TR=	.364	880=	380.16	CO=	2.23	TC*CO=	.215
THETA=120.0 Z=D=	50000.7	3STAR=	1380.00	TR=	.352	880=	380.16	CO=	2.23	TC*CO=	.197
THETA=120.0 Z=D=	100001.3	3STAR=	1455.13	TR=	.333	880=	380.16	CO=	2.23	TC*CO=	.179
THETA=120.0 Z=D=	200002.6	3STAR=	1463.61	TR=	.329	880=	380.16	CO=	2.23	TC*CO=	.176

CURVES INTERSECT AT AX= .17653 AY= 181178.33280

THETA=105.0 Z=D=	517.7	3STAR=	118.02	YR=	.897	BB0=	422.33	C0=	1.97	YC=C0=	1.500	CT=P=	.00	I=	1	BBR=	496.98
THETA=105.0 Z=D=	1035.3	3STAR=	237.46	YR=	.763	BB0=	422.33	C0=	1.97	YC=C0=	1.133	CT=P=	.00	I=	2	BBR=	559.90
THETA=105.0 Z=D=	1553.0	3STAR=	376.19	YR=	.598	BB0=	422.33	C0=	1.97	YC=C0=	.791	CT=P=	.00	I=	3	BBR=	628.93
THETA=105.0 Z=D=	2070.6	3STAR=	509.13	YR=	.446	BB0=	422.33	C0=	1.97	YC=C0=	.531	CT=P=	.00	I=	4	BBR=	697.55
THETA=105.0 Z=D=	2588.3	3STAR=	605.42	YR=	.362	BB0=	422.33	C0=	1.97	YC=C0=	.397	CT=P=	.00	I=	5	BBR=	758.41
THETA=105.0 Z=D=	5176.5	3STAR=	876.36	YR=	.256	BB0=	422.33	C0=	1.97	YC=C0=	.216	CT=P=	.00	I=	6	BBR=	984.48
THETA=105.0 Z=D=	10353.0	3STAR=	1262.00	YR=	.224	BB0=	422.33	C0=	1.97	YC=C0=	.137	CT=P=	.00	I=	7	BBR=	1356.70
THETA=105.0 Z=D=	15529.5	3STAR=	1441.18	YR=	.197	BB0=	422.33	C0=	1.97	YC=C0=	.107	CT=P=	.01	I=	8	BBR=	1524.34
THETA=105.0 Z=D=	20706.1	3STAR=	1646.83	YR=	.177	BB0=	422.33	C0=	1.97	YC=C0=	.086	CT=P=	.01	I=	9	BBR=	1721.75
THETA=105.0 Z=D=	25882.6	3STAR=	1836.48	YR=	.164	BB0=	422.33	C0=	1.97	YC=C0=	.071	CT=P=	.02	I=	10	BBR=	1905.71
THETA=105.0 Z=D=	51765.1	3STAR=	2292.36	YR=	.132	BB0=	422.33	C0=	1.97	YC=C0=	.047	CT=P=	.06	I=	11	BBR=	2348.05

CURVES INTERSECT AT AX= .05083 AY= 47426.63640

THETA=100.0 Z=D=	347.2	3STAR=	168.41	YR=	.910	BB0=	450.25	C0=	1.84	YC=C0=	1.302	CT=P=	.00	I=	1	BBR=	578.25
THETA=100.0 Z=D=	694.5	3STAR=	336.83	YR=	.826	BB0=	450.25	C0=	1.84	YC=C0=	.964	CT=P=	.00	I=	2	BBR=	708.90
THETA=100.0 Z=D=	1041.7	3STAR=	496.60	YR=	.674	BB0=	450.25	C0=	1.84	YC=C0=	.696	CT=P=	.00	I=	3	BBR=	799.97
THETA=100.0 Z=D=	1389.0	3STAR=	593.14	YR=	.534	BB0=	450.25	C0=	1.84	YC=C0=	.529	CT=P=	.00	I=	4	BBR=	833.35
THETA=100.0 Z=D=	1736.2	3STAR=	689.67	YR=	.437	BB0=	450.25	C0=	1.84	YC=C0=	.408	CT=P=	.00	I=	5	BBR=	886.64
THETA=100.0 Z=D=	3472.4	3STAR=	984.61	YR=	.167	BB0=	450.25	C0=	1.84	YC=C0=	.130	CT=P=	.00	I=	6	BBR=	1059.69
THETA=100.0 Z=D=	6944.9	3STAR=	1352.83	YR=	.126	BB0=	450.25	C0=	1.84	YC=C0=	.074	CT=P=	.00	I=	7	BBR=	1409.51
THETA=100.0 Z=D=	10417.3	3STAR=	1557.53	YR=	.109	BB0=	450.25	C0=	1.84	YC=C0=	.056	CT=P=	.01	I=	8	BBR=	1606.71
THETA=100.0 Z=D=	13889.8	3STAR=	1703.37	YR=	.096	BB0=	450.25	C0=	1.84	YC=C0=	.045	CT=P=	.01	I=	9	BBR=	1746.44
THETA=100.0 Z=D=	17362.2	3STAR=	1853.94	YR=	.087	BB0=	450.25	C0=	1.84	YC=C0=	.038	CT=P=	.02	I=	10	BBR=	1893.03
THETA=100.0 Z=D=	34724.4	3STAR=	2424.49	YR=	.061	BB0=	450.25	C0=	1.84	YC=C0=	.021	CT=P=	.06	I=	11	BBR=	2452.10

CURVES INTERSECT AT AX= .03166 AY= 23666.18193

THETA= 95.0 Z=D=	174.2	3STAR=	149.80	YR=	.917	BB0=	490.05	C0=	1.69	YC=C0=	1.268	CT=P=	.00	I=	1	BBR=	599.35
THETA= 95.0 Z=D=	348.4	3STAR=	299.61	YR=	.829	BB0=	490.05	C0=	1.69	YC=C0=	.973	CT=P=	.00	I=	2	BBR=	706.01
THETA= 95.0 Z=D=	522.6	3STAR=	449.41	YR=	.736	BB0=	490.05	C0=	1.69	YC=C0=	.753	CT=P=	.00	I=	3	BBR=	809.97
THETA= 95.0 Z=D=	696.8	3STAR=	599.22	YR=	.689	BB0=	490.05	C0=	1.69	YC=C0=	.607	CT=P=	.00	I=	4	BBR=	934.67
THETA= 95.0 Z=D=	871.0	3STAR=	749.02	YR=	.574	BB0=	490.05	C0=	1.69	YC=C0=	.462	CT=P=	.00	I=	5	BBR=	1030.48
THETA= 95.0 Z=D=	1741.9	3STAR=	1067.74	YR=	.199	BB0=	490.05	C0=	1.69	YC=C0=	.139	CT=P=	.00	I=	6	BBR=	1163.09
THETA= 95.0 Z=D=	3483.8	3STAR=	1299.03	YR=	.029	BB0=	490.05	C0=	1.69	YC=C0=	.019	CT=P=	.00	I=	7	BBR=	1313.48
THETA= 95.0 Z=D=	5225.8	3STAR=	1395.86	YR=	.019	BB0=	490.05	C0=	1.69	YC=C0=	.011	CT=P=	.01	I=	8	BBR=	1485.22
THETA= 95.0 Z=D=	6967.7	3STAR=	1479.03	YR=	.018	BB0=	490.05	C0=	1.69	YC=C0=	.010	CT=P=	.01	I=	9	BBR=	1487.78

CURVES INTERSECT AT AX= .01035 AY= 6466.60132

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 180 DEGREES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 0 ALTITUDE = 608610 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 140537 ALTITUDE = 524352 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 244400 ALTITUDE = 425345 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 330382 ALTITUDE = 330403 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 313987 ALTITUDE = 181178 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 176977 ALTITUDE = 47427 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 134220 ALTITUDE = 23666 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 73945 ALTITUDE = 6467 CONTRAST IS POSITIVE

COORDINATES FOR PLOTTING 4 CROSS SECTIONS, X = HORIZONTAL Z = VERTICAL

X1	Z1	X2	Z2	X3	Z3	X4	Z4
807867	8057	825324	6531	831480	9994	826335	6442
710432	33425	746545	27058	764555	23882	761097	24492
646471	67941	702187	53810	716880	49148	709151	51144

373258 304136 521493 218547 597831 174470 597249 174806

116029 784021 497453 402572 565713 334308 606636 293383

407603 852920 584356 546753 633914 460909 646453 439190

691570 777662 715326 689029 751868 551813 790471 557899

900000 608610 900000 608610 900000 608610 900000 608610

1040537 524352 1049529 557899 1048192 552813 1084674 689029

1144400 423345 1153547 439190 1166086 460909 1215644 546753

1230382 330403 1193364 293383 1234287 334308 1302547 402572

1213787 181178 1202751 174806 1202169 174470 1278907 218547

1076977 47427 1090849 51144 1083400 49148 1097813 53010

1034220 23666 1038903 24492 1035445 23882 1053455 27058

973945 6467 973665 6442 968540 5994 974676 6531

AXSL= 1800000.0 CSLX= 18000.0 CSLY= 1620000.0 AXLY= 900000.0 AXLY= 0

NTGDM= 100 NAINC= 180000 NPROB= 50

CURRENT ELAPSED TIME IS 0 MINUTES 55 SECONDS.

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PROGRAM PODV1
C ...PROGRAM PODV1...140V.65...BARKDOLL...VISLAR...UCSD
C ...PODV1= PROBABILITY OF DETECTION VOLUME PHASE 1
C ...THIS PROGRAM PROVIDES INPUT DATA FOR THE
C ...SOLUTION OF A PROBABILITY OF TARGET DETECTION VOLUME.
C ...THE CALLED SEQUENCE OF PROGRAMS WILL PRINT THE
C ...ALTITUDE AND DISTANCE FROM THE TARGET AXIS FOR
C ...8 DOWNWARD LOOKING ZENITHS OF PATH OF SIGHT,
C ...THETA=180,165,150,135,120,105,100,95 DEGREES AND
C ...FOR 5 AZIMUTHS OF PATH OF SIGHT WITH RESPECT
C ...TO THE SUN, PHI=0,45,90,135,180 DEGREES,
C ...THE PROGRAM WILL ALSO PLOT THESE POINTS AS
C ...4 HEMISPHERIC CROSS SECTIONS.
C
C ...VARIABLE INPUTS...
C ...OPT=OPTION FOR ATMOSPHERIC AND OPTICAL SYSTEM
C .....OPT=0 FOR VIEWING THROUGH ATMOSPHERE ONLY
C .....OPT=-1 FOR OPTICS AND NO ATMOSPHERE
C .....OPT=+1 FOR OPTICS AND AN ATMOSPHERE
C ...FNUMB=FLIGHT NUMBER FOR ATMOSPHERIC DATA
C ...OPTNU=OPTICAL SYSTEM INDEX NUMBER
C ...DIAM=TARGET DIAMETER IN FT.,NOT TO EXCEED 100 FT.
C ...OBJ=INDEX FOR DIRECTIONAL REFLECTANCE PROPERTIES
C ...OF TARGET OBJECT
C ...BAC=INDEX FOR DIRECTIONAL REFLECTANCE PROPERTIES
C ...OF BACKGROUND
C ...PROBK=CONSTANT FOR DEVIATION FROM 50 PERCENT
C ...PROBABILITY,1. FOR 50,1.206 FOR 70, 1.58 FOR 90. AND
C ...1.91 FOR 99 PERCENT PROBABILITY OF DETECTION
C ...NPROB=INTEGER REPRESENTING PROBABILITY
C ...SW1=SWITCH FOR OUTPUT PRINTING, 1 FOR CALCULATIONS
C ...AND COORDINATES, 0 FOR COORDINATES ONLY
C ...SW2=SWITCH FOR PLOTTING, 1 IF PLOT IS DESIRED
C ...0 FOR NO PLOT
C ...
C ...CALLED PROGRAMS=TCAL
C
OPT=+1.
FNUMB=74.
DIAM=100.
OBJ=1.
BAC=1.
PROBK=1.
NPROB=50
SW1=1.
SW2=1.
CALL DATA1
CALL DATA2
CALL DATA3
CALL TCAL(OPT,FNUMB,OPTNU,DIAM,OBJ,BAC,PROBK,NPROB,
1SW1,SW2)
CALL PREP(9)
END

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TARGET DETECTION FOR INFINITE VIEWING TIME

PATH OF SIGHT THROUGH OPTICAL SYSTEM AND ATMOSPHERE

PROGRAM DATA FROM FLIGHT NUMBER 74

PROBABILITY OF DETECTION IS 50 PERCENT

TARGET DIAMETER IN FT. = 100

BACKGROUND FOR TARGET IS PINE TREES

TARGET IS SPHERICAL AND PAINTED GRAY

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 0 DEGREES													
THETA=180.0 Z=0.0	2000.0	BSTAR=	131.71	TR=	.763	BBO=	197.80	CO=	4.95	TC=CO=	2.642	CR=P=	.00 I= 1 BBR= 282.71
THETA=180.0 Z=0.0	4000.0	BSTAR=	220.81	TR=	.648	BBO=	197.80	CO=	4.95	TC=CO=	1.816	CR=P=	.00 I= 2 BBR= 348.49
THETA=180.0 Z=0.0	6000.0	BSTAR=	273.01	TR=	.632	BBO=	197.80	CO=	4.95	TC=CO=	1.553	CR=P=	.00 I= 3 BBR= 397.92
THETA=180.0 Z=0.0	8000.0	BSTAR=	318.01	TR=	.625	BBO=	197.80	CO=	4.95	TC=CO=	1.384	CR=P=	.00 I= 4 BBR= 441.56
THETA=180.0 Z=0.0	10000.0	BSTAR=	360.31	TR=	.615	BBO=	197.80	CO=	4.95	TC=CO=	1.248	CR=P=	.00 I= 5 BBR= 481.97
THETA=180.0 Z=0.0	20000.0	BSTAR=	533.81	TR=	.581	BBO=	197.80	CO=	4.95	TC=CO=	.850	CR=P=	.00 I= 6 BBR= 668.75
THETA=180.0 Z=0.0	40000.0	BSTAR=	846.31	TR=	.543	BBO=	197.80	CO=	4.95	TC=CO=	.557	CR=P=	.00 I= 7 BBR= 953.46
THETA=180.0 Z=0.0	60000.0	BSTAR=	945.11	TR=	.528	BBO=	197.80	CO=	4.95	TC=CO=	.483	CR=P=	.01 I= 8 BBR= 1069.51
THETA=180.0 Z=0.0	80000.0	BSTAR=	980.26	TR=	.522	BBO=	197.80	CO=	4.95	TC=CO=	.472	CR=P=	.01 I= 9 BBR= 1083.59
THETA=180.0 Z=0.0	100000.0	BSTAR=	987.97	TR=	.519	BBO=	197.80	CO=	4.95	TC=CO=	.466	CR=P=	.02 I=10 BBR= 1090.70
THETA=180.0 Z=0.0	200000.0	BSTAR=	995.77	TR=	.516	BBO=	197.80	CO=	4.95	TC=CO=	.460	CR=P=	.06 I=11 BBR= 1097.90
THETA=180.0 Z=0.0	400000.0	BSTAR=	996.05	TR=	.516	BBO=	197.80	CO=	4.95	TC=CO=	.460	CR=P=	.20 I=12 BBR= 1098.17
THETA=180.0 Z=0.0	600000.0	BSTAR=	996.05	TR=	.516	BBO=	197.80	CO=	4.95	TC=CO=	.460	CR=P=	.45 I=13 BBR= 1098.17
THETA=180.0 Z=0.0	800000.0	BSTAR=	996.05	TR=	.516	BBO=	197.80	CO=	4.95	TC=CO=	.460	CR=P=	.79 I=14 BBR= 1098.17

CURVES INTERSECT AT AX= .45990 AY= 609879.55823													
THETA=165.0 Z=0	1931.8	BSTAR=	125.55	TR=	.756	BBO=	143.15	CO=	8.75	TC=CO=	4.053	CR=P=	.00 I= 1 BBR= 233.34
THETA=165.0 Z=0	3863.6	BSTAR=	237.46	TR=	.640	BBO=	143.15	CO=	8.75	TC=CO=	2.435	CR=P=	.00 I= 2 BBR= 329.93
THETA=165.0 Z=0	5795.4	BSTAR=	278.33	TR=	.622	BBO=	143.15	CO=	8.75	TC=CO=	2.122	CR=P=	.00 I= 3 BBR= 367.43
THETA=165.0 Z=0	7727.2	BSTAR=	330.94	TR=	.615	BBO=	143.15	CO=	8.75	TC=CO=	1.839	CR=P=	.00 I= 4 BBR= 419.01
THETA=165.0 Z=0	9659.0	BSTAR=	356.84	TR=	.607	BBO=	143.15	CO=	8.75	TC=CO=	1.675	CR=P=	.00 I= 5 BBR= 453.57
THETA=165.0 Z=0	19318.0	BSTAR=	453.61	TR=	.572	BBO=	143.15	CO=	8.75	TC=CO=	1.313	CR=P=	.00 I= 6 BBR= 545.47
THETA=165.0 Z=0	38636.1	BSTAR=	591.81	TR=	.535	BBO=	143.15	CO=	8.75	TC=CO=	1.002	CR=P=	.01 I= 7 BBR= 668.38
THETA=165.0 Z=0	57954.1	BSTAR=	646.24	TR=	.520	BBO=	143.15	CO=	8.75	TC=CO=	.903	CR=P=	.01 I= 8 BBR= 720.52
THETA=165.0 Z=0	77272.2	BSTAR=	659.15	TR=	.513	BBO=	143.15	CO=	8.75	TC=CO=	.877	CR=P=	.01 I= 9 BBR= 732.59
THETA=165.0 Z=0	96590.2	BSTAR=	664.61	TR=	.510	BBO=	143.15	CO=	8.75	TC=CO=	.866	CR=P=	.02 I=10 BBR= 737.59
THETA=165.0 Z=0	193180.5	BSTAR=	670.38	TR=	.506	BBO=	143.15	CO=	8.75	TC=CO=	.854	CR=P=	.06 I=11 BBR= 742.96
THETA=165.0 Z=0	386360.9	BSTAR=	670.62	TR=	.506	BBO=	143.15	CO=	8.75	TC=CO=	.853	CR=P=	.23 I=12 BBR= 743.08
THETA=165.0 Z=0	579541.4	BSTAR=	670.62	TR=	.506	BBO=	143.15	CO=	8.75	TC=CO=	.853	CR=P=	.50 I=13 BBR= 743.08
THETA=165.0 Z=0	772721.9	BSTAR=	670.62	TR=	.506	BBO=	143.15	CO=	8.75	TC=CO=	.853	CR=P=	.88 I=14 BBR= 743.08

CURVES INTERSECT AT AX= .85341 AY= 761154.48257														
THETA=150.0 Z=0.0	1732.1	BSTAR=	134.94	TR=	.761	BBO=	127.12	CO=	18.16	TC=CO=	7.584	CR=P=	.00	I= 1 BBR= 231.71
THETA=150.0 Z=0.0	3464.1	BSTAR=	246.03	TR=	.627	BBO=	127.12	CO=	18.16	TC=CO=	4.444	CR=P=	.00	I= 2 BBR= 325.75
THETA=150.0 Z=0.0	5196.2	BSTAR=	301.90	TR=	.599	BBO=	127.12	CO=	18.16	TC=CO=	3.657	CR=P=	.00	I= 3 BBR= 378.34
THETA=150.0 Z=0.0	6928.2	BSTAR=	348.28	TR=	.592	BBO=	127.12	CO=	18.16	TC=CO=	3.227	CR=P=	.00	I= 4 BBR= 423.56
THETA=150.0 Z=0.0	8660.3	BSTAR=	403.66	TR=	.586	BBO=	127.12	CO=	18.16	TC=CO=	2.828	CR=P=	.00	I= 5 BBR= 478.12
THETA=150.0 Z=0.0	17320.6	BSTAR=	519.99	TR=	.548	BBO=	127.12	CO=	18.16	TC=CO=	2.146	CR=P=	.00	I= 6 BBR= 589.56
THETA=150.0 Z=0.0	34641.2	BSTAR=	704.10	TR=	.509	BBO=	127.12	CO=	18.16	TC=CO=	1.529	CR=P=	.01	I= 7 BBR= 768.92
THETA=150.0 Z=0.0	51961.8	BSTAR=	797.06	TR=	.491	BBO=	127.12	CO=	18.16	TC=CO=	1.319	CR=P=	.01	I= 8 BBR= 859.49
THETA=150.0 Z=0.0	69282.4	BSTAR=	826.94	TR=	.483	BBO=	127.12	CO=	18.16	TC=CO=	1.255	CR=P=	.01	I= 9 BBR= 888.35
THETA=150.0 Z=0.0	86603.0	BSTAR=	835.02	TR=	.479	BBO=	127.12	CO=	18.16	TC=CO=	1.234	CR=P=	.02	I=10 BBR= 895.90
THETA=150.0 Z=0.0	173206.0	BSTAR=	844.68	TR=	.474	BBO=	127.12	CO=	18.16	TC=CO=	1.209	CR=P=	.06	I=11 BBR= 904.94
THETA=150.0 Z=0.0	346411.9	BSTAR=	845.25	TR=	.474	BBO=	127.12	CO=	18.16	TC=CO=	1.208	CR=P=	.21	I=12 BBR= 905.47
THETA=150.0 Z=0.0	519617.9	BSTAR=	845.25	TR=	.474	BBO=	127.12	CO=	18.16	TC=CO=	1.208	CR=P=	.47	I=13 BBR= 905.47
THETA=150.0 Z=0.0	692823.8	BSTAR=	845.25	TR=	.474	BBO=	127.12	CO=	18.16	TC=CO=	1.208	CR=P=	.82	I=14 BBR= 905.47
THETA=150.0 Z=0.0	866029.8	BSTAR=	845.25	TR=	.474	BBO=	127.12	CO=	18.16	TC=CO=	1.208	CR=P=	1.30	I=15 BBR= 905.47

CURVES INTERSECT AT AX= 1.20762 AY= 832109.95479													
THETA=135.0 Z=0	1414.2	BSTAR=	118.64	TR=	.757	BBO=	127.12	CO=	27.50	TC=CO=	12.315	CR=P=	.00 I= 1 BBR= 214.43
THETA=135.0 Z=0	2828.5	BSTAR=	212.24	TR=	.606	BBO=	127.12	CO=	27.50	TC=CO=	7.322	CR=P=	.00 I= 2 BBR= 289.24
THETA=135.0 Z=0	4242.7	BSTAR=	293.26	TR=	.556	BBO=	127.12	CO=	27.50	TC=CO=	5.344	CR=P=	.00 I= 3 BBR= 363.97
THETA=135.0 Z=0	5656.9	BSTAR=	341.35	TR=	.544	BBO=	127.12	CO=	27.50	TC=CO=	4.635	CR=P=	.00 I= 4 BBR= 410.54
THETA=135.0 Z=0	7071.1	BSTAR=	405.68	TR=	.539	BBO=	127.12	CO=	27.50	TC=CO=	3.972	CR=P=	.00 I= 5 BBR= 474.15
THETA=135.0 Z=0	14142.3	BSTAR=	530.08	TR=	.502	BBO=	127.12	CO=	27.50	TC=CO=	2.857	CR=P=	.00 I= 6 BBR= 613.94
THETA=135.0 Z=0	28284.5	BSTAR=	697.39	TR=	.459	BBO=	127.12	CO=	27.50	TC=CO=	2.125	CR=P=	.01 I= 7 BBR= 755.77
THETA=135.0 Z=0	42426.8	BSTAR=	783.78	TR=	.438	BBO=	127.12	CO=	27.50	TC=CO=	1.823	CR=P=	.01 I= 8 BBR= 839.93
THETA=135.0 Z=0	56569.0	BSTAR=	828.38	TR=	.426	BBO=	127.12	CO=	27.50	TC=CO=	1.687	CR=P=	.01 I= 9 BBR= 882.51
THETA=135.0 Z=0	70711.3	BSTAR=	843.57	TR=	.420	BBO=	127.12	CO=	27.50	TC=CO=	1.636	CR=P=	.02 I=10 BBR= 896.90
THETA=135.0 Z=0	141422.5	BSTAR=	858.45	TR=	.411	BBO=	127.12	CO=	27.50	TC=CO=	1.578	CR=P=	.06 I=11 BBR= 910.59
THETA=135.0 Z=0	282845.0	BSTAR=	859.98	TR=	.410	BBO=	127.12	CO=	27.50	TC=CO=	1.572	CR=P=	.21 I=12 BBR= 912.11
THETA=135.0 Z=0	424267.5	BSTAR=	859.99	TR=	.410	BBO=	127.12	CO=	27.50	TC=CO=	1.572	CR=P=	.47 I=13 BBR= 912.12
THETA=135.0 Z=0	565690.0	BSTAR=	859.99	TR=	.410	BBO=	127.12	CO=	27.50	TC=CO=	1.572	CR=P=	.82 I=14 BBR= 912.12
THETA=135.0 Z=0	707112.6	BSTAR=	859.99	TR=	.410	BBO=	127.12	CO=	27.50	TC=CO=	1.572	CR=P=	1.30 I=15 BBR= 912.12
THETA=135.0 Z=0	1060668.8	BSTAR=	859.99	TR=	.410	BBO=	127.12	CO=	27.50	TC=CO=	1.572	CR=P=	2.90 I=16 BBR= 912.12

CURVES INTERSECT AT AX= 1.97191 AY= 769588.77872													
THETA=120.0 Z=0.0	1000.0	BSTAR=	121.81	TR=	.783	BBO=	155.03	CO=	11.45	TC=CO=	5.715	CR=P=	.00 I= 1 BBR= 243.15
THETA=120.0 Z=0.0	2000.0	BSTAR=	203.71	TR=	.593	BBO=	155.03	CO=	11.45	TC=CO=	3.560	CR=P=	.00 I= 2 BBR= 295.59
THETA=120.0 Z=0.0	3000.0	BSTAR=	279.31	TR=	.503	BBO=	155.03	CO=	11.45	TC=CO=	2.500	CR=P=	.00 I= 3 BBR= 357.32
THETA=120.0 Z=0.0	4000.1	BSTAR=	345.81	TR=	.461	BBO=	155.03	CO=	11.45	TC=CO=	1.964	CR=P=	.00 I= 4 BBR= 416.43
THETA=120.0 Z=0.0	5000.1	BSTAR=	383.71	TR=	.445	BBO=	155.03	CO=	11.45	TC=CO=	1.746	CR=P=	.00 I= 5 BBR= 452.73
THETA=120.0 Z=0.0	10000.1	BSTAR=	585.21	TR=	.417	BBO=	155.03	CO=	11.45	TC=CO=	.987	CR=P=	.00 I= 6 BBR= 749.68
THETA=120.0 Z=0.0	20000.3	BSTAR=	817.51	TR=	.370	BBO=	155.03	CO=	11.45	TC=CO=	.750	CR=P=	.01 I= 7 BBR= 874.95
THETA=120.0 Z=0.0	30000.4	BSTAR=	929.11	TR=	.344	BBO=	155.03	CO=	11.45	TC=CO=	.621	CR=P=	.01 I= 8 BBR= 982.40
THETA=120.0 Z=0.0	40000.5	BSTAR=	1010.11	TR=	.327	BBO=	155.03	CO=	11.45	TC=CO=	.548	CR=P=	.01 I= 9 BBR= 1060.95
THETA=120.0 Z=0.0	50000.7	BSTAR=	1046.11	TR=	.316	BBO=	155.03	CO=	11.45	TC=CO=	.513	CR=P=	.02 I=10 BBR= 1085.18
THETA=120.0 Z=0.0	100001.3	BSTAR=	1091.77	TR=	.300	BBO=	155.03	CO=	11.45	TC=CO=	.468	CR=P=	.06 I=11 BBR= 1138.25

THETA=120.0	Z=0	200002.6	BSTAR=	1098.07	TR=	.296	BB0=	155.03	C0=	11.45	YC=C0=	.460	CR=P=	.20	I=12	BBR=1144.00
THETA=120.0	Z=0	300003.9	BSTAR=	1098.29	TR=	.296	BB0=	155.03	C0=	11.45	YC=C0=	.460	CR=P=	.45	I=13	BBR=1144.20
THETA=120.0	Z=0	400005.2	BSTAR=	1098.30	TR=	.296	BB0=	155.03	C0=	11.45	YC=C0=	.459	CR=P=	.79	I=14	BBR=1144.21

CURVES INTERSECT AT AX= .45950 AY= 302827.90846

THETA=105.0	Z=0	517.7	BSTAR=	115.00	TR=	.808	BB0=	225.13	C0=	7.81	YC=C0=	4.785	CR=P=	.00	I= 1	BBR= 296.90
THETA=105.0	Z=0	1035.3	BSTAR=	219.37	TR=	.687	BB0=	225.13	C0=	7.81	YC=C0=	3.231	CR=P=	.00	I= 2	BBR= 374.96
THETA=105.0	Z=0	1553.0	BSTAR=	330.25	TR=	.539	BB0=	225.13	C0=	7.81	YC=C0=	2.098	CR=P=	.00	I= 3	BBR= 451.51
THETA=105.0	Z=0	2070.6	BSTAR=	439.67	TR=	.402	BB0=	225.13	C0=	7.81	YC=C0=	1.332	CR=P=	.00	I= 4	BBR= 530.06
THETA=105.0	Z=0	2588.3	BSTAR=	539.84	TR=	.326	BB0=	225.13	C0=	7.81	YC=C0=	.935	CR=P=	.00	I= 5	BBR= 613.24
THETA=105.0	Z=0	5176.5	BSTAR=	902.22	TR=	.230	BB0=	225.13	C0=	7.81	YC=C0=	.425	CR=P=	.00	I= 6	BBR= 954.09
THETA=105.0	Z=0	10353.0	BSTAR=	1261.37	TR=	.202	BB0=	225.13	C0=	7.81	YC=C0=	.272	CR=P=	.00	I= 7	BBR=1376.90
THETA=105.0	Z=0	15529.5	BSTAR=	1384.41	TR=	.177	BB0=	225.13	C0=	7.81	YC=C0=	.219	CR=P=	.01	I= 8	BBR=1424.30
THETA=105.0	Z=0	20706.1	BSTAR=	1521.63	TR=	.160	BB0=	225.13	C0=	7.81	YC=C0=	.180	CR=P=	.01	I= 9	BBR=1557.58
THETA=105.0	Z=0	25882.6	BSTAR=	1638.00	TR=	.148	BB0=	225.13	C0=	7.81	YC=C0=	.155	CR=P=	.02	I=10	BBR=1671.21
THETA=105.0	Z=0	51765.1	BSTAR=	1927.05	TR=	.119	BB0=	225.13	C0=	7.81	YC=C0=	.107	CR=P=	.06	I=11	BBR=1953.77
THETA=105.0	Z=0	103530.3	BSTAR=	1992.98	TR=	.107	BB0=	225.13	C0=	7.81	YC=C0=	.094	CR=P=	.20	I=12	BBR=2007.14

CURVES INTERSECT AT AX= .10289 AY= 67751.36679

THETA=100.0	Z=0	347.2	BSTAR=	135.49	TR=	.819	BB0=	275.02	C0=	7.25	YC=C0=	4.920	CR=P=	.00	I= 1	BBR= 360.79
THETA=100.0	Z=0	694.5	BSTAR=	259.88	TR=	.744	BB0=	275.02	C0=	7.25	YC=C0=	3.193	CR=P=	.00	I= 2	BBR= 464.42
THETA=100.0	Z=0	1041.7	BSTAR=	381.67	TR=	.606	BB0=	275.02	C0=	7.25	YC=C0=	2.205	CR=P=	.00	I= 3	BBR= 548.44
THETA=100.0	Z=0	1389.0	BSTAR=	484.49	TR=	.480	BB0=	275.02	C0=	7.25	YC=C0=	1.553	CR=P=	.00	I= 4	BBR= 616.54
THETA=100.0	Z=0	1736.2	BSTAR=	597.31	TR=	.394	BB0=	275.02	C0=	7.25	YC=C0=	1.129	CR=P=	.00	I= 5	BBR= 695.59
THETA=100.0	Z=0	3472.4	BSTAR=	999.45	TR=	.150	BB0=	275.02	C0=	7.25	YC=C0=	.288	CR=P=	.00	I= 6	BBR=1040.73
THETA=100.0	Z=0	6944.9	BSTAR=	1330.14	TR=	.113	BB0=	275.02	C0=	7.25	YC=C0=	.166	CR=P=	.00	I= 7	BBR=1361.30
THETA=100.0	Z=0	10417.3	BSTAR=	1472.88	TR=	.098	BB0=	275.02	C0=	7.25	YC=C0=	.131	CR=P=	.01	I= 8	BBR=1499.92
THETA=100.0	Z=0	13889.8	BSTAR=	1579.14	TR=	.086	BB0=	275.02	C0=	7.25	YC=C0=	.107	CR=P=	.01	I= 9	BBR=1602.31
THETA=100.0	Z=0	17362.2	BSTAR=	1698.15	TR=	.078	BB0=	275.02	C0=	7.25	YC=C0=	.091	CR=P=	.02	I=10	BBR=1719.44
THETA=100.0	Z=0	34724.4	BSTAR=	2126.39	TR=	.055	BB0=	275.02	C0=	7.25	YC=C0=	.051	CR=P=	.06	I=11	BBR=2141.58

CURVES INTERSECT AT AX= .05447 AY= 33362.05398

THETA= 95.0	Z=0	174.2	BSTAR=	128.69	TR=	.826	BB0=	510.25	C0=	3.45	YC=C0=	2.640	CR=P=	.00	I= 1	BBR= 549.95
THETA= 95.0	Z=0	348.4	BSTAR=	246.27	TR=	.746	BB0=	510.25	C0=	3.45	YC=C0=	2.093	CR=P=	.00	I= 2	BBR= 627.10
THETA= 95.0	Z=0	522.6	BSTAR=	353.85	TR=	.662	BB0=	510.25	C0=	3.45	YC=C0=	1.660	CR=P=	.00	I= 3	BBR= 701.72
THETA= 95.0	Z=0	696.8	BSTAR=	491.43	TR=	.616	BB0=	510.25	C0=	3.45	YC=C0=	1.362	CR=P=	.00	I= 4	BBR= 795.79
THETA= 95.0	Z=0	871.0	BSTAR=	599.01	TR=	.517	BB0=	510.25	C0=	3.45	YC=C0=	1.054	CR=P=	.00	I= 5	BBR= 862.76
THETA= 95.0	Z=0	1741.9	BSTAR=	946.52	TR=	.175	BB0=	510.25	C0=	3.45	YC=C0=	.297	CR=P=	.00	I= 6	BBR=1035.98
THETA= 95.0	Z=0	3483.8	BSTAR=	1353.85	TR=	.027	BB0=	510.25	C0=	3.45	YC=C0=	.034	CR=P=	.00	I= 7	BBR=1367.38
THETA= 95.0	Z=0	5225.8	BSTAR=	1550.40	TR=	.017	BB0=	510.25	C0=	3.45	YC=C0=	.020	CR=P=	.01	I= 8	BBR=1559.22
THETA= 95.0	Z=0	6967.7	BSTAR=	1708.91	TR=	.016	BB0=	510.25	C0=	3.45	YC=C0=	.016	CR=P=	.01	I= 9	BBR=1717.11
THETA= 95.0	Z=0	8709.6	BSTAR=	1886.59	TR=	.015	BB0=	510.25	C0=	3.45	YC=C0=	.014	CR=P=	.02	I=10	BBR=1894.13

CURVES INTERSECT AT AX= .01478 AY= 8037.55352

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 0 DEGREES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 0 ALTITUDE = 605880 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 204005 ALTITUDE = 761154 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 480383 ALTITUDE = 832110 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 767540 ALTITUDE = 767589 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 524476 ALTITUDE = 302828 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 252821 ALTITUDE = 67751 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 189209 ALTITUDE = 33362 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 91908 ALTITUDE = 8038 CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 45 DEGREES																	
THETA=180.0 Z=0	2000.0	BSTAR=	131.71	TR=	.762	BB0=	197.80	C0=	4.95	TC=C0=	2.639	CR=P=	.00	I=	1	BBR=	282.42
THETA=180.0 Z=0	4000.0	BSTAR=	220.81	TR=	.646	BB0=	197.80	C0=	4.95	TC=C0=	1.813	CR=P=	.00	I=	2	BBR=	348.65
THETA=180.0 Z=0	6000.0	BSTAR=	273.01	TR=	.630	BB0=	197.80	C0=	4.95	TC=C0=	1.551	CR=P=	.00	I=	3	BBR=	397.68
THETA=180.0 Z=0	8000.0	BSTAR=	318.01	TR=	.623	BB0=	197.80	C0=	4.95	TC=C0=	1.382	CR=P=	.00	I=	4	BBR=	441.33
THETA=180.0 Z=0	10000.0	BSTAR=	350.31	TR=	.614	BB0=	197.80	C0=	4.95	TC=C0=	1.247	CR=P=	.00	I=	5	BBR=	481.74
THETA=180.0 Z=0	20000.0	BSTAR=	553.81	TR=	.580	BB0=	197.80	C0=	4.95	TC=C0=	.849	CR=P=	.00	I=	6	BBR=	668.53
THETA=180.0 Z=0	40000.0	BSTAR=	846.31	TR=	.543	BB0=	197.80	C0=	4.95	TC=C0=	.557	CR=P=	.00	I=	7	BBR=	953.56
THETA=180.0 Z=0	60000.0	BSTAR=	955.11	TR=	.528	BB0=	197.80	C0=	4.95	TC=C0=	.483	CR=P=	.01	I=	8	BBR=	1069.61
THETA=180.0 Z=0	80000.0	BSTAR=	980.26	TR=	.522	BB0=	197.80	C0=	4.95	TC=C0=	.472	CR=P=	.01	I=	9	BBR=	1083.59
THETA=180.0 Z=0	100000.0	BSTAR=	987.97	TR=	.519	BB0=	197.80	C0=	4.95	TC=C0=	.466	CR=P=	.02	I=	10	BBR=	1090.70
THETA=180.0 Z=0	200000.0	BSTAR=	995.77	TR=	.516	BB0=	197.80	C0=	4.95	TC=C0=	.460	CR=P=	.06	I=	11	BBR=	1097.90
THETA=180.0 Z=0	400000.0	BSTAR=	996.05	TR=	.516	BB0=	197.80	C0=	4.95	TC=C0=	.460	CR=P=	.20	I=	12	BBR=	1098.17
THETA=180.0 Z=0	600000.0	BSTAR=	996.05	TR=	.516	BB0=	197.80	C0=	4.95	TC=C0=	.460	CR=P=	.45	I=	13	BBR=	1098.17
THETA=180.0 Z=0	800000.0	BSTAR=	996.05	TR=	.516	BB0=	197.80	C0=	4.95	TC=C0=	.460	CR=P=	.79	I=	14	BBR=	1098.17

CURVES INTERSECT AT AX= .45990 AY= 609879.55823

THETA=165.0 Z=0	1931.8	BSTAR=	149.74	TR=	.756	BB0=	131.87	C0=	9.09	TC=C0=	3.634	CR=P=	.00	I=	1	BBR=	249.50
THETA=165.0 Z=0	3863.6	BSTAR=	245.64	TR=	.640	BB0=	131.87	C0=	9.09	TC=C0=	2.324	CR=P=	.00	I=	2	BBR=	329.99
THETA=165.0 Z=0	5795.4	BSTAR=	298.11	TR=	.622	BB0=	131.87	C0=	9.09	TC=C0=	1.962	CR=P=	.00	I=	3	BBR=	380.19
THETA=165.0 Z=0	7727.2	BSTAR=	340.02	TR=	.615	BB0=	131.87	C0=	9.09	TC=C0=	1.751	CR=P=	.00	I=	4	BBR=	421.15
THETA=165.0 Z=0	9659.0	BSTAR=	381.50	TR=	.607	BB0=	131.87	C0=	9.09	TC=C0=	1.576	CR=P=	.00	I=	5	BBR=	461.49
THETA=165.0 Z=0	19318.0	BSTAR=	528.12	TR=	.572	BB0=	131.87	C0=	9.09	TC=C0=	1.136	CR=P=	.00	I=	6	BBR=	603.52
THETA=165.0 Z=0	38636.1	BSTAR=	755.61	TR=	.535	BB0=	131.87	C0=	9.09	TC=C0=	.776	CR=P=	.01	I=	7	BBR=	826.14
THETA=165.0 Z=0	57954.1	BSTAR=	831.01	TR=	.520	BB0=	131.87	C0=	9.09	TC=C0=	.677	CR=P=	.01	I=	8	BBR=	919.53
THETA=165.0 Z=0	77272.2	BSTAR=	859.99	TR=	.513	BB0=	131.87	C0=	9.09	TC=C0=	.656	CR=P=	.01	I=	9	BBR=	937.64
THETA=165.0 Z=0	96590.2	BSTAR=	877.23	TR=	.510	BB0=	131.87	C0=	9.09	TC=C0=	.647	CR=P=	.02	I=	10	BBR=	944.46
THETA=165.0 Z=0	193180.5	BSTAR=	884.87	TR=	.506	BB0=	131.87	C0=	9.09	TC=C0=	.638	CR=P=	.06	I=	11	BBR=	951.54
THETA=165.0 Z=0	386360.9	BSTAR=	885.19	TR=	.506	BB0=	131.87	C0=	9.09	TC=C0=	.637	CR=P=	.21	I=	12	BBR=	951.94
THETA=165.0 Z=0	579541.4	BSTAR=	885.19	TR=	.506	BB0=	131.87	C0=	9.09	TC=C0=	.637	CR=P=	.46	I=	13	BBR=	951.94
THETA=165.0 Z=0	772721.9	BSTAR=	885.19	TR=	.506	BB0=	131.87	C0=	9.09	TC=C0=	.637	CR=P=	.81	I=	14	BBR=	951.94

CURVES INTERSECT AT AX= .63743 AY= 678054.57579

THETA=150.0 Z=0	1732.1	BSTAR=	136.52	TR=	.761	BB0=	119.99	C0=	8.41	TC=C0=	3.098	CR=P=	.00	I=	1	BBR=	247.87
THETA=150.0 Z=0	3464.1	BSTAR=	251.30	TR=	.627	BB0=	119.99	C0=	8.41	TC=C0=	1.879	CR=P=	.00	I=	2	BBR=	336.55
THETA=150.0 Z=0	5196.2	BSTAR=	316.32	TR=	.599	BB0=	119.99	C0=	8.41	TC=C0=	1.556	CR=P=	.00	I=	3	BBR=	388.19
THETA=150.0 Z=0	6928.2	BSTAR=	344.04	TR=	.592	BB0=	119.99	C0=	8.41	TC=C0=	1.439	CR=P=	.00	I=	4	BBR=	415.10
THETA=150.0 Z=0	8660.3	BSTAR=	404.24	TR=	.586	BB0=	119.99	C0=	8.41	TC=C0=	1.245	CR=P=	.00	I=	5	BBR=	474.52
THETA=150.0 Z=0	17320.6	BSTAR=	534.35	TR=	.548	BB0=	119.99	C0=	8.41	TC=C0=	.921	CR=P=	.00	I=	6	BBR=	600.12
THETA=150.0 Z=0	34641.2	BSTAR=	745.18	TR=	.509	BB0=	119.99	C0=	8.41	TC=C0=	.637	CR=P=	.01	I=	7	BBR=	806.27
THETA=150.0 Z=0	51961.8	BSTAR=	849.97	TR=	.491	BB0=	119.99	C0=	8.41	TC=C0=	.545	CR=P=	.01	I=	8	BBR=	908.30
THETA=150.0 Z=0	69282.4	BSTAR=	853.20	TR=	.483	BB0=	119.99	C0=	8.41	TC=C0=	.518	CR=P=	.01	I=	9	BBR=	941.17
THETA=150.0 Z=0	86603.0	BSTAR=	891.84	TR=	.479	BB0=	119.99	C0=	8.41	TC=C0=	.509	CR=P=	.02	I=	10	BBR=	949.30
THETA=150.0 Z=0	173206.0	BSTAR=	902.17	TR=	.474	BB0=	119.99	C0=	8.41	TC=C0=	.498	CR=P=	.06	I=	11	BBR=	959.75
THETA=150.0 Z=0	346411.9	BSTAR=	902.78	TR=	.474	BB0=	119.99	C0=	8.41	TC=C0=	.498	CR=P=	.21	I=	12	BBR=	959.42
THETA=150.0 Z=0	519617.9	BSTAR=	902.78	TR=	.474	BB0=	119.99	C0=	8.41	TC=C0=	.498	CR=P=	.46	I=	13	BBR=	959.42
THETA=150.0 Z=0	692823.8	BSTAR=	902.78	TR=	.474	BB0=	119.99	C0=	8.41	TC=C0=	.498	CR=P=	.81	I=	14	BBR=	959.42

CURVES INTERSECT AT AX= .49790 AY= 539855.72945

THETA=135.0 Z=0	1414.2	BSTAR=	140.68	TR=	.757	BB0=	115.24	C0=	8.48	TC=C0=	3.247	CR=P=	.00	I=	1	BBR=	227.88
THETA=135.0 Z=0	2828.5	BSTAR=	236.10	TR=	.606	BB0=	115.24	C0=	8.48	TC=C0=	1.936	CR=P=	.00	I=	2	BBR=	305.91
THETA=135.0 Z=0	4242.7	BSTAR=	307.58	TR=	.556	BB0=	115.24	C0=	8.48	TC=C0=	1.463	CR=P=	.00	I=	3	BBR=	371.68
THETA=135.0 Z=0	5656.9	BSTAR=	353.85	TR=	.544	BB0=	115.24	C0=	8.48	TC=C0=	1.248	CR=P=	.00	I=	4	BBR=	426.57
THETA=135.0 Z=0	7071.1	BSTAR=	410.96	TR=	.539	BB0=	115.24	C0=	8.48	TC=C0=	1.113	CR=P=	.00	I=	5	BBR=	473.33
THETA=135.0 Z=0	14142.3	BSTAR=	546.14	TR=	.502	BB0=	115.24	C0=	8.48	TC=C0=	.812	CR=P=	.00	I=	6	BBR=	603.95
THETA=135.0 Z=0	28284.5	BSTAR=	733.87	TR=	.459	BB0=	115.24	C0=	8.48	TC=C0=	.571	CR=P=	.01	I=	7	BBR=	788.80
THETA=135.0 Z=0	42426.8	BSTAR=	843.92	TR=	.438	BB0=	115.24	C0=	8.48	TC=C0=	.478	CR=P=	.01	I=	8	BBR=	894.35
THETA=135.0 Z=0	56566.8	BSTAR=	900.92	TR=	.426	BB0=	115.24	C0=	8.48	TC=C0=	.438	CR=P=	.01	I=	9	BBR=	949.39
THETA=135.0 Z=0	70711.3	BSTAR=	918.92	TR=	.420	BB0=	115.24	C0=	8.48	TC=C0=	.424	CR=P=	.02	I=	10	BBR=	967.27
THETA=135.0 Z=0	141422.5	BSTAR=	935.15	TR=	.411	BB0=	115.24	C0=	8.48	TC=C0=	.409	CR=P=	.06	I=	11	BBR=	982.51
THETA=135.0 Z=0	282845.0	BSTAR=	936.81	TR=	.410	BB0=	115.24	C0=	8.48	TC=C0=	.407	CR=P=	.21	I=	12	BBR=	984.07
THETA=135.0 Z=0	424267.5	BSTAR=	936.82	TR=	.410	BB0=	115.24	C0=	8.48	TC=C0=	.407	CR=P=	.45	I=	13	BBR=	984.08

CURVES INTERSECT AT AX= .40744 AY= 598417.91871

THETA=120.0 Z=0	1000.0	BSTAR=	126.31	TR=	.783	BB0=	124.74	C0=	7.90	TC=C0=	3.446	CR=P=	.00	I=	1	BBR=	223.94
THETA=120.0 Z=0	2000.0	BSTAR=	230.71	TR=	.593	BB0=	124.74	C0=	7.90	TC=C0=	1.918	CR=P=	.00	I=	2	BBR=	304.64
THETA=120.0 Z=0	3000.0	BSTAR=	309.01	TR=	.503	BB0=	124.74	C0=	7.90	TC=C0=	1.335	CR=P=	.00	I=	3	BBR=	371.78
THETA=120.0 Z=0	4000.1	BSTAR=	363.01	TR=	.461	BB0=	124.74	C0=	7.90	TC=C0=	1.080	CR=P=	.00	I=	4	BBR=	420.49
THETA=120.0 Z=0	5000.1	BSTAR=	410.71	TR=	.445	BB0=	124.74	C0=	7.90	TC=C0=	.941	CR=P=	.00	I=	5	BBR=	466.24
THETA=120.0 Z=0	10000.1	BSTAR=	621.31	TR=	.417	BB0=	124.74	C0=	7.90	TC=C0=	.611	CR=P=	.00	I=	6	BBR=	673.33
THETA=120.0 Z=0	20000.3	BSTAR=	781.52	TR=	.370	BB0=	124.74	C0=	7.90	TC=C0=	.441	CR=P=	.01	I=	7	BBR=	827.64
THETA=120.0 Z=0	30000.4	BSTAR=	929.11	TR=	.344	BB0=	124.74	C0=	7.90	TC=C0=	.349	CR=P=	.01	I=	8	BBR=	971.99
THETA=120.0 Z=0	40000.5	BSTAR=	1028.11	TR=	.327	BB0=	124.74	C0=	7.90	TC=C0=	.302	CR=P=	.01	I=	9	BBR=	1068.94
THETA=120.0 Z=0	50000.7	BSTAR=	1092.11	TR=	.316	BB0=	124.74	C0=	7.90	TC=C0=	.278	CR=P=	.02	I=	10	BBR=	1121.59
THETA=120.0 Z=0	100001.3	BSTAR=	1137.56	TR=	.300	BB0=	124.74	C0=	7.90	TC=C0=	.252	CR=P=	.06	I=	11	BBR=	1174.96
THETA=120.0 Z=0	200002.6	BSTAR=	1144.13	TR=	.296	BB0=	124.74	C0=	7.90	TC=C0=	.247	CR=P=	.20	I=	12	BBR=	1181.08
THETA=120.0 Z=0	300003.9	BSTAR=	1144.36	TR=	.294	BB0=	124.74	C0=	7.90	TC=C0=	.247	CR=P=	.45	I=	13	BBR=	1181.30

CURVES INTERSECT AT AX= .24730 AY= 217591.73331

THETA=105.0 Z=0	517.7	BSTAR=	131.78	TR=	.808	BB0=	179.98	CO=	5.37	TC*CO=	2.816	CR*P=	.00	I=	1	BBR=	277.12
THETA=105.0 Z=0	1035.3	BSTAR=	251.01	TR=	.687	BB0=	179.98	CO=	5.37	TC*CO=	1.772	CR*P=	.00	I=	2	BBR=	374.58
THETA=105.0 Z=0	1553.0	BSTAR=	350.71	TR=	.539	BB0=	179.98	CO=	5.37	TC*CO=	1.163	CR*P=	.00	I=	3	BBR=	447.45
THETA=105.0 Z=0	2070.6	BSTAR=	447.36	TR=	.402	BB0=	179.98	CO=	5.37	TC*CO=	.747	CR*P=	.00	I=	4	BBR=	519.52
THETA=105.0 Z=0	2588.3	BSTAR=	524.70	TR=	.326	BB0=	179.98	CO=	5.37	TC*CO=	.540	CR*P=	.00	I=	5	BBR=	583.38
THETA=105.0 Z=0	5176.5	BSTAR=	792.58	TR=	.230	BB0=	179.98	CO=	5.37	TC*CO=	.267	CR*P=	.00	I=	6	BBR=	834.95
THETA=105.0 Z=0	10353.0	BSTAR=	1012.55	TR=	.202	BB0=	179.98	CO=	5.37	TC*CO=	.186	CR*P=	.00	I=	7	BBR=	1048.97
THETA=105.0 Z=0	15529.5	BSTAR=	1181.22	TR=	.177	BB0=	179.98	CO=	5.37	TC*CO=	.141	CR*P=	.01	I=	8	BBR=	1213.12
THETA=105.0 Z=0	20706.1	BSTAR=	1354.45	TR=	.160	BB0=	179.98	CO=	5.37	TC*CO=	.112	CR*P=	.01	I=	9	BBR=	1383.18
THETA=105.0 Z=0	25882.6	BSTAR=	1498.76	TR=	.148	BB0=	179.98	CO=	5.37	TC*CO=	.093	CR*P=	.02	I=	10	BBR=	1525.12
THETA=105.0 Z=0	51765.1	BSTAR=	1858.23	TR=	.119	BB0=	179.98	CO=	5.37	TC*CO=	.061	CR*P=	.06	I=	11	BBR=	1879.59
THETA=105.0 Z=0	103530.3	BSTAR=	1928.46	TR=	.107	BB0=	179.98	CO=	5.37	TC*CO=	.053	CR*P=	.20	I=	12	BBR=	1947.77

CURVES INTERSECT AT AX= .06086 AY= 52889.04994

THETA=100.0 Z=0	347.2	BSTAR=	123.31	TR=	.819	BB0=	229.88	CO=	4.43	TC*CO=	2.675	CR*P=	.00	I=	1	BBR=	311.52
THETA=100.0 Z=0	694.5	BSTAR=	235.50	TR=	.744	BB0=	229.88	CO=	4.43	TC*CO=	1.862	CR*P=	.00	I=	2	BBR=	406.47
THETA=100.0 Z=0	1041.7	BSTAR=	346.72	TR=	.606	BB0=	229.88	CO=	4.43	TC*CO=	1.269	CR*P=	.00	I=	3	BBR=	486.11
THETA=100.0 Z=0	1389.0	BSTAR=	450.79	TR=	.480	BB0=	229.88	CO=	4.43	TC*CO=	.871	CR*P=	.00	I=	4	BBR=	561.17
THETA=100.0 Z=0	1736.2	BSTAR=	554.86	TR=	.394	BB0=	229.88	CO=	4.43	TC*CO=	.621	CR*P=	.00	I=	5	BBR=	645.16
THETA=100.0 Z=0	3472.4	BSTAR=	876.24	TR=	.150	BB0=	229.88	CO=	4.43	TC*CO=	.168	CR*P=	.00	I=	6	BBR=	910.74
THETA=100.0 Z=0	6944.9	BSTAR=	1196.63	TR=	.113	BB0=	229.88	CO=	4.43	TC*CO=	.094	CR*P=	.00	I=	7	BBR=	1222.67
THETA=100.0 Z=0	10417.3	BSTAR=	1352.13	TR=	.098	BB0=	229.88	CO=	4.43	TC*CO=	.073	CR*P=	.01	I=	8	BBR=	1374.73
THETA=100.0 Z=0	13889.8	BSTAR=	1427.13	TR=	.086	BB0=	229.88	CO=	4.43	TC*CO=	.061	CR*P=	.01	I=	9	BBR=	1446.92
THETA=100.0 Z=0	17362.2	BSTAR=	1519.14	TR=	.078	BB0=	229.88	CO=	4.43	TC*CO=	.052	CR*P=	.02	I=	10	BBR=	1537.10
THETA=100.0 Z=0	34724.4	BSTAR=	1893.89	TR=	.055	BB0=	229.88	CO=	4.43	TC*CO=	.030	CR*P=	.06	I=	11	BBR=	1896.99

CURVES INTERSECT AT AX= .03947 AY= 26985.09406

THETA= 95.0 Z=0	174.2	BSTAR=	113.01	TR=	.826	BB0=	326.11	CO=	2.83	TC*CO=	1.990	CR*P=	.00	I=	1	BBR=	382.25
THETA= 95.0 Z=0	348.4	BSTAR=	214.92	TR=	.746	BB0=	326.11	CO=	2.83	TC*CO=	1.500	CR*P=	.00	I=	2	BBR=	458.31
THETA= 95.0 Z=0	522.6	BSTAR=	316.82	TR=	.662	BB0=	326.11	CO=	2.83	TC*CO=	1.145	CR*P=	.00	I=	3	BBR=	532.76
THETA= 95.0 Z=0	696.8	BSTAR=	418.72	TR=	.616	BB0=	326.11	CO=	2.83	TC*CO=	.916	CR*P=	.00	I=	4	BBR=	619.63
THETA= 95.0 Z=0	871.0	BSTAR=	520.62	TR=	.517	BB0=	326.11	CO=	2.83	TC*CO=	.691	CR*P=	.00	I=	5	BBR=	689.19
THETA= 95.0 Z=0	1741.9	BSTAR=	805.78	TR=	.175	BB0=	326.11	CO=	2.83	TC*CO=	.187	CR*P=	.00	I=	6	BBR=	862.98
THETA= 95.0 Z=0	3483.8	BSTAR=	1134.37	TR=	.027	BB0=	326.11	CO=	2.83	TC*CO=	.021	CR*P=	.00	I=	7	BBR=	1143.02
THETA= 95.0 Z=0	5225.8	BSTAR=	1340.49	TR=	.017	BB0=	326.11	CO=	2.83	TC*CO=	.012	CR*P=	.01	I=	8	BBR=	1346.13
THETA= 95.0 Z=0	6967.7	BSTAR=	1495.07	TR=	.016	BB0=	326.11	CO=	2.83	TC*CO=	.010	CR*P=	.01	I=	9	BBR=	1490.32

CURVES INTERSECT AT AX= .01044 AY= 6506.93054

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 45 DEGREES

ZENITH OF PATH OF SIGHT = 180	DISTANCE TO TARGET AXIS =	0	ALTITUDE =	605880	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 165	DISTANCE TO TARGET AXIS =	181733	ALTITUDE =	678055	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 150	DISTANCE TO TARGET AXIS =	311662	ALTITUDE =	539856	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 135	DISTANCE TO TARGET AXIS =	398393	ALTITUDE =	398418	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 120	DISTANCE TO TARGET AXIS =	376853	ALTITUDE =	217592	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 105	DISTANCE TO TARGET AXIS =	197360	ALTITUDE =	52889	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 100	DISTANCE TO TARGET AXIS =	153043	ALTITUDE =	26985	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 95	DISTANCE TO TARGET AXIS =	74406	ALTITUDE =	6507	CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGMT WITH RESPECT TO SUN IS 90 DEGREES																		
THETA=180.0	Z=0	2000.0	BSTAR=	131.71	TR=	.762	BBQ=	197.80	CO=	4.95	TC*CO=	2.639	CR*P=	.00	I=	1	BBR=	282.42
THETA=180.0	Z=0	4000.0	BSTAR=	220.81	TR=	.646	BBQ=	197.80	CO=	4.95	TC*CO=	1.813	CR*P=	.00	I=	2	BBR=	348.55
THETA=180.0	Z=0	6000.0	BSTAR=	273.01	TR=	.630	BBQ=	197.80	CO=	4.95	TC*CO=	1.551	CR*P=	.00	I=	3	BBR=	397.58
THETA=180.0	Z=0	8000.0	BSTAR=	318.01	TR=	.623	BBQ=	197.80	CO=	4.95	TC*CO=	1.382	CR*P=	.00	I=	4	BBR=	441.33
THETA=180.0	Z=0	10000.0	BSTAR=	350.31	TR=	.614	BBQ=	197.80	CO=	4.95	TC*CO=	1.247	CR*P=	.00	I=	5	BBR=	481.74
THETA=180.0	Z=0	20000.0	BSTAR=	553.81	TR=	.580	BBQ=	197.80	CO=	4.95	TC*CO=	.849	CR*P=	.00	I=	6	BBR=	868.23
THETA=180.0	Z=0	40000.0	BSTAR=	846.31	TR=	.543	BBQ=	197.80	CO=	4.95	TC*CO=	.557	CR*P=	.00	I=	7	BBR=	953.56
THETA=180.0	Z=0	60000.0	BSTAR=	945.11	TR=	.528	BBQ=	197.80	CO=	4.95	TC*CO=	.483	CR*P=	.01	I=	8	BBR=	1069.51
THETA=180.0	Z=0	80000.0	BSTAR=	980.26	TR=	.522	BBQ=	197.80	CO=	4.95	TC*CO=	.472	CR*P=	.01	I=	9	BBR=	1083.59
THETA=180.0	Z=0	100000.0	BSTAR=	987.97	TR=	.519	BBQ=	197.80	CO=	4.95	TC*CO=	.466	CR*P=	.02	I=	10	BBR=	1090.70
THETA=180.0	Z=0	200000.0	BSTAR=	995.77	TR=	.516	BBQ=	197.80	CO=	4.95	TC*CO=	.460	CR*P=	.06	I=	11	BBR=	1097.90
THETA=180.0	Z=0	400000.0	BSTAR=	996.05	TR=	.516	BBQ=	197.80	CO=	4.95	TC*CO=	.460	CR*P=	.20	I=	12	BBR=	1098.17
THETA=180.0	Z=0	600000.0	BSTAR=	996.05	TR=	.516	BBQ=	197.80	CO=	4.95	TC*CO=	.460	CR*P=	.45	I=	13	BBR=	1098.17
THETA=180.0	Z=0	800000.0	BSTAR=	996.05	TR=	.516	BBQ=	197.80	CO=	4.95	TC*CO=	.460	CR*P=	.79	I=	14	BBR=	1098.17

CURVES INTERSECT AT AX= .45990 AY= 605879.55823

THETA=165.0	Z=0	1931.8	BSTAR=	131.12	TR=	.756	BBQ=	187.11	CO=	4.40	TC*CO=	2.282	CR*P=	.00	I=	1	BBR=	272.46
THETA=165.0	Z=0	3863.6	BSTAR=	220.03	TR=	.640	BBQ=	187.11	CO=	4.40	TC*CO=	1.549	CR*P=	.00	I=	2	BBR=	339.72
THETA=165.0	Z=0	5795.4	BSTAR=	270.21	TR=	.622	BBQ=	187.11	CO=	4.40	TC*CO=	1.324	CR*P=	.00	I=	3	BBR=	386.57
THETA=165.0	Z=0	7727.2	BSTAR=	310.65	TR=	.615	BBQ=	187.11	CO=	4.40	TC*CO=	1.164	CR*P=	.00	I=	4	BBR=	434.76
THETA=165.0	Z=0	9659.0	BSTAR=	339.59	TR=	.607	BBQ=	187.11	CO=	4.40	TC*CO=	1.055	CR*P=	.00	I=	5	BBR=	473.09
THETA=165.0	Z=0	19318.0	BSTAR=	522.27	TR=	.572	BBQ=	187.11	CO=	4.40	TC*CO=	.748	CR*P=	.00	I=	6	BBR=	629.26
THETA=165.0	Z=0	38636.1	BSTAR=	774.84	TR=	.535	BBQ=	187.11	CO=	4.40	TC*CO=	.503	CR*P=	.01	I=	7	BBR=	874.91
THETA=165.0	Z=0	57954.1	BSTAR=	851.78	TR=	.520	BBQ=	187.11	CO=	4.40	TC*CO=	.437	CR*P=	.01	I=	8	BBR=	979.00
THETA=165.0	Z=0	77272.2	BSTAR=	901.93	TR=	.513	BBQ=	187.11	CO=	4.40	TC*CO=	.423	CR*P=	.01	I=	9	BBR=	997.33
THETA=165.0	Z=0	96590.2	BSTAR=	909.44	TR=	.510	BBQ=	187.11	CO=	4.40	TC*CO=	.417	CR*P=	.02	I=	10	BBR=	1000.43
THETA=165.0	Z=0	193180.5	BSTAR=	917.37	TR=	.506	BBQ=	187.11	CO=	4.40	TC*CO=	.412	CR*P=	.06	I=	11	BBR=	1012.11
THETA=165.0	Z=0	386360.9	BSTAR=	917.70	TR=	.506	BBQ=	187.11	CO=	4.40	TC*CO=	.411	CR*P=	.20	I=	12	BBR=	1012.42
THETA=165.0	Z=0	579541.4	BSTAR=	917.70	TR=	.506	BBQ=	187.11	CO=	4.40	TC*CO=	.411	CR*P=	.45	I=	13	BBR=	1012.42

CURVES INTERSECT AT AX= .41135 AY= 549324.41515

THETA=150.0	Z=0	1732.1	BSTAR=	132.65	TR=	.761	BBQ=	184.73	CO=	4.11	TC*CO=	2.116	CR*P=	.00	I=	1	BBR=	273.29
THETA=150.0	Z=0	3464.1	BSTAR=	236.65	TR=	.627	BBQ=	184.73	CO=	4.11	TC*CO=	1.352	CR*P=	.00	I=	2	BBR=	352.50
THETA=150.0	Z=0	5196.2	BSTAR=	290.40	TR=	.599	BBQ=	184.73	CO=	4.11	TC*CO=	1.135	CR*P=	.00	I=	3	BBR=	401.34
THETA=150.0	Z=0	6928.2	BSTAR=	319.68	TR=	.592	BBQ=	184.73	CO=	4.11	TC*CO=	1.049	CR*P=	.00	I=	4	BBR=	429.08
THETA=150.0	Z=0	8660.3	BSTAR=	371.26	TR=	.586	BBQ=	184.73	CO=	4.11	TC*CO=	.928	CR*P=	.00	I=	5	BBR=	479.47
THETA=150.0	Z=0	17320.6	BSTAR=	514.36	TR=	.548	BBQ=	184.73	CO=	4.11	TC*CO=	.676	CR*P=	.00	I=	6	BBR=	615.52
THETA=150.0	Z=0	34641.2	BSTAR=	740.00	TR=	.509	BBQ=	184.73	CO=	4.11	TC*CO=	.464	CR*P=	.01	I=	7	BBR=	814.35
THETA=150.0	Z=0	51961.8	BSTAR=	851.22	TR=	.491	BBQ=	184.73	CO=	4.11	TC*CO=	.396	CR*P=	.01	I=	8	BBR=	941.35
THETA=150.0	Z=0	69282.4	BSTAR=	885.93	TR=	.483	BBQ=	184.73	CO=	4.11	TC*CO=	.376	CR*P=	.01	I=	9	BBR=	975.17
THETA=150.0	Z=0	86603.0	BSTAR=	894.59	TR=	.479	BBQ=	184.73	CO=	4.11	TC*CO=	.370	CR*P=	.02	I=	10	BBR=	983.16
THETA=150.0	Z=0	173206.0	BSTAR=	904.95	TR=	.474	BBQ=	184.73	CO=	4.11	TC*CO=	.363	CR*P=	.06	I=	11	BBR=	992.52
THETA=150.0	Z=0	346411.9	BSTAR=	905.56	TR=	.474	BBQ=	184.73	CO=	4.11	TC*CO=	.362	CR*P=	.20	I=	12	BBR=	993.77
THETA=150.0	Z=0	519617.9	BSTAR=	905.56	TR=	.474	BBQ=	184.73	CO=	4.11	TC*CO=	.362	CR*P=	.45	I=	13	BBR=	993.77

CURVES INTERSECT AT AX= .36240 AY= 457314.77164

THETA=135.0	Z=0	1414.2	BSTAR=	119.63	TR=	.757	BBQ=	188.30	CO=	3.95	TC*CO=	2.149	CR*P=	.00	I=	1	BBR=	262.12
THETA=135.0	Z=0	2828.5	BSTAR=	220.65	TR=	.606	BBQ=	188.30	CO=	3.95	TC*CO=	1.347	CR*P=	.00	I=	2	BBR=	334.71
THETA=135.0	Z=0	4242.7	BSTAR=	298.27	TR=	.556	BBQ=	188.30	CO=	3.95	TC*CO=	1.054	CR*P=	.00	I=	3	BBR=	393.72
THETA=135.0	Z=0	5656.9	BSTAR=	335.72	TR=	.544	BBQ=	188.30	CO=	3.95	TC*CO=	.924	CR*P=	.00	I=	4	BBR=	418.21
THETA=135.0	Z=0	7071.1	BSTAR=	376.12	TR=	.539	BBQ=	188.30	CO=	3.95	TC*CO=	.840	CR*P=	.00	I=	5	BBR=	477.54
THETA=135.0	Z=0	14142.3	BSTAR=	511.12	TR=	.502	BBQ=	188.30	CO=	3.95	TC*CO=	.617	CR*P=	.00	I=	6	BBR=	605.57
THETA=135.0	Z=0	28284.5	BSTAR=	735.78	TR=	.459	BBQ=	188.30	CO=	3.95	TC*CO=	.415	CR*P=	.01	I=	7	BBR=	823.26
THETA=135.0	Z=0	42426.8	BSTAR=	857.49	TR=	.438	BBQ=	188.30	CO=	3.95	TC*CO=	.343	CR*P=	.01	I=	8	BBR=	949.99
THETA=135.0	Z=0	56569.0	BSTAR=	934.76	TR=	.426	BBQ=	188.30	CO=	3.95	TC*CO=	.312	CR*P=	.01	I=	9	BBR=	1014.94
THETA=135.0	Z=0	70711.3	BSTAR=	955.23	TR=	.420	BBQ=	188.30	CO=	3.95	TC*CO=	.302	CR*P=	.02	I=	10	BBR=	1034.23
THETA=135.0	Z=0	141422.5	BSTAR=	972.11	TR=	.411	BBQ=	188.30	CO=	3.95	TC*CO=	.291	CR*P=	.06	I=	11	BBR=	1049.49
THETA=135.0	Z=0	282845.0	BSTAR=	973.84	TR=	.410	BBQ=	188.30	CO=	3.95	TC*CO=	.290	CR*P=	.20	I=	12	BBR=	1051.06
THETA=135.0	Z=0	424267.5	BSTAR=	973.85	TR=	.410	BBQ=	188.30	CO=	3.95	TC*CO=	.290	CR*P=	.45	I=	13	BBR=	1051.07

CURVES INTERSECT AT AX= .29039 AY= 332522.55129

THETA=120.0	Z=0	1000.0	BSTAR=	109.21	TR=	.783	BBQ=	188.30	CO=	3.92	TC*CO=	2.252	CR*P=	.00	I=	1	BBR=	256.58
THETA=120.0	Z=0	2000.0	BSTAR=	214.51	TR=	.593	BBQ=	188.30	CO=	3.92	TC*CO=	1.342	CR*P=	.00	I=	2	BBR=	326.11
THETA=120.0	Z=0	3000.0	BSTAR=	303.61	TR=	.503	BBQ=	188.30	CO=	3.92	TC*CO=	.933	CR*P=	.00	I=	3	BBR=	398.36
THETA=120.0	Z=0	4000.1	BSTAR=	374.71	TR=	.461	BBQ=	188.30	CO=	3.92	TC*CO=	.737	CR*P=	.00	I=	4	BBR=	461.47
THETA=120.0	Z=0	5000.1	BSTAR=	426.91	TR=	.445	BBQ=	188.30	CO=	3.92	TC*CO=	.644	CR*P=	.00	I=	5	BBR=	510.74
THETA=120.0	Z=0	10000.1	BSTAR=	576.31	TR=	.417	BBQ=	188.30	CO=	3.92	TC*CO=	.470	CR*P=	.00	I=	6	BBR=	654.93
THETA=120.0	Z=0	20000.3	BSTAR=	796.82	TR=	.370	BBQ=	188.30	CO=	3.92	TC*CO=	.315	CR*P=	.01	I=	7	BBR=	866.45
THETA=120.0	Z=0	30000.4	BSTAR=	992.12	TR=	.344	BBQ=	188.30	CO=	3.92	TC*CO=	.240	CR*P=	.01	I=	8	BBR=	1056.94
THETA=120.0	Z=0	40000.5	BSTAR=	1118.12	TR=	.327	BBQ=	188.30	CO=	3.92	TC*CO=	.205	CR*P=	.01	I=	9	BBR=	1179.74
THETA=120.0	Z=0	50000.7	BSTAR=	1193.71	TR=	.316	BBQ=	188.30	CO=	3.92	TC*CO=	.186	CR*P=	.02	I=	10	BBR=	1253.31
THETA=120.0	Z=0	100001.3	BSTAR=	1255.78	TR=	.300	BBQ=	188.30	CO=	3.92	TC*CO=	.167	CR*P=	.06	I=	11	BBR=	1322.22
THETA=120.0	Z=0	200002.6	BSTAR=	1273.09	TR=	.296	BBQ=	188.30	CO=	3.92	TC*CO=	.165	CR*P=	.20	I=	12	BBR=	1328.47

CURVES INTERSECT AT AX= .16534 AY= 173534.47178

THETA=105.0	Z=0	517.7	BSTAR=	105.69	TR=	.808	BBO=	200.18	CO=	3.54	TC*CO=	2.141	CR*P=	.00	I=	1	BBR=	267.14
THETA=105.0	Z=0	1035.3	BSTAR=	199.72	TR=	.687	BBO=	200.18	CO=	3.54	TC*CO=	1.444	CR*P=	.00	I=	2	BBR=	337.27
THETA=105.0	Z=0	1553.0	BSTAR=	296.38	TR=	.539	BBO=	200.18	CO=	3.54	TC*CO=	.968	CR*P=	.00	I=	3	BBR=	394.19
THETA=105.0	Z=0	2070.6	BSTAR=	370.81	TR=	.402	BBO=	200.18	CO=	3.54	TC*CO=	.631	CR*P=	.00	I=	4	BBR=	451.19
THETA=105.0	Z=0	2588.3	BSTAR=	441.16	TR=	.326	BBO=	200.18	CO=	3.54	TC*CO=	.456	CR*P=	.00	I=	5	BBR=	506.42
THETA=105.0	Z=0	5176.5	BSTAR=	691.20	TR=	.230	BBO=	200.18	CO=	3.54	TC*CO=	.221	CR*P=	.00	I=	6	BBR=	737.32
THETA=105.0	Z=0	10353.0	BSTAR=	921.26	TR=	.202	BBO=	200.18	CO=	3.54	TC*CO=	.149	CR*P=	.00	I=	7	BBR=	961.57
THETA=105.0	Z=0	15529.5	BSTAR=	1059.41	TR=	.177	BBO=	200.18	CO=	3.54	TC*CO=	.114	CR*P=	.01	I=	8	BBR=	1104.88
THETA=105.0	Z=0	20706.1	BSTAR=	1207.90	TR=	.160	BBO=	200.18	CO=	3.54	TC*CO=	.091	CR*P=	.01	I=	9	BBR=	1239.96
THETA=105.0	Z=0	25882.6	BSTAR=	1333.59	TR=	.148	BBO=	200.18	CO=	3.54	TC*CO=	.077	CR*P=	.02	I=	10	BBR=	1363.12
THETA=105.0	Z=0	51765.1	BSTAR=	1640.64	TR=	.119	BBO=	200.18	CO=	3.54	TC*CO=	.051	CR*P=	.06	I=	11	BBR=	1664.40

CURVES INTERSECT AT AX= .05332 AY= 49005.40761

THETA=100.0	Z=0	347.2	BSTAR=	123.31	TR=	.819	BBO=	229.88	CO=	2.93	TC*CO=	1.769	CR*P=	.00	I=	1	BBR=	311.52
THETA=100.0	Z=0	694.5	BSTAR=	235.50	TR=	.744	BBO=	229.88	CO=	2.93	TC*CO=	1.231	CR*P=	.00	I=	2	BBR=	406.47
THETA=100.0	Z=0	1041.7	BSTAR=	341.84	TR=	.606	BBO=	229.88	CO=	2.93	TC*CO=	.848	CR*P=	.00	I=	3	BBR=	481.23
THETA=100.0	Z=0	1389.0	BSTAR=	405.28	TR=	.480	BBO=	229.88	CO=	2.93	TC*CO=	.627	CR*P=	.00	I=	4	BBR=	515.56
THETA=100.0	Z=0	1736.2	BSTAR=	468.72	TR=	.394	BBO=	229.88	CO=	2.93	TC*CO=	.474	CR*P=	.00	I=	5	BBR=	559.22
THETA=100.0	Z=0	3472.4	BSTAR=	722.56	TR=	.150	BBO=	229.88	CO=	2.93	TC*CO=	.133	CR*P=	.00	I=	6	BBR=	757.56
THETA=100.0	Z=0	6944.9	BSTAR=	1060.14	TR=	.113	BBO=	229.88	CO=	2.93	TC*CO=	.070	CR*P=	.00	I=	7	BBR=	1086.19
THETA=100.0	Z=0	10417.3	BSTAR=	1165.38	TR=	.098	BBO=	229.88	CO=	2.93	TC*CO=	.056	CR*P=	.01	I=	8	BBR=	1187.98
THETA=100.0	Z=0	13889.8	BSTAR=	1259.13	TR=	.086	BBO=	229.88	CO=	2.93	TC*CO=	.045	CR*P=	.01	I=	9	BBR=	1278.92
THETA=100.0	Z=0	17362.2	BSTAR=	1337.14	TR=	.078	BBO=	229.88	CO=	2.93	TC*CO=	.038	CR*P=	.02	I=	10	BBR=	1375.10
THETA=100.0	Z=0	34724.4	BSTAR=	1721.89	TR=	.055	BBO=	229.88	CO=	2.93	TC*CO=	.021	CR*P=	.06	I=	11	BBR=	1734.58

CURVES INTERSECT AT AX= .03200 AY= 23808.01959

THETA= 95.0	Z=0	174.2	BSTAR=	104.39	TR=	.826	BBO=	275.02	CO=	2.26	TC*CO=	1.549	CR*P=	.00	I=	1	BBR=	331.45
THETA= 95.0	Z=0	348.4	BSTAR=	197.67	TR=	.746	BBO=	275.02	CO=	2.26	TC*CO=	1.152	CR*P=	.00	I=	2	BBR=	402.34
THETA= 95.0	Z=0	522.6	BSTAR=	290.95	TR=	.662	BBO=	275.02	CO=	2.26	TC*CO=	.871	CR*P=	.00	I=	3	BBR=	473.16
THETA= 95.0	Z=0	696.8	BSTAR=	384.23	TR=	.616	BBO=	275.02	CO=	2.26	TC*CO=	.692	CR*P=	.00	I=	4	BBR=	553.56
THETA= 95.0	Z=0	871.0	BSTAR=	477.51	TR=	.517	BBO=	275.02	CO=	2.26	TC*CO=	.519	CR*P=	.00	I=	5	BBR=	619.57
THETA= 95.0	Z=0	1741.9	BSTAR=	705.53	TR=	.175	BBO=	275.02	CO=	2.26	TC*CO=	.144	CR*P=	.00	I=	6	BBR=	753.59
THETA= 95.0	Z=0	3483.8	BSTAR=	954.37	TR=	.027	BBO=	275.02	CO=	2.26	TC*CO=	.017	CR*P=	.00	I=	7	BBR=	961.56
THETA= 95.0	Z=0	5225.8	BSTAR=	1096.33	TR=	.017	BBO=	275.02	CO=	2.26	TC*CO=	.010	CR*P=	.01	I=	8	BBR=	1101.29
THETA= 95.0	Z=0	6967.7	BSTAR=	1198.66	TR=	.016	BBO=	275.02	CO=	2.26	TC*CO=	.008	CR*P=	.01	I=	9	BBR=	1193.18

CURVES INTERSECT AT AX= .00918 AY= 5965.14159

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 90 DEGREES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 0 ALTITUDE = 605880 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 147230 ALTITUDE = 549324 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 264011 ALTITUDE = 457315 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 332501 ALTITUDE = 332523 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 300549 ALTITUDE = 173535 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 182868 ALTITUDE = 49005 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 135024 ALTITUDE = 23808 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 68209 ALTITUDE = 5965 CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 135 DEGREES

THETA=180.0 Z=0	2000.0	BSTAR=	131.71	TR=	.762	BB0=	197.80	CO=	4.95	TC*CO=	2.639	CR*P=	.00	I=	1	BBR=	282.42
THETA=180.0 Z=0	4000.0	BSTAR=	220.81	TR=	.646	BB0=	197.80	CO=	4.95	TC*CO=	1.813	CR*P=	.00	I=	2	BBR=	348.65
THETA=180.0 Z=0	6000.0	BSTAR=	273.01	TR=	.630	BB0=	197.80	CO=	4.95	TC*CO=	1.551	CR*P=	.00	I=	3	BBR=	397.68
THETA=180.0 Z=0	8000.0	BSTAR=	318.01	TR=	.623	BB0=	197.80	CO=	4.95	TC*CO=	1.382	CR*P=	.00	I=	4	BBR=	441.33
THETA=180.0 Z=0	10000.0	BSTAR=	360.31	TR=	.614	BB0=	197.80	CO=	4.95	TC*CO=	1.247	CR*P=	.00	I=	5	BBR=	481.74
THETA=180.0 Z=0	20000.0	BSTAR=	553.81	TR=	.580	BB0=	197.80	CO=	4.95	TC*CO=	.849	CR*P=	.00	I=	6	BBR=	668.53
THETA=180.0 Z=0	40000.0	BSTAR=	846.31	TR=	.543	BB0=	197.80	CO=	4.95	TC*CO=	.557	CR*P=	.00	I=	7	BBR=	953.56
THETA=180.0 Z=0	60000.0	BSTAR=	955.11	TR=	.528	BB0=	197.80	CO=	4.95	TC*CO=	.483	CR*P=	.01	I=	8	BBR=	1069.61
THETA=180.0 Z=0	80000.0	BSTAR=	980.26	TR=	.522	BB0=	197.80	CO=	4.95	TC*CO=	.472	CR*P=	.01	I=	9	BBR=	1083.59
THETA=180.0 Z=0	100000.0	BSTAR=	987.97	TR=	.519	BB0=	197.80	CO=	4.95	TC*CO=	.466	CR*P=	.02	I=	10	BBR=	1090.70
THETA=180.0 Z=0	200000.0	BSTAR=	995.77	TR=	.516	BB0=	197.80	CO=	4.95	TC*CO=	.460	CR*P=	.06	I=	11	BBR=	1097.90
THETA=180.0 Z=0	400000.0	BSTAR=	996.05	TR=	.516	BB0=	197.80	CO=	4.95	TC*CO=	.460	CR*P=	.20	I=	12	BBR=	1098.17
THETA=180.0 Z=0	600000.0	BSTAR=	996.05	TR=	.516	BB0=	197.80	CO=	4.95	TC*CO=	.460	CR*P=	.45	I=	13	BBR=	1098.17
THETA=180.0 Z=0	800000.0	BSTAR=	996.05	TR=	.516	BB0=	197.80	CO=	4.95	TC*CO=	.460	CR*P=	.79	I=	14	BBR=	1098.17

CURVES INTERSECT AT AX= .45990 AY= 609879.55823

THETA=165.0 Z=0	1931.8	BSTAR=	151.86	TR=	.756	BB0=	198.99	CO=	4.43	TC*CO=	2.207	CR*P=	.00	I=	1	BBR=	302.39
THETA=165.0 Z=0	3863.6	BSTAR=	239.18	TR=	.640	BB0=	198.99	CO=	4.43	TC*CO=	1.540	CR*P=	.00	I=	2	BBR=	366.46
THETA=165.0 Z=0	5795.4	BSTAR=	296.10	TR=	.622	BB0=	198.99	CO=	4.43	TC*CO=	1.307	CR*P=	.00	I=	3	BBR=	419.96
THETA=165.0 Z=0	7727.2	BSTAR=	333.80	TR=	.615	BB0=	198.99	CO=	4.43	TC*CO=	1.190	CR*P=	.00	I=	4	BBR=	456.73
THETA=165.0 Z=0	9659.0	BSTAR=	379.66	TR=	.607	BB0=	198.99	CO=	4.43	TC*CO=	1.069	CR*P=	.00	I=	5	BBR=	500.36
THETA=165.0 Z=0	19318.0	BSTAR=	569.07	TR=	.572	BB0=	198.99	CO=	4.43	TC*CO=	.739	CR*P=	.00	I=	6	BBR=	682.86
THETA=165.0 Z=0	38636.1	BSTAR=	820.74	TR=	.535	BB0=	198.99	CO=	4.43	TC*CO=	.509	CR*P=	.00	I=	7	BBR=	927.17
THETA=165.0 Z=0	57954.1	BSTAR=	930.01	TR=	.520	BB0=	198.99	CO=	4.43	TC*CO=	.444	CR*P=	.01	I=	8	BBR=	1033.40
THETA=165.0 Z=0	77272.2	BSTAR=	951.22	TR=	.513	BB0=	198.99	CO=	4.43	TC*CO=	.430	CR*P=	.01	I=	9	BBR=	1053.31
THETA=165.0 Z=0	96590.2	BSTAR=	959.15	TR=	.510	BB0=	198.99	CO=	4.43	TC*CO=	.424	CR*P=	.02	I=	10	BBR=	1060.59
THETA=165.0 Z=0	193180.5	BSTAR=	967.51	TR=	.506	BB0=	198.99	CO=	4.43	TC*CO=	.418	CR*P=	.06	I=	11	BBR=	1068.27
THETA=165.0 Z=0	386360.9	BSTAR=	967.86	TR=	.506	BB0=	198.99	CO=	4.43	TC*CO=	.418	CR*P=	.20	I=	12	BBR=	1068.59
THETA=165.0 Z=0	579541.4	BSTAR=	967.86	TR=	.506	BB0=	198.99	CO=	4.43	TC*CO=	.418	CR*P=	.45	I=	13	BBR=	1068.59

CURVES INTERSECT AT AX= .41786 AY= 554447.25531

THETA=150.0 Z=0	1732.1	BSTAR=	176.43	TR=	.761	BB0=	226.91	CO=	3.58	TC*CO=	1.772	CR*P=	.00	I=	1	BBR=	349.19
THETA=150.0 Z=0	3464.1	BSTAR=	281.36	TR=	.627	BB0=	226.91	CO=	3.58	TC*CO=	1.203	CR*P=	.00	I=	2	BBR=	423.46
THETA=150.0 Z=0	5196.2	BSTAR=	338.08	TR=	.599	BB0=	226.91	CO=	3.58	TC*CO=	1.027	CR*P=	.00	I=	3	BBR=	473.99
THETA=150.0 Z=0	6928.2	BSTAR=	370.98	TR=	.592	BB0=	226.91	CO=	3.58	TC*CO=	.952	CR*P=	.00	I=	4	BBR=	505.35
THETA=150.0 Z=0	8660.3	BSTAR=	413.83	TR=	.586	BB0=	226.91	CO=	3.58	TC*CO=	.871	CR*P=	.00	I=	5	BBR=	546.75
THETA=150.0 Z=0	17320.6	BSTAR=	612.55	TR=	.548	BB0=	226.91	CO=	3.58	TC*CO=	.604	CR*P=	.00	I=	6	BBR=	736.93
THETA=150.0 Z=0	34641.2	BSTAR=	864.65	TR=	.509	BB0=	226.91	CO=	3.58	TC*CO=	.422	CR*P=	.00	I=	7	BBR=	980.17
THETA=150.0 Z=0	51961.8	BSTAR=	990.17	TR=	.491	BB0=	226.91	CO=	3.58	TC*CO=	.362	CR*P=	.01	I=	8	BBR=	1101.61
THETA=150.0 Z=0	69282.4	BSTAR=	1027.49	TR=	.483	BB0=	226.91	CO=	3.58	TC*CO=	.345	CR*P=	.01	I=	9	BBR=	1137.11
THETA=150.0 Z=0	86603.0	BSTAR=	1037.55	TR=	.479	BB0=	226.91	CO=	3.58	TC*CO=	.340	CR*P=	.02	I=	10	BBR=	1146.73
THETA=150.0 Z=0	173206.0	BSTAR=	1049.60	TR=	.474	BB0=	226.91	CO=	3.58	TC*CO=	.333	CR*P=	.06	I=	11	BBR=	1157.15
THETA=150.0 Z=0	346411.9	BSTAR=	1050.30	TR=	.474	BB0=	226.91	CO=	3.58	TC*CO=	.332	CR*P=	.20	I=	12	BBR=	1157.79
THETA=150.0 Z=0	519617.9	BSTAR=	1050.31	TR=	.474	BB0=	226.91	CO=	3.58	TC*CO=	.332	CR*P=	.45	I=	13	BBR=	1157.90

CURVES INTERSECT AT AX= .33247 AY= 436918.58942

THETA=135.0 Z=0	1414.2	BSTAR=	173.18	TR=	.757	BB0=	232.85	CO=	3.41	TC*CO=	1.721	CR*P=	.00	I=	1	BBR=	349.39
THETA=135.0 Z=0	2828.5	BSTAR=	283.19	TR=	.606	BB0=	232.85	CO=	3.41	TC*CO=	1.135	CR*P=	.00	I=	2	BBR=	424.24
THETA=135.0 Z=0	4242.7	BSTAR=	357.13	TR=	.556	BB0=	232.85	CO=	3.41	TC*CO=	.909	CR*P=	.00	I=	3	BBR=	486.67
THETA=135.0 Z=0	5656.9	BSTAR=	399.08	TR=	.544	BB0=	232.85	CO=	3.41	TC*CO=	.823	CR*P=	.00	I=	4	BBR=	525.82
THETA=135.0 Z=0	7071.1	BSTAR=	432.50	TR=	.539	BB0=	232.85	CO=	3.41	TC*CO=	.767	CR*P=	.00	I=	5	BBR=	557.92
THETA=135.0 Z=0	14142.3	BSTAR=	612.79	TR=	.502	BB0=	232.85	CO=	3.41	TC*CO=	.546	CR*P=	.00	I=	6	BBR=	729.59
THETA=135.0 Z=0	28284.5	BSTAR=	987.97	TR=	.459	BB0=	232.85	CO=	3.41	TC*CO=	.333	CR*P=	.00	I=	7	BBR=	1094.91
THETA=135.0 Z=0	42426.8	BSTAR=	1205.14	TR=	.438	BB0=	232.85	CO=	3.41	TC*CO=	.266	CR*P=	.01	I=	8	BBR=	1307.03
THETA=135.0 Z=0	56569.0	BSTAR=	1321.50	TR=	.426	BB0=	232.85	CO=	3.41	TC*CO=	.238	CR*P=	.01	I=	9	BBR=	1420.64
THETA=135.0 Z=0	70711.3	BSTAR=	1354.67	TR=	.420	BB0=	232.85	CO=	3.41	TC*CO=	.230	CR*P=	.02	I=	10	BBR=	1452.36
THETA=135.0 Z=0	141422.5	BSTAR=	1378.68	TR=	.411	BB0=	232.85	CO=	3.41	TC*CO=	.222	CR*P=	.06	I=	11	BBR=	1474.38
THETA=135.0 Z=0	282845.0	BSTAR=	1391.14	TR=	.410	BB0=	232.85	CO=	3.41	TC*CO=	.221	CR*P=	.20	I=	12	BBR=	1476.63
THETA=135.0 Z=0	424267.5	BSTAR=	1391.17	TR=	.410	BB0=	232.85	CO=	3.41	TC*CO=	.221	CR*P=	.45	I=	13	BBR=	1476.65

CURVES INTERSECT AT AX= .22072 AY= 292419.76497

THETA=120.0 Z=0	1000.0	BSTAR=	134.41	TR=	.783	BB0=	229.88	CO=	3.52	TC*CO=	2.016	CR*P=	.00	I=	1	BBR=	314.33
THETA=120.0 Z=0	2000.0	BSTAR=	264.91	TR=	.593	BB0=	229.88	CO=	3.52	TC*CO=	1.196	CR*P=	.00	I=	2	BBR=	401.15
THETA=120.0 Z=0	3000.0	BSTAR=	357.61	TR=	.503	BB0=	229.88	CO=	3.52	TC*CO=	.861	CR*P=	.00	I=	3	BBR=	473.28
THETA=120.0 Z=0	4000.1	BSTAR=	426.91	TR=	.461	BB0=	229.88	CO=	3.52	TC*CO=	.700	CR*P=	.00	I=	4	BBR=	532.93
THETA=120.0 Z=0	5000.1	BSTAR=	493.61	TR=	.445	BB0=	229.88	CO=	3.52	TC*CO=	.615	CR*P=	.00	I=	5	BBR=	585.94
THETA=120.0 Z=0	10000.1	BSTAR=	635.72	TR=	.417	BB0=	229.88	CO=	3.52	TC*CO=	.461	CR*P=	.00	I=	6	BBR=	731.57
THETA=120.0 Z=0	20000.3	BSTAR=	906.62	TR=	.370	BB0=	229.88	CO=	3.52	TC*CO=	.302	CR*P=	.00	I=	7	BBR=	991.63
THETA=120.0 Z=0	30000.4	BSTAR=	1109.12	TR=	.344	BB0=	229.88	CO=	3.52	TC*CO=	.234	CR*P=	.01	I=	8	BBR=	1188.13
THETA=120.0 Z=0	40000.5	BSTAR=	1235.11	TR=	.327	BB0=	229.88	CO=	3.52	TC*CO=	.202	CR*P=	.01	I=	9	BBR=	1310.34
THETA=120.0 Z=0	50000.7	BSTAR=	1307.11	TR=	.316	BB0=	229.88	CO=	3.52	TC*CO=	.186	CR*P=	.02	I=	10	BBR=	1379.87
THETA=120.0 Z=0	100001.3	BSTAR=	1375.68	TR=	.300	BB0=	229.88	CO=	3.52	TC*CO=	.168	CR*P=	.06	I=	11	BBR=	1444.58
THETA=120.0 Z=0	200002.6	BSTAR=	1393.63	TR=	.296	BB0=	229.88	CO=	3.52	TC*CO=	.165	CR*P=	.20	I=	12	BBR=	1451.73

CURVES INTERSECT AT AX= .16594 AY= 173947.02178

THETA=105.0 Z=D=	517.7	BSTAR=	157.65	TR=	.808	BB0=	260.17	CO=	3.11	TC*CO=	1.730	CR*P=	.00	I=	1	BBR=	377.75
THETA=105.0 Z=D=	1035.3	BSTAR=	318.53	TR=	.687	BB0=	260.17	CO=	3.11	TC*CO=	1.118	CR*P=	.00	I=	2	BBR=	497.30
THETA=105.0 Z=D=	1553.0	BSTAR=	392.14	TR=	.539	BB0=	260.17	CO=	3.11	TC*CO=	.819	CR*P=	.00	I=	3	BBR=	532.27
THETA=105.0 Z=D=	2070.6	BSTAR=	454.04	TR=	.402	BB0=	260.17	CO=	3.11	TC*CO=	.571	CR*P=	.00	I=	4	BBR=	568.50
THETA=105.0 Z=D=	2588.3	BSTAR=	525.07	TR=	.326	BB0=	260.17	CO=	3.11	TC*CO=	.432	CR*P=	.00	I=	5	BBR=	609.99
THETA=105.0 Z=D=	5176.5	BSTAR=	747.58	TR=	.230	BB0=	260.17	CO=	3.11	TC*CO=	.231	CR*P=	.00	I=	6	BBR=	807.33
THETA=105.0 Z=D=	10353.0	BSTAR=	1075.55	TR=	.202	BB0=	260.17	CO=	3.11	TC*CO=	.145	CR*P=	.00	I=	7	BBR=	1128.05
THETA=105.0 Z=D=	15529.5	BSTAR=	1237.55	TR=	.177	BB0=	260.17	CO=	3.11	TC*CO=	.112	CR*P=	.01	I=	8	BBR=	1283.56
THETA=105.0 Z=D=	20706.1	BSTAR=	1349.36	TR=	.160	BB0=	260.17	CO=	3.11	TC*CO=	.093	CR*P=	.01	I=	9	BBR=	1390.90
THETA=105.0 Z=D=	25882.6	BSTAR=	1454.82	TR=	.148	BB0=	260.17	CO=	3.11	TC*CO=	.080	CR*P=	.02	I=	10	BBR=	1493.21
THETA=105.0 Z=D=	51765.1	BSTAR=	1691.47	TR=	.119	BB0=	260.17	CO=	3.11	TC*CO=	.056	CR*P=	.06	I=	11	BBR=	1722.35

CURVES INTERSECT AT AX= .05647 AY= 50997.83236

THETA=100.0 Z=D=	347.2	BSTAR=	163.00	TR=	.819	BB0=	275.02	CO=	2.93	TC*CO=	1.701	CR*P=	.00	I=	1	BBR=	388.30
THETA=100.0 Z=D=	694.5	BSTAR=	314.88	TR=	.744	BB0=	275.02	CO=	2.93	TC*CO=	1.154	CR*P=	.00	I=	2	BBR=	519.42
THETA=100.0 Z=D=	1041.7	BSTAR=	435.68	TR=	.606	BB0=	275.02	CO=	2.93	TC*CO=	.785	CR*P=	.00	I=	3	BBR=	622.46
THETA=100.0 Z=D=	1389.0	BSTAR=	515.38	TR=	.480	BB0=	275.02	CO=	2.93	TC*CO=	.598	CR*P=	.00	I=	4	BBR=	647.43
THETA=100.0 Z=D=	1736.2	BSTAR=	575.07	TR=	.394	BB0=	275.02	CO=	2.93	TC*CO=	.464	CR*P=	.00	I=	5	BBR=	683.35
THETA=100.0 Z=D=	3472.4	BSTAR=	784.06	TR=	.150	BB0=	275.02	CO=	2.93	TC*CO=	.147	CR*P=	.00	I=	6	BBR=	825.33
THETA=100.0 Z=D=	6944.9	BSTAR=	1060.14	TR=	.113	BB0=	275.02	CO=	2.93	TC*CO=	.084	CR*P=	.00	I=	7	BBR=	1091.30
THETA=100.0 Z=D=	10417.3	BSTAR=	1331.89	TR=	.098	BB0=	275.02	CO=	2.93	TC*CO=	.058	CR*P=	.01	I=	8	BBR=	1358.93
THETA=100.0 Z=D=	13889.8	BSTAR=	1463.14	TR=	.086	BB0=	275.02	CO=	2.93	TC*CO=	.047	CR*P=	.01	I=	9	BBR=	1486.92
THETA=100.0 Z=D=	17362.2	BSTAR=	1556.13	TR=	.078	BB0=	275.02	CO=	2.93	TC*CO=	.040	CR*P=	.02	I=	10	BBR=	1577.52
THETA=100.0 Z=D=	34724.4	BSTAR=	1839.88	TR=	.055	BB0=	275.02	CO=	2.93	TC*CO=	.024	CR*P=	.06	I=	11	BBR=	1855.06

CURVES INTERSECT AT AX= .03344 AY= 24422.67295

THETA= 95.0 Z=D=	174.2	BSTAR=	119.75	TR=	.826	BB0=	339.77	CO=	2.27	TC*CO=	1.590	CR*P=	.00	I=	1	BBR=	400.27
THETA= 95.0 Z=D=	348.4	BSTAR=	228.40	TR=	.746	BB0=	339.77	CO=	2.27	TC*CO=	1.194	CR*P=	.00	I=	2	BBR=	481.99
THETA= 95.0 Z=D=	522.6	BSTAR=	337.04	TR=	.662	BB0=	339.77	CO=	2.27	TC*CO=	.908	CR*P=	.00	I=	3	BBR=	562.03
THETA= 95.0 Z=D=	696.8	BSTAR=	445.68	TR=	.616	BB0=	339.77	CO=	2.27	TC*CO=	.725	CR*P=	.00	I=	4	BBR=	655.01
THETA= 95.0 Z=D=	871.0	BSTAR=	554.33	TR=	.517	BB0=	339.77	CO=	2.27	TC*CO=	.546	CR*P=	.00	I=	5	BBR=	729.96
THETA= 95.0 Z=D=	1741.9	BSTAR=	807.08	TR=	.175	BB0=	339.77	CO=	2.27	TC*CO=	.156	CR*P=	.00	I=	6	BBR=	866.58
THETA= 95.0 Z=D=	3483.8	BSTAR=	1037.72	TR=	.027	BB0=	339.77	CO=	2.27	TC*CO=	.019	CR*P=	.00	I=	7	BBR=	1066.73
THETA= 95.0 Z=D=	5225.8	BSTAR=	1176.17	TR=	.017	BB0=	339.77	CO=	2.27	TC*CO=	.011	CR*P=	.01	I=	8	BBR=	1182.05
THETA= 95.0 Z=D=	6967.7	BSTAR=	1258.49	TR=	.016	BB0=	339.77	CO=	2.27	TC*CO=	.010	CR*P=	.01	I=	9	BBR=	1273.95

CURVES INTERSECT AT AX= .01022 AY= 6413.56954

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 135 DEGREES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 0 ALTITUDE = 605880 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 148603 ALTITUDE = 534447 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 252236 ALTITUDE = 436919 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 292401 ALTITUDE = 292420 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 331263 ALTITUDE = 173947 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 190303 ALTITUDE = 56998 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 138510 ALTITUDE = 24423 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 73338 ALTITUDE = 6414 CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 180 DEGREES															
THETA=180.0 Z=0=	2000.0	BSTAR=	131.71	TR=	.762	BB0=	197.80	C0=	4.95	TC=C0=	2.639	CR=P=	.00	I= 1	BBR= 282.42
THETA=180.0 Z=0=	4000.0	BSTAR=	220.81	TR=	.646	BB0=	197.80	C0=	4.95	TC=C0=	1.813	CR=P=	.00	I= 2	BBR= 348.45
THETA=180.0 Z=0=	6000.0	BSTAR=	273.01	TR=	.630	BB0=	197.80	C0=	4.95	TC=C0=	1.551	CR=P=	.00	I= 3	BBR= 397.68
THETA=180.0 Z=0=	8000.0	BSTAR=	318.01	TR=	.623	BB0=	197.80	C0=	4.95	TC=C0=	1.382	CR=P=	.00	I= 4	BBR= 441.33
THETA=180.0 Z=0=	10000.0	BSTAR=	360.31	TR=	.614	BB0=	197.80	C0=	4.95	TC=C0=	1.247	CR=P=	.00	I= 5	BBR= 481.74
THETA=180.0 Z=0=	20000.0	BSTAR=	553.81	TR=	.580	BB0=	197.80	C0=	4.95	TC=C0=	.849	CR=P=	.00	I= 6	BBR= 668.53
THETA=180.0 Z=0=	40000.0	BSTAR=	846.31	TR=	.543	BB0=	197.80	C0=	4.95	TC=C0=	.557	CR=P=	.00	I= 7	BBR= 953.66
THETA=180.0 Z=0=	60000.0	BSTAR=	945.11	TR=	.528	BB0=	197.80	C0=	4.95	TC=C0=	.483	CR=P=	.01	I= 8	BBR= 1069.61
THETA=180.0 Z=0=	80000.0	BSTAR=	980.26	TR=	.522	BB0=	197.80	C0=	4.95	TC=C0=	.472	CR=P=	.01	I= 9	BBR= 1083.59
THETA=180.0 Z=0=	100000.0	BSTAR=	987.97	TR=	.519	BB0=	197.80	C0=	4.95	TC=C0=	.466	CR=P=	.02	I= 10	BBR= 1090.70
THETA=180.0 Z=0=	200000.0	BSTAR=	995.77	TR=	.516	BB0=	197.80	C0=	4.95	TC=C0=	.460	CR=P=	.06	I= 11	BBR= 1097.90
THETA=180.0 Z=0=	400000.0	BSTAR=	996.05	TR=	.516	BB0=	197.80	C0=	4.95	TC=C0=	.460	CR=P=	.20	I= 12	BBR= 1098.17
THETA=180.0 Z=0=	600000.0	BSTAR=	996.05	TR=	.516	BB0=	197.80	C0=	4.95	TC=C0=	.460	CR=P=	.45	I= 13	BBR= 1098.17
THETA=180.0 Z=0=	800000.0	BSTAR=	996.05	TR=	.516	BB0=	197.80	C0=	4.95	TC=C0=	.460	CR=P=	.79	I= 14	BBR= 1098.17

CURVES INTERSECT AT AX= .45990 AY= 605879.55823

THETA=165.0 Z=0=	1931.8	BSTAR=	130.89	TR=	.756	BB0=	238.79	C0=	3.85	TC=C0=	2.233	CR=P=	.00	I= 1	BBR= 311.52
THETA=165.0 Z=0=	3863.6	BSTAR=	222.73	TR=	.640	BB0=	238.79	C0=	3.85	TC=C0=	1.566	CR=P=	.00	I= 2	BBR= 375.47
THETA=165.0 Z=0=	5795.4	BSTAR=	263.74	TR=	.622	BB0=	238.79	C0=	3.85	TC=C0=	1.388	CR=P=	.00	I= 3	BBR= 412.37
THETA=165.0 Z=0=	7727.2	BSTAR=	341.98	TR=	.615	BB0=	238.79	C0=	3.85	TC=C0=	1.157	CR=P=	.00	I= 4	BBR= 488.49
THETA=165.0 Z=0=	9659.0	BSTAR=	428.55	TR=	.607	BB0=	238.79	C0=	3.85	TC=C0=	.973	CR=P=	.00	I= 5	BBR= 573.39
THETA=165.0 Z=0=	19318.0	BSTAR=	624.99	TR=	.572	BB0=	238.79	C0=	3.85	TC=C0=	.690	CR=P=	.00	I= 6	BBR= 761.54
THETA=165.0 Z=0=	38636.1	BSTAR=	939.17	TR=	.535	BB0=	238.79	C0=	3.85	TC=C0=	.461	CR=P=	.00	I= 7	BBR= 1066.49
THETA=165.0 Z=0=	57954.1	BSTAR=	1072.90	TR=	.520	BB0=	238.79	C0=	3.85	TC=C0=	.399	CR=P=	.01	I= 8	BBR= 1196.97
THETA=165.0 Z=0=	77272.2	BSTAR=	1097.26	TR=	.513	BB0=	238.79	C0=	3.85	TC=C0=	.387	CR=P=	.01	I= 9	BBR= 1219.77
THETA=165.0 Z=0=	96590.2	BSTAR=	1106.41	TR=	.510	BB0=	238.79	C0=	3.85	TC=C0=	.382	CR=P=	.02	I= 10	BBR= 1228.15
THETA=165.0 Z=0=	193180.5	BSTAR=	1116.08	TR=	.506	BB0=	238.79	C0=	3.85	TC=C0=	.376	CR=P=	.06	I= 11	BBR= 1236.39
THETA=165.0 Z=0=	386360.9	BSTAR=	1116.48	TR=	.506	BB0=	238.79	C0=	3.85	TC=C0=	.376	CR=P=	.20	I= 12	BBR= 1237.36
THETA=165.0 Z=0=	579541.4	BSTAR=	1116.48	TR=	.506	BB0=	238.79	C0=	3.85	TC=C0=	.376	CR=P=	.45	I= 13	BBR= 1237.36

CURVES INTERSECT AT AX= .37618 AY= 521671.88513

THETA=150.0 Z=0=	1732.1	BSTAR=	161.01	TR=	.761	BB0=	263.74	C0=	3.64	TC=C0=	2.020	CR=P=	.00	I= 1	BBR= 361.79
THETA=150.0 Z=0=	3464.1	BSTAR=	286.66	TR=	.627	BB0=	263.74	C0=	3.64	TC=C0=	1.332	CR=P=	.00	I= 2	BBR= 452.05
THETA=150.0 Z=0=	5196.2	BSTAR=	342.60	TR=	.599	BB0=	263.74	C0=	3.64	TC=C0=	1.149	CR=P=	.00	I= 3	BBR= 500.56
THETA=150.0 Z=0=	6928.2	BSTAR=	384.41	TR=	.592	BB0=	263.74	C0=	3.64	TC=C0=	1.052	CR=P=	.00	I= 4	BBR= 540.60
THETA=150.0 Z=0=	8660.3	BSTAR=	437.83	TR=	.586	BB0=	263.74	C0=	3.64	TC=C0=	.949	CR=P=	.00	I= 5	BBR= 592.31
THETA=150.0 Z=0=	17320.6	BSTAR=	649.16	TR=	.548	BB0=	263.74	C0=	3.64	TC=C0=	.663	CR=P=	.00	I= 6	BBR= 793.72
THETA=150.0 Z=0=	34641.2	BSTAR=	1049.30	TR=	.509	BB0=	263.74	C0=	3.64	TC=C0=	.413	CR=P=	.00	I= 7	BBR= 1183.58
THETA=150.0 Z=0=	51961.8	BSTAR=	1247.47	TR=	.491	BB0=	263.74	C0=	3.64	TC=C0=	.342	CR=P=	.01	I= 8	BBR= 1377.00
THETA=150.0 Z=0=	69282.4	BSTAR=	1308.81	TR=	.483	BB0=	263.74	C0=	3.64	TC=C0=	.323	CR=P=	.01	I= 9	BBR= 1436.22
THETA=150.0 Z=0=	86603.0	BSTAR=	1321.66	TR=	.479	BB0=	263.74	C0=	3.64	TC=C0=	.318	CR=P=	.02	I= 10	BBR= 1447.97
THETA=150.0 Z=0=	173206.0	BSTAR=	1337.04	TR=	.474	BB0=	263.74	C0=	3.64	TC=C0=	.311	CR=P=	.06	I= 11	BBR= 1462.05
THETA=150.0 Z=0=	346411.9	BSTAR=	1337.94	TR=	.474	BB0=	263.74	C0=	3.64	TC=C0=	.311	CR=P=	.20	I= 12	BBR= 1462.87
THETA=150.0 Z=0=	519617.9	BSTAR=	1337.94	TR=	.474	BB0=	263.74	C0=	3.64	TC=C0=	.311	CR=P=	.45	I= 13	BBR= 1462.88

CURVES INTERSECT AT AX= .31084 AY= 421667.48001

THETA=135.0 Z=0=	1414.2	BSTAR=	151.62	TR=	.757	BB0=	343.33	C0=	2.94	TC=C0=	1.859	CR=P=	.00	I= 1	BBR= 411.43
THETA=135.0 Z=0=	2828.5	BSTAR=	289.97	TR=	.606	BB0=	343.33	C0=	2.94	TC=C0=	1.230	CR=P=	.00	I= 2	BBR= 497.95
THETA=135.0 Z=0=	4242.7	BSTAR=	386.80	TR=	.556	BB0=	343.33	C0=	2.94	TC=C0=	.973	CR=P=	.00	I= 3	BBR= 577.91
THETA=135.0 Z=0=	5656.9	BSTAR=	436.21	TR=	.544	BB0=	343.33	C0=	2.94	TC=C0=	.883	CR=P=	.00	I= 4	BBR= 623.09
THETA=135.0 Z=0=	7071.1	BSTAR=	476.15	TR=	.539	BB0=	343.33	C0=	2.94	TC=C0=	.824	CR=P=	.00	I= 5	BBR= 681.08
THETA=135.0 Z=0=	14142.3	BSTAR=	638.70	TR=	.502	BB0=	343.33	C0=	2.94	TC=C0=	.625	CR=P=	.00	I= 6	BBR= 810.34
THETA=135.0 Z=0=	28284.5	BSTAR=	969.31	TR=	.459	BB0=	343.33	C0=	2.94	TC=C0=	.412	CR=P=	.00	I= 7	BBR= 1126.98
THETA=135.0 Z=0=	42426.8	BSTAR=	1154.77	TR=	.438	BB0=	343.33	C0=	2.94	TC=C0=	.336	CR=P=	.01	I= 8	BBR= 1315.01
THETA=135.0 Z=0=	56569.0	BSTAR=	1261.58	TR=	.426	BB0=	343.33	C0=	2.94	TC=C0=	.306	CR=P=	.01	I= 9	BBR= 1407.77
THETA=135.0 Z=0=	70711.3	BSTAR=	1291.12	TR=	.420	BB0=	343.33	C0=	2.94	TC=C0=	.296	CR=P=	.02	I= 10	BBR= 1435.17
THETA=135.0 Z=0=	141422.5	BSTAR=	1314.00	TR=	.411	BB0=	343.33	C0=	2.94	TC=C0=	.286	CR=P=	.06	I= 11	BBR= 1455.10
THETA=135.0 Z=0=	282845.0	BSTAR=	1316.35	TR=	.410	BB0=	343.33	C0=	2.94	TC=C0=	.285	CR=P=	.20	I= 12	BBR= 1457.14
THETA=135.0 Z=0=	424267.5	BSTAR=	1316.37	TR=	.410	BB0=	343.33	C0=	2.94	TC=C0=	.285	CR=P=	.45	I= 13	BBR= 1457.15

CURVES INTERSECT AT AX= .28452 AY= 329144.50197

THETA=120.0 Z=0=	1000.0	BSTAR=	140.71	TR=	.783	BB0=	380.16	C0=	2.23	TC=C0=	1.517	CR=P=	.00	I= 1	BBR= 438.24
THETA=120.0 Z=0=	2000.0	BSTAR=	257.71	TR=	.593	BB0=	380.16	C0=	2.23	TC=C0=	1.042	CR=P=	.00	I= 2	BBR= 483.01
THETA=120.0 Z=0=	3000.0	BSTAR=	354.91	TR=	.503	BB0=	380.16	C0=	2.23	TC=C0=	.782	CR=P=	.00	I= 3	BBR= 546.20
THETA=120.0 Z=0=	4000.1	BSTAR=	417.01	TR=	.461	BB0=	380.16	C0=	2.23	TC=C0=	.661	CR=P=	.00	I= 4	BBR= 592.19
THETA=120.0 Z=0=	5000.1	BSTAR=	471.91	TR=	.445	BB0=	380.16	C0=	2.23	TC=C0=	.590	CR=P=	.00	I= 5	BBR= 641.14
THETA=120.0 Z=0=	10000.1	BSTAR=	645.61	TR=	.417	BB0=	380.16	C0=	2.23	TC=C0=	.440	CR=P=	.00	I= 6	BBR= 804.13
THETA=120.0 Z=0=	20000.3	BSTAR=	860.72	TR=	.370	BB0=	380.16	C0=	2.23	TC=C0=	.314	CR=P=	.00	I= 7	BBR= 1001.00
THETA=120.0 Z=0=	30000.4	BSTAR=	1055.12	TR=	.344	BB0=	380.16	C0=	2.23	TC=C0=	.246	CR=P=	.01	I= 8	BBR= 1185.79
THETA=120.0 Z=0=	40000.5	BSTAR=	1181.11	TR=	.327	BB0=	380.16	C0=	2.23	TC=C0=	.213	CR=P=	.01	I= 9	BBR= 1305.52
THETA=120.0 Z=0=	50000.7	BSTAR=	1253.11	TR=	.316	BB0=	380.16	C0=	2.23	TC=C0=	.196	CR=P=	.02	I= 10	BBR= 1373.43
THETA=120.0 Z=0=	100001.3	BSTAR=	1320.73	TR=	.300	BB0=	380.16	C0=	2.23	TC=C0=	.177	CR=P=	.06	I= 11	BBR= 1434.58
THETA=120.0 Z=0=	200002.6	BSTAR=	1328.36	TR=	.296	BB0=	380.16	C0=	2.23	TC=C0=	.175	CR=P=	.20	I= 12	BBR= 1440.98

CURVES INTERSECT AT AX= .17519 AY= 180265.52450

THETA=105.0 Z=0=	517.7	BSTAR=	117.33	TR=	.808	RBO=	422.33	CO=	1.97	TC*CO=	1.464	CR*P=	.00	I=	1	BBR=	458.39
THETA=105.0 Z=0=	1035.3	BSTAR=	224.83	TR=	.687	RBO=	422.33	CO=	1.97	TC*CO=	1.109	CR*P=	.00	I=	2	BBR=	515.12
THETA=105.0 Z=0=	1553.0	BSTAR=	349.68	TR=	.539	RBO=	422.33	CO=	1.97	TC*CO=	.775	CR*P=	.00	I=	3	BBR=	577.15
THETA=105.0 Z=0=	2070.6	BSTAR=	469.33	TR=	.402	RBO=	422.33	CO=	1.97	TC*CO=	.522	CR*P=	.00	I=	4	BBR=	638.90
THETA=105.0 Z=0=	2588.3	BSTAR=	555.99	TR=	.326	RBO=	422.33	CO=	1.97	TC*CO=	.391	CR*P=	.00	I=	5	BBR=	693.58
THETA=105.0 Z=0=	5176.5	BSTAR=	799.83	TR=	.230	RBO=	422.33	CO=	1.97	TC*CO=	.213	CR*P=	.00	I=	6	BBR=	897.14
THETA=105.0 Z=0=	10353.0	BSTAR=	1146.91	TR=	.202	RBO=	422.33	CO=	1.97	TC*CO=	.136	CR*P=	.00	I=	7	BBR=	1232.14
THETA=105.0 Z=0=	15529.5	BSTAR=	1308.17	TR=	.177	RBO=	422.33	CO=	1.97	TC*CO=	.106	CR*P=	.01	I=	8	BBR=	1383.12
THETA=105.0 Z=0=	20706.1	BSTAR=	1493.26	TR=	.160	RBO=	422.33	CO=	1.97	TC*CO=	.085	CR*P=	.01	I=	9	BBR=	1560.59
THETA=105.0 Z=0=	25882.6	BSTAR=	1663.94	TR=	.148	RBO=	422.33	CO=	1.97	TC*CO=	.071	CR*P=	.02	I=	10	BBR=	1726.25
THETA=105.0 Z=0=	51765.1	BSTAR=	2074.23	TR=	.119	RBO=	422.33	CO=	1.97	TC*CO=	.046	CR*P=	.06	I=	11	BBR=	2124.36

CURVES INTERSECT AT AX= .05066 AY= 47315.77401

THETA=100.0 Z=0=	347.2	BSTAR=	162.68	TR=	.819	RBO=	450.25	CO=	1.84	TC*CO=	1.274	CR*P=	.00	I=	1	BBR=	531.53
THETA=100.0 Z=0=	694.5	BSTAR=	314.26	TR=	.744	RBO=	450.25	CO=	1.84	TC*CO=	.947	CR*P=	.00	I=	2	BBR=	649.12
THETA=100.0 Z=0=	1041.7	BSTAR=	458.05	TR=	.606	RBO=	450.25	CO=	1.84	TC*CO=	.686	CR*P=	.00	I=	3	BBR=	731.18
THETA=100.0 Z=0=	1389.0	BSTAR=	544.93	TR=	.480	RBO=	450.25	CO=	1.84	TC*CO=	.522	CR*P=	.00	I=	4	BBR=	761.13
THETA=100.0 Z=0=	1736.2	BSTAR=	631.81	TR=	.394	RBO=	450.25	CO=	1.84	TC*CO=	.402	CR*P=	.00	I=	5	BBR=	809.18
THETA=100.0 Z=0=	3472.4	BSTAR=	897.26	TR=	.190	RBO=	450.25	CO=	1.84	TC*CO=	.129	CR*P=	.00	I=	6	BBR=	964.43
THETA=100.0 Z=0=	6944.9	BSTAR=	1228.66	TR=	.113	RBO=	450.25	CO=	1.84	TC*CO=	.073	CR*P=	.00	I=	7	BBR=	1279.57
THETA=100.0 Z=0=	10417.3	BSTAR=	1412.89	TR=	.098	RBO=	450.25	CO=	1.84	TC*CO=	.056	CR*P=	.01	I=	8	BBR=	1457.15
THETA=100.0 Z=0=	13889.8	BSTAR=	1544.14	TR=	.086	RBO=	450.25	CO=	1.84	TC*CO=	.045	CR*P=	.01	I=	9	BBR=	1582.90
THETA=100.0 Z=0=	17362.2	BSTAR=	1679.65	TR=	.078	RBO=	450.25	CO=	1.84	TC*CO=	.038	CR*P=	.02	I=	10	BBR=	1714.34
THETA=100.0 Z=0=	34724.4	BSTAR=	2193.15	TR=	.055	RBO=	450.25	CO=	1.84	TC*CO=	.021	CR*P=	.06	I=	11	BBR=	2218.10

CURVES INTERSECT AT AX= .03153 AY= 23608.12207

THETA= 95.0 Z=0=	174.2	BSTAR=	145.94	TR=	.826	RBO=	490.15	CO=	1.69	TC*CO=	1.243	CR*P=	.00	I=	1	BBR=	550.52
THETA= 95.0 Z=0=	348.4	BSTAR=	290.76	TR=	.746	RBO=	490.15	CO=	1.69	TC*CO=	.957	CR*P=	.00	I=	2	BBR=	646.52
THETA= 95.0 Z=0=	522.6	BSTAR=	415.58	TR=	.662	RBO=	490.15	CO=	1.69	TC*CO=	.741	CR*P=	.00	I=	3	BBR=	740.18
THETA= 95.0 Z=0=	696.8	BSTAR=	550.41	TR=	.616	RBO=	490.15	CO=	1.69	TC*CO=	.599	CR*P=	.00	I=	4	BBR=	852.32
THETA= 95.0 Z=0=	871.0	BSTAR=	685.23	TR=	.517	RBO=	490.15	CO=	1.69	TC*CO=	.456	CR*P=	.00	I=	5	BBR=	938.54
THETA= 95.0 Z=0=	1741.9	BSTAR=	972.07	TR=	.175	RBO=	490.15	CO=	1.69	TC*CO=	.137	CR*P=	.00	I=	6	BBR=	1057.99
THETA= 95.0 Z=0=	3483.8	BSTAR=	1190.24	TR=	.027	RBO=	490.15	CO=	1.69	TC*CO=	.018	CR*P=	.00	I=	7	BBR=	1193.24
THETA= 95.0 Z=0=	5225.8	BSTAR=	1257.33	TR=	.017	RBO=	490.15	CO=	1.69	TC*CO=	.011	CR*P=	.01	I=	8	BBR=	1275.91
THETA= 95.0 Z=0=	6967.7	BSTAR=	1342.24	TR=	.016	RBO=	490.15	CO=	1.69	TC*CO=	.010	CR*P=	.01	I=	9	BBR=	1350.11

CURVES INTERSECT AT AX= .01028 AY= 6438.13485

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 180 DEGRFES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 0 ALTITUDE = 605880 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 119819 ALTITUDE = 521672 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 243432 ALTITUDE = 421667 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 329123 ALTITUDE = 329144 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 312207 ALTITUDE = 180266 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 176563 ALTITUDE = 47316 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 133890 ALTITUDE = 23608 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 13626 ALTITUDE = 6439 CONTRAST IS POSITIVE

COORDINATES FOR PLOTTING 4 CROSS SECTIONS. X = HORIZONTAL Z = VERTICAL

X1	Z1	X2	Z2	X3	Z3	X4	Z4
808092	8038	825594	6507	931791	5965	826662	6414
710791	33362	746957	26985	764976	23808	761490	24423
647179	67751	702640	52889	717132	49005	709697	50998
375524	302828	523147	217592	599451	173535	598737	173947

132460	767589	501607	398418	567499	332523	607599	292420
419617	832110	588338	539856	635989	457315	647764	436919
695995	761154	718267	678055	752770	549324	751397	554447
900000	605880	900000	605880	900000	605880	900000	605880
1039819	521672	1048603	554447	1047230	549324	1081733	678055
1143432	421667	1152236	436919	1164011	457315	1211662	539856
1229123	329144	1192401	292420	1232501	332523	1298393	398418
1212207	180266	1201263	173947	1200549	173535	1276853	217592
1076563	47316	1090303	50998	1082868	49005	1097360	52889
1033890	23608	1038510	24423	1035024	23808	1051043	26985
973626	6439	973338	6414	969209	5965	974406	6507
AXSL= 1800000.0	CSLX= 18000.0	CS.Y= 1620000.0	AXLW= 900000.0	AXLY= 0			
NTGDM= 100	NAINC= 180000	NPROR= 50					
CURRENT ELAPSED TIME IS 0 MINUTES 36 SECONDS.							

PROGRAM PDV1

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C ...PROGRAM PDV1...1NOV,65...BARKDOLL...VISLAR...UCSD
C ...PDV1= PROBABILITY OF DETECTION VOLUME PHASE 1
C ...THIS PROGRAM PROVIDES INPUT DATA FOR THE
C ...SOLUTION OF A PROBABILITY OF TARGET DETECTION VOLUME.
C ...THE CALLED SEQUENCE OF PROGRAMS WILL PRINT THE
C ...ALTITUDE AND DISTANCE FROM THE TARGET AXIS FOR
C ...8 DOWNWARD LOOKING ZENITHS OF PATH OF SIGHT,
C ...THETA=100,105,110,115,120,125,130,135 DEGREES AND
C ...FOR 5 AZIMUTHS OF PATH OF SIGHT WITH RESPECT
C ...TO THE SUN, PHI=0,45,90,135,180 DEGREES.
C ...THE PROGRAM WILL ALSO PLOT THESE POINTS AS
C ...4 HEMISPHERIC CROSS SECTIONS,
C
C ...VARIABLE INPUTS...
C ...OPT=OPTION FOR ATMOSPHERIC AND OPTICAL SYSTEM
C ...OPT=0 FOR VIEWING THROUGH ATMOSPHERE ONLY
C ...OPT=-1 FOR OPTICS AND NO ATMOSPHERE
C ...OPT=+1 FOR OPTICS AND AN ATMOSPHERE
C ...FNUMB=FLIGHT NUMBER FOR ATMOSPHERIC DATA
C ...OPTNU=OPTICAL SYSTEM INDEX NUMBER
C ...DIAM=TARGET DIAMETER IN FT.,NOT TO EXCEED 100 FT.
C ...OBJ=INDEX FOR DIRECTIONAL REFLECTANCE PROPERTIES
C ...OF TARGET OBJECT
C ...BAC=INDEX FOR DIRECTIONAL REFLECTANCE PROPERTIES
C ...OF BACKGROUND
C ...PROBK=CONSTANT FOR DEVIATION FROM 50 PERCENT
C ...PROBABILITY,1. FOR 50,1.206 FOR 70, 1.56 FOR 90, AND
C ...1.91 FOR 99 PERCENT PROBABILITY OF DETECTION
C ...NPROB=INTEGER REPRESENTING PROBABILITY
C ...SW1=SWITCH FOR OUTPUT PRINTING, 1 FOR CALCULATIONS
C ...AND COORDINATES, 0 FOR COORDINATES ONLY
C ...SW2=SWITCH FOR PLOTTING, 1 IF PLOT IS DESIRED
C ...0 FOR NO PLOT
C ...
C ...CALLED PROGRAMS=TCAL
C
C OPT=-1.
C FNUMB=74.
C DIAM=100.
C OBJ=1.
C BAC=1.
C PROBK=1.
C NPROB=50
C SW1=1.
C SW2=1.
C CALL DATA1
C CALL DATA2
C CALL DATA 3
C CALL TCAL(OPT,FNUMB,OPTNU,DIAM,OBJ,BAC,PROBK,NPROB,
C 1SW1,SW2)
C CALL PREP(9)
C END

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TARGET DETECTION FOR INFINITE VIEWING TIME

PATH OF SIGHT THROUGH OPTICAL SYSTEM AND NO ATMOSPHERE

PROGRAM DATA FROM FLIGHT NUMBER 74

PROBABILITY OF DETECTION IS 50 PERCENT

TARGET DIAMETER IN FT. = 100

BACKGROUND FOR TARGET IS PINE TREES

TARGET IS SPHERICAL AND PAINTED GRAY

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 0 DEGREES

THETA=180.0 Z=D= 2000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .00 I= 1 BBR= 189.13
THETA=180.0 Z=D= 4000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .00 I= 2 BBR= 189.13
THETA=180.0 Z=D= 6000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .00 I= 3 BBR= 189.13
THETA=180.0 Z=D= 8000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .00 I= 4 BBR= 189.13
THETA=180.0 Z=D= 10000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .00 I= 5 BBR= 189.13
THETA=180.0 Z=D= 20000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .00 I= 6 BBR= 189.13
THETA=180.0 Z=D= 40000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .01 I= 7 BBR= 189.13
THETA=180.0 Z=D= 60000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .01 I= 8 BBR= 189.13
THETA=180.0 Z=D= 80000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .01 I= 9 BBR= 189.13
THETA=180.0 Z=D= 100000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .02 I=10 BBR= 189.13
THETA=180.0 Z=D= 200000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .07 I=11 BBR= 189.13
THETA=180.0 Z=D= 400000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .27 I=12 BBR= 189.13
THETA=180.0 Z=D= 600000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= .59 I=13 BBR= 189.13
THETA=180.0 Z=D= 800000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= 1.05 I=14 BBR= 189.13
THETA=180.0 Z=D=1000000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= 1.65 I=15 BBR= 189.13
THETA=180.0 Z=D=1500000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= 3.71 I=16 BBR= 189.13
THETA=180.0 Z=D=2000000.0 BSTAR= 11.11 TR= .900 BBO= 197.80 C0= 4.95 TC=C0= 4.655 CR=P= 6.54 I=17 BBR= 189.13

CURVES INTERSECT AT AX= 4.65338 AY= 1667644.05591

THETA=165.0 Z=D= 1931.8 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .00 I= 1 BBR= 139.95
THETA=165.0 Z=D= 3863.6 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .00 I= 2 BBR= 139.95
THETA=165.0 Z=D= 5795.4 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .00 I= 3 BBR= 139.95
THETA=165.0 Z=D= 7727.2 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .00 I= 4 BBR= 139.95
THETA=165.0 Z=D= 9659.0 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .00 I= 5 BBR= 139.95
THETA=165.0 Z=D= 19318.0 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .00 I= 6 BBR= 139.95
THETA=165.0 Z=D= 38636.1 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .01 I= 7 BBR= 139.95
THETA=165.0 Z=D= 57954.1 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .01 I= 8 BBR= 139.95
THETA=165.0 Z=D= 77272.2 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .01 I= 9 BBR= 139.95
THETA=165.0 Z=D= 96590.2 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .02 I=10 BBR= 139.95
THETA=165.0 Z=D= 193180.5 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .07 I=11 BBR= 139.95
THETA=165.0 Z=D= 386360.9 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .27 I=12 BBR= 139.95
THETA=165.0 Z=D= 579541.4 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= .60 I=13 BBR= 139.95
THETA=165.0 Z=D= 772721.9 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= 1.07 I=14 BBR= 139.95
THETA=165.0 Z=D= 965902.4 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= 1.68 I=15 BBR= 139.95
THETA=165.0 Z=D=1448853.6 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= 3.76 I=16 BBR= 139.95
THETA=165.0 Z=D=1931804.7 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P= 6.63 I=17 BBR= 139.95
THETA=165.0 Z=D=2414755.9 BSTAR= 11.11 TR= .900 BBO= 143.15 C0= 8.75 TC=C0= 8.056 CR=P=10.39 I=18 BBR= 139.95

CURVES INTERSECT AT AX= 8.05626 AY= 2115034.18878

THETA=150.0 Z=D= 1732.1 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .00 I= 1 BBR= 125.52
THETA=150.0 Z=D= 3464.1 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .00 I= 2 BBR= 125.52
THETA=150.0 Z=D= 5196.2 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .00 I= 3 BBR= 125.52
THETA=150.0 Z=D= 6928.2 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .00 I= 4 BBR= 125.52
THETA=150.0 Z=D= 8660.3 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .00 I= 5 BBR= 125.52
THETA=150.0 Z=D= 17320.6 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .00 I= 6 BBR= 125.52
THETA=150.0 Z=D= 34641.2 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .01 I= 7 BBR= 125.52
THETA=150.0 Z=D= 51961.8 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .01 I= 8 BBR= 125.52
THETA=150.0 Z=D= 69282.4 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .01 I= 9 BBR= 125.52
THETA=150.0 Z=D= 86603.0 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .02 I=10 BBR= 125.52
THETA=150.0 Z=D= 173206.0 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .07 I=11 BBR= 125.52
THETA=150.0 Z=D= 346411.9 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .28 I=12 BBR= 125.52
THETA=150.0 Z=D= 519617.9 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= .61 I=13 BBR= 125.52
THETA=150.0 Z=D= 692823.8 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= 1.07 I=14 BBR= 125.52
THETA=150.0 Z=D= 866029.8 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= 1.68 I=15 BBR= 125.52
THETA=150.0 Z=D=1299044.7 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= 3.78 I=16 BBR= 125.52
THETA=150.0 Z=D=1732059.6 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P= 6.66 I=17 BBR= 125.52
THETA=150.0 Z=D=2165074.5 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P=10.43 I=18 BBR= 125.52
THETA=150.0 Z=D=2598089.4 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P=15.08 I=19 BBR= 125.52
THETA=150.0 Z=D=3464119.2 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 18.16 TC=C0=16.551 CR=P=26.81 I=20 BBR= 125.52

CURVES INTERSECT AT AX= 16.55139 AY= 2706779.30414

THETA=135.0 Z=D= 1414.2 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .00 I= 1 BBR= 125.52
THETA=135.0 Z=D= 2828.5 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .00 I= 2 BBR= 125.52
THETA=135.0 Z=D= 4242.7 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .00 I= 3 BBR= 125.52
THETA=135.0 Z=D= 5656.9 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .00 I= 4 BBR= 125.52
THETA=135.0 Z=D= 7071.1 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .00 I= 5 BBR= 125.52
THETA=135.0 Z=D= 14142.3 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .00 I= 6 BBR= 125.52
THETA=135.0 Z=D= 28284.5 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .01 I= 7 BBR= 125.52
THETA=135.0 Z=D= 42426.8 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .01 I= 8 BBR= 125.52
THETA=135.0 Z=D= 56569.0 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .01 I= 9 BBR= 125.52
THETA=135.0 Z=D= 70711.3 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .02 I=10 BBR= 125.52
THETA=135.0 Z=D= 141422.5 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .07 I=11 BBR= 125.52
THETA=135.0 Z=D= 282845.0 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .28 I=12 BBR= 125.52
THETA=135.0 Z=D= 424267.5 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= .61 I=13 BBR= 125.52
THETA=135.0 Z=D= 565690.0 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= 1.07 I=14 BBR= 125.52
THETA=135.0 Z=D= 707112.6 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= 1.68 I=15 BBR= 125.52
THETA=135.0 Z=D=1060668.8 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= 3.78 I=16 BBR= 125.52
THETA=135.0 Z=D=1414225.1 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P= 6.66 I=17 BBR= 125.52
THETA=135.0 Z=D=1767781.4 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P=10.43 I=18 BBR= 125.52
THETA=135.0 Z=D=2121337.7 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P=15.08 I=19 BBR= 125.52
THETA=135.0 Z=D=2828450.2 BSTAR= 11.11 TR= .900 BBO= 127.12 C0= 27.50 TC=C0=25.070 CR=P=26.81 I=20 BBR= 125.52

CURVES INTERSECT AT AX= 25.06985 AY= 2723664.52417

THETA=120.0 Z=D= 1000.0 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .00 I= 1 BBR= 150.44
THETA=120.0 Z=D= 2000.0 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .00 I= 2 BBR= 150.44
THETA=120.0 Z=D= 3000.0 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .00 I= 3 BBR= 150.44
THETA=120.0 Z=D= 4000.1 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .00 I= 4 BBR= 150.44
THETA=120.0 Z=D= 5000.1 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .00 I= 5 BBR= 150.44
THETA=120.0 Z=D= 10000.1 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .00 I= 6 BBR= 150.44
THETA=120.0 Z=D= 20000.3 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .01 I= 7 BBR= 150.44
THETA=120.0 Z=D= 30000.4 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .01 I= 8 BBR= 150.44
THETA=120.0 Z=D= 40000.5 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .01 I= 9 BBR= 150.44
THETA=120.0 Z=D= 50000.7 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .02 I=10 BBR= 150.44
THETA=120.0 Z=D= 100001.3 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .07 I=11 BBR= 150.44
THETA=120.0 Z=D= 200002.6 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .27 I=12 BBR= 150.44
THETA=120.0 Z=D= 300003.9 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= .60 I=13 BBR= 150.44
THETA=120.0 Z=D= 400005.2 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= 1.07 I=14 BBR= 150.44
THETA=120.0 Z=D= 500006.5 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= 1.67 I=15 BBR= 150.44
THETA=120.0 Z=D= 750009.8 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= 3.75 I=16 BBR= 150.44
THETA=120.0 Z=D=1000013.1 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P= 6.61 I=17 BBR= 150.44
THETA=120.0 Z=D=1250016.3 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P=10.35 I=18 BBR= 150.44
THETA=120.0 Z=D=1500019.6 BSTAR= 11.11 TR= .900 BBO= 155.03 CO= 11.45 TC*CO=10.607 CR*P=14.97 I=19 BBR= 150.44

CURVES INTERSECT AT AX= 10.60742 AY= 1263761.91306

THETA=105.0 Z=D= 517.7 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .00 I= 1 BBR= 213.72
THETA=105.0 Z=D= 1035.3 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .00 I= 2 BBR= 213.72
THETA=105.0 Z=D= 1553.0 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .00 I= 3 BBR= 213.72
THETA=105.0 Z=D= 2070.6 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .00 I= 4 BBR= 213.72
THETA=105.0 Z=D= 2588.3 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .00 I= 5 BBR= 213.72
THETA=105.0 Z=D= 5176.5 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .00 I= 6 BBR= 213.72
THETA=105.0 Z=D= 10353.0 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .01 I= 7 BBR= 213.72
THETA=105.0 Z=D= 15529.5 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .01 I= 8 BBR= 213.72
THETA=105.0 Z=D= 20706.1 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .01 I= 9 BBR= 213.72
THETA=105.0 Z=D= 25882.6 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .02 I=10 BBR= 213.72
THETA=105.0 Z=D= 51765.1 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .07 I=11 BBR= 213.72
THETA=105.0 Z=D= 103530.3 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .27 I=12 BBR= 213.72
THETA=105.0 Z=D= 155295.4 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= .59 I=13 BBR= 213.72
THETA=105.0 Z=D= 207060.6 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= 1.05 I=14 BBR= 213.72
THETA=105.0 Z=D= 258825.7 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= 1.64 I=15 BBR= 213.72
THETA=105.0 Z=D= 388238.6 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= 3.68 I=16 BBR= 213.72
THETA=105.0 Z=D= 517651.5 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P= 6.49 I=17 BBR= 213.72
THETA=105.0 Z=D= 647064.4 BSTAR= 11.11 TR= .900 BBO= 225.13 CO= 7.81 TC*CO= 7.407 CR*P=10.15 I=18 BBR= 213.72

CURVES INTERSECT AT AX= 7.40650 AY= 558055.43394

THETA=100.0 Z=D= 347.2 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .00 I= 1 BBR= 258.53
THETA=100.0 Z=D= 694.5 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .00 I= 2 BBR= 258.53
THETA=100.0 Z=D= 1041.7 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .00 I= 3 BBR= 258.53
THETA=100.0 Z=D= 1389.0 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .00 I= 4 BBR= 258.53
THETA=100.0 Z=D= 1736.2 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .00 I= 5 BBR= 258.53
THETA=100.0 Z=D= 3472.4 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .00 I= 6 BBR= 258.53
THETA=100.0 Z=D= 6944.9 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .01 I= 7 BBR= 258.53
THETA=100.0 Z=D= 10417.3 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .01 I= 8 BBR= 258.53
THETA=100.0 Z=D= 13889.6 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .01 I= 9 BBR= 258.53
THETA=100.0 Z=D= 17362.2 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .02 I=10 BBR= 258.53
THETA=100.0 Z=D= 34724.4 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .07 I=11 BBR= 258.53
THETA=100.0 Z=D= 69448.8 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .27 I=12 BBR= 258.53
THETA=100.0 Z=D= 104173.2 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= .58 I=13 BBR= 258.53
THETA=100.0 Z=D= 138897.6 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= 1.03 I=14 BBR= 258.53
THETA=100.0 Z=D= 173622.0 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= 1.62 I=15 BBR= 258.53
THETA=100.0 Z=D= 260433.0 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= 3.63 I=16 BBR= 258.53
THETA=100.0 Z=D= 347244.0 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P= 6.40 I=17 BBR= 258.53
THETA=100.0 Z=D= 434055.0 BSTAR= 11.11 TR= .900 BBO= 275.02 CO= 7.25 TC*CO= 6.939 CR*P=10.01 I=18 BBR= 258.53

CURVES INTERSECT AT AX= 6.93905 AY= 360142.32948

THETA= 95.0 Z=D= 174.2 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .00 I= 1 BBR= 470.33
THETA= 95.0 Z=D= 348.4 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .00 I= 2 BBR= 470.33
THETA= 95.0 Z=D= 522.6 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .00 I= 3 BBR= 470.33
THETA= 95.0 Z=D= 696.8 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .00 I= 4 BBR= 470.33
THETA= 95.0 Z=D= 871.0 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .00 I= 5 BBR= 470.33
THETA= 95.0 Z=D= 1741.9 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .00 I= 6 BBR= 470.33
THETA= 95.0 Z=D= 3483.8 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .01 I= 7 BBR= 470.33
THETA= 95.0 Z=D= 5225.5 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .01 I= 8 BBR= 470.33
THETA= 95.0 Z=D= 6967.7 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .01 I= 9 BBR= 470.33
THETA= 95.0 Z=D= 8709.8 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .02 I=10 BBR= 470.33
THETA= 95.0 Z=D= 17419.2 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .07 I=11 BBR= 470.33
THETA= 95.0 Z=D= 34838.3 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .25 I=12 BBR= 470.33
THETA= 95.0 Z=D= 52257.5 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .54 I=13 BBR= 470.33
THETA= 95.0 Z=D= 69676.7 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= .96 I=14 BBR= 470.33
THETA= 95.0 Z=D= 87095.8 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= 1.51 I=15 BBR= 470.33
THETA= 95.0 Z=D= 130643.8 BSTAR= 11.11 TR= .900 BBO= 510.25 CO= 3.45 TC*CO= 3.366 CR*P= 3.39 I=16 BBR= 470.33

CURVES INTERSECT AT AX= 3.36560 AY= 130005.43046

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 0 DEGREES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 5 ALTITUDE = 1667644 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 566873 ALTITUDE = 2115034 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 1562643 ALTITUDE = 2706779 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 2723491 ALTITUDE = 2723665 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 2188742 ALTITUDE = 1263762 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 2052583 ALTITUDE = 550055 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 2042504 ALTITUDE = 360142 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 1486593 ALTITUDE = 130005 CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 45 DEGREES

THETA=180.0 Z=0	2000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.00 I=	1 BBR=	189.13
THETA=180.0 Z=0	4000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.00 I=	2 BBR=	189.13
THETA=180.0 Z=0	6000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.00 I=	3 BBR=	189.13
THETA=180.0 Z=0	8000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.00 I=	4 BBR=	189.13
THETA=180.0 Z=0	10000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.00 I=	5 BBR=	189.13
THETA=180.0 Z=0	20000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.00 I=	6 BBR=	189.13
THETA=180.0 Z=0	40000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.01 I=	7 BBR=	189.13
THETA=180.0 Z=0	60000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.01 I=	8 BBR=	189.13
THETA=180.0 Z=0	80000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.01 I=	9 BBR=	189.13
THETA=180.0 Z=0	100000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.02 I=	10 BBR=	189.13
THETA=180.0 Z=0	200000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.07 I=	11 BBR=	189.13
THETA=180.0 Z=0	400000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.27 I=	12 BBR=	189.13
THETA=180.0 Z=0	600000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	.59 I=	13 BBR=	189.13
THETA=180.0 Z=0	800000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	1.05 I=	14 BBR=	189.13
THETA=180.0 Z=0	1000000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	1.65 I=	15 BBR=	189.13
THETA=180.0 Z=0	1500000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	3.71 I=	16 BBR=	189.13
THETA=180.0 Z=0	2000000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 CO=	4.95 TC*CO=	4.655 CR*P=	6.54 I=	17 BBR=	189.13

CURVES INTERSECT AT AX= 4.65538 AY= 1667644.05591

THETA=165.0 Z=0	1931.8 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.00 I=	1 BBR=	129.79
THETA=165.0 Z=0	3863.6 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.00 I=	2 BBR=	129.79
THETA=165.0 Z=0	5795.4 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.00 I=	3 BBR=	129.79
THETA=165.0 Z=0	7727.2 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.00 I=	4 BBR=	129.79
THETA=165.0 Z=0	9659.0 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.00 I=	5 BBR=	129.79
THETA=165.0 Z=0	19318.0 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.00 I=	6 BBR=	129.79
THETA=165.0 Z=0	38636.1 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.01 I=	7 BBR=	129.79
THETA=165.0 Z=0	57954.1 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.01 I=	8 BBR=	129.79
THETA=165.0 Z=0	77272.2 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.01 I=	9 BBR=	129.79
THETA=165.0 Z=0	96590.2 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.02 I=	10 BBR=	129.79
THETA=165.0 Z=0	193180.5 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.07 I=	11 BBR=	129.79
THETA=165.0 Z=0	386360.9 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.28 I=	12 BBR=	129.79
THETA=165.0 Z=0	579541.4 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	.61 I=	13 BBR=	129.79
THETA=165.0 Z=0	772721.9 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	1.07 I=	14 BBR=	129.79
THETA=165.0 Z=0	965902.4 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	1.68 I=	15 BBR=	129.79
THETA=165.0 Z=0	1448853.6 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	3.77 I=	16 BBR=	129.79
THETA=165.0 Z=0	1931804.7 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	6.65 I=	17 BBR=	129.79
THETA=165.0 Z=0	2414755.9 BSTAR=	11.11 TR=	.900 BBO=	131.87 CO=	9.09 TC*CO=	8.312 CR*P=	10.42 I=	18 BBR=	129.79

CURVES INTERSECT AT AX= 8.31192 AY= 2144655.23987

THETA=150.0 Z=0	1732.1 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.00 I=	1 BBR=	119.10
THETA=150.0 Z=0	3464.1 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.00 I=	2 BBR=	119.10
THETA=150.0 Z=0	5196.2 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.00 I=	3 BBR=	119.10
THETA=150.0 Z=0	6928.2 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.00 I=	4 BBR=	119.10
THETA=150.0 Z=0	8660.3 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.00 I=	5 BBR=	119.10
THETA=150.0 Z=0	17320.6 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.00 I=	6 BBR=	119.10
THETA=150.0 Z=0	34641.2 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.01 I=	7 BBR=	119.10
THETA=150.0 Z=0	51961.8 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.01 I=	8 BBR=	119.10
THETA=150.0 Z=0	69282.4 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.01 I=	9 BBR=	119.10
THETA=150.0 Z=0	86603.0 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.02 I=	10 BBR=	119.10
THETA=150.0 Z=0	173206.0 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.07 I=	11 BBR=	119.10
THETA=150.0 Z=0	346411.9 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.28 I=	12 BBR=	119.10
THETA=150.0 Z=0	519617.9 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	.61 I=	13 BBR=	119.10
THETA=150.0 Z=0	692823.8 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	1.08 I=	14 BBR=	119.10
THETA=150.0 Z=0	866029.8 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	1.69 I=	15 BBR=	119.10
THETA=150.0 Z=0	1299044.7 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	3.78 I=	16 BBR=	119.10
THETA=150.0 Z=0	1732059.6 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	6.67 I=	17 BBR=	119.10
THETA=150.0 Z=0	2165074.5 BSTAR=	11.11 TR=	.900 BBO=	119.99 CO=	8.41 TC*CO=	7.622 CR*P=	10.45 I=	18 BBR=	119.10

CURVES INTERSECT AT AX= 7.62173 AY= 1840884.23999

THETA=135.0 Z=D= 1414.2 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .00 I= 1 BBR= 114.92
THETA=135.0 Z=D= 2828.5 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .00 I= 2 BBR= 114.92
THETA=135.0 Z=D= 4242.7 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .00 I= 3 BBR= 114.92
THETA=135.0 Z=D= 5656.9 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .00 I= 4 BBR= 114.92
THETA=135.0 Z=D= 7071.1 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .00 I= 5 BBR= 114.92
THETA=135.0 Z=D= 14142.3 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .00 I= 6 BBR= 114.92
THETA=135.0 Z=D= 28284.5 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .01 I= 7 BBR= 114.92
THETA=135.0 Z=D= 42426.8 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .01 I= 8 BBR= 114.92
THETA=135.0 Z=D= 56569.0 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .01 I= 9 BBR= 114.92
THETA=135.0 Z=D= 70711.3 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .02 I=10 BBR= 114.92
THETA=135.0 Z=D= 141422.5 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .07 I=11 BBR= 114.92
THETA=135.0 Z=D= 282845.0 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .28 I=12 BBR= 114.92
THETA=135.0 Z=D= 424267.5 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= .61 I=13 BBR= 114.92
THETA=135.0 Z=D= 565690.0 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= 1.08 I=14 BBR= 114.92
THETA=135.0 Z=D= 707112.6 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= 1.69 I=15 BBR= 114.92
THETA=135.0 Z=D=1060668.8 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= 3.79 I=16 BBR= 114.92
THETA=135.0 Z=D=1414225.1 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P= 6.68 I=17 BBR= 114.92
THETA=135.0 Z=D=1767781.4 BSTAR= 11.11 TR= .900 BBO= 115.24 C0= 8.48 TC=C0= 7.664 CR=P=10.47 I=18 BBR= 114.92

CURVES INTERSECT AT AX= 7.68351 AY= 1506085.15417

THETA=120.0 Z=D= 1000.0 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .00 I= 1 BBR= 123.38
THETA=120.0 Z=D= 2000.0 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .00 I= 2 BBR= 123.38
THETA=120.0 Z=D= 3000.0 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .00 I= 3 BBR= 123.38
THETA=120.0 Z=D= 4000.1 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .00 I= 4 BBR= 123.38
THETA=120.0 Z=D= 5000.1 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .00 I= 5 BBR= 123.38
THETA=120.0 Z=D= 10000.1 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .00 I= 6 BBR= 123.38
THETA=120.0 Z=D= 20000.3 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .01 I= 7 BBR= 123.38
THETA=120.0 Z=D= 30000.4 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .01 I= 8 BBR= 123.38
THETA=120.0 Z=D= 40000.5 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .01 I= 9 BBR= 123.38
THETA=120.0 Z=D= 50000.7 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .02 I=10 BBR= 123.38
THETA=120.0 Z=D= 100001.3 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .07 I=11 BBR= 123.38
THETA=120.0 Z=D= 200002.6 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .28 I=12 BBR= 123.38
THETA=120.0 Z=D= 300003.9 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= .61 I=13 BBR= 123.38
THETA=120.0 Z=D= 400005.2 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= 1.07 I=14 BBR= 123.38
THETA=120.0 Z=D= 500006.5 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= 1.69 I=15 BBR= 123.38
THETA=120.0 Z=D= 750009.8 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= 3.78 I=16 BBR= 123.38
THETA=120.0 Z=D=1000013.1 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P= 6.66 I=17 BBR= 123.38
THETA=120.0 Z=D=1250016.3 BSTAR= 11.11 TR= .900 BBO= 124.74 C0= 7.90 TC=C0= 7.193 CR=P=10.44 I=18 BBR= 123.38

CURVES INTERSECT AT AX= 7.19287 AY= 1035101.55829

THETA=105.0 Z=D= 517.7 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .00 I= 1 BBR= 173.09
THETA=105.0 Z=D= 1035.3 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .00 I= 2 BBR= 173.09
THETA=105.0 Z=D= 1553.0 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .00 I= 3 BBR= 173.09
THETA=105.0 Z=D= 2070.6 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .00 I= 4 BBR= 173.09
THETA=105.0 Z=D= 2588.3 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .00 I= 5 BBR= 173.09
THETA=105.0 Z=D= 5176.5 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .00 I= 6 BBR= 173.09
THETA=105.0 Z=D= 10353.0 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .01 I= 7 BBR= 173.09
THETA=105.0 Z=D= 15529.5 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .01 I= 8 BBR= 173.09
THETA=105.0 Z=D= 20706.1 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .01 I= 9 BBR= 173.09
THETA=105.0 Z=D= 25882.6 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .02 I=10 BBR= 173.09
THETA=105.0 Z=D= 51765.1 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .07 I=11 BBR= 173.09
THETA=105.0 Z=D= 103530.3 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .27 I=12 BBR= 173.09
THETA=105.0 Z=D= 155295.4 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= .60 I=13 BBR= 173.09
THETA=105.0 Z=D= 207060.6 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= 1.06 I=14 BBR= 173.09
THETA=105.0 Z=D= 258825.7 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= 1.66 I=15 BBR= 173.09
THETA=105.0 Z=D= 388238.6 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= 3.72 I=16 BBR= 173.09
THETA=105.0 Z=D= 517651.5 BSTAR= 11.11 TR= .900 BBO= 179.98 C0= 5.37 TC=C0= 5.025 CR=P= 6.57 I=17 BBR= 173.09

CURVES INTERSECT AT AX= 5.02496 AY= 447442.56679

THETA=100.0 Z=D= 347.2 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .00 I= 1 BBR= 218.00
THETA=100.0 Z=D= 694.5 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .00 I= 2 BBR= 218.00
THETA=100.0 Z=D= 1041.7 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .00 I= 3 BBR= 218.00
THETA=100.0 Z=D= 1389.0 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .00 I= 4 BBR= 218.00
THETA=100.0 Z=D= 1736.2 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .00 I= 5 BBR= 218.00
THETA=100.0 Z=D= 3472.4 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .00 I= 6 BBR= 218.00
THETA=100.0 Z=D= 6944.9 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .01 I= 7 BBR= 218.00
THETA=100.0 Z=D= 10417.3 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .01 I= 8 BBR= 218.00
THETA=100.0 Z=D= 13889.8 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .01 I= 9 BBR= 218.00
THETA=100.0 Z=D= 17362.2 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .02 I=10 BBR= 218.00
THETA=100.0 Z=D= 34724.4 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .07 I=11 BBR= 218.00
THETA=100.0 Z=D= 69448.8 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .27 I=12 BBR= 218.00
THETA=100.0 Z=D= 104173.2 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= .59 I=13 BBR= 218.00
THETA=100.0 Z=D= 138897.6 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= 1.04 I=14 BBR= 218.00
THETA=100.0 Z=D= 173622.0 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= 1.64 I=15 BBR= 218.00
THETA=100.0 Z=D= 260433.0 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= 3.67 I=16 BBR= 218.00
THETA=100.0 Z=D= 347244.0 BSTAR= 11.11 TR= .900 BBO= 229.88 C0= 4.43 TC=C0= 4.201 CR=P= 6.48 I=17 BBR= 218.00

CURVES INTERSECT AT AX= 4.20075 AY= 276714.23695

THETA= 95.0 Z=D=	174.2 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.00 I=	1 BBR=	304.51
THETA= 95.0 Z=D=	348.4 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.00 I=	2 BBR=	304.51
THETA= 95.0 Z=D=	522.6 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.00 I=	3 BBR=	304.51
THETA= 95.0 Z=D=	696.8 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.00 I=	4 BBR=	304.51
THETA= 95.0 Z=D=	871.0 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.00 I=	5 BBR=	304.51
THETA= 95.0 Z=D=	1741.9 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.00 I=	6 BBR=	304.51
THETA= 95.0 Z=D=	3483.8 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.01 I=	7 BBR=	304.51
THETA= 95.0 Z=D=	5225.8 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.01 I=	8 BBR=	304.51
THETA= 95.0 Z=D=	6967.7 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.01 I=	9 BBR=	304.51
THETA= 95.0 Z=D=	8709.6 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.02 I=	10 BBR=	304.51
THETA= 95.0 Z=D=	17419.2 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.07 I=	11 BBR=	304.51
THETA= 95.0 Z=D=	34838.3 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.26 I=	12 BBR=	304.51
THETA= 95.0 Z=D=	52257.5 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	.57 I=	13 BBR=	304.51
THETA= 95.0 Z=D=	69676.7 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	1.02 I=	14 BBR=	304.51
THETA= 95.0 Z=D=	87095.8 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	1.60 I=	15 BBR=	304.51
THETA= 95.0 Z=D=	130643.8 BSTAR=	11.11 TR=	.900 BBO=	326.11 C0=	2.83 TC=C0=	2.722 CR=P=	3.58 I=	16 BBR=	304.51

CURVES INTERSECT AT AX= 2.72208 AY= 111835.46144

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 45 DEGREES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 5 ALTITUDE = 1667644 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 574813 ALTITUDE = 2144655 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 1062755 ALTITUDE = 1840884 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 1505989 ALTITUDE = 1506085 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 1792719 ALTITUDE = 1035102 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 1669674 ALTITUDE = 447443 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 1569351 ALTITUDE = 276714 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 1278822 ALTITUDE = 111835 CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 90 DEGREES

THETA=180.0 Z=D=	2000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	1 BBR=	189.13
THETA=180.0 Z=D=	4000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	2 BBR=	189.13
THETA=180.0 Z=D=	6000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	3 BBR=	189.13
THETA=180.0 Z=D=	8000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	4 BBR=	189.13
THETA=180.0 Z=D=	10000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	5 BBR=	189.13
THETA=180.0 Z=D=	20000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	6 BBR=	189.13
THETA=180.0 Z=D=	40000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.01 I=	7 BBR=	189.13
THETA=180.0 Z=D=	60000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.01 I=	8 BBR=	189.13
THETA=180.0 Z=D=	80000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.01 I=	9 BBR=	189.13
THETA=180.0 Z=D=	100000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.02 I=	10 BBR=	189.13
THETA=180.0 Z=D=	200000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.07 I=	11 BBR=	189.13
THETA=180.0 Z=D=	400000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.27 I=	12 BBR=	189.13
THETA=180.0 Z=D=	600000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.59 I=	13 BBR=	189.13
THETA=180.0 Z=D=	800000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	1.05 I=	14 BBR=	189.13
THETA=180.0 Z=D=	1000000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	1.65 I=	15 BBR=	189.13
THETA=180.0 Z=D=	1500000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	3.71 I=	16 BBR=	189.13
THETA=180.0 Z=D=	2000000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	6.54 I=	17 BBR=	189.13

CURVES INTERSECT AT AX= 4.65538 AY= 1667644.05591

THETA=165.0 Z=D=	1931.0 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.00 I=	1 BBR=	179.51
THETA=165.0 Z=D=	3863.6 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.00 I=	2 BBR=	179.51
THETA=165.0 Z=D=	5795.4 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.00 I=	3 BBR=	179.51
THETA=165.0 Z=D=	7727.2 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.00 I=	4 BBR=	179.51
THETA=165.0 Z=D=	9659.0 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.00 I=	5 BBR=	179.51
THETA=165.0 Z=D=	19318.0 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.00 I=	6 BBR=	179.51
THETA=165.0 Z=D=	38636.1 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.01 I=	7 BBR=	179.51
THETA=165.0 Z=D=	57954.1 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.01 I=	8 BBR=	179.51
THETA=165.0 Z=D=	77272.2 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.01 I=	9 BBR=	179.51
THETA=165.0 Z=D=	96590.2 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.02 I=	10 BBR=	179.51
THETA=165.0 Z=D=	193180.5 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.07 I=	11 BBR=	179.51
THETA=165.0 Z=D=	386360.9 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.27 I=	12 BBR=	179.51
THETA=165.0 Z=D=	579541.4 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	.60 I=	13 BBR=	179.51
THETA=165.0 Z=D=	772721.9 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	1.06 I=	14 BBR=	179.51
THETA=165.0 Z=D=	965902.4 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	1.66 I=	15 BBR=	179.51
THETA=165.0 Z=D=	1448853.6 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	3.72 I=	16 BBR=	179.51
THETA=165.0 Z=D=	1931804.7 BSTAR=	11.11 TR=	.900 BBO=	187.11 C0=	4.40 TC=C0=	4.125 CR=P=	6.56 I=	17 BBR=	179.51

CURVES INTERSECT AT AX= 4.12468 AY= 1518199.92462

THETA=150.0 Z=D=	1732.1	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.00	I=	1	BBR=	177.37
THETA=150.0 Z=D=	3464.1	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.00	I=	2	BBR=	177.37
THETA=150.0 Z=D=	5196.2	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.00	I=	3	BBR=	177.37
THETA=150.0 Z=D=	6928.2	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.00	I=	4	BBR=	177.37
THETA=150.0 Z=D=	8660.3	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.00	I=	5	BBR=	177.37
THETA=150.0 Z=D=	17320.6	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.00	I=	6	BBR=	177.37
THETA=150.0 Z=D=	34641.2	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.01	I=	7	BBR=	177.37
THETA=150.0 Z=D=	51961.8	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.01	I=	8	BBR=	177.37
THETA=150.0 Z=D=	69282.4	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.01	I=	9	BBR=	177.37
THETA=150.0 Z=D=	86603.0	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.02	I=	10	BBR=	177.37
THETA=150.0 Z=D=	173206.0	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.07	I=	11	BBR=	177.37
THETA=150.0 Z=D=	346411.9	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.27	I=	12	BBR=	177.37
THETA=150.0 Z=D=	519617.9	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	.60	I=	13	BBR=	177.37
THETA=150.0 Z=D=	692823.8	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	1.06	I=	14	BBR=	177.37
THETA=150.0 Z=D=	866029.8	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	1.66	I=	15	BBR=	177.37
THETA=150.0 Z=D=	1299044.7	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	3.72	I=	16	BBR=	177.37
THETA=150.0 Z=D=	1732059.6	BSTAR=	11.11	TR=	.900	BB0=	184.73	C0=	4.11	TC=C0=	3.855	CR=P=	6.56	I=	17	BBR=	177.37

CURVES INTERSECT AT AX= 3.85492 AY= 1319683.63943

THETA=135.0 Z=D=	1414.2	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.00	I=	1	BBR=	180.58
THETA=135.0 Z=D=	2828.5	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.00	I=	2	BBR=	180.58
THETA=135.0 Z=D=	4242.7	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.00	I=	3	BBR=	180.58
THETA=135.0 Z=D=	5656.9	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.00	I=	4	BBR=	180.58
THETA=135.0 Z=D=	7071.1	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.00	I=	5	BBR=	180.58
THETA=135.0 Z=D=	14142.3	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.00	I=	6	BBR=	180.58
THETA=135.0 Z=D=	28284.5	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.01	I=	7	BBR=	180.58
THETA=135.0 Z=D=	42426.8	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.01	I=	8	BBR=	180.58
THETA=135.0 Z=D=	56569.0	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.01	I=	9	BBR=	180.58
THETA=135.0 Z=D=	70711.3	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.02	I=	10	BBR=	180.58
THETA=135.0 Z=D=	141422.5	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.07	I=	11	BBR=	180.58
THETA=135.0 Z=D=	282845.0	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.27	I=	12	BBR=	180.58
THETA=135.0 Z=D=	424267.5	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	.60	I=	13	BBR=	180.58
THETA=135.0 Z=D=	565690.0	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	1.06	I=	14	BBR=	180.58
THETA=135.0 Z=D=	707112.6	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	1.66	I=	15	BBR=	180.58
THETA=135.0 Z=D=	1060668.8	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.95	TC=C0=	3.709	CR=P=	3.72	I=	16	BBR=	180.58

CURVES INTERSECT AT AX= 3.70947 AY= 1059547.43411

THETA=120.0 Z=D=	1000.0	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.00	I=	1	BBR=	180.58
THETA=120.0 Z=D=	2000.0	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.00	I=	2	BBR=	180.58
THETA=120.0 Z=D=	3000.0	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.00	I=	3	BBR=	180.58
THETA=120.0 Z=D=	4000.1	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.00	I=	4	BBR=	180.58
THETA=120.0 Z=D=	5000.1	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.00	I=	5	BBR=	180.58
THETA=120.0 Z=D=	10000.1	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.00	I=	6	BBR=	180.58
THETA=120.0 Z=D=	20000.3	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.01	I=	7	BBR=	180.58
THETA=120.0 Z=D=	30000.4	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.01	I=	8	BBR=	180.58
THETA=120.0 Z=D=	40000.5	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.01	I=	9	BBR=	180.58
THETA=120.0 Z=D=	50000.7	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.02	I=	10	BBR=	180.58
THETA=120.0 Z=D=	100001.3	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.07	I=	11	BBR=	180.58
THETA=120.0 Z=D=	200002.6	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.27	I=	12	BBR=	180.58
THETA=120.0 Z=D=	300003.9	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	.60	I=	13	BBR=	180.58
THETA=120.0 Z=D=	400005.2	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	1.06	I=	14	BBR=	180.58
THETA=120.0 Z=D=	500006.5	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	1.66	I=	15	BBR=	180.58
THETA=120.0 Z=D=	750009.8	BSTAR=	11.11	TR=	.900	BB0=	188.30	C0=	3.92	TC=C0=	3.680	CR=P=	3.72	I=	16	BBR=	180.58

CURVES INTERSECT AT AX= 3.67987 AY= 749621.34659

THETA=105.0 Z=D=	517.7	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.00	I=	1	BBR=	191.27
THETA=105.0 Z=D=	1035.3	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.00	I=	2	BBR=	191.27
THETA=105.0 Z=D=	1553.0	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.00	I=	3	BBR=	191.27
THETA=105.0 Z=D=	2070.6	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.00	I=	4	BBR=	191.27
THETA=105.0 Z=D=	2588.3	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.00	I=	5	BBR=	191.27
THETA=105.0 Z=D=	5176.5	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.00	I=	6	BBR=	191.27
THETA=105.0 Z=D=	10353.0	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.01	I=	7	BBR=	191.27
THETA=105.0 Z=D=	15529.5	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.01	I=	8	BBR=	191.27
THETA=105.0 Z=D=	20706.1	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.01	I=	9	BBR=	191.27
THETA=105.0 Z=D=	25882.6	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.02	I=	10	BBR=	191.27
THETA=105.0 Z=D=	51765.1	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.07	I=	11	BBR=	191.27
THETA=105.0 Z=D=	103530.3	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.27	I=	12	BBR=	191.27
THETA=105.0 Z=D=	155295.4	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	.59	I=	13	BBR=	191.27
THETA=105.0 Z=D=	207060.6	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	1.05	I=	14	BBR=	191.27
THETA=105.0 Z=D=	258825.7	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	1.65	I=	15	BBR=	191.27
THETA=105.0 Z=D=	388238.6	BSTAR=	11.11	TR=	.900	BB0=	200.18	C0=	3.54	TC=C0=	3.334	CR=P=	3.70	I=	16	BBR=	191.27

CURVES INTERSECT AT AX= 3.33441 AY= 364922.59957

THETA=100.0 Z=D=	347.2	BSTAR=	11.11	TR=	.900	BB0=	229.88	C0=	2.93	TC=C0=	2.778	CR=P=	.00	I=	1	BBR=	218.30
THETA=100.0 Z=D=	694.5	BSTAR=	11.11	TR=	.900	BB0=	229.88	C0=	2.93	TC=C0=	2.778	CR=P=	.00	I=	2	BBR=	218.30
THETA=100.0 Z=D=	1041.7	BSTAR=	11.11	TR=	.900	BB0=	229.88	C0=	2.93	TC=C0=	2.778	CR=P=	.00	I=	3	BBR=	218.30
THETA=100.0 Z=D=	1389.0	BSTAR=	11.11	TR=	.900	BB0=	229.88	C0=	2.93	TC=C0=	2.778	CR=P=	.00	I=	4	BBR=	218.30
THETA=100.0 Z=D=	1736.2	BSTAR=	11.11	TR=	.900	BB0=	229.88	C0=	2.93	TC=C0=	2.778	CR=P=	.00	I=	5	BBR=	218.30
THETA=100.0 Z=D=	3472.4	BSTAR=	11.11	TR=	.900	BB0=	229.88	C0=	2.93	TC=C0=	2.778	CR=P=	.00	I=	6	BBR=	218.30

THETA=100.0 Z=0	6944.9	BSTAR=	11.11	TR=	.900	BBO=	229.88	CO=	2.93	TC=CO=	2.778	CR=P=	.01	I=	7	BBR=	218.00
THETA=100.0 Z=0	10417.3	BSTAR=	11.11	TR=	.900	BBO=	229.88	CO=	2.93	TC=CO=	2.778	CR=P=	.01	I=	8	BBR=	218.00
THETA=100.0 Z=0	13889.8	BSTAR=	11.11	TR=	.900	BBO=	229.88	CO=	2.93	TC=CO=	2.778	CR=P=	.01	I=	9	BBR=	218.00
THETA=100.0 Z=0	17362.2	BSTAR=	11.11	TR=	.900	BBO=	229.88	CO=	2.93	TC=CO=	2.778	CR=P=	.02	I=	10	BBR=	218.00
THETA=100.0 Z=0	34724.4	BSTAR=	11.11	TR=	.900	BBO=	229.88	CO=	2.93	TC=CO=	2.778	CR=P=	.07	I=	11	BBR=	218.00
THETA=100.0 Z=0	69448.8	BSTAR=	11.11	TR=	.900	BBO=	229.88	CO=	2.93	TC=CO=	2.778	CR=P=	.27	I=	12	BBR=	218.00
THETA=100.0 Z=0	104173.2	BSTAR=	11.11	TR=	.900	BBO=	229.88	CO=	2.93	TC=CO=	2.778	CR=P=	.59	I=	13	BBR=	218.00
THETA=100.0 Z=0	138897.6	BSTAR=	11.11	TR=	.900	BBO=	229.88	CO=	2.93	TC=CO=	2.778	CR=P=	1.04	I=	14	BBR=	218.00
THETA=100.0 Z=0	173622.0	BSTAR=	11.11	TR=	.900	BBO=	229.88	CO=	2.93	TC=CO=	2.778	CR=P=	1.64	I=	15	BBR=	218.00
THETA=100.0 Z=0	260433.0	BSTAR=	11.11	TR=	.900	BBO=	229.88	CO=	2.93	TC=CO=	2.778	CR=P=	3.67	I=	16	BBR=	218.00

CURVES INTERSECT AT AX= 2.77843 AY= 222219.59030

THETA= 95.0 Z=0	174.2	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.00	I=	1	BBR=	258.63
THETA= 95.0 Z=0	348.4	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.00	I=	2	BBR=	258.63
THETA= 95.0 Z=0	522.6	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.00	I=	3	BBR=	258.63
THETA= 95.0 Z=0	696.8	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.00	I=	4	BBR=	258.63
THETA= 95.0 Z=0	871.0	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.00	I=	5	BBR=	258.63
THETA= 95.0 Z=0	1741.9	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.00	I=	6	BBR=	258.63
THETA= 95.0 Z=0	3483.8	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.01	I=	7	BBR=	258.63
THETA= 95.0 Z=0	5225.8	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.01	I=	8	BBR=	258.63
THETA= 95.0 Z=0	6967.7	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.01	I=	9	BBR=	258.63
THETA= 95.0 Z=0	8709.6	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.02	I=	10	BBR=	258.63
THETA= 95.0 Z=0	17419.2	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.07	I=	11	BBR=	258.63
THETA= 95.0 Z=0	34838.3	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.27	I=	12	BBR=	258.63
THETA= 95.0 Z=0	52257.5	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	.58	I=	13	BBR=	258.63
THETA= 95.0 Z=0	69676.7	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	1.03	I=	14	BBR=	258.63
THETA= 95.0 Z=0	87095.8	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	1.62	I=	15	BBR=	258.63
THETA= 95.0 Z=0	130643.8	BSTAR=	11.11	TR=	.900	BBO=	275.02	CO=	2.26	TC=CO=	2.164	CR=P=	3.63	I=	16	BBR=	258.63

CURVES INTERSECT AT AX= 2.16419 AY= 98905.46765

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 90 DEGREES

ZENITH OF PATH OF SIGHT = 180	DISTANCE TO TARGET AXIS =	5	ALTITUDE =	1667644	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 165	DISTANCE TO TARGET AXIS =	406909	ALTITUDE =	1518200	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 150	DISTANCE TO TARGET AXIS =	761863	ALTITUDE =	1319684	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 135	DISTANCE TO TARGET AXIS =	1059480	ALTITUDE =	1059547	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 120	DISTANCE TO TARGET AXIS =	1291361	ALTITUDE =	745621	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 105	DISTANCE TO TARGET AXIS =	1361743	ALTITUDE =	364923	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 100	DISTANCE TO TARGET AXIS =	1260291	ALTITUDE =	222220	CONTRAST IS POSITIVE
ZENITH OF PATH OF SIGHT = 95	DISTANCE TO TARGET AXIS =	1130970	ALTITUDE =	98905	CONTRAST IS POSITIVE

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 135 DEGREES

THETA=180.0 Z=0	2000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.00	I=	1	BBR=	189.13
THETA=180.0 Z=0	4000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.00	I=	2	BBR=	189.13
THETA=180.0 Z=0	6000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.00	I=	3	BBR=	189.13
THETA=180.0 Z=0	8000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.00	I=	4	BBR=	189.13
THETA=180.0 Z=0	10000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.00	I=	5	BBR=	189.13
THETA=180.0 Z=0	20000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.00	I=	6	BBR=	189.13
THETA=180.0 Z=0	40000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.01	I=	7	BBR=	189.13
THETA=180.0 Z=0	60000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.01	I=	8	BBR=	189.13
THETA=180.0 Z=0	80000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.01	I=	9	BBR=	189.13
THETA=180.0 Z=0	100000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.02	I=	10	BBR=	189.13
THETA=180.0 Z=0	200000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.07	I=	11	BBR=	189.13
THETA=180.0 Z=0	400000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.27	I=	12	BBR=	189.13
THETA=180.0 Z=0	600000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	.59	I=	13	BBR=	189.13
THETA=180.0 Z=0	800000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	1.05	I=	14	BBR=	189.13
THETA=180.0 Z=0	1000000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	1.65	I=	15	BBR=	189.13
THETA=180.0 Z=0	1500000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	3.71	I=	16	BBR=	189.13
THETA=180.0 Z=0	2000000.0	BSTAR=	11.11	TR=	.900	BBO=	197.80	CO=	4.95	TC=CO=	4.655	CR=P=	6.54	I=	17	BBR=	189.13

CURVES INTERSECT AT AX= 4.65538 AY= 1667644.05591

THETA=165.0 Z=0	1931.8	BSTAR=	11.11	TR=	.900	BBO=	198.99	CO=	4.43	TC=CO=	4.174	CR=P=	.00	I=	1	BBR=	190.20
THETA=165.0 Z=0	3863.6	BSTAR=	11.11	TR=	.900	BBO=	198.99	CO=	4.43	TC=CO=	4.174	CR=P=	.00	I=	2	BBR=	190.20

THETA=165.0	Z=0	5795.4	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.00	I=	3	BBR=	190.20
THETA=165.0	Z=0	7727.2	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.00	I=	4	BBR=	190.20
THETA=165.0	Z=0	9659.0	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.00	I=	5	BBR=	190.20
THETA=165.0	Z=0	19318.0	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.00	I=	6	BBR=	190.20
THETA=165.0	Z=0	38636.1	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.01	I=	7	BBR=	190.20
THETA=165.0	Z=0	57954.1	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.01	I=	8	BBR=	190.20
THETA=165.0	Z=0	77272.2	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.01	I=	9	BBR=	190.20
THETA=165.0	Z=0	96590.2	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.02	I=	10	BBR=	190.20
THETA=165.0	Z=0	193180.5	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.07	I=	11	BBR=	190.20
THETA=165.0	Z=0	386360.9	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.27	I=	12	BBR=	190.20
THETA=165.0	Z=0	579541.4	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	.59	I=	13	BBR=	190.20
THETA=165.0	Z=0	772721.9	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	1.05	I=	14	BBR=	190.20
THETA=165.0	Z=0	965902.4	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	1.65	I=	15	BBR=	190.20
THETA=165.0	Z=0	1931805.6	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	3.71	I=	16	BBR=	190.20
THETA=165.0	Z=0	3863609.7	BSTAR=	11.11	TR=	.900	BBQ=	198.99	CO=	4.43	TC*CO=	4.174	CR*P=	6.53	I=	17	BBR=	190.20

CURVES INTERSECT AT AX= 4.17388 AY= 1528842.74527

THETA=150.0	Z=0	1732.1	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.00	I=	1	BBR=	215.33
THETA=150.0	Z=0	3464.1	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.00	I=	2	BBR=	215.33
THETA=150.0	Z=0	5196.2	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.00	I=	3	BBR=	215.33
THETA=150.0	Z=0	6928.2	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.00	I=	4	BBR=	215.33
THETA=150.0	Z=0	8660.3	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.00	I=	5	BBR=	215.33
THETA=150.0	Z=0	17320.6	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.00	I=	6	BBR=	215.33
THETA=150.0	Z=0	34641.2	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.01	I=	7	BBR=	215.33
THETA=150.0	Z=0	51961.8	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.01	I=	8	BBR=	215.33
THETA=150.0	Z=0	69282.4	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.01	I=	9	BBR=	215.33
THETA=150.0	Z=0	86603.0	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.02	I=	10	BBR=	215.33
THETA=150.0	Z=0	173206.0	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.07	I=	11	BBR=	215.33
THETA=150.0	Z=0	346411.9	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.27	I=	12	BBR=	215.33
THETA=150.0	Z=0	519617.9	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	.59	I=	13	BBR=	215.33
THETA=150.0	Z=0	692823.8	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	1.04	I=	14	BBR=	215.33
THETA=150.0	Z=0	866029.8	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	1.64	I=	15	BBR=	215.33
THETA=150.0	Z=0	1299044.7	BSTAR=	11.11	TR=	.900	BBQ=	226.91	CO=	3.58	TC*CO=	3.396	CR*P=	3.68	I=	16	BBR=	215.33

CURVES INTERSECT AT AX= 3.39636 AY= 1239324.13342

THETA=135.0	Z=0	1414.2	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.00	I=	1	BBR=	220.57
THETA=135.0	Z=0	2828.5	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.00	I=	2	BBR=	220.57
THETA=135.0	Z=0	4242.7	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.00	I=	3	BBR=	220.57
THETA=135.0	Z=0	5656.9	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.00	I=	4	BBR=	220.57
THETA=135.0	Z=0	7071.1	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.00	I=	5	BBR=	220.57
THETA=135.0	Z=0	14142.3	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.00	I=	6	BBR=	220.57
THETA=135.0	Z=0	28284.5	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.01	I=	7	BBR=	220.57
THETA=135.0	Z=0	42426.8	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.01	I=	8	BBR=	220.57
THETA=135.0	Z=0	56569.0	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.01	I=	9	BBR=	220.57
THETA=135.0	Z=0	70711.3	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.02	I=	10	BBR=	220.57
THETA=135.0	Z=0	141422.5	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.07	I=	11	BBR=	220.57
THETA=135.0	Z=0	282845.0	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.27	I=	12	BBR=	220.57
THETA=135.0	Z=0	424267.5	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	.59	I=	13	BBR=	220.57
THETA=135.0	Z=0	565696.0	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	1.04	I=	14	BBR=	220.57
THETA=135.0	Z=0	707112.6	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	1.64	I=	15	BBR=	220.57
THETA=135.0	Z=0	1068668.8	BSTAR=	11.11	TR=	.900	BBQ=	232.85	CO=	3.41	TC*CO=	3.241	CR*P=	3.67	I=	16	BBR=	220.57

CURVES INTERSECT AT AX= 3.24140 AY= 985921.58496

THETA=120.0	Z=0	1000.0	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.00	I=	1	BBR=	218.00
THETA=120.0	Z=0	2000.0	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.00	I=	2	BBR=	218.00
THETA=120.0	Z=0	3000.0	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.00	I=	3	BBR=	218.00
THETA=120.0	Z=0	4000.1	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.00	I=	4	BBR=	218.00
THETA=120.0	Z=0	5000.1	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.00	I=	5	BBR=	218.00
THETA=120.0	Z=0	10000.1	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.00	I=	6	BBR=	218.00
THETA=120.0	Z=0	20000.3	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.01	I=	7	BBR=	218.00
THETA=120.0	Z=0	30000.4	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.01	I=	8	BBR=	218.00
THETA=120.0	Z=0	40000.5	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.01	I=	9	BBR=	218.00
THETA=120.0	Z=0	50000.7	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.02	I=	10	BBR=	218.00
THETA=120.0	Z=0	100001.3	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.07	I=	11	BBR=	218.00
THETA=120.0	Z=0	200002.6	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.27	I=	12	BBR=	218.00
THETA=120.0	Z=0	300003.9	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	.59	I=	13	BBR=	218.00
THETA=120.0	Z=0	400005.2	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	1.04	I=	14	BBR=	218.00
THETA=120.0	Z=0	500006.5	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	1.64	I=	15	BBR=	218.00
THETA=120.0	Z=0	750009.8	BSTAR=	11.11	TR=	.900	BBQ=	229.88	CO=	3.52	TC*CO=	3.342	CR*P=	3.67	I=	16	BBR=	218.00

CURVES INTERSECT AT AX= 3.34246 AY= 709245.76660

THETA=105.0	Z=0	517.7	BSTAR=	11.11	TR=	.900	BBQ=	260.17	CO=	3.11	TC*CO=	2.969	CR*P=	.00	I=	1	BBR=	245.27
THETA=105.0	Z=0	1035.3	BSTAR=	11.11	TR=	.900	BBQ=	260.17	CO=	3.11	TC*CO=	2.969	CR*P=	.00	I=	2	BBR=	245.27
THETA=105.0	Z=0	1553.0	BSTAR=	11.11	TR=	.900	BBQ=	260.17	CO=	3.11	TC*CO=	2.969	CR*P=	.00	I=	3	BBR=	245.27
THETA=105.0	Z=0	2070.6	BSTAR=	11.11	TR=	.900	BBQ=	260.17	CO=	3.11	TC*CO=	2.969	CR*P=	.00	I=	4	BBR=	245.27
THETA=105.0	Z=0	2588.3	BSTAR=	11.11	TR=	.900	BBQ=	260.17	CO=	3.11	TC*CO=	2.969	CR*P=	.00	I=	5	BBR=	245.27
THETA=105.0	Z=0	5176.5	BSTAR=	11.11	TR=	.900	BBQ=	260.17	CO=	3.11	TC*CO=	2.969	CR*P=	.00	I=	6	BBR=	245.27
THETA=105.0	Z=0	10353.0	BSTAR=	11.11	TR=	.900	BBQ=	260.17	CO=	3.11	TC*CO=	2.969	CR*P=	.01	I=	7	BBR=	245.27
THETA=105.0	Z=0	15329.5	BSTAR=	11.11	TR=	.900	BBQ=	260.17	CO=	3.11	TC*CO=	2.969	CR*P=	.01	I=	8	BBR=	245.27

THETA=105.0 Z=D=	20706.1	BSTAR=	11.11	TR=	.900	BB0=	260.17	C0=	3.11	TC=C0=	2.969	CR=P=	.01	I=	9	BBR=	245.27
THETA=105.0 Z=D=	25882.6	BSTAR=	11.11	TR=	.900	BB0=	260.17	C0=	3.11	TC=C0=	2.969	CR=P=	.02	I=	10	BBR=	245.27
THETA=105.0 Z=D=	51765.1	BSTAR=	11.11	TR=	.900	BB0=	260.17	C0=	3.11	TC=C0=	2.969	CR=P=	.07	I=	11	BBR=	245.27
THETA=105.0 Z=D=	103530.3	BSTAR=	11.11	TR=	.900	BB0=	260.17	C0=	3.11	TC=C0=	2.969	CR=P=	.27	I=	12	BBR=	245.27
THETA=105.0 Z=D=	155295.4	BSTAR=	11.11	TR=	.900	BB0=	260.17	C0=	3.11	TC=C0=	2.969	CR=P=	.58	I=	13	BBR=	245.27
THETA=105.0 Z=D=	207060.6	BSTAR=	11.11	TR=	.900	BB0=	260.17	C0=	3.11	TC=C0=	2.969	CR=P=	1.04	I=	14	BBR=	245.27
THETA=105.0 Z=D=	258825.7	BSTAR=	11.11	TR=	.900	BB0=	260.17	C0=	3.11	TC=C0=	2.969	CR=P=	1.63	I=	15	BBR=	245.27
THETA=105.0 Z=D=	388238.6	BSTAR=	11.11	TR=	.900	BB0=	260.17	C0=	3.11	TC=C0=	2.969	CR=P=	3.64	I=	16	BBR=	245.27

CURVES INTERSECT AT AX= 2.96872 AY= 344942.97360

THETA=100.0 Z=D=	347.2	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.00	I=	1	BBR=	258.63
THETA=100.0 Z=D=	694.5	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.00	I=	2	BBR=	258.63
THETA=100.0 Z=D=	1041.7	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.00	I=	3	BBR=	258.63
THETA=100.0 Z=D=	1389.0	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.00	I=	4	BBR=	258.63
THETA=100.0 Z=D=	1736.2	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.00	I=	5	BBR=	258.63
THETA=100.0 Z=D=	3472.4	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.00	I=	6	BBR=	258.63
THETA=100.0 Z=D=	6944.9	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.01	I=	7	BBR=	258.63
THETA=100.0 Z=D=	10417.3	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.01	I=	8	BBR=	258.63
THETA=100.0 Z=D=	13889.8	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.01	I=	9	BBR=	258.63
THETA=100.0 Z=D=	17362.2	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.02	I=	10	BBR=	258.63
THETA=100.0 Z=D=	34724.4	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.07	I=	11	BBR=	258.63
THETA=100.0 Z=D=	69448.8	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.27	I=	12	BBR=	258.63
THETA=100.0 Z=D=	104173.2	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	.58	I=	13	BBR=	258.63
THETA=100.0 Z=D=	138897.6	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	1.03	I=	14	BBR=	258.63
THETA=100.0 Z=D=	173622.0	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	1.62	I=	15	BBR=	258.63
THETA=100.0 Z=D=	260433.0	BSTAR=	11.11	TR=	.900	BB0=	275.02	C0=	2.93	TC=C0=	2.805	CR=P=	3.63	I=	16	BBR=	258.63

CURVES INTERSECT AT AX= 2.80497 AY= 224840.50816

THETA= 95.0 Z=D=	174.2	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.00	I=	1	BBR=	316.90
THETA= 95.0 Z=D=	348.4	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.00	I=	2	BBR=	316.90
THETA= 95.0 Z=D=	522.6	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.00	I=	3	BBR=	316.90
THETA= 95.0 Z=D=	696.8	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.00	I=	4	BBR=	316.90
THETA= 95.0 Z=D=	871.0	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.00	I=	5	BBR=	316.90
THETA= 95.0 Z=D=	1741.9	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.00	I=	6	BBR=	316.90
THETA= 95.0 Z=D=	3483.8	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.01	I=	7	BBR=	316.90
THETA= 95.0 Z=D=	5225.8	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.01	I=	8	BBR=	316.90
THETA= 95.0 Z=D=	6967.7	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.01	I=	9	BBR=	316.90
THETA= 95.0 Z=D=	8709.6	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.02	I=	10	BBR=	316.90
THETA= 95.0 Z=D=	17419.2	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.07	I=	11	BBR=	316.90
THETA= 95.0 Z=D=	34838.3	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.26	I=	12	BBR=	316.90
THETA= 95.0 Z=D=	52257.5	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	.57	I=	13	BBR=	316.90
THETA= 95.0 Z=D=	69676.7	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	1.01	I=	14	BBR=	316.90
THETA= 95.0 Z=D=	87095.8	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	1.59	I=	15	BBR=	316.90
THETA= 95.0 Z=D=	130643.8	BSTAR=	11.11	TR=	.900	BB0=	339.77	C0=	2.27	TC=C0=	2.190	CR=P=	3.56	I=	16	BBR=	316.90

CURVES INTERSECT AT AX= 2.18967 AY= 100317.12356

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 135 DEGREES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 5 ALTITUDE = 1667644 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 409762 ALTITUDE = 1528843 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 715471 ALTITUDE = 1239324 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 985859 ALTITUDE = 985922 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 1228361 ALTITUDE = 709246 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 1287187 ALTITUDE = 344943 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 1275156 ALTITUDE = 224841 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 1147112 ALTITUDE = 100317 CONTRAST IS POSITIVE

4210000 OF PATH OF SIGHT WITH RESPECT TO SUN IS 180 DEGREES

THETA=180.0 Z=D=	2000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	1 BBR=	189.13
THETA=180.0 Z=D=	4000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	2 BBR=	189.13
THETA=180.0 Z=D=	6000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	3 BBR=	189.13
THETA=180.0 Z=D=	8000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	4 BBR=	189.13
THETA=180.0 Z=D=	10000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	5 BBR=	189.13
THETA=180.0 Z=D=	20000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.00 I=	6 BBR=	189.13
THETA=180.0 Z=D=	40000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.01 I=	7 BBR=	189.13
THETA=180.0 Z=D=	60000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.01 I=	8 BBR=	189.13
THETA=180.0 Z=D=	80000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.01 I=	9 BBR=	189.13
THETA=180.0 Z=D=	100000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.02 I=	10 BBR=	189.13
THETA=180.0 Z=D=	200000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.07 I=	11 BBR=	189.13
THETA=180.0 Z=D=	400000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.27 I=	12 BBR=	189.13
THETA=180.0 Z=D=	600000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	.59 I=	13 BBR=	189.13
THETA=180.0 Z=D=	800000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	1.05 I=	14 BBR=	189.13
THETA=180.0 Z=D=	1000000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	1.65 I=	15 BBR=	189.13
THETA=180.0 Z=D=	2000000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	3.71 I=	16 BBR=	189.13
THETA=180.0 Z=D=	4000000.0 BSTAR=	11.11 TR=	.900 BBO=	197.80 C0=	4.95 TC=C0=	4.655 CR=P=	6.54 I=	17 BBR=	189.13

CURVES INTERSECT AT AX= 4.45538 AY= 1667644.05591

THETA=165.0 Z=D=	1931.8 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.00 I=	1 BBR=	226.02
THETA=165.0 Z=D=	3863.6 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.00 I=	2 BBR=	226.02
THETA=165.0 Z=D=	5795.4 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.00 I=	3 BBR=	226.02
THETA=165.0 Z=D=	7727.2 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.00 I=	4 BBR=	226.02
THETA=165.0 Z=D=	9659.0 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.00 I=	5 BBR=	226.02
THETA=165.0 Z=D=	19318.0 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.00 I=	6 BBR=	226.02
THETA=165.0 Z=D=	38636.1 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.01 I=	7 BBR=	226.02
THETA=165.0 Z=D=	57954.1 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.01 I=	8 BBR=	226.02
THETA=165.0 Z=D=	77272.2 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.01 I=	9 BBR=	226.02
THETA=165.0 Z=D=	96590.2 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.02 I=	10 BBR=	226.02
THETA=165.0 Z=D=	193180.5 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.07 I=	11 BBR=	226.02
THETA=165.0 Z=D=	386360.9 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.27 I=	12 BBR=	226.02
THETA=165.0 Z=D=	579541.4 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	.59 I=	13 BBR=	226.02
THETA=165.0 Z=D=	772721.9 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	1.04 I=	14 BBR=	226.02
THETA=165.0 Z=D=	965902.4 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	1.64 I=	15 BBR=	226.02
THETA=165.0 Z=D=	1448853.6 BSTAR=	11.11 TR=	.900 BBO=	238.79 C0=	3.85 TC=C0=	3.661 CR=P=	3.67 I=	16 BBR=	226.02

CURVES INTERSECT AT AX= 3.66144 AY= 1447920.77249

THETA=150.0 Z=D=	1732.1 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.00 I=	1 BBR=	248.47
THETA=150.0 Z=D=	3464.1 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.00 I=	2 BBR=	248.47
THETA=150.0 Z=D=	5196.2 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.00 I=	3 BBR=	248.47
THETA=150.0 Z=D=	6928.2 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.00 I=	4 BBR=	248.47
THETA=150.0 Z=D=	8660.3 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.00 I=	5 BBR=	248.47
THETA=150.0 Z=D=	17320.6 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.00 I=	6 BBR=	248.47
THETA=150.0 Z=D=	34641.2 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.01 I=	7 BBR=	248.47
THETA=150.0 Z=D=	51961.8 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.01 I=	8 BBR=	248.47
THETA=150.0 Z=D=	69282.4 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.01 I=	9 BBR=	248.47
THETA=150.0 Z=D=	86603.0 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.02 I=	10 BBR=	248.47
THETA=150.0 Z=D=	173206.0 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.07 I=	11 BBR=	248.47
THETA=150.0 Z=D=	346411.9 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.27 I=	12 BBR=	248.47
THETA=150.0 Z=D=	519617.9 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	.58 I=	13 BBR=	248.47
THETA=150.0 Z=D=	692823.8 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	1.03 I=	14 BBR=	248.47
THETA=150.0 Z=D=	866029.8 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	1.62 I=	15 BBR=	248.47
THETA=150.0 Z=D=	1299044.7 BSTAR=	11.11 TR=	.900 BBO=	263.74 C0=	3.64 TC=C0=	3.477 CR=P=	3.64 I=	16 BBR=	248.47

CURVES INTERSECT AT AX= 3.47688 AY= 1263938.66122

THETA=135.0 Z=D=	1414.2 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.00 I=	1 BBR=	320.11
THETA=135.0 Z=D=	2828.5 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.00 I=	2 BBR=	320.11
THETA=135.0 Z=D=	4242.7 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.00 I=	3 BBR=	320.11
THETA=135.0 Z=D=	5656.9 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.00 I=	4 BBR=	320.11
THETA=135.0 Z=D=	7071.1 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.00 I=	5 BBR=	320.11
THETA=135.0 Z=D=	14142.3 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.00 I=	6 BBR=	320.11
THETA=135.0 Z=D=	28284.5 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.01 I=	7 BBR=	320.11
THETA=135.0 Z=D=	42426.8 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.01 I=	8 BBR=	320.11
THETA=135.0 Z=D=	56569.0 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.01 I=	9 BBR=	320.11
THETA=135.0 Z=D=	70711.3 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.02 I=	10 BBR=	320.11
THETA=135.0 Z=D=	141422.5 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.07 I=	11 BBR=	320.11
THETA=135.0 Z=D=	282845.0 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.26 I=	12 BBR=	320.11
THETA=135.0 Z=D=	424267.5 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	.57 I=	13 BBR=	320.11
THETA=135.0 Z=D=	565690.0 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	1.01 I=	14 BBR=	320.11
THETA=135.0 Z=D=	707112.6 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	1.59 I=	15 BBR=	320.11
THETA=135.0 Z=D=	1060668.8 BSTAR=	11.11 TR=	.900 BBO=	343.33 C0=	2.94 TC=C0=	2.842 CR=P=	3.56 I=	16 BBR=	320.11

CURVES INTERSECT AT AX= 2.84243 AY= 931898.97212

THETA=120.0 Z=D=	1000.0 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.00 I=	1 BBR=	353.26
THETA=120.0 Z=D=	2000.0 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.00 I=	2 BBR=	353.26
THETA=120.0 Z=D=	3000.0 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.00 I=	3 BBR=	353.26
THETA=120.0 Z=D=	4000.1 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.00 I=	4 BBR=	353.26
THETA=120.0 Z=D=	5000.1 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.00 I=	5 BBR=	353.26

THETA=120.0 Z=D=	10000.1 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.00 I=	6 BBR=	353.26
THETA=120.0 Z=D=	20000.3 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.01 I=	7 BBR=	353.26
THETA=120.0 Z=D=	30000.4 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.01 I=	8 BBR=	353.26
THETA=120.0 Z=D=	40000.5 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.01 I=	9 BBR=	353.26
THETA=120.0 Z=D=	50000.7 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.02 I=	10 BBR=	353.26
THETA=120.0 Z=D=	100001.3 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.07 I=	11 BBR=	353.26
THETA=120.0 Z=D=	200002.6 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.26 I=	12 BBR=	353.26
THETA=120.0 Z=D=	300003.9 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	.57 I=	13 BBR=	353.26
THETA=120.0 Z=D=	400005.2 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	1.00 I=	14 BBR=	353.26
THETA=120.0 Z=D=	500006.5 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	1.57 I=	15 BBR=	353.26
THETA=120.0 Z=D=	750009.8 BSTAR=	11.11 TR=	.900 BBO=	380.16 C0=	2.23 TC=C0=	2.164 CR=P=	3.52 I=	16 BBR=	353.26

CURVES INTERSECT AT AX= 2.16410 AY= 575803.16029

THETA=105.0 Z=D=	517.7 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.00 I=	1 BBR=	391.21
THETA=105.0 Z=D=	1035.3 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.00 I=	2 BBR=	391.21
THETA=105.0 Z=D=	1553.0 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.00 I=	3 BBR=	391.21
THETA=105.0 Z=D=	2070.6 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.00 I=	4 BBR=	391.21
THETA=105.0 Z=D=	2588.3 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.00 I=	5 BBR=	391.21
THETA=105.0 Z=D=	5176.5 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.00 I=	6 BBR=	391.21
THETA=105.0 Z=D=	10353.0 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.01 I=	7 BBR=	391.21
THETA=105.0 Z=D=	15529.5 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.01 I=	8 BBR=	391.21
THETA=105.0 Z=D=	20706.1 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.01 I=	9 BBR=	391.21
THETA=105.0 Z=D=	25882.6 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.02 I=	10 BBR=	391.21
THETA=105.0 Z=D=	51765.1 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.07 I=	11 BBR=	391.21
THETA=105.0 Z=D=	103530.3 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.25 I=	12 BBR=	391.21
THETA=105.0 Z=D=	155295.4 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.56 I=	13 BBR=	391.21
THETA=105.0 Z=D=	207060.6 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	.99 I=	14 BBR=	391.21
THETA=105.0 Z=D=	258825.7 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	1.55 I=	15 BBR=	391.21
THETA=105.0 Z=D=	388238.6 BSTAR=	11.11 TR=	.900 BBO=	422.33 C0=	1.97 TC=C0=	1.912 CR=P=	3.48 I=	16 BBR=	391.21

CURVES INTERSECT AT AX= 1.91177 AY= 282853.44553

THETA=100.0 Z=D=	347.2 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.00 I=	1 BBR=	416.34
THETA=100.0 Z=D=	694.5 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.00 I=	2 BBR=	416.34
THETA=100.0 Z=D=	1041.7 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.00 I=	3 BBR=	416.34
THETA=100.0 Z=D=	1389.0 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.00 I=	4 BBR=	416.34
THETA=100.0 Z=D=	1736.2 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.00 I=	5 BBR=	416.34
THETA=100.0 Z=D=	3472.4 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.00 I=	6 BBR=	416.34
THETA=100.0 Z=D=	6944.9 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.01 I=	7 BBR=	416.34
THETA=100.0 Z=D=	10417.3 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.01 I=	8 BBR=	416.34
THETA=100.0 Z=D=	13889.8 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.01 I=	9 BBR=	416.34
THETA=100.0 Z=D=	17362.2 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.02 I=	10 BBR=	416.34
THETA=100.0 Z=D=	34724.4 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.07 I=	11 BBR=	416.34
THETA=100.0 Z=D=	69448.8 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.25 I=	12 BBR=	416.34
THETA=100.0 Z=D=	104173.2 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.55 I=	13 BBR=	416.34
THETA=100.0 Z=D=	138897.6 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	.98 I=	14 BBR=	416.34
THETA=100.0 Z=D=	173622.0 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	1.54 I=	15 BBR=	416.34
THETA=100.0 Z=D=	260433.0 BSTAR=	11.11 TR=	.900 BBO=	450.25 C0=	1.84 TC=C0=	1.787 CR=P=	3.45 I=	16 BBR=	416.34

CURVES INTERSECT AT AX= 1.78740 AY= 184785.67677

THETA= 95.0 Z=D=	174.2 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.00 I=	1 BBR=	452.16
THETA= 95.0 Z=D=	348.4 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.00 I=	2 BBR=	452.16
THETA= 95.0 Z=D=	522.6 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.00 I=	3 BBR=	452.16
THETA= 95.0 Z=D=	696.8 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.00 I=	4 BBR=	452.16
THETA= 95.0 Z=D=	871.0 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.00 I=	5 BBR=	452.16
THETA= 95.0 Z=D=	1741.9 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.00 I=	6 BBR=	452.16
THETA= 95.0 Z=D=	3483.8 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.01 I=	7 BBR=	452.16
THETA= 95.0 Z=D=	5225.8 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.01 I=	8 BBR=	452.16
THETA= 95.0 Z=D=	6967.7 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.01 I=	9 BBR=	452.16
THETA= 95.0 Z=D=	8709.6 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.02 I=	10 BBR=	452.16
THETA= 95.0 Z=D=	17419.2 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.07 I=	11 BBR=	452.16
THETA= 95.0 Z=D=	34838.3 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.25 I=	12 BBR=	452.16
THETA= 95.0 Z=D=	52255.5 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.55 I=	13 BBR=	452.16
THETA= 95.0 Z=D=	69676.7 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	.97 I=	14 BBR=	452.16
THETA= 95.0 Z=D=	87095.8 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	1.52 I=	15 BBR=	452.16
THETA= 95.0 Z=D=	130643.8 BSTAR=	11.11 TR=	.900 BBO=	490.05 C0=	1.69 TC=C0=	1.649 CR=P=	3.41 I=	16 BBR=	452.16

CURVES INTERSECT AT AX= 1.64936 AY= 89986.49382

AZIMUTH OF PATH OF SIGHT WITH RESPECT TO SUN IS 180 DEGRFES

ZENITH OF PATH OF SIGHT = 180 DISTANCE TO TARGET AXIS = 5 ALTITUDE = 1667644 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 165 DISTANCE TO TARGET AXIS = 388073 ALTITUDE = 1447921 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 150 DISTANCE TO TARGET AXIS = 729681 ALTITUDE = 1263939 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 135 DISTANCE TO TARGET AXIS = 931840 ALTITUDE = 931899 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 120 DISTANCE TO TARGET AXIS = 997248 ALTITUDE = 975803 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 105 DISTANCE TO TARGET AXIS = 1055494 ALTITUDE = 282853 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 100 DISTANCE TO TARGET AXIS = 1047998 ALTITUDE = 184786 CONTRAST IS POSITIVE

ZENITH OF PATH OF SIGHT = 95 DISTANCE TO TARGET AXIS = 1028982 ALTITUDE = 89986 CONTRAST IS POSITIVE

COORDINATES FOR PLOTTING 4 CROSS SECTIONS. X = HORIZONTAL Z = VERTICAL

X1	Z1	X2	Z2	X3	Z3	X4	Z4
1513487	138005	1721178	111839	1869838	98905	1852888	100317
957496	368142	1430649	276714	1739789	222220	1724844	224841
947417	558055	1330328	447443	1638257	364923	1712813	344943
811258	1263762	1207281	1035102	1708639	745621	1771639	709246
278589	2723665	1494811	1586883	1948528	1059547	2014141	985922
1437357	2706779	1937245	1840884	2238137	1319684	2284589	1239324
2433127	2115034	2425187	2144695	2593891	1518200	2590238	1528843
2999995	1667644	2999995	1667644	2999995	1667644	2999995	1667644
3388873	1447921	3409762	1528843	3406989	1518200	3574813	2144655
3729681	1263939	3715471	1239324	3761863	1319684	4062755	1840884
3931848	931899	3985859	985922	4059488	1059547	4505989	1506885
3997248	575803	4228361	709246	4291361	745621	4792719	1035102
4055494	282853	4287187	344943	4361743	364923	4669674	447443
4047990	184786	4275156	224841	4268291	222220	4569321	276714
4028982	89986	4147112	100317	4130978	98905	4278822	111839

AXSL= 6000000.0 CSLX= 60000.0 CSLY= 5400000.0 AXLY= 3800000.0 AXLY= 0

NTGDM= 100 NAINC= 600000 NPRDB= 50

CURRENT ELAPSED TIME IS 0 MINUTES 37 SECONDS.

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DOCUMENT CONTROL DATA - R&D		
(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)		
1. ORIGINATING ACTIVITY (Corporate author) Visibility Laboratory University of California San Diego, Calif. 92152		2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED
		2b. GROUP
3. REPORT TITLE COMPUTERIZED VISIBILITY CALCULATIONS MAXIMUM SIGHTING RANGE PROGRAM		
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Technical Report		
5. AUTHOR(S) (Last name, first name, initial) Barkdoll, Ivan Harry III		
6. REPORT DATE July 1967	7a. TOTAL NO. OF PAGES 121	7b. NO. OF REFS 10
8a. CONTRACT OR GRANT NO. Naval Ship Systems Command NObs-92058 a. PROJECT NO. c. R-139 d. Task 3		8b. ORIGINATOR'S REPORT NUMBER(S) SIO Ref. 67-23
		8c. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)
10. AVAILABILITY/LIMITATION NOTICES DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED		
11. SUPPLEMENTARY NOTES		12. SPONSORING MILITARY ACTIVITY Office of Grants and Research Contracts, Code SC, National Aeronautics and Space Administration Washington, D. C. 20546
13. ABSTRACT This report describes the development of computer programs for the performance of visibility calculations. The computer programs use input data as to the directional reflectance properties of both object and background to determine the inherent contrast of the object for a particular path of sight. Atmospheric contrast transmittance for the path of sight is calculated from input atmospheric data in the form of path luminance and beam transmittance. The inherent contrast is then multiplied by the contrast transmittance to find the apparent contrast. These calculations are repeated for selected distances from the object to determine that range at which the apparent contrast of the object matches the contrast threshold for the human visual system for the angular subtense of the object as viewed at that distance, and for the adaptation level specified. The vision data used in the calculation is the Tiffany data and represents best visual performance, in that the stimulus duration was long, the observers knew where the object was located, and the observers were allowed to fixate in any manner of their choosing. Therefore, ranges calculated from this vision data are called maximum sighting ranges. The computer program described in this report calculates maximum sighting ranges for 57 paths of sight defining hemispherical volume within which the object can be detected.		

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14.	KEY WORDS	LINK A		LINK B		LINK C	
		ROLE	WT	ROLE	WT	ROLE	WT
	Visibility Vision Visual Detection						

UNCLASSIFIED

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