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DEPARTMENT OF DEFENSE SELENODETIC CONTROL SYSTEM 1966

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DEPARTMENT OF DEFENSE

SELENODETIC CONTROL SYSTEM 1966

ABSTRACT

Using the methods described in Army Map Service Technical Report No. 29 (Part I: Methods) and (Part II: AMS Selenodetic Control System 1964), the Army Map Service in cooperation with the Aeronautical Chart and Information Center has completed the Department of Defense (DOD) Selenodetic Control System 1966. A listing of the 734 points which constitute the DOD-66 is included. The average point was measured on nine photographic plates. The rms horizontal and vertical uncertainties (precision) of the solution are ±972 and ±751 meters, respectively. The crater coordinates were compared point-by-point with other selenodetic systems. In each comparison, the rms differences, both horizontal and vertical, were less than the expected rms differences computed from the corresponding variances. Maximum rms differences approached ±1500 meters.

FOREWORD

This report presents the results in the reduction of Army Map Service (AMS) and Aeronautical Chart and Information Center (ACIC) measurements for selenodetic control conducted for and sponsored by the National Aeronautics and Space Administration (NASA) under NASA Defense Purchase Request T-37794(G).

The work was done under the direction of the Defense Intelligence Agency (DIA). This report was compiled by the project leader, Mr. James D. Hathaway, and his assistant, Mr. James M. Eigen, using input from ACIC, AMS, and DIA. Supplementary computations were done by Mrs. Aletha Moncrief and Miss Judith A. Herndon. The work was carried out in the Selenodetic Branch, under the supervision of Mr. Marvin Q. Marchant, Research and Analysis Division, Department of Geodesy, AMS. Assistance was provided by Mr. Charles Martin and Mr. Martin Wienshienk, ACIC. Acknowledgment is also made to Mr. Jack Williams and Mr. Charles McCluggage, Department of Computer Services, AMS, for their assistance in the data processing.

Any mention herein of a commercial product does not constitute endorsement by the United States Government.

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SECTION 1. INTRODUCTION

1. Purpose. The Department of Defense (DOD) Selenodetic Control System 1966 has been established by the Selenodetic Branch of the Army Map Service (AMS) in cooperation with the Lunar and Planetary Branch of the Aeronautical Chart and Information Center (ACIC). Initial application of the new system will be in the preparation of charts and maps for the Project Apollo landing site selection. It is expected that the parameters descriptive of the lunar figure will be improved significantly from the harmonic analysis of the new control.

2. Scope. a. Three sets of data were combined to form the data for the DOD-66 adjustment. Each of the three sets was first adjusted independently, using the AMS procedures, for comparison on an equal basis prior to beginning the computations which involved all the data simultaneously. The three sources used to form the DOD system are: the 256 craters of AMS-64 produced by AMS, the 196-crater reduction by ACIC, and the 484-crater reduction completed for the National Aeronautics and Space Administration (NASA) by AMS.

b. A least-squares solution was performed to obtain the statistically most likely selenodetic coordinates of 734 craters. The adjustment contained 13,966 observation equations and solved for 2,886 unknowns.

c. The control covers 74% of the visible surface of the lunar disk and is the largest adjustment ever completed by DOD.

SECTION II. COLLECTION OF DATA

3. AMS-64 Data. a. In preparing AMS-64, 15 photographs were selected from the Lick Observatory lunar photographs and copied on ¼-inch, micro-flat glass plates. The copying was done with a Kel-Wat Photographic Dodger.[1] The "FLUOR-O-DODGE" system of contrast control was used in order that crater detail, hidden by the high-contrast range in the original negatives, could be made available for examination on the dodged copies.

b. The photographs were:

Lick Designation	Universal Time	Date
M2	$4^h\ 14^m\ 05^s$	7 May 1938
M3	3 54 44	12 January 1938
M4A	8 03 25	22 October 1937
M5	13 00 40	24 October 1937
M7	12 47 19	20 August 1938
187	4 07 54	10 August 1940
190	3 39 08	7 April 1938
199	3 55 20	12 August 1940
202	4 19 06	8 December 1940
204	4 22 38	7 July 1938
206B	4 14 00	13 August 1940
209	12 48 30	22 August 1940
212	13 38 00	26 October 1945
214	11 19 34	6 September 1936
219	13 42 53	26 October 1937

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[1] Superscripts refer to similarly numbered entries in the Literature Cited section.

c. The 15 photographs described above were measured at Georgetown Observatory, with 24 to 204 crater images measured on each photograph. Measurements for each of 310 craters were made on one to eleven photographs. The average crater was measured on six photographs. Positioning of the plates in the measuring engine was facilitated through use of the image of a National Bureau of Standards reseau with five-millimeter intervals, which had been overprinted on each of the plates during Fluor-o-dodging. For the 0^{o} orientation, horizontal grid lines on the plate were oriented parallel to the X-axis of the engine by reading coordinates of a series of points along one of the grid lines. The physical corrections to parallel were made by a rotation adjustment on the plate holder. After the features were measured in the 0^{o} orientation, the plate was removed, rotated approximately 180^{o}, replaced in the measuring engine,and positioned in the same manner as described for the 0^{o} orientation.

d. The coordinates of the geometric center of each feature were obtained by measuring and averaging the maximum and minimum abscissas and ordinates of the feature according to its orientation on the plate. The features chosen for measurement were identified by comparison of photographic plates with the International Astronomical Union Lunar Atlas.

e. The measurements were corrected so that the center of the coordinate system, to which the measurements were referred, coincided with the projection on the plate of the optical center of the moon. The measurements were rotated so that the axes, to which the measurements were referred, were parallel to the projection of the axes in the moon's equatorial coordinate system. The components of the displacements, due to refraction of the crater images on the

photographic plates, were corrected by refraction coefficients. The values of the semi-diameter of the moon's image on each plate were obtained, and the measurements were converted from stereographically projected values to orthographically projected values.

4. NASA Data. a. In December 1963, AMS was awarded a contract from NASA to establish a control net about the moon's equator. In order to produce a better control system the Chief of Engineers authorized a similar polar strip to be established.[2] After four iterations, Group NASA contained 484 craters adjusted in a least-squares solution.

b. In preparation for work in Group NASA 18 plates were selected from the Lick Observatory lunar photographs and processed in the same manner as the AMS-64 plates. Fourteen of the original AMS-64 plates were used, the exception being plate M2. The four additional Lick plates were:

Lick Designation	Universal Time	Date
198	$4^h\ 46^m\ 55^s$	7 May 1938
M7A	12 57 18	11 September 1936
182	4 02 00	3 June 1938
192	4 22 37	20 July 1942

c. The photographs described above were measured at AMS with a total of 4,774 crater images measured. An average of 265 craters were measured on each of the 18 photographic plates. For purposes of quality control, the designated craters for measurement on each photographic plate were randomly sorted into groups of 35 to 45 craters. These groups were then of such size that the

entire measurement of an orientation, 0° or 180°, was accomplished in one measurement session. The measurement and reduction technique then proceeded in the same manner as previously described for the AMS-64 system.[3]

5. ACIC Data. a. The ACIC solution used full moon photographs on which each of the 196 craters composing the system was measured. Two types of photography were used in the process and comprised eight references as listed below.[4]

Reference		Date	Universal Time
Group I	89	21 December 1961	$22^{h}\ 14^{m}\ 29^{s}$
	195	9 February 1963	3 04 50
	118	21 April 1962	0 16 00
	358	25 August 1964	0 47 19
Group II	183	13 November 1962	22 39 43
	323	27 March 1964	22 12 35
	128	17 May 1962	21 52 35
	N-8	21 October 1964	7 37 10

b. Reference N-8 consisted of three photographs taken at the U. S. Naval Observatory in Flagstaff, Arizona. The sequential photographs in reference N-8 were of long duration exposure to minimize the effect of atmospheric distortion. The other seven references consisted of five sequential photographs each and were taken at the Pic du Midi Observatory in France. These were taken using a modified K-22 aerial camera. The mean values from the five plates for each reference were used to minimize the effects of atmospheric distortion.

c. The measurement process began by placing the plate so that the selenographic coordinates of the observatory coincided with the center of rotation of the comparator stage. A continuous measuring operation was carried out on the 196 craters by two operators working independently. An arithmetic mean was then taken of the two operators' measures of each of the crater centers for each photographic plate in the sequences. The rotation and translation factors, computed by a linear transformation, transformed all measurements to the reference system of the reference plate of the sequence. Several corrections were then applied, including corrections for refraction and topocentric librations of the moon.

6. Data Characteristics. a. Earth-based lunar photography at present represents the sole source of data acquisition for the determination of fundamental selenodetic control.

b. The available lunar photography, regardless of its site of origin, is subject to significant limitations--both observational and geometrical.

c. As an instance of observational limitation, the non-systematic wandering of each individual crater's image recorded on a photographic emulsion is caused by the reflected light from the moon passing through the continually mixing air currents of varying refractive indices at different levels of the earth's atmosphere. In addition, the time interval of exposure is finite. The emulsion is not able to adapt to the rapidly changing "seeing" conditions, and consequently, each individual crater's image on the photographic record is a composite of many superimposed images.

d. The fidelity of the imagery is further diminished by the physical characteristics of light. Even with perfect optics, the image of a luminous point will not be a point, but rather a small finite diffraction disk.

According to Dawes' equation, the angular diameter of the spurious disk recorded by the Lick, Pic du Midi, and Naval Observatory instruments are 0.123, 0.188, and 0.07 seconds of arc, respectively. These values are theoretical and represent the minimum limitation of the telescopes with respect to resolving power under perfect "seeing" conditions. The condition of perfect "seeing" would require that the air at all levels of the earth's atmosphere be perfectly steady. Unfortunately, perfect "seeing" seldom happens. Under nominal observing conditions, the minimum diameter of an observable crater would be increased with respect to the theoretical minimum. In addition, the image of the sharp line at a crater rim, delineated by shadow and direct sunlight, is broadened and bordered by a faint fringe.

e. In addition to the above mentioned observational limitations, the grain size of the emulsion, the stability of the emulsion's support, and the entire photographic processing after exposure are all contributors to producing a lunar photographic record whose fidelity with respect to the moon, itself, has been compromised.

f. Clearly, the uncertainty in the imagery of the data source will be perpetuated in the mensuration program. Disregarding the gross errors in identification, the errors in the measured rectangular coordinates of each crater image have two other sources: the mechanical error introduced by the comparator, and the personal equation of the operator.

g. The calibration of the linear comparator used in the mensuration programs at AMS showed a precision of $\pm 1\mu$. At the center of the lunar disk at mean distance, 1μ would be about 20 meters.

h. The operator's personal equation is twofold: accidental and systematic errors. The accidental portion is forever preserved in the measurements. The systematic portion is attributed to the operator's own peculiar reaction to approaching the image of the crater rim from the shadow or illuminated side. Errors have been removed from the ACIC measurements by duplicate measurements of the estimated crater center on each plate by two different operators. Any discrepancies are remeasured until agreement is attained. The systematic error has been removed from the AMS-measured crater coordinates for each session by one operator's measuring the image of each crater rim in two orientations differing by 180°. The coordinates were then combined as previously described.

i. By means of actual experiment, an estimate of the uncertainties attributable to the above mentioned causes--both of photographic and mensuration origin--has been determined. The rms plate-to-plate observational uncertainty for DOD-66 is ±16μ at the average scale of the photographic plates.

j. The ideal collection of lunar photography for selenodetic control determination from a geometrical standpoint would include plates which were symmetrically distributed with respect to the lunar ξ, η, and ζ-axes. A collection of this sort would become available only from extraterrestrial sources and would provide the potential for mensuration data literally from all angles.

k. Since at present only earth-based photography is available, the possibility of a symmetrical distribution of plates with respect to the lunar axes is confined to the ξ, η-plane and is further limited by the maximum selenocentric longitude and latitude of the earth-based sub-camera point.

The maximum ranges in longitude and latitude are $\pm 7^{\circ} 3/4$ and $\pm 6^{\circ} 1/2$, respectively. Unfortunately, none of the lunar photography to date has been taken expressly for the purpose of selenodetic control determination. Thus, for DOD-66 it was necessary to make the best use of the available collections.

l. To acquire a statistically reasonable symmetrical distribution of plates with respect to the lunar axes using earth-based facilities, a highly organized and controlled observing program, extending over a span of nearly two decades, would be required. A program of this magnitude would not be practical in the light of the potential availability of superior extraterrestrial lunar photography within the complete luni-solar cycle.

m. The horizontal and vertical positions of craters determined from earth-based photography are further affected by the foreshortening of the imagery on the photographic record. As the angular distance (θ) increases from the ζ-axis to the plane of the 90th meridian, the geometrical uncertainties of the horizontal and vertical positions increase and decrease, respectively, as θ increases. Ideally, by taking into consideration a symmetrical distribution of craters with respect to the ζ-axis, as well as a symmetrical distribution of plates with respect to the lunar axes, the statistical estimate of the uncertainty (as determined from the residuals of an adjustment) will approach the true uncertainties imposed by the geometrical limitations of the source data.

n. The uncertainties, listed with crater coordinates as determined by the DOD-66 adjustment, are the result of a statistical analysis and represent

the product of the estimates of the uncertainties introduced by the limitations of the observational and geometrical characteristics of the data.

o. A statistical study has been performed at AMS as an attempt to numerically determine the potential relative gain in the reduction of the observational and geometrical uncertainties that would be attained by further selenodetic control programs using earth-based photography only.

p. The major part of the geometrical uncertainties of the horizontal and vertical positions is due to the geometrical uncertainty in ζ. Figure 1 shows that as the number of plates (n) measured for the average crater increases, the estimate of the geometrical uncertainty in ζ, in units of the uncertainty of the observation of unit weight, decreases. At 169 plates the uncertainty in ζ equals the uncertainty in the observation of unit weight. An equal area distribution of craters, as well as 3^{o} separation between each plate and at least one other plate, are assumed. Figure 2 shows for a 99% confidence interval that as the number of plates measured for the average crater increases, the range of the expected observational variance of the distribution decreases. The range of the expected observational variance is in units of the best estimate of the observational variance computed from the residuals of the random sample.

q. The average crater of the DOD-66 adjustment was measured on 9 plates. By increasing the number of plates measured from 2 to 9, or 4% with respect to 169 plates, the geometrical uncertainty in ζ is reduced

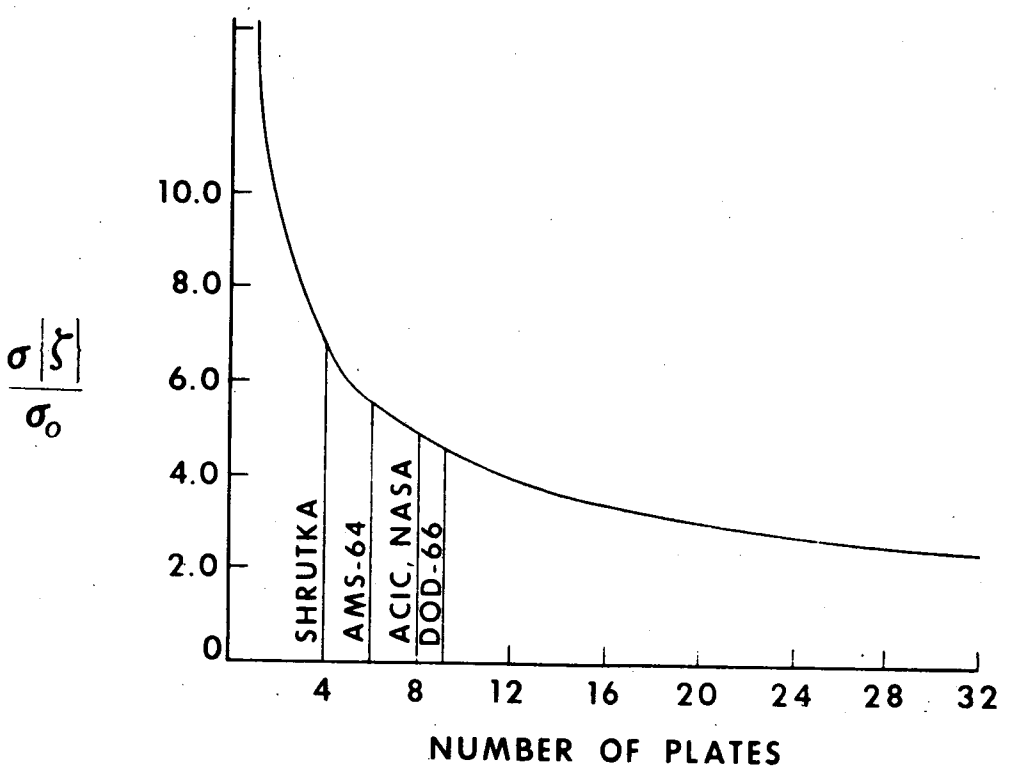

Figure 1. Geometric uncertainty in ζ, in units of the observation of unit weight, as a function of plates measured for the average crater.

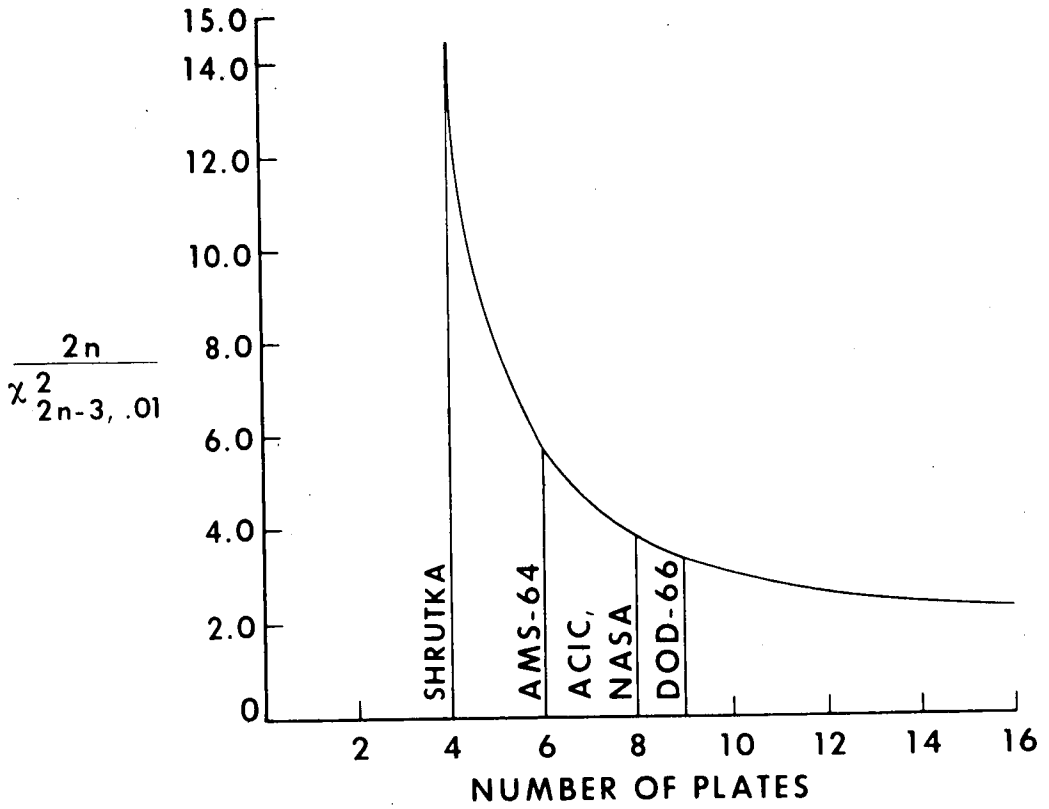

Figure 2. The range from O to $\frac{2n}{\chi^2_{2n-3,.01}}$ of the expected observational variance--in units of the best estimates of the observational variance obtained from the residuals of an adjustment of the random sample--as a function of the number of plates measured for the average crater.

by 58%. The range of the expected observational variance of the distribution is less than, or equal to, 3.44 times the best estimate of the observational variance obtained from the residuals of the random sample. By further increase of the number of plates measured, for instance, from

two to 20 or 11% with respect to 169 plates, the geometrical uncertainty of ζ is reduced by 76%. The range of the expected observational variance of the distribution is less than, or equal to, two times the best estimate of the observational variance obtained from the random sample.

r. Although it is desirable to more closely estimate the geometrical and observational uncertainties in ζ and the observation of unit weight, respectively, the further mensuration and adjustment programs required would be impractical using earth-based photography. The example cited above illustrates that by more than doubling the magnitude of the DOD-66 effort, the gain in further reduction of the geometrical uncertainty in ζ would be only 18%. The range of the observational variance would be reduced by less than 3%.

s. DOD-66 Selenodetic Control System was designed to supply mapping data for selected areas of the moon (Apollo mission). In a more general context it is another step in an orderly, scientific investigation designed to broaden selenodetic knowledge and evaluate, through actual experiment, parameters which have hitherto been evaluated on the basis of opinion only.

SECTION III. WORK PRIOR TO THE FUNDAMENTAL ADJUSTMENT (FA)

7. Plate Constant Computation. To prepare the data for the FA, plate constant adjustments were run to approximate corrections to the plate constants. The AMS reduction solved independently by the method of least-squares for 171 sets of plate constants. Each session had one adjustment that was iterated until the absolute values of the corrections were less than 10^{-7}. The following listing shows the number of sessions computed for each

source:

Computation	No. of Sessions
AMS-64	32
NASA	131
ACIC	8

8. AMS-64: Fundamental Adjustment. a. The AMS-64 data started with 3,492 observation equations that contained 987 unknowns. After analysis of this FA, 259 measurements and six craters were deleted because their residuals exceeded four times the rms uncertainty in the observation of unit weight.

b. A second iteration was then run and a second analysis was completed. Nineteen craters were deleted because their uncertainty in the vertical direction exceeded ±1945 meters and/or the absolute value of the rim height above the corresponding contour exceeded 3000 meters. The third and final iteration contained 2,842 observation equations with 909 unknowns. The results of this third iteration are described below. The rms uncertainties referred to the various coordinate axes are:

RMS Uncertainty[1, 5]	
in	±meters
ξ_k	133
η_k	123
ζ_k	1378
W_k	896
N_k	628
H_k	858

c. ξ_k, η_k, ζ_k equal coordinates of crater k referred to the equatorial rectangular selenocentric coordinate system in which the η-axis coincides with the moon's polar axis. The ξ-axis and the ζ-axis are perpendicular to each other and to the η-axis at the optical center of the moon, and the ζ-axis passes through the central meridian of the mean visible disk.

d. W_k, N_k, H_k equal the position of crater k referred respectively to westing (W), northing (N), and vertical (H) axes in the local horizontal coordinate system at the crater.

e. With the completion of the third iteration, which contained 256 craters, AMS-64 was published. The knowledge gained from the three iterations helped to set the patterns for the Group NASA adjustments.

9. NASA: Fundamental Adjustment. a. For the Group NASA's first computation, 9,298 observation equations were formed which contained 2,091 unknowns: 1,569 for the craters, and 522 for the plates. All measurements were deleted for nine craters, with a total of 276 observation equations deleted.

b. A second computation, using the remaining 9,014 equations, was performed and, after analysis, 185 observation equations were deleted.

c. A third computation contained 8,829 observation equations with 2,010 unknowns: 1,488 crater unknowns and 522 plate unknowns. A least-squares solution was performed and the standard FA analysis was applied. All measurements were deleted for 12 craters, with a total of 805 observation equations deleted.

d. The remaining 8,024 observation equations with 1,974 unknowns: 1,452 crater and 522 plate unknowns, formed the fourth FA for Group NASA.

Upon completion of this adjustment, 484 craters remained to be used in DOD-66. The rms uncertainties referred to the various coordinate axes are described below:

RMS Uncertainty[1,5]	
in	± meters
ξ_k	116
η_k	103
ζ_k	1121
W_k	636
N_k	600
H_k	718

10. ACIC: Fundamental Adjustment. a. The ACIC-meaned measurements for 196 points were mathematically reduced using AMS methods.[7,8] Reference 89 was held fixed for orientation and scaling in the least-squares adjustment for simultaneous corrections to the approximate plate constants and crater coordinates. Corrections to the approximate plate constants and to the approximate crater coordinates were obtained by a least-squares adjustment with 3,132 observation equations in 618 unknowns. One crater was deleted from this adjustment in two references because of apparent errors in the published data. No craters or equations were deleted from the solution on the basis of this adjustment. The rms uncertainties referred to the various coordinate axes are listed :

RMS Uncertainty[1,5]	
in	±meters
ξ_k	109
η_k	109
ζ_k	847
W_k	470
N_k	390
H_k	606

11. Combined Data. a. Data from ACIC consisted of meaned measurements for 196 craters from each of the eight references. This source provided 3,132 observation equations with 618 unknowns.

b. Data from AMS came from two independent sets of measurements. The first set contained 256 craters. However, two craters were deleted because their heights, computed as described in Paragraph 8, exceeded 10 km. It provided 2,810 equations for 890 unknowns for 15 plates and 32 sessions (one session being the number of measurements one man could make in one day).

c. The second set of measurements from AMS were the Group NASA 484 craters which were measured on 18 plates and 131 sessions. This source consisted of 8,024 observation equations in 1,974 unknowns.

d. The total input for DOD-66, thus, consisted of 734 craters and contained 13,966 observation equations for 2,886 unknowns.

SECTION IV: WEIGHTS

12. Description. Under the direction of the Defense Intelligence Agency a weighting procedure was developed to form the best solution for the combined data. The selection of the weighting criteria to be applied to the observation equation matrix was based upon the following:

a. Librational Baseline (W_1): The strength of the analytical stereographic model is dependent upon perspective movement which is derived from widely separated librational angles. This suggests assigning greatest weight to those sets of observations made under strongest librational conditions. This component of the observation weight was computed by forming the ratio of the average librational baseline for each crater to the maximum average librational baseline of any crater in the adjustment. The average librational baseline was formed by:

$$\text{average} \quad \theta_{bk} = \frac{\sum_{i=1}^{q} \theta_{bki}}{q}$$

$$\text{where} \quad q = \frac{n\,(n-1)}{2}$$

n = number of plates on which the crater was measured

The librational baseline, the spherical distance between the librational centers of any two plates, was computed using:

$$\cos \theta_b = \sin B_R \sin B_S + \cos B_R \cos B_S \cos (L_R - L_S)$$

where L and B represent librations of plates R and S.

b. Observational Uncertainty (W_2): A mathematical model is essentially a function of the measurements which describe the framework of the system. The uncertainty of that observation of greatest confidence provides a statistical measure for the determination of the strength of plate measurement. A five to two ratio was applied in favor of ACIC points as suggested by the five photographs in the sequential process of ACIC and the two orientations in measuring at AMS. W_2 was computed as the ratio of the minimum observational uncertainty (σ_{ok}) of any crater in the adjustment to the σ_{ok} of the crater observed. The σ_{ok} were computed in previous fundamental adjustments of each data source independently and represent the plate agreements of the measures.

c. Equal Area Distribution (W_3): An undistorted geometric model is best determined by assigning uniform density to the areas covered. Thus, a heavily populated region, e.g., mountainous area, will not influence the determination of the best fitting surface by outweighing the contribution of the less heavily populated regions, e.g., maria. The visible surface of the moon has been divided into areas, each equal to a 10° by 10° square at the equator. Each square was given equal weight and, therefore, the weight of each crater was inversely proportional to the density of identified features in its own square.

d. Plate Coverage (W_4): Certain systematic errors can be eliminated from sets of measurements, if those sets are measured in a homogeneous manner. The area covered by each plate was considered, using the maximum area covered by any plate as a statistical standard.

13. Resultant Weights. The resultant weights for the observation equations were obtained as follows:

$$W_o = \sqrt{W_1} \times W_2 \times \sqrt{W_3} \times \sqrt{W_4} \quad ;$$

and then, the normalized resultant weight obtained by

$$W_{no} = \frac{W_o}{\max W_o} \quad . \qquad \text{(See Figure 3.)}$$

14. Astronomical and Geodetic Constants. a. The astronomical constants and the equations used to determine L_p, B_p, S''_p, and the x- and y- coefficients for plate p are given in AMS Technical Report No. 29, Part I:

L_p, B_p = selenocentric longitude and latitude of the center of plate p when it was exposed.

S''_p = angle subtended at the camera's focal point by the moon's semi-diameter, corrected for augmentation and refraction.

x- and y- coefficients = coefficients of components for refractional displacement.

b. The referenced procedure was used to compute the astronomical parameters for each plate used in AMS-64 and Group NASA mensuration programs as well as for each reference of the AMS reduction of the ACIC measurements.

c. These computations were performed on the Bendix G-15 and Univac computers for AMS-64 and on the Bendix G-15 and Honeywell H-800 computers for both Group NASA and the AMS reduction of ACIC data.

d. For AMS-64 and Group NASA photography, the Universal Time (UT) of exposure for each plate was converted to Ephemeris Time (ET) using Brouwer's Table.[9] The ET and the $\alpha_{\mathbb{C}}$, $\delta_{\mathbb{C}}$, and $\pi_{\mathbb{C}}$--as interpolated from the American

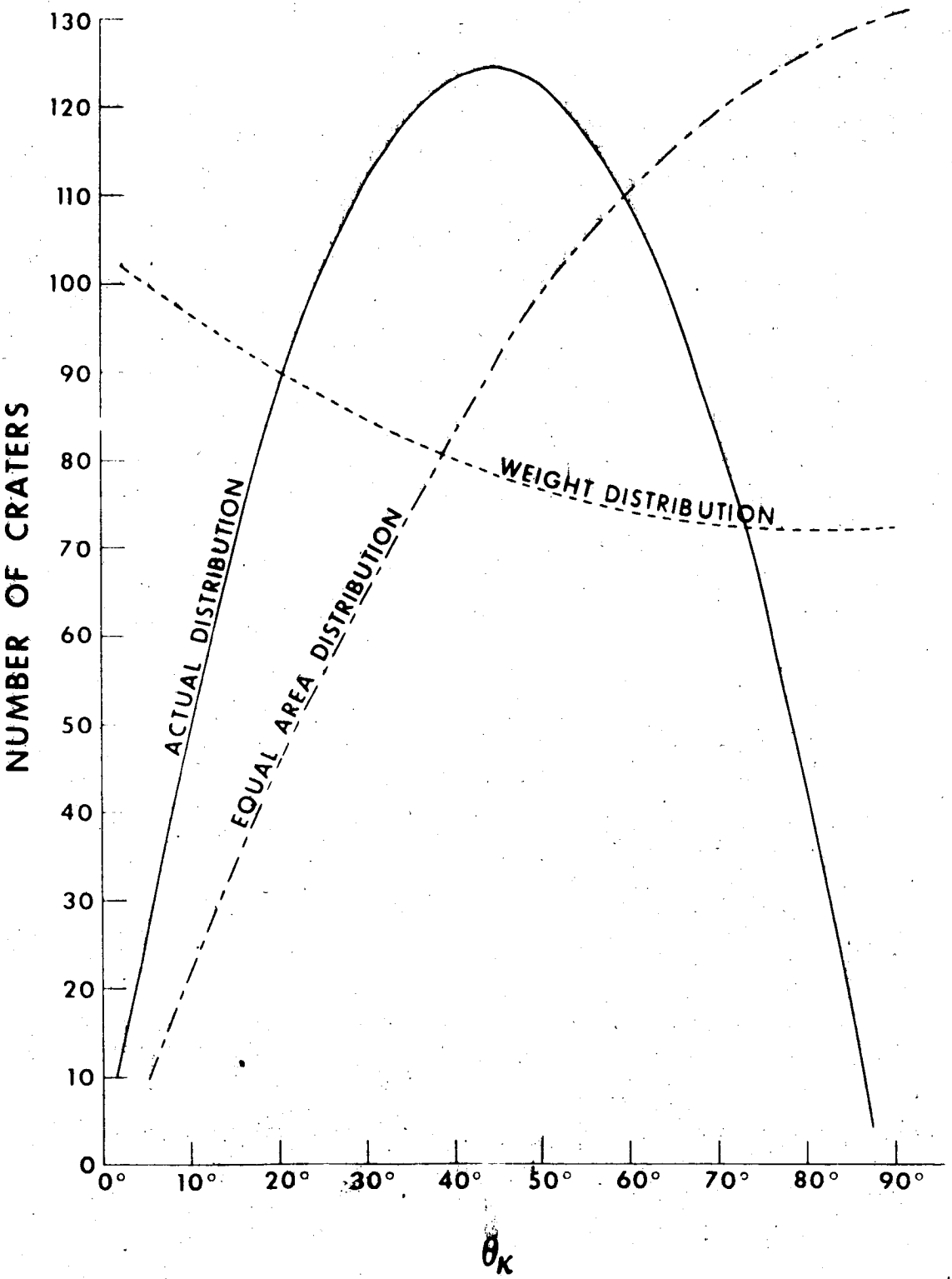

Figure 3. Actual, equal-area, and weight distributions.

Ephemeris and Nautical Almanac--were used as the variable parameters in the computation of L_p and B_p.

e. The ACIC photography was made after 1960. There were five exposures taken within minutes of each other for each ACIC reference with the exception of N-8 which had three exposures. The UT used by AMS was the most recent value furnished by ACIC as representing the time of exposure of the middle photograph. The UT was converted to ET using the correction furnished in the American Ephemeris. The $\alpha_{\zeta}, \delta_{\zeta}$, and π_{ζ} were interpolated from the same source and the L_p, B_p were computed.

f. The temperature (t_p) and barometric pressure (b_p) data required were interpolated from photocopies of original Weather Bureau records for Mt. Hamilton. The Pic du Midi and U. S. Naval Observatory supplied the corresponding data for the ACIC photography. After AMS-64 was published, an error in the interpretation of the Mt. Hamilton weather data was discovered. The revised values of t_p and b_p caused a change in the computed parameters S''_p and in the components of refraction as used by AMS-64. It was planned originally to remove this inconsistency when the measurements of AMS-64 and Group NASA were reduced together to produce the superseding system--AMS-65. To date this step has not been performed.

g. The geodetic latitude, longitude, and height used for the three observatories, whose photography was measured, are listed:

Control System	AMS-64	Group NASA	ACIC	
Observatory / Coordinate	Lick		Pic du Midi	U.S.N.O.
latitude	37° 20' 25".3 N		42° 56' 18".188 N	35° 11' 28".0 N
longitude	121° 38' 44".40 E		0° 08' 32".852 W	111° 45' 31".50 E
height in feet	4212.59		9393	7598.0
spheroid	Hayford International 1909		Hayford International 1909	Hayford International 1909
datum	North American 1927		New French 1898	North American 1927

h. In addition to the above-mentioned geodetic and astronomical parameters, the coordinates of Mösting A determined by K. Koziel were used in the fundamental adjustment for DOD-66. To be fully consistent, the astronomical constants I and f determined by Koziel should be used in the computations of both optical and physical librations in longitude and latitude.[10] The original plan for the production of DOD-66 included the recomputation of the astronomical and geodetic parameters for each plate and reference. For reasons of expediency, the system reported herein is based on the following constants:

Symbol	Quantity	Source	Used for computation of
I	1° 31' 52"	Schrutka-Rechtenstamm 1958	geometric libration
I	1° 32' 20"	Hayn 1914	physical libration
f	0.73	Hayn 1914	physical libration
$f_{\oplus}$	1/294	Brown 1919	lunar ephemeris
π	3422".70	Brown 1919	lunar ephemeris and S''_{ρ}
$a_{\oplus}$	6 378 388m	Hayford International 1909	geocentric to topocentric coord.
$f_{\oplus}$	1/297	Hayford International 1909	geodetic to geocentric coord.
$\mathfrak{C}_{pl}$	quoted in AMS TR No.29, Pt. I	Brown's tables with empirical term	libration in longitude for Lick photography
$\mathfrak{C}_{pl}$	quoted in Explanatory Supplement to the Ephemeris	Brown's tables without empirical term	libration in longitude for Pic du Midi and USNO photography

I = Inclination of mean lunar equator to the ecliptic.

f = Mechanical ellipticity of the moon.

$f_{\oplus}^{\bullet}$ = Polar flattening of the earth.

π = Equatorial-horizontal parallax of moon at the mean distance from the center of the earth to the center of the moon.

$a_{\oplus}$ = Equatorial semi-major axis of spheroid of reference.

$\mathfrak{C}_{pl}$ = Mean longitude of the moon, measured in the ecliptic from the mean equinox of date to the mean ascending node of the lunar orbit, and then along the orbit.

i. The inclination of the mean lunar equator to the ecliptic (I) and mechanical ellipticity of the moon (f) as determined by Koziel are:

$I = 1^{o}\ 32'\ 01\overset{''}{.}0 \pm 7\overset{''}{.}1$

$f = 0.633 \pm 0.011$

j. It is estimated that the maximum shift of the sub-camera point on the surface of the moon that would occur using the Koziel values of I and f is ±500 meters.

k. Although the astronomical constants used in the production of DOD-66 are not completely consistent, they are within the uncertainty tolerances of each other. The result of this inconsistency would be most evident in an absolute error analysis of the system and would have little or no affect on the relative error analysis performed to date of DOD-66.

l. Any inconsistencies noted above have subsequently been removed from the selenodetic data reduction systems. Unfortunately, these reduction routines were never used for DOD-66, as originally planned.

SECTION V: FUNDAMENTAL ADJUSTMENT

15. Plate Constant Adjustment. a. The plate constant adjustment used in the previous individual FA's gave the initial starting values for the FA. This was with the exception of Reference 89. The orientation and scale of Reference 89 was determined by a plate constant adjustment which used the coordinates of the 41 Schrutka-Rechtenstamm (S-R) craters, contained in the ACIC system. These craters used the S-R values as the initial approximations. The plate constants computed by the FA are listed in Table I.

Table I. Plate Constants Determined by the FA. The Unit of P_p is Degrees. The Unit of the Other Entries is Demi-microns.

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
M3	207	S	13°113 010 333	169 958.538 644	-178 798.619 450	-169 272.055 832
M3	208	J	13.112 904 958	169 971.421 014	-178 806.401 737	-169 257.016 084
M3	209	J	13.108 723 613	169 993.480 964	-178 814.982 308	-169 258.296 296
M3	210	B	13.104 787 845	169 945.527 665	-178 805.194 959	-169 251.425 369
M3	271	B	13.097 253 655	169 968.110 016	-178 808.678 428	-169 247.048 695
M3	272	J	13.101 616 289	169 949.984 650	-178 799.082 061	-169 263.399 753
M3	273	B	13.099 934 029	169 954.750 432	-178 812.532 756	-169 261.824 285
M3	274	S	13.098 442 527	169 946.936 608	-178 804.302 967	-169 269.514 753
M3	275	J	13.103 468 481	169 968.374 568	-178 803.831 027	-169 260.305 826
M3	276	J	13.112 114 627	169 959.086 353	-178 814.822 144	-169 259.530 600
M3	331	S	13.118 689 758	169 983.284 658	-178 786.804 441	-169 270.548 341
M3	332	T	13.108 172 934	169 932.645 747	-178 828.954 486	-169 269.053 884
M4A	214A	S	10.827 467 138	171 640.882 828	-186 976.233 226	-160 949.605 867
M4A	215A	B	10.826 648 149	171 612.332 452	-186 982.180 910	-160 975.371 293
M4A	216A	B	10.833 355 267	171 646.329 753	-186 997.708 619	-160 961.686 747
M4A	217A	J	10.824 957 446	171 634.462 213	-186 993.545 123	-160 950.852 798

TABLE I (Cont)

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
M4A	277	S	10.830 113 146	171 628.159 135	-186 985.519 315	-160 949.463 007
M4A	278	S	10.823 712 525	171 606.533 376	-186 994.483 433	-160 943.129 074
M4A	279	J	10.828 261 835	171 637.334 934	-187 007.005 249	-160 967.988 788
M4A	280	B	10.820 334 798	171 621.668 014	-186 978.210 001	-160 958.467 547
M4A	281	B	10.821 400 852	171 614.712 544	-186 981.633 657	-160 957.352 877
M4A	282	S	10.821 861 818	171 636.922 824	-187 005.875 181	-160 934.020 164
M4A	283	J	10.828 315 416	171 669.275 566	-186 993.662 384	-160 944.190 561
M4A	333	S	10.846 107 126	171 627.381 097	-187 046.260 282	-160 964.419 847
M4A	334	T	10.833 524 006	171 629.116 673	-186 999.234 742	-160 961.876 814
M5	220	S	- 2.917 758 279	169 327.329 687	-195 118.926 775	-185 153.978 531
M5	221	T	- 2.924 272 634	169 354.362 488	-195 113.686 114	-185 154.862 030
M5	222	J	- 2.916 366 133	169 298.390 987	-195 096.214 106	-185 138.681 921
M5	284	J	- 2.927 698 110	169 364.277 152	-195 104.219 156	-185 147.193 232
M5	285	S	- 2.922 203 167	169 382.625 882	-195 116.922 709	-185 132.417 788
M5	286	B	- 2.919 299 087	169 389.805 417	-195 106.446 814	-185 143.959 932
M5	287	S	- 2.919 044 727	169 402.285 798	-195 120.810 245	-185 134.256 794

TABLE I (Cont)

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
M5	288	J	- 2.925 998 203	169 374.741 645	-195 113.596 806	-185 132.965 530
M5	335	S	- 2.911 920 523	169 376.412 686	-195 171.995 502	-185 141.019 609
M5	336	S	- 2.916 269 543	169 377.770 601	-195 120.520 319	-185 156.114 690
M7	223	S	3.921 655 016	168 356.894 603	-222 523.986 144	-179 311.729 320
M7	224	T	3.918 596 033	168 383.388 578	-222 540.432 569	-179 329.730 033
M7A	225	S	-193.329 157 358	158 796.383 657	-146 383.263 714	-177 812.644 136
182	264	T	- 19.228 557 071	167 948.603 369	-174 205.883 370	-186 747.080 283
182	265F	T	- 19.290 791 887	167 694.512 486	-174 376.987 951	-186 617.633 293
187	226F	T	- 21.672 244 595	165 684.402 698	-168 491.998 593	-164 496.859 527
187	227	S	- 21.681 395 799	165 600.160 624	-168 541.543 768	-164 493.751 706
187	228	S	- 21.685 234 204	165 652.499 339	-168 532.641 050	-164 471.022 578
187	300	J	- 21.662 761 769	165 671.753 159	-168 534.410 114	-164 473.732 535
190	229F	T	- 2.085 555 724	167 728.591 125	-151 987.193 350	-171 737.277 330
190	230	S	- 1.996 353 102	167 757.712 956	-151 977.006 058	-171 898.786 059
190	231	B	- 2.021 515 354	167 765.020 001	-151 988.384 725	-171 857.966 384
190	301	B	- 2.072 219 486	167 882.397 141	-152 023.182 848	-171 888.309 135

TABLE I (Cont)

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
192	266A	J	- 4.938 387 965	161 715.441 871	-118 315.340 915	-167 264.964 318
192	267A	S	- 4.915 717 919	161 780.054 261	-118 257.172 628	-167 298.275 639
192	268	S	- 4.906 043 594	161 777.458 388	-118 258.958 090	-167 329.425 142
192	302	B	- 4.910 573 345	161 749.176 579	-118 251.688 816	-167 280.322 852
192	303	S	- 4.919 869 210	161 729.020 280	-118 216.435 453	-167 276.000 511
198-1B	204	S	1.115 899 388	165 359.585 799	-152 492.367 542	-173 554.929 609
198-1B	205	S	1.112 082 083	165 376.457 946	-152 458.577 773	-173 545.304 539
198-1B	206F	S	1.132 237 786	165 363.262 379	-152 494.588 608	-173 565.356 275
198-1B	269	T	1.117 588 918	165 416.732 719	-152 456.931 830	-173 599.151 738
198-1B	270	T	1.120 091 995	165 421.539 893	-152 466.578 211	-173 574.126 527
199	232	S	- 11.845 895 042	162 602.018 625	-174 465.077 806	-178 685.441 602
199	233	J	- 11.813 400 155	162 730.431 236	-174 436.340 266	-178 688.139 277
199	234	J	- 11.833 875 586	162 617.340 871	-174 471.087 636	-178 717.600 196
199	235	T	- 11.815 810 169	162 572.305 889	-174 491.533 398	-178 747.751 689
199	304	T	- 11.812 888 770	162 574.444 477	-174 493.251 341	-178 686.983 991
199	305	J	- 11.807 107 284	162 564.446 526	-174 493.030 898	-178 718.677 468

TABLE I (Cont)

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
199	306	S	- 11.806 838 464	162 568.761 571	-174 530.852 213	-178 723.681 572
199	307	S	- 11.815 214 465	162 566.496 573	-174 495.938 251	-178 716.810 361
202	236	S	-180.659 169 432	153 233.621 001	-181 206.957 115	-186 451.947 860
202	238A	B	-180.665 938 260	153 115.519 694	-181 144.646 344	-186 452.518 978
202	239	J	-180.645 933 158	153 216.063 985	-181 186.258 299	-186 446.135 019
202	308A	J	-180.625 204 954	153 192.302 719	-181 214.316 204	-186 432.155 174
202	309A	B	-180.630 853 416	153 188.339 624	-181 183.296 269	-186 429.781 301
202	310A	J	-180.631 652 748	153 186.184 547	-181 194.634 447	-186 432.770 376
202	311A	S	-180.631 340 273	153 191.606 708	-181 208.479 664	-186 434.631 371
202	337	B	-180.645 973 474	153 194.588 050	-181 202.117 108	-186 435.151 638
202	338	S	-180.646 628 384	153 189.989 529	-181 191.715 199	-186 427.175 874
204	240	B	- 4.077 128 863	155 084.129 531	-180 464.207 004	-174 021.448 886
204	241	T	- 4.072 383 510	155 126.048 691	-180 474.867 397	-174 019.708 654
204	242	T	- 4.067 305 029	155 085.895 033	-180 494.413 835	-174 026.396 742
204	295	S	- 4.082 456 130	155 104.403 209	-180 489.545 105	-174 044.098 636
204	296	J	- 4.075 087 778	155 103.262 944	-180 500.877 853	-174 048.257 825

TABLE I (Cont)

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
204	297	B	- 4.068 746 430	155 099.697 016	-180 518.043 073	-174 027.253 487
204	298	S	- 4.079 943 626	155 094.041 011	-180 496.705 924	-174 046.712 140
204	299	J	- 4.076 852 240	155 102.179 194	-180 491.797 228	-174 046.513 682
204	339	T	- 4.074 220 216	155 098.024 525	-180 475.119 983	-174 029.809 326
204	340	S	- 4.069 960 336	155 092.542 051	-180 483.778 333	-174 046.276 953
206B	245	B	- 4.058 532 423	160 801.602 133	-165 979.358 664	-165 723.051 586
206B	246	S	- 4.049 611 880	160 855.984 170	-165 976.065 644	-165 706.961 429
206B	247	J	- 4.062 604 814	160 846.082 232	-166 007.700 724	-165 719.157 051
206B	312	J	- 4.041 631 108	160 912.709 852	-166 010.320 922	-165 726.880 326
206B	313	J	- 4.042 304 312	160 919.664 232	-166 000.759 507	-165 710.874 309
206B	314	T	- 4.040 623 607	160 916.594 093	-165 992.375 816	-165 715.433 635
206B	315	S	- 4.040 547 866	160 920.867 314	-166 009.484 826	-165 719.332 481
206B	316	S	- 4.037 084 898	160 913.157 199	-166 008.191 312	-165 712.677 465
206B	341	S	- 4.032 682 113	160 910.151 548	-165 949.684 178	-165 721.457 980
206B	342	T	- 4.036 895 882	160 898.496 069	-165 927.886 977	-165 726.870 461
209	249	S	22.384 280 920	152 789.012 872	-210 895.816 442	-167 152.002 705

TABLE I (Cont)

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
209	250	J	22.400 818 039	152 724.937 434	-210 886.783 549	-167 184.828 858
209	251	S	22.385 297 382	152 784.741 061	-210 891.570 739	-167 152.555 584
209	289	J	22.389 821 634	152 792.266 084	-210 886.968 922	-167 142.647 526
209	290	B	22.392 886 513	152 790.156 453	-210 877.347 198	-167 145.081 012
209	291	B	22.391 457 764	152 770.663 405	-210 854.664 214	-167 167.057 353
209	292	B	22.392 619 046	152 794.738 519	-210 860.092 716	-167 156.851 550
209	293	J	22.401 952 020	152 791.215 448	-210 885.826 982	-167 151.113 750
209	294	B	22.388 905 506	152 779.804 915	-210 853.853 886	-167 154.694 404
209	343	T	22.392 181 594	152 790.638 913	-210 892.485 746	-167 150.412 490
209	344	T	22.395 061 384	152 807.973 810	-210 884.050 884	-167 166.182 833
212	254	J	- 16.816 492 188	165 192.498 378	-198 288.091 207	-185 782.410 042
212	255	S	- 16.807 032 181	165 215.181 870	-198 296.422 618	-185 813.372 396
212	317	J	- 16.794 662 556	165 230.594 250	-198 305.549 422	-185 794.243 017
212	318	B	- 16.789 623 262	165 212.983 218	-198 290.185 637	-185 789.498 594
212	319	J	- 16.793 364 958	165 225.145 654	-198 293.114 624	-185 788.580 912
212	320	S	- 16.793 445 133	165 211.107 047	-198 290.866 920	-185 789.223 072

TABLE I (Cont)

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
212	321	J	-16.788 862 623	165 213.947 603	-198 295.636 734	-185 799.753 571
212	348	B	-16.800 180 904	165 278.184 746	-198 339.589 371	-185 799.911 458
212	349	T	-16.806 359 785	165 210.981 317	-198 296.451 970	-185 816.180 364
214	257	S	193.858 398 623	168 851.169 677	-152 075.648 026	-175 543.833 235
214	258	S	193.839 902 414	168 862.276 618	-152 060.802 135	-175 540.019 009
214	259	B	193.855 370 013	168 833.949 296	-152 075.888 222	-175 534.051 682
214	260F	S	193.854 297 833	168 852.138 180	-152 073.158 233	-175 553.410 806
214	322	J	193.861 456 884	168 862.842 345	-152 066.509 171	-175 548.782 101
214	323	S	193.861 914 468	168 874.593 349	-152 073.334 677	-175 553.190 120
214	324	B	193.860 114 355	168 858.729 116	-152 070.004 146	-175 552.165 953
214	325	J	193.864 867 739	168 862.454 922	-152 081.912 709	-175 548.477 094
214	326	B	193.865 021 977	168 866.675 882	-152 078.856 687	-175 543.624 302
219	261	J	186.327 402 777	165 526.578 990	-170 252.465 143	-182 416.296 986
219	262	S	186.347 833 904	165 503.238 456	-170 261.644 346	-182 427.930 974
219	263F	T	186.353 755 696	165 499.749 519	-170 284.823 639	-182 433.762 314
219	327	B	186.352 886 765	165 515.627 468	-170 289.078 069	-182 420.710 342

TABLE I (Cont)

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
219	328	J	186.353 030 952	165 526.975 320	-170 264.123 244	-182 420.239 555
219	329	S	186.349 274 957	165 502.727 790	-170 282.835 819	-182 421.537 143
219	330	B	186.355 400 370	165 506.098 929	-170 290.460 040	-182 409.171 409
M2	400	H	.536 736 106	165 653.497 013	325 269.722 154	339 382.685 956
M3	401	B1	14.670 776 887	170 060.179 411	318 833.599 894	342 511.969 152
M3	402	B2	14.650 853 248	170 077.095 759	318 840.162 684	342 550.648 437
M3	403	R	14.655 677 111	170 067.718 658	318 791.414 149	342 582.042 715
M4A	404	K	11.318 695 025	171 684.899 308	-299 712.187 249	-368 810.666 665
M4A	405	B1	11.304 175 192	171 789.951 210	-299 592.442 363	-368 817.245 867
M4A	406	B2	11.293 342 807	171 722.690 005	-299 676.057 559	-368 831.077 797
M4A	407	B3	11.302 209 255	171 722.078 168	-299 669.584 119	-368 840.699 350
M5	408	R	- 1.823 684 128	169 437.347 677	247 886.847 058	363 069.356 714
M5	409	H	- 1.833 161 263	169 472.088 883	247 913.259 544	363 031.011 917
M7	410	R	2.848 074 457	168 403.743 377	180 551.806 543	324 014.936 099
187	411	K	- 21.499 816 492	165 564.369 909	350 602.355 180	319 159.010 606
187	412	B	- 21.510 595 540	165 647.680 136	350 650.850 011	319 148.173 337

TABLE I (Cont)

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
190	413	B	- 1.789 070 137	167 927.734 382	- 199 586.590 055	- 312 031.181 046
199	414	B	- 11.437 473 879	162 523.191 489	299 878.226 010	346 069.621 515
199	415	K	- 11.411 057 203	162 568.086 558	299 916.742 635	345 995.416 689
202	416	B1	- .149 885 273	153 169.767 146	284 269.483 930	361 034.912 614
202	417	B2	- .174 769 948	153 244.096 015	284 280.681 670	361 030.125 129
202	418	R	- .162 081 406	153 170.629 894	284 272.866 533	361 002.525 741
204	419	R	- 4.133 164 996	155 068.482 740	318 453.062 851	345 723.679 674
204	420	H	- 4.181 014 236	155 057.705 307	318 368.041 685	345 827.685 166
206B	421	B	- 5.253 787 170	160 872.163 077	358 356.527 589	333 770.424 895
206B	422	R	- 5.257 395 274	160 859.929 981	358 310.809 487	333 828.875 455
209	423	B	20.887 553 361	152 797.526 314	-314 042.819 265	-356 559.037 250
209	424	B2	20.870 090 005	152 822.175 376	-314 087.442 118	-356 532.372 530
212	425	B	- 16.071 996 095	165 760.393 443	250 382.922 862	295 824.119 620
212	426	R	- 16.090 899 895	165 199.177 052	250 396.392 715	295 837.614 535
214	427	K	14.277 559 949	168 794.729 984	-313 777.618 353	-144 047.772 245
214	428	B	14.250 228 825	168 839.934 842	-313 841.886 992	-144 079.273 671
219	429	R1	4.199 575 975	165 413.916 942	-314 885.910 134	-355 522.680 576

TABLE I (Cont)

Plate	Session	Measurer	P_p	r_p	Δx_p	Δy_p
219	430	R2	4.179 790 059	165 580.750 732	-315 003.723 923	-355 542.264 492
219	431	R3	4.182 872 687	165 472.069 365	-314 923.978 850	-355 600.573 445
21	N-8	AF	13.571 051 929	146 850.560 489	-273 495.427 763	-273 278.551 385
22	89	AF	- 36.995 248 910	164 278.620 953	-273 381.981 761	-262 522.813 838
23	118	AF	- 25.177 075 427	160 854.694 325	-272 582.721 103	-263 816.769 621
24	128	AF	- 30.817 672 698	161 075.417 854	-272 159.492 218	-263 581.171 187
25	183	AF	- 43.547 182 689	173 557.469 628	-273 531.975 697	-261 829.345 310
26	195	AF	20.079 344 060	162 554.317 422	-272 383.934 519	-261 694.239 069
27	350	AF	- 54.203 921 916	163 201.374 681	-278 070.472 749	-261 196.655 492
28	358	AF	13.434 027 765	166 254.581 226	-273 864.001 252	-262 867.593 046

16. Least-squares Adjustment. a. The weight matrix was formed and applied to the observation equations following Gauss' method.

C = diagonal weight matrix 13,966 x 13,966

M = matrix of coefficients of observation equations 13,966 x 2,886

X = matrix of unknown corrections to plate parameters and point coordinates 2,886 x 1

L = difference between the errors in the adjusted measured coordinates and the errors in the approximate computed plate coordinates.

Then, CMX = CL.

b. A least-squares solution was then performed and corrected crater coordinates and plate constants were determined.

17. Control Analysis. a. The FA was analyzed by both AMS and ACIC to check the accuracy and validity of the adjustment. This included statistical, coordinate, and comparison analyses which are explained below. The uncertainties from the statistical analysis were:

RMS Uncertainties[1, 5]	
in	±meters
ξ_k	116
η_k	106
ζ_k	1218
H_k	751
Hor_k	972

where $\sigma_k\{Hor\} = \left[\sigma_k^2 \{W\} + \sigma_k^2 \{N\}\right]^{\frac{1}{2}}$

b. The error analysis performed by AMS consisted, in part, of the correlation between $\sigma_k\{Hor\}$ and σ_{ok}, respectively, and θ_k, the spherical arc distance from the corresponding crater to the point of zero selenocentric latitude and longitude. $\sigma_k\{H\}$ is the uncertainty in the position of crater k referred to the vertical axis in the local horizon coordinate system at the crater. $\sigma_k\{Hor\}$ is the uncertainty in the position of crater k referred to the westing (W) and northing (N) axes in the local horizon coordinate system at the crater. σ_{ok} is the uncertainty in the observation of unit weight of crater k. Studies were also made of the $\sigma_k\{H\}/\sigma_{ok}$ and $\sigma_k\{Hor\}/\sigma_{ok}$ which are the $\sigma_k\{H\}$ and $\sigma_k\{Hor\}$ with the observational uncertainty removed.

$\sigma_k\{\xi\}$, $\sigma_k\{\eta\}$, $\sigma_k\{\zeta\}$ = uncertainties in the coordinates referred to the selenocentric rectangular coordinate system

$\sigma_k\{W\}$, $\sigma_k\{N\}$, $\sigma_k\{H\}$ = uncertainties in the crater positions referred to the westing (W), northing (N) and vertical axes (H) in the local horizon coordinate system at the crater

A curve was fitted to the points, σ_k versus θ_k, with the equation

$$A\theta_k^2 + B\theta_k + C_k = \sigma_k\{\ \}$$

used in a least-squares solution to find the best curve for the given set of points. All craters whose sigmas were greater than one standard error were considered for possible deletions in later FA's.

c. The crater coordinates which were obtained from the FA were then compared point by corresponding point with other selenodetic systems. The coordinates were compared both before and after the datum of the comparison

system was transformed to that of DOD-66 through orientation and scaling. The numerical results of the comparison are summarized in Tables II through VI. In each comparison, the rms differences (both vertical and horizontal) were less than the expected rms differences computed from the respective variances of the systems being compared. Maximum rms differences, and variances, approached ±1500 meters. Craters whose differences exceeded the corresponding variances were considered for possible deletion in later FA's.

d. The AMS deletion analysis consisted of 27 different programs. A crater had to fail five of these programs for consideration for deletion from DOD-66. Fifty-seven craters failed five or more times and all are considered for deletion by AMS. The 27 programs are explained below:

(1) The following uncertainties were graphed with respect to Theta, the distance in degrees from crater k to the point with selenodetic latitude = longitude = 0°.

(a) The uncertainty in the position of crater k referred to the vertical axis in the local horizon coordinate system at the crater. This was also done with the observational uncertainty removed from the height sigma, or the uncertainty with respect to the librational or geometrical model.

(b) The uncertainty in the position of crater k referred to the westing and northing in the local horizon coordinate system at the crater. This was also done with the observational uncertainty removed from the horizontal sigma, or the uncertainty with respect to the librational or geometrical model.

(c) The uncertainty in the observation of unit weight of crater k (Figure 4).

Table II. RMS Differences in ± Meters Between DOD-66 and NASA for 484 Craters

RMS differences in	Before Adjustment	After Adjustment
ξ_k	173	246
η_k	377	206
ζ_k	1704	718
W_k	871	473
N_k	991	319
H_k	1155	541
horizontal_k	1319	570
distance_k	1754	786

Table III. RMS Differences in ± Meters Between DOD-66 and ACIC-65 for 196 Craters

RMS Differences in	Before Adjustment	After Adjustment
ξ_k	421	171
η_k	674	236
ζ_k	717	439
W_k	433	200
N_k	646	295
H_k	735	386
horizontal_k	777	356
distance_k	1070	527

Table IV. RMS Differences in ± Meters Between DOD-66 and AMS-64 for 254 Craters

RMS Differences in	Before Adjustment	After Adjustment
ξ_k	613	574
η_k	556	192
ζ_k	2899	1603
W_k	1456	1112
N_k	1011	689
H_k	2346	1107
horizontal_k	1894	1308
distance_k	3015	1713

Table V. RMS Differences in ± Meters Between DOD-66 and S-R for 104 Craters

RMS Differences in	Before Adjustment	After Adjustment
ξ_k	514	438
η_k	395	485
ζ_k	2218	1889
W_k	1266	1119
N_k	890	777
H_k	1716	1463
horizontal_k	1548	1362
distance_k	2311	1998

Table VI. Actual and Estimated Differences Between DOD-66 and Comparison Systems

Comparison System	r.m.s. {DOD 66 - Comparison System}							
	± meters		σ vs Δ		± meters		σ vs Δ	
	Δ H	σ {H}	>	<	Δ Hor	σ {Hor}	>	<
ACIC	386	965	X		356	1148	X	
Shrutka	1463	1597	X		1362	not available	-	-
AMS-64	1107	1140	X		1308	1463	X	
NASA	541	1039	X		570	1306	X	

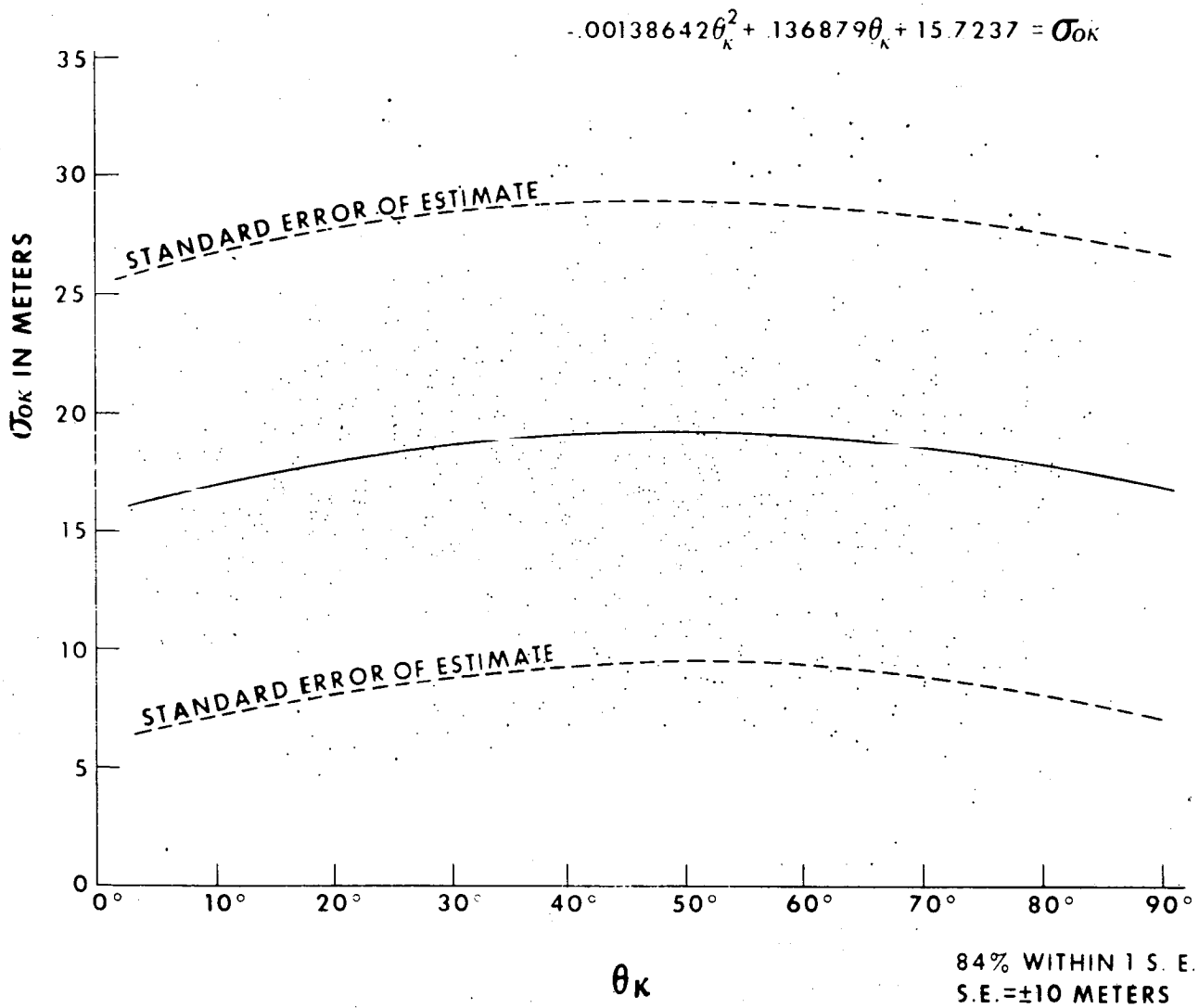

Figure 4. σ_{ok} vs. θ_k graph. Observational uncertainty plotted with the position on the moon.

(2) Charts were produced for the five uncertainty units listed in (a) through (c) above. Charts differ from graphs in that charts depict the respective sigma analyses with respect to the crater's position plotted on a modified stereographic projection base, thus showing side-by-side relationships as well as those of areas; whereas, graphs indicate only the relation between the various sigma analyses and the distance of each crater from the point on the lunar surface with selenodetic latitude = longitude = 0°. On the graphs the one standard error curve is used to detect possible anomalous craters, but is not used as an absolute deletion criteria. Craters that "fail" the graphs might well be reasonable if they are grouped together or if one crater within the local area is bad and has affected the surrounding region. (See Figure 5.)

(3) Comparisons were made between DOD-66 and four other systems, which are: AMS-64, Group NASA (which was reduced by AMS), ACIC-65, and the Schrutka points. These comparisons were made before and after an orientation and scaling routine was used to adjust the datum of each comparison system to the datum of the DOD-66 system:

(a) The difference in heights between the two systems.

(b) The difference in the horizontal position for each crater.

It is noted that the orientation and scaling analysis is similar to comparing positions and heights from spheroid to spheroid on the earth.

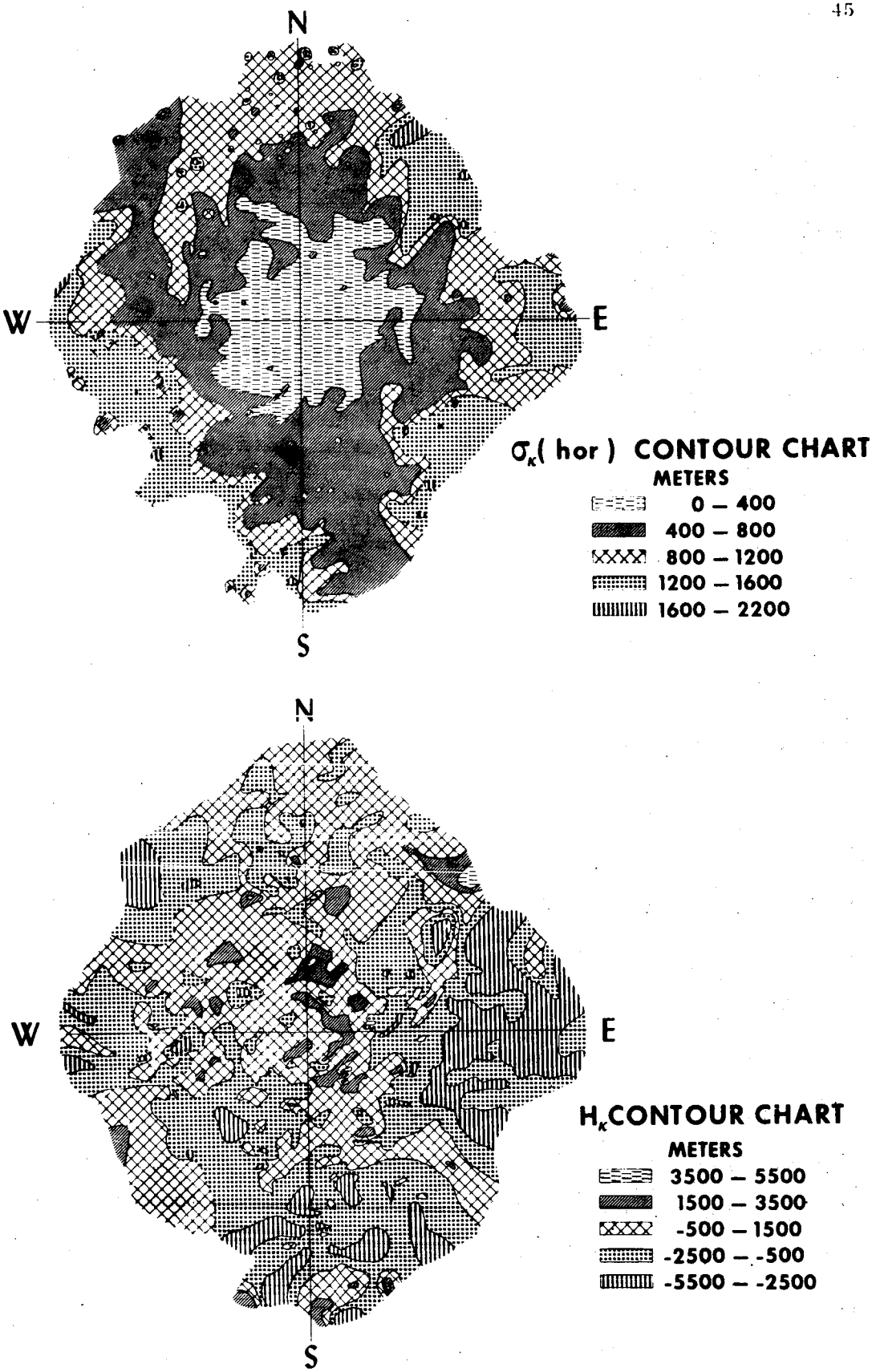

Figure 5. Contour Charts

e. The analysis performed by ACIC consisted of a coordinate comparison and comparison of elevation with the lunar topography. The first approach was to compare the DOD-66 solution to the previous solutions on a point-by-point basis, without transformations to datums common with DOD-66. After a least-squares adjustment to make the datums common, the actual differences between 19 points were larger than the corresponding expected differences based on one sigma confidence intervals. There was close agreement between the DOD-66 and ACIC-65 since by design the orientation and scaling procedures for DOD-66 resembled most nearly the procedure for the previous solutions with ACIC data only.

f. In the other phase of the analysis, ACIC and AMS compared the DOD-66 elevation values against relative heights determined from measurement of shadow lengths, comparison with general topography, etc. This was done for 20 areas of the moon which were generally suited for such a comparison. In these 20 areas, some 67 points were singled out because of apparent unexplained discrepancies in relative elevations. Upon further investigation, by AMS, which was expanded to include 200 points in these 20 areas, nine points were found to have elevation differences which exceeded the computed uncertainties. Two of the nine points were measured on three or less plates. Consequently, the computed uncertainties did not reflect these discrepancies due to the weak geometrical relationship between the observations for these points. The remainder of these points showed large observational uncertainties, indicating that the irregular shape, size, or prevailing illumination conditions presented measurement difficulties for which the skill of the

measurers could not compensate. Where similar conditions prevail, one should suspect that the corresponding uncertainties may have a low degree of reliability. The reader is urged to use the uncertainties listed with the coordinates in Catalog I within the confidence limitations shown in Figures 6 and 7.

18. Conclusions. The analyses accomplished to date have revealed means by which the sources of a large part of the discrepancies can be identified. The statistics are lacking in that a uniform reliability for all points is not possible because the data base is not uniform. More complete analyses would probably provide a basis for identifying the sources for all of the discrepancies. Such analyses would provide realistic criteria whereby one could identify those points which should be deleted from any follow-on solution.

19. Results. Catalog I lists the ξ_k, η_k, ζ_k coordinate values with their uncertainties and the longitude, latitude, and height with the uncertainties in the height and horizontal directions. The unit of $\sigma_k\{\xi, \eta, \zeta\}$ is lunar radii (1,738,000 meters) times 10^{-6}. $\sigma_k\{H, Hor\}$ are in meters. The reference numbers were assigned using the system devised by Arthur.[11]

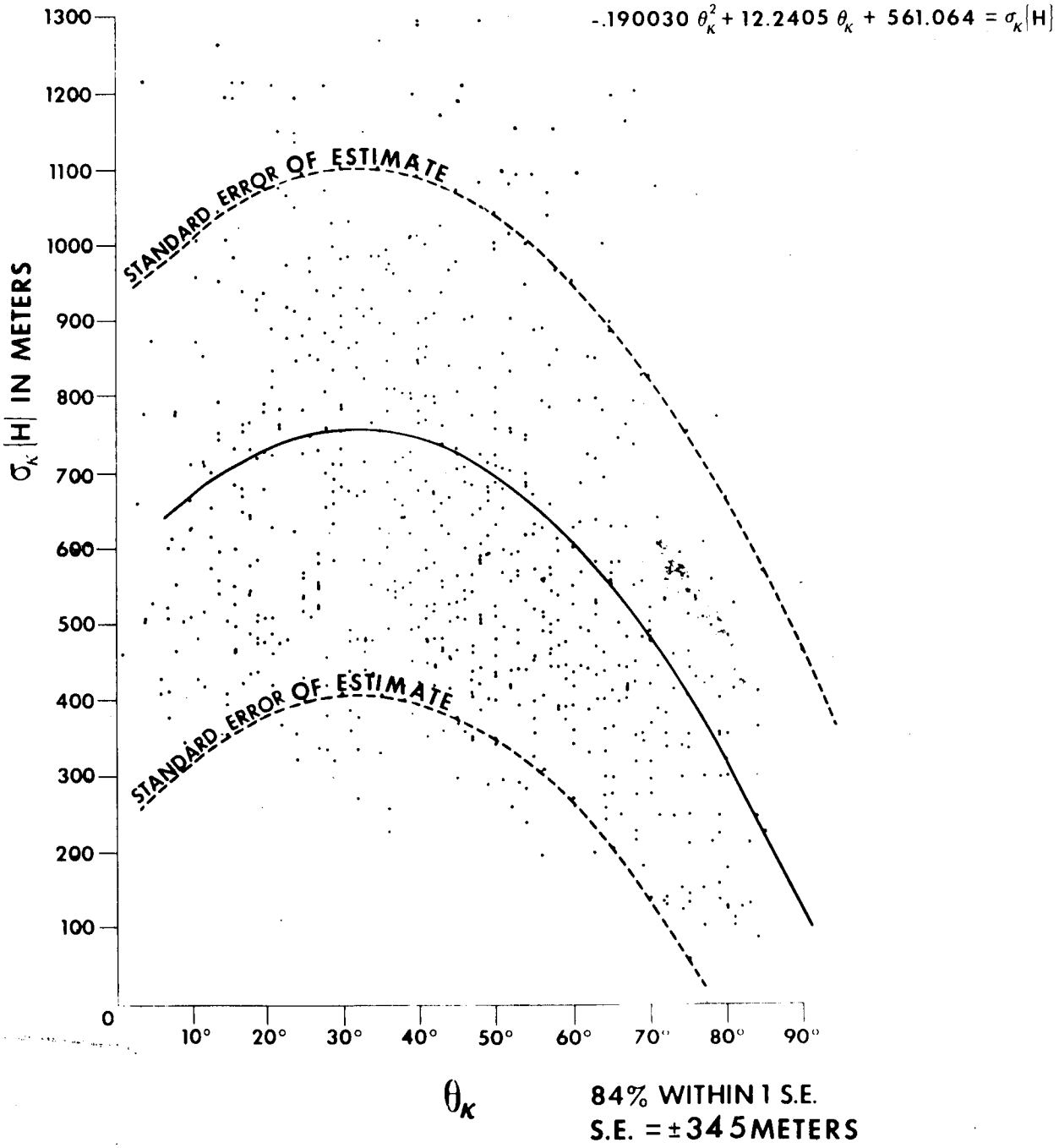

Figure 6. $\sigma_k\{H\}$ vs θ_k graph. Height uncertainty plotted with position on the moon.

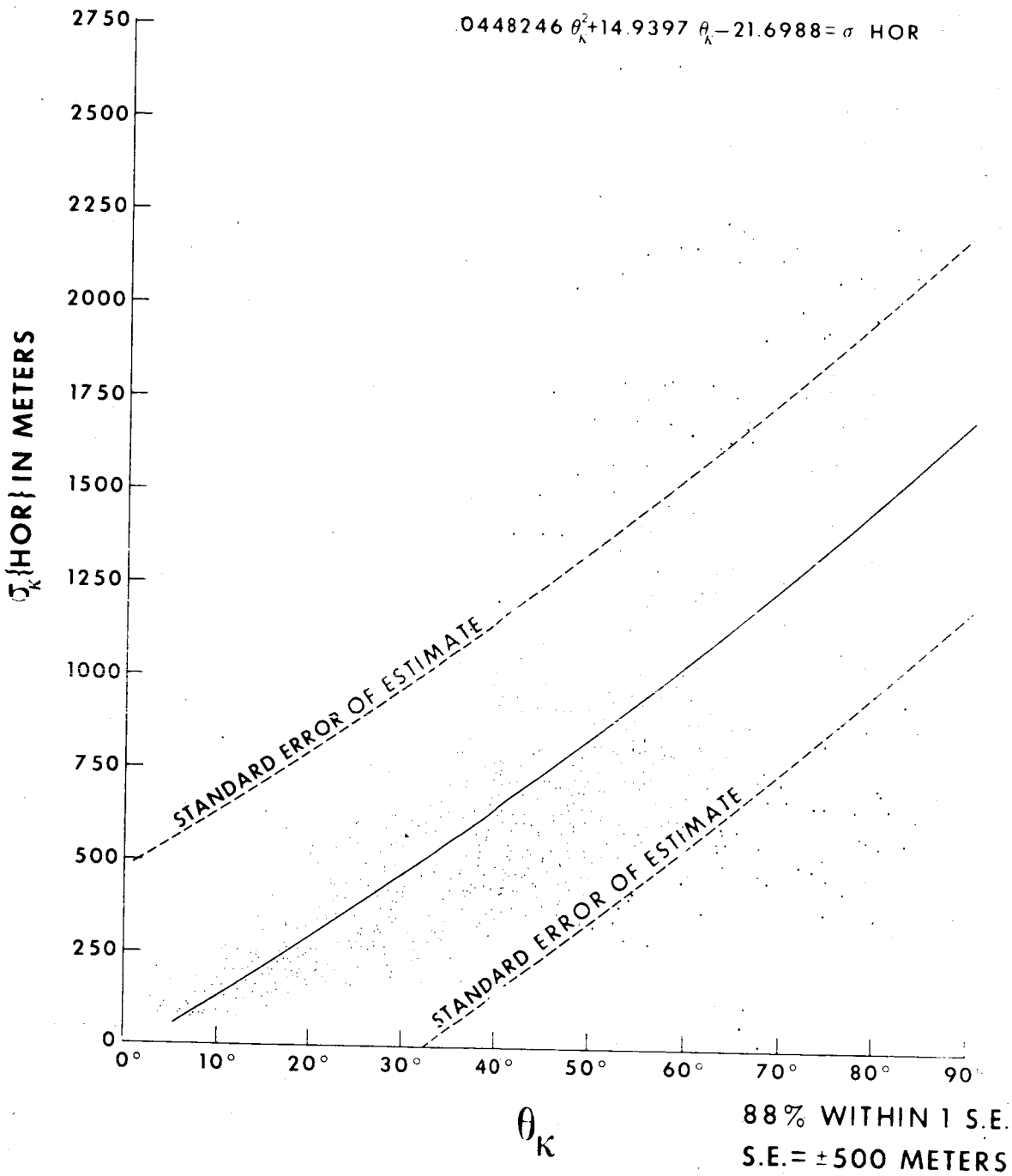

Figure 7. σ_k{Hor} vs θ_k graph. Horizontal uncertainty plotted with the position on the moon.

SECTION VI. FUTURE WORK

20. Lunar Orbiters. With the advent of the Lunar Orbiting Satellites, it is now possible to relate a consistent control system determined from earth-based photography to the physical moon. The size and shape of the moon as determined from the analysis of the ephemeris can be used in an adjustment of a fundamental network of control. As good quality photography is obtained, it can be utilized along with the tracking data to improve the fundamental network further. Photogrammetric control will be developed in each of the photographed areas. This control can then be tied together through the orbital ephemeris. As additional orbiters are successful, the resulting control nets can be tied together by the use of a Multiple Orbital Reduction technique, assuming overlap of photographs from different missions. The orbital reduction will provide a network of photogrammetric control that is properly constrained by the orbital parameters, and which can be used to adjust the basic selenodetic network.

SECTION VII. LITERATURE CITED

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APPENDIX I. CATALOG I

DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
10002	857	.006827622	31	.020744884	29	1.000035662	265
10016	865	.019697485	44	.069907432	39	.997284389	450
10045	ACIC 183	.042876862	38	.057167315	38	.997732762	293
10093	834	.090496066	29	.030485312	25	.996466474	304
10107	ACIC 179	.005935426	53	.176064198	53	.985270763	416
10179	871	.074236303	41	.198078826	32	.976213012	420
10183	869	.087774808	38	.132704418	38	.988220196	292
10191	867	.098252256	33	.110693115	30	.988778949	349
10279	800	.078505253	42	.291834521	37	.954636695	463
10336	891	.032064686	45	.369538011	37	.931199003	489
10373	892	.072151098	83	.336894017	75	.939897899	842
10418	ACIC 110	.016213445	49	.488004679	49	.873044076	384

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10002	857	1° 11' 18.''074	0° 23' 28.''226	476	461	74
10016	865	4° 00' 32.''289	1° 07' 53.''432	- 129	780	111
10045	ACIC 183	3° 16' 34.''630	2° 27' 38.''634	502	508	97
10093	834	1° 44' 42.''538	5° 11' 21.''098	1793	529	67
10107	ACIC 179	10° 07' 53.''121	0° 20' 42.''557	1557	712	178
10179	871	11° 26' 15.''913	4° 20' 55.''315	- 1967	716	171
10183	869	7° 37' 07.''118	5° 04' 32.''716	1645	503	119
10191	867	6° 21' 23.''687	5° 40' 28.''908	- 356	601	110
10279	800	16° 56' 40.''561	4° 42' 04.''256	2311	767	261
10336	891	21° 38' 00.''869	1° 58' 19.''668	4095	785	342
10373	892	19° 39' 58.''125	4° 23' 22.''889	1834	1376	536
10418	ACIC 110	29° 11' 58.''687	1° 03' 50.''137	536	586	341

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
10470	895	.072354053	24	.400472735	24	.914744977	224
10476	897A	.073271844	63	.466599202	64	.881552233	698
10521	909	.022322551	66	.510183215	59	.859166500	660
10565	917A	.66127929	87	.553644829	76	.828842003	962
10646	936	.049256229	78	.660168040	78	.748232029	608
10664	930	.063332374	33	.649063423	31	.759276344	368
10680	923	.084652252	56	.601434896	49	.795060142	588
10695	934	.095867908	44	.654244773	38	.750909706	461
10698	933	.093083497	48	.681165845	36	.727947687	440
10765	968	.065810526	29	.757789583	26	.648651192	308
10778	968A	.074431646	63	.787014917	55	.612788444	666
10797	966	.098360983	53	.771427773	47	.627750629	511

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
10470	895	23° 34' 41!!136	4° 31' 21!!136	2060	356	168
10476	897A	27° 48' 37!!714	4° 45' 04!!764	189	1073	586
10521	909	30° 41' 37!!876	1° 29' 17!!892	- 911	986	605
10565	917A	33° 39' 28!!729	4° 33' 41!!747	- 1848	1386	957
10646	936	41° 21' 38!!291	3° 45' 58!!880	- 1653	802	714
10664	930	40° 25' 38!!017	4° 46' 05!!121	1559	482	427
10680	923	36° 57' 03!!453	6° 04' 39!!155	878	812	635
10695	934	40° 50' 07!!324	7° 16' 31!!935	949	599	542
10698	933	42° 52' 00!!363	7° 17' 12!!954	2223	560	532
10765	968	49° 17' 31!!958	5° 47' 35!!746	- 587	344	414
10778	968A	51° 53' 28!!558	6° 55' 31!!588	384	704	930
10797	966	50° 31' 20!!595	8° 54' 18!!555	-1003	570	692

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
10845	971	.045216937	106	.855139255	80	.516054876	1100
10872	985	.071311835	79	.828014717	69	.555791962	832
10909	1018	.004185391	38	.993336019	31	.121133274	541
10917	AMS 43	.012199924	90	.971969076	103	.236799607	989
10924	1006	.022502780	66	.943215344	57	.333975213	664
10928A	1015	.028828523	104	.983616660	110	.180512554	1149
10950	987	.055314996	42	.906145368	38	.418955669	409
10956	AMS 42	.052277146	93	.962689864	64	.264074693	950
10957	1013	.051631094	55	.977665487	50	.206837609	566
10978	1014	.075572878	147	.985237102	168	.151948325	1599
11006	856	.103689265	39	.061207408	39	.993652708	303
11012	835	.118754808	38	.028459429	38	.993437758	294

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Ref. No.	I. A. U. No.	Latitude	Longitude	$H_k^{W_a}$	$\sigma\{H_k^{W_a}\}$	$\sigma\{hor_k^{W_a}\}$
10845	971	58° 47' 35!!064	5° 00' 26!!967	- 330	976	1660
10872	985	55° 54' 44!!405	7° 18' 41!!347	- 349	798	1220
10909	1018	83° 02' 35!!641	1° 58' 44!!017	1222	136	933
10917	AMS 43	76° 17' 25!!318	2° 56' 57!!383	823	434	1680
10924	1006	70° 27' 39!!663	3° 51' 16!!858	1478	391	1096
10928A	1015	79° 28' 19!!148	9° 04' 25!!404	797	406	1973
10950	987	64° 59' 50!!837	7° 31' 16!!670	- 275	301	652
10956	AMS 42	74° 22' 38!!196	11° 11' 51!!693	- 660	467	1597
10957	1013	77° 41' 56!!214	14° 00' 56!!972	1110	216	969
10978	1014	80° 13' 36!!710	26° 26' 37!!940	- 442	531	2756
11006	856	3° 30' 21!!188	5° 57' 26!!445	1601	523	111
11012	835	1° 37' 45!!602	6° 49' 00!!293	1591	509	109

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
11064	829	.167890245	29	.047088349	26	.985883968	296
11212	798	.118536989	32	.229213986	32	.966737032	300
11266	801A	.163536206	32	.266849625	27	.950260117	326
11270	797	.175517367	75	.209617131	64	.961856280	720
11303	ACIC 112	.103622159	50	.338790314	50	.935892105	385
11347	606A	.144150688	68	.375919855	68	.915686484	530
11350	795	.151096571	46	.303037153	42	.942316504	481
11393	606	.190594074	31	.335787502	29	.923743047	298
11402	897	.103879916	68	.423050980	45	.901465729	627
11588	635B	.186322397	46	.585800966	35	.789758219	479
11600	749	.109689511	53	.602056998	47	.792386173	525
11667	729	.167125241	32	.679244565	31	.716837649	330

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Ref. No.	I. A. U. No.	Latitude	Longitude	$H_k^{W_a}$	$\sigma\{H_k^{W_a}\}$	$\sigma\{hor_k^{W_a}\}$
11064	829	2° 41' 44!!752	9° 39' 51!!923	2060	511	92
11212	798	13° 14' 34!!478	6° 59' 25!!655	1017	506	152
11266	801A	15° 28' 09!!766	9° 45' 53!!056	823	540	184
11270	797	12° 06' 01!!617	10° 20' 29!!124	- 75	1215	348
11303	ACIC 112	19° 47' 19!!164	6° 19' 05!!038	1225	629	259
11347	606A	22° 04' 28!!112	8° 56' 46!!639	501	849	397
11350	795	17° 36' 58!!591	9° 06' 34!!556	2277	792	291
11393	606	19° 35' 46!!198	11° 39' 29!!262	2067	481	204
11402	897	24° 59' 42!!978	6° 34' 24!!435	2088	983	492
11588	635B	35° 49' 35!!672	13° 16' 28!!832	1387	667	508
11600	749	36° 57' 57!!794	7° 52' 52!!789	2067	722	570
11667	729	42° 42' 03!!970	13° 07' 25!!127	2744	417	402

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
11718	965	.113246962	28	.782354899	27	.611438521	243
11746	967	.143933163	64	.767534601	56	.623497027	646
11809	AMS 48	.103029670	76	.898261467	63	.428838981	799
11858	699B	.157147650	49	.883028074	47	.442637482	505
11863	700	.168781646	51	.838003480	48	.517432815	522
11866	698A	.162260718	26	.865277687	23	.472492392	244
11904	991	.099705648	66	.947419226	59	.303918985	698
11916A	AMS 41	.115891803	140	.969280343	101	.213095934	1378
11938A	999D	.131259564	98	.984321289	90	.106977063	1262
11947C	AMS 40	.140268331	108	.974334802	118	.174605109	1014
11956	999A	.158432488	38	.962736196	37	.220172569	383
11972	AMS 49	.172821071	54	.923163748	52	.341748004	536
12040	3650	.243878118	41	.003432308	41	.970519215	321

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
11718	965	51° 31' 16.''827	10° 29' 35.''060	- 1077	263	338
11746	967	50° 10' 55.''134	12° 59 56.''084	- 1239	707	885
11809	AMS 48	63° 50' 57.''085	13° 30' 33.''897	1209	584	1273
11858	699B	61° 59' 25.''182	19° 32' 46.''199	314	403	789
11863	700	56° 59' 49.''823	18° 03' 56.''995	- 1327	479	781
11866	698A	59° 59' 58.''370	18° 57' 11.''565	- 1493	202	378
11904	991	71° 20' 41.''691	18° 09' 46.''556	- 77	386	1161
11916A	AMS 41	75° 56' 59.''232	28° 32' 22.''096	- 1439	562	2348
11938A	999D	80° 14' 20.''475	50° 49' 11.''388	- 2120	369	2174
11947C	AMS 40	77° 03' 15.''769	38° 46' 35.''464	- 443	358	1747
11956	999A	74° 15' 53.''435	35° 44' 17.''367	380	156	653
11972	AMS 49	67° 28' 10.''621	26° 49' 32.''176	- 965	320	885
12040	3650	00° 11' 47.''472	14° 06' 20.''099	1213	542	165

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
12066	561	.259959694	31	.069187556	28	.963936689	312
12094	553	.297145458	39	.048655408	38	.953536146	399
12110	816	.215903415	33	.108467305	30	.970424020	329
12116	810A	.215882337	30	.164818098	29	.962760628	278
12122	819	.226990989	31	.121106812	31	.966515334	243
12136	579A	.237541440	82	.169904762	74	.957760250	852
12195	572	.299326872	61	.151818999	49	.943065274	565
12353	627	.250631496	54	.335816452	52	.907744642	457
12387	619	.285681913	58	.370158587	45	.883296149	545
12454	628	.252640201	31	.447016545	30	.857763945	257
12510	632	.210673993	35	.507644776	34	.835000829	317
12701	728	.208345204	51	.715050906	47	.667595960	520

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
12066	561	3° 57' 51!!367	15° 05' 33!!992	1338	528	143
12094	553	2° 47' 20!!395	17° 18' 29!!975	- 92	669	203
12110	816	6° 13' 35!!942	12° 32' 35!!078	89	559	141
12116	810A	9° 29' 00!!321	12° 38' 18!!699	589	467	144
12122	819	6° 57' 17!!220	13° 13' 00!!046	299	409	128
12136	579A	9° 46' 10!!105	13° 55' 45!!459	2256	1437	403
12195	572	8° 43' 24!!564	17° 36' 33!!571	1752	938	320
12353	627	19° 37' 35!!008	15° 26' 06!!060	- 357	726	347
12387	619	21° 44' 18!!997	17° 55' 21!!407	- 1005	851	433
12454	628	26° 33' 39!!174	16° 24' 41!!279	- 513	388	235
12510	632	30° 31' 07!!238	14° 09' 37!!500	- 597	465	306
12701	728	45° 38' 09!!423	17° 19' 56!!078	339	608	678

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
12721	732	.225803069	57	.711520895	57	.665276384	443
12731	727	.239322801	23	.716938039	22	.655634398	252
12743	723	.248783164	35	.738907762	34	.625744307	379
12812	725	.213097906	41	.826994543	39	.520192621	426
12815	679	.218598816	39	.858643259	39	.462931148	404
12857	677	.255193990	69	.879035440	69	.400976567	540
12868	676	.267150201	54	.884964090	52	.382446782	603
12870A	AMS 51	.272093589	67	.802938836	63	.530233483	663
12874	672B	.270365249	57	.842853795	52	.465869895	588
12910	685A	.210987417	65	.904770873	59	.371237188	648
12912	689B	.219884206	61	.923415250	57	.313564097	602
12915	689F	.211583399	118	.954015099	92	.213779190	1048

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
12721	732	45° 21' 48.''197	18° 44' 52.''262	- 138	523	582
12731	727	45° 46' 08.''190	20° 03' 12.''006	983	292	332
12743	723	47° 39' 22.''531	21° 40' 54.''331	- 492	419	516
12812	725	55° 47' 38.''893	22° 16' 35.''593	- 60	394	634
12815	679	59° 11' 43.''371	25° 16' 37.''046	- 557	333	626
12857	677	61° 35' 59.''419	32° 28' 26.''208	- 1209	400	865
12868	676	62° 12' 13.''718	34° 56' 07.''509	692	415	971
12870A	AMS 51	53° 24' 56.''824	27° 09' 53.''974	- 93	615	987
12874	672B	57° 25' 07.''464	30° 07' 42.''675	465	493	905
12910	685A	64° 44' 06.''533	29° 36' 40.''045	819	426	1054
12912	689B	67° 28' 27.''349	35° 02' 23.''058	- 550	340	1000
12915	689F	72° 30' 03.''742	44° 42' 15.''237	533	433	1788

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
12945	694E	.241524261	73	.953518739	72	.182026749	772
13021	552	.321816567	54	.017017611	51	.945990214	559
13047	537	.340867422	57	.080071379	43	.935604567	536
13056	536A	.354386803	57	.060363165	57	.932999621	444
13138	535	.337722715	63	.182688147	65	.923338615	656
13160	536	.363148443	66	.107535277	61	.925957951	704
13218	587	.314674860	35	.286172170	35	.904004813	272
13243	593A	.349497173	44	.232890813	44	.907115385	339
13281	534A	.386126954	60	.217877111	61	.895394935	613
13421	622	.325102588	23	.418343811	23	.846926787	182
13518	490C	.312953113	38	.588054629	37	.745352367	319
13544	491	.342135432	80	.547290726	80	.764452045	826

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{WA}	$\sigma\{H_k^{WA}\}$	$\sigma\{hor_k^{WA}\}$
12945	694E	72° 24' 07!!405	52° 59' 46!!294	578	303	1319
13021	552	0° 58' 32!!495	18° 47' 16!!077	- 1084	929	309
13047	537	4° 35' 50!!551	20° 01' 05!!248	- 1775	890	305
13056	536A	3° 27' 40!!104	20° 47' 54!!879	- 242	724	303
13138	535	10° 31' 35!!226	20° 05' 26!!263	- 12	1066	435
13160	536	6° 10' 14!!366	21° 24' 52!!034	729	1154	437
13218	587	16° 38' 41!!529	19° 11' 32!!950	- 1618	431	213
13243	593A	13° 28' 21!!038	21° 04' 15!!178	- 656	538	262
13281	534A	12° 35' 43!!024	23° 19' 38!!883	- 1481	968	468
13421	622	24° 45' 23!!967	20° 59' 59!!545	- 1749	271	173
13518	490C	36° 02' 01!!355	22° 46' 34!!340	- 610	421	373
13544	491	33° 09' 47!!425	24° 06' 40!!355	843	1119	920

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
13584	490A	.382855108	51	.541188924	51	.747723906	393
13585	490	.385248237	60	.553026080	58	.739161349	609
13626	645A	.328892318	50	.665746702	50	.669778149	389
13637	645	.334632131	41	.678972369	45	.654311890	499
13718	ACIC 37	.315803493	72	.781622362	72	.535985435	561
13845	429	.341235590	46	.852670597	35	.396907672	549
13868	427	.364074461	203	.881288839	118	.301967866	2374
13901	680	.306839875	58	.916524278	49	.258650187	629
14044	248A	.448412360	39	.040469517	39	.891653652	335
14083	244A	.483341763	54	.034878602	52	.872674456	543
14118	534D	.412736720	48	.185652598	48	.891350774	373
14148	259	.441206004	65	.185478541	57	.878138454	606

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
13584	490A	32° 47' 28.''660	27° 06' 49.''281	- 1257	520	461
13585	490	33° 33' 47.''529	27° 31' 42.''109	533	794	713
13626	645A	41° 44' 23.''462	26° 09' 11.''491	- 7	463	508
13637	645	42° 44' 02.''817	27° 05' 10.''984	961	594	640
13718	ACIC 37	51° 28' 59.''796	30° 30' 23.''981	- 1786	541	829
13845	429	58° 27' 19.''809	40° 41' 12.''538	890	423	862
13868	427	61° 46' 35.''814	50° 19' 38.''163	352	1421	3894
13901	680	66° 21' 11.''580	49° 52' 15.''021	927	358	1041
14044	248A	2° 19' 19.''100	26° 41' 52.''115	- 1950	526	267
14083	244A	2° 00' 08.''693	28° 58' 49.''547	- 3134	837	453
14118	534D	10° 42' 10.''223	24° 50' 46.''764	- 587	582	308
14148	259	10° 41' 16.''781	26° 40' 35.''317	167	941	496

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
14163	249	.462985497	41	.136209519	39	.874290237	408
14229	519	.423646732	52	.295844700	50	.854440910	569
14254	255B	.451656495	36	.249911890	36	.855799392	279
14366	280	.461250570	35	.369359163	35	.805734715	420
14490	281	.496026951	38	.401564230	38	.769360740	306
14512	482	.418598791	43	.524827843	43	.740317820	342
14558	498	.457426989	54	.581095666	54	.672109677	421
14614	463	.414743548	69	.646861806	68	.639808743	861
14732A	458	.435100938	91	.723757656	74	.534674291	983
14737	453	.432019419	93	.779493675	61	.455763336	1050
14750	457	.453191940	74	.704112152	74	.545967070	577
14815	417A	.410460802	27	.856482265	24	.312315572	310

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
14163	249	7° 50' 21!"316	27° 54' 13!"385	- 2355	632	334
14229	519	17° 14' 03!"309	26° 22' 22!"864	- 2548	866	495
14254	255B	14° 28' 51!"122	27° 49' 23!"843	- 1006	420	260
14366	280	21° 41' 40!"178	29° 47' 21!"817	- 1403	604	418
14490	281	23° 41' 09!"242	32° 48' 39!"356	- 684	415	345
14512	482	31° 40' 44!"182	29° 29' 06!"620	- 1096	448	405
14558	498	35° 33' 19!"558	34° 14' 18!"854	- 1180	502	547
14614	463	40° 18' 37!"187	32° 57' 09!"137	- 176	998	1127
14732A	458	46° 23' 42!"852	39° 08' 15!"361	- 857	971	1421
14737	453	51° 08' 38!"830	43° 28' 04!"724	1712	853	1626
14750	457	44° 46' 46!"396	39° 41' 42!"408	- 663	567	847
14815	417A	58° 56' 37!"709	52° 43' 58!"267	- 364	204	502

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
14853	409	.455887744	101	.833048017	75	.311449465	1233
15003	242	.499764519	59	.038019523	53	.864578803	588
15038	248B	.531558860	35	.085843817	34	.842078897	298
15106	261	.507606181	53	.167981777	53	.844166280	559
15115	260	.517652576	39	.154239046	35	.841327697	390
15147B	ACIC 57	.545678784	30	.179342275	30	.818405204	231
15176A	AMS 203	.576796491	88	.169044331	58	.798409940	864
15201	255A	.503553435	60	.218367892	58	.835527729	613
15284	275A	.579755857	32	.247951512	32	.775637351	271
15330	267	.529692927	85	.305060871	87	.789499331	999
15338	308	.536431843	108	.384210497	79	.750943665	1272
15548	383	.539807577	90	.587860682	126	.601947367	992

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{Wa}	$\sigma\{H_k^{Wa}\}$	$\sigma\{hor_k^{Wa}\}$
14853	409	56° 27' 53.''391	55° 39' 36.''821	- 1040	794	2003
15003	242	2° 10' 49.''060	30° 01' 47.''274	- 1124	908	490
15038	248B	4° 55' 37.''085	32° 15' 43.''206	- 851	441	283
15106	261	9° 40' 40.''201	31° 01' 08.''109	- 1305	840	507
15115	260	8° 52' 28.''263	31° 36' 11.''440	- 360	586	353
15147B	ACIC 57	10° 19' 58.''565	33° 41' 37.''384	- 247	332	237
15176A	AMS 203	9° 44' 18.''644	35° 50' 43.''917	- 1105	1276	828
15201	255A	12° 37' 02.''324	31° 04' 35.''068	- 559	908	576
15284	275A	14° 21' 43.''637	36° 46' 35.''571	- 687	373	298
15330	267	17° 47' 23.''709	33° 51' 30.''789	- 2656	1408	1039
15338	308	22° 36' 11.''400	35° 32' 23.''553	- 614	1733	1392
15548	383	36° 01' 10.''748	41° 53' 05.''142	- 597	1117	1340

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
15645A	391	.546903472	57	.656341589	57	.518816733	456
15731	446	.534568731	93	.711490291	98	.458438586	1204
16046	221	.647954136	65	.068557850	65	.757755251	637
16049	219	.642256247	38	.096494340	37	.759746861	373
16066	237B	.661033593	63	.064294964	63	.746248314	493
16116	262	.615910936	83	.166737566	58	.772112548	723
16201	262A	.599971225	73	.209487033	69	.771313849	706
16204	206	.696988479	63	.245717678	63	.672920720	491
16253	199	.653915393	61	.231147512	59	.720283905	658
16272	203	.671956541	89	.224245847	77	.705168830	808
16313	182	.609980710	66	.334793323	67	.716547260	760
16315	183	.610415700	53	.357289166	53	.706741131	409
16446	177	.648658731	126	.460824646	85	.602202190	1342

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	Latitude	Longitude	$H_k^{w\,a}$	$\sigma\{H_k^{w\,a}\}$	$\sigma\{hor_k^{w\,a}\}$
15645A	391	41° 02' 41.''784	46° 30' 34.''790	- 818	430	680
15731	446	45° 17' 38.''850	49° 23' 02.''675	1866	1096	1798
16046	221	3° 56' 01.''127	40° 32' 01.''134	- 1097	867	706
16049	219	5° 32' 24.''214	40° 12' 34.''898	- 852	509	413
16066	237B	3° 41' 24.''346	41° 32' 05.''340	- 1751	650	580
16116	262	9° 34' 55.''973	38° 34' 45.''182	2870	1013	763
16201	262A	12° 05' 59.''338	37° 52' 40.''014	- 1065	977	764
16204	206	14° 13' 53.''662	46° 00' 23.''467	- 876	587	639
16253	199	13° 21' 56.''541	42° 14' 05.''942	- 136	842	788
16272	203	12° 57' 52.''697	43° 37' 06.''452	- 804	1030	976
16313	182	19° 35' 03.''891	40° 24' 25.''237	- 2084	968	914
16315	183	20° 56' 11.''734	40° 49' 02.''386	- 221	512	509
16446	177	27° 30' 12.''777	47° 07' 37.''084	- 3684	1504	1803

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
16485	178	.687263711	71	.457983163	71	.562771865	553
16504	312	.604340023	117	.541979348	117	.582656126	909
16639	359	.634829118	38	.694271824	32	.342041280	442
17053	224	.759240047	41	.032884085	39	.647594661	402
17060	225	.763739238	42	.006223949	38	.642298473	345
17069	AMS 16	.762570501	54	.097120098	45	.634766267	608
17110	220	.713512441	72	.108246863	61	.689040225	731
17145A	AMS 15	.746634399	65	.151919607	63	.645873125	628
17152	216	.758061847	42	.126558700	43	.637244119	376
17207	198	.701438068	61	.278163513	71	.656727331	571
17272	112	.773836074	71	.227952645	67	.587308476	650

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Ref. No.	I. A. U. No.	Latitude	Longitude	$H_k^{W_a}$	$\sigma\{H_k^{W_a}\}$	$\sigma\{hor_k^{W_a}\}$
16485	178	27° 16' 29!!587	50° 41' 14!!532	- 1050	559	800
16504	312	32° 50' 49!!327	46° 02' 47!!601	- 1342	950	1294
16639	359	43° 54' 49!!257	61° 41' 04!!337	1749	298	713
17053	224	1° 53' 14!!577	49° 32' 14!!792	- 2691	482	515
17060	225	0° 21' 26!!440	49° 56' 11!!177	- 3581	402	455
17069	AMS 16	5° 35' 26!!018	50° 13' 33!!198	- 5331	689	811
17110	220	6° 13' 40!!998	45° 59' 58!!613	- 3833	904	907
17145A	AMS 15	8° 44' 54!!082	49° 08' 19!!269	- 2005	726	831
17152	216	7° 16' 57!!603	49° 56' 55!!765	- 2822	434	501
17207	198	16° 08' 41!!930	46° 53' 07!!776	592	677	745
17272	112	13° 12' 19!!414	52° 48' 11!!005	- 3727	701	902

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
17285	106	.788410265	63	.250721617	66	.559233305	615
17378B	ACIC 33	.779344043	79	.381048308	79	.493253822	617
17460	128A	.766784479	151	.407525452	111	.490912377	1462
17509	162	.702985698	151	.594125942	99	.398097724	1421
17517	161	.714264761	57	.572819313	42	.403963879	510
18004	227	.803542024	25	.042046218	23	.589256688	222
18013	226A	.810667372	85	.039020022	85	.580274245	662
18019	78	.812148725	75	.097315306	70	.572925736	633
18035	69	.836721397	81	.058165629	76	.540573105	769
18057	70	.856843409	81	.074168506	74	.506351809	674
18096	77	.890523212	81	.060243984	67	.447863729	696
18190	56A	.896175065	43	.103244672	37	.429704813	385

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{W*}	$\sigma\{H_k^{W*}\}$	$\sigma\{hor_k^{W*}\}$
17285	106	14° 32' 27.''897	54° 39' 04.''500	- 2440	629	878
17378B	ACIC 33	22° 26' 51.''017	57° 40' 11.''691	- 3589	553	939
17460	128A	24° 06' 47.''771	57° 22' 18.''227	- 4324	1364	2168
17509	162	36° 19' 52.''525	60° 28' 38.''324	4908	1170	2198
17517	161	34° 55' 02.''676	60° 30' 32.''309	1288	448	774
18004	227	2° 24' 58.''434	53° 44' 47.''430	- 4637	242	306
18013	226A	2° 14' 29.''000	54° 24' 17.''931	- 3983	688	946
18019	78	5° 35' 31.''826	54° 47' 56.''976	- 2348	674	887
18035	69	3° 20' 30.''188	57° 08' 06.''259	- 3736	788	1096
18057	70	4° 15' 42.''618	59° 25' 08.''494	- 3415	630	1006
18096	77	3° 27' 30.''940	63° 18' 04.''212	- 2398	584	1074
18190	56A	5° 55' 50.''527	64° 22' 58.''299	- 1360	321	595

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Ref. No.	I. A. U. No.		ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
18195		50	.897272210	67	.153054634	61	.411041399	625
18252A		40	.855573962	64	.227047018	66	.460568441	591
18252B	ACIC	32	.855608448	111	.226911905	111	.458755627	860
19037		7	.936032846	89	.077140382	88	.337871383	764
19079		8	.976054979	57	.092908606	51	.186854719	523
19083		2	.981087452	37	.037521278	28	.182094595	343
19117	AMS	17	.915586197	74	.170751609	79	.358191564	808
19162		9	.960042946	105	.122507857	77	.246001085	951
19224		11	.926117108	84	.243678294	81	.289427438	742
19254		13	.952303725	47	.247477686	29	.167734772	404
20044A	AMS	202	-.045465786	75	.041709015	66	.998509185	705
20115		1214	-.020055342	20	.156706945	18	.988315358	201

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
18195	50	8° 48' 54!"718	65° 23' 14!"754	- 2193	504	976
18252A	40	13° 09' 08!"009	61° 42' 20!"686	- 3758	515	903
18252B	ACIC 32	13° 09' 19!"746	61° 48' 03!"295	- 5212	721	1337
19037	7	4° 25' 57!"054	70° 09' 08!"614	- 3249	480	1257
19079	8	5° 20' 27!"837	79° 09' 44!"976	- 3279	251	884
19083	2	2° 09' 12!"395	79° 29' 06!"996	- 2523	161	580
19117	AMS 17	9° 51' 09!"586	68° 38' 01!"643	- 3692	560	1302
19162	9	7° 02' 48!"326	75° 37' 39!"997	- 2429	539	1579
19224	11	14° 05' 51!"700	72° 38' 42!"297	730	442	1228
19254	13	14° 21' 20!"663	80° 00' 38!"247	- 3251	182	685
20044A	AMS 202	2° 23' 22!"038	357° 23' 34!"490	719	1220	207
20115	1214	9° 00' 28!"689	358° 50' 14!"956	1500	345	73

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
20141	1212	-.042033104	24	.117393748	17	.992037419	220
20155	1215	-.052883776	34	.152319943	34	.987628466	295
20161	1213	-.061421598	31	.110970039	31	.993424765	239
20235	1202	-.032753752	59	.257411353	51	.966024469	601
20239	1203	-.030915154	50	.295831839	50	.956218505	390
20281	1217	-.080688071	37	.212156613	33	.975419641	366
20284	1204	-.084400967	42	.242539497	38	.966684389	356
20333	1200	-.031132150	76	.339188990	70	.941775668	805
20374	1294B	-.074024017	73	.345255396	64	.935348579	744
20442	AMS 54	-.041181035	50	.423260343	43	.903712445	498
20497	1145	-.098338239	24	.470153300	23	.877783795	210

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{Wa}	$\sigma\{H_k^{Wa}\}$	$\sigma\{hor_k^{Wa}\}$
20141	1212	6° 44' 33.''989	357° 34' 25.''685	- 273	378	75
20155	1215	8° 45' 18.''664	356° 56' 05.''836	1223	505	118
20161	1213	6° 21' 42.''217	356° 27' 43.''245	2587	412	91
20235	1202	14° 54' 44.''720	358° 03' 29.''122	466	1008	306
20239	1203	17° 10' 56.''663	358° 08' 53.''649	2454	649	231
20281	1217	12° 13' 49.''330	355° 16' 16.''248	2574	617	175
20284	1204	14° 02' 00.''277	355° 00' 36.''625	372	597	191
20333	1200	19° 47' 49.''087	358° 06' 24.''014	2570	1311	519
20374	1294B	20° 12' 07.''375	355° 28' 30.''039	- 384	1207	495
20442	AMS 54	25° 04' 24.''846	357° 23' 27.''271	- 2183	783	387
20497	1145	28° 01' 32.''394	353° 36' 28.''078	1059	321	184

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
20522	1147	-.022433046	25	.523938888	22	.852219917	255
20527	921	-.027438985	69	.570148953	53	.820292196	691
20527A	1146	-.027240189	61	.570120037	54	.821509233	626
20599	1143A	-.096833474	44	.594320727	44	.797886435	389
20603	1131A	-.001983834	76	.633428396	76	.773252167	593
20613	1131	-.012518244	42	.639845064	37	.767690396	427
20646	1125	-.041867215	50	.667224182	43	.744592928	527
20673	1132	-.075561698	62	.632386606	54	.771049759	635
20708	1065	-.002833529	42	.780700921	32	.625102617	453
20711	1065A	-.010898612	60	.716441896	55	.698098407	564
20732	1076	-.038557187	53	.728452851	46	.684023726	541

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Ref. No.	I. A. U. No.	Latitude	Longitude	$H_k^{W\,a}$	$\sigma\{H_k^{W\,a}\}$	$\sigma\{hor_k^{W\,a}\}$
20522	1147	31° 34' 26.613	358° 29' 31.''730	1124	378	239
20527	921	34° 47' 11.''215	358° 05' 02.''961	- 1128	987	702
20527A	1146	34° 44' 44.''004	358° 06' 03.''029	570	898	629
20599	1143A	36° 28' 50.''951	353° 04' 49.''019	- 681	544	415
20603	1131A	39° 19' 24.''113	359° 51' 10.''814	- 735	807	669
20613	1131	39° 48' 22.''913	359° 03' 56.''868	- 950	572	483
20646	1125	41° 49' 06.''026	356° 46' 54.''274	1181	677	626
20673	1132	39° 13' 23.''325	354° 24' 10.''703	122	850	719
20708	1065	51° 18' 56.''389	359° 44' 25.''028	222	489	623
20711	1065A	45° 44' 22.''090	359° 06' 20.''085	651	690	710
20732	1076	46° 45' 22.''603	356° 46' 25.''515	16	646	696

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
20748	1077	-.047333119	84	.783658060	69	.622347570	833
20755	1075	-.052190179	61	.754507020	48	.653524466	583
20768	1072	-.066909780	40	.789477564	35	.611651771	389
20773	1124	-.078350522	50	.733501102	46	.672957170	498
20786	1077G	-.083075092	70	.760826887	63	.642140139	731
20790B	AMS 52	-.093033406	87	.702212807	66	.705216742	957
20808	1051	-.004211204	79	.889886747	79	.452847912	816
20822	1073	-.020078610	33	.819939383	30	.571632494	326
20841	1077E	-.048788052	60	.814470586	52	.578696472	614
20872A	AMS 50	-.071477769	96	.826525232	94	.557570715	941
20889	1325	-.086802150	43	.894143876	37	.437950955	434

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Ref. No.	I. A. U. No.	Latitude	Longitude	$H_k^{W\,a}$	$\sigma\{H_k^{W\,a}\}$	$\sigma\{hor_k^{W\,c}\}$
20748	1077	51° 27' 51.''873	355° 39' 02.''516	3192	905	1145
20755	1075	49° 00' 43.''272	355° 26' 02.''667	- 783	665	777
20768	1072	52° 04' 04.''700	353° 45' 25.''653	1624	419	538
20773	1124	47° 16' 21.''694	353° 21' 32.''801	- 2579	582	652
20786	1077G	49° 36' 03.''583	352° 37' 42.''464	- 1649	814	988
20790B	AMS 52	44° 37' 50.''092	352° 29' 05.''417	- 792	1187	1180
20808	1051	63° 01' 41.''685	359° 28' 01.''921	- 2620	641	1281
20822	1073	55° 06' 02.''136	357° 59' 17.''919	- 463	327	469
20841	1077E	54° 30' 34.''717	355° 10' 51.''497	549	620	879
20872A	AMS 50	55° 46' 47.''017	352° 41' 41.''324	- 749	893	1391
20889	1325	63° 27' 56.''892	348° 47' 21.''241	- 1018	334	683

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
20902	1041	-.002598871	60	.920332728	53	.391406920	655
20935	1027	-.037111797	59	.952380446	58	.304407773	641
20936B	AMS 44	-.033123858	126	.967328473	94	.254313073	1226
20955	1026	-.050421311	90	.959458851	119	.280693755	1149
20995	AMS 45	-.093056610	31	.955239154	22	.280512034	293
20997B	AMS 36	-.095990193	77	.976003776	90	.195620139	994
21017A	AMS 201	-.115537261	47	.071563449	45	.989364131	455
21067	1253	-.164802187	58	.078775335	55	.982883567	566
21104	1253A	-.105097818	43	.148271042	42	.983648646	367
21247	1284B	-.145393297	91	.276573592	66	.950789709	864
21252	1283B	-.156258731	79	.222681173	69	.962744452	715

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{Wa}	$\sigma\{H_k^{Wa}\}$	$\sigma\{hor_k^{Wa}\}$
20902	1041	66° 57' 36.''194	359° 37' 10.''459	190	445	1056
20935	1027	72° 09' 06.''138	353° 02' 56.''766	929	357	1065
20936B	AMS 44	75° 09' 04.''250	352° 34' 44.''744	1300	565	2072
20955	1026	73° 26' 46.''020	349° 48' 59.''414	1644	598	1922
20995	AMS 45	72° 48' 29.''843	341° 38' 50.''409	- 149	155	490
20997B	AMS 36	77° 24' 52.''441	333° 51' 46.''645	56	361	1702
21017A	AMS 201	4° 06' 33.''583	353° 20' 21.''148	- 2338	778	177
21067	1253	4° 31' 10.''116	350° 28' 53.''885	- 499	960	257
21104	1253A	8° 31' 27.''091	353° 54' 04.''954	517	626	161
21247	1284B	16° 02' 32.''507	351° 18' 20.''768	1419	1406	563
21252	1283B	12° 51' 38.''887	350° 46' 51.''495	765	1186	410

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
21331	1283	-.136972812	51	.314654876	44	.939228532	539
21342	1283A	-.142832980	34	.320697959	33	.936431519	294
21420	1150	-.123930463	58	.409981917	51	.903808599	564
21428	1150A	-.123376365	45	.486614382	44	.865031947	456
21445	1185	-.140393438	24	.454870066	21	.879101234	251
21486	1298	-.185944031	60	.467242832	55	.864856914	629
21503	1141	-.103658635	33	.540121544	28	.835527187	333
21524	1142	-.128143492	32	.542521038	32	.830456828	300
21638	1123	-.130412499	35	.681517443	31	.720439607	363
21648	1122	-.141942852	83	.686988672	83	.712007757	644
21663	1302	-.164007541	38	.638670992	35	.751971892	401
21680	AMS 53	-.180920340	51	.604756719	50	.774493528	589

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{Wa}	$\sigma\{H_k^{Wa}\}$	$\sigma\{hor_k^{Wa}\}$
21331	1283	18° 20' 26.''682	351° 42' 09.''851	- 70	880	342
21342	1283A	18° 42' 13.''181	351° 19' 39.''265	132	478	200
21420	1150	24° 11' 58.''767	352° 11' 32.''204	273	881	449
21428	1150A	29° 06' 48.''893	351° 52' 58.''282	257	682	417
21445	1185	27° 03' 53.''387	350° 55' 35.''119	- 490	381	219
21486	1298	27° 50' 32.''392	347° 51' 58.''078	755	945	569
21503	1141	32° 40' 52.''380	352° 55' 40.''108	506	482	330
21524	1142	32° 50' 52.''330	351° 13' 41.''403	355	438	294
21638	1123	42° 56' 55.''768	349° 44' 22.''353	440	458	441
21648	1122	43° 25' 04.''043	348° 43' 32.''031	- 820	808	801
21663	1302	39° 41' 11.''722	347° 41' 46.''605	227	527	465
21680	AMS 53	37° 14' 53.''910	346° 51' 05.''699	- 1475	800	650

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
21766	1069	-.162288410	55	.761650876	52	.627153286	595
21768	1074A	-.162620752	32	.781940915	32	.600942781	371
21769B	1088	-.168115805	81	.799784807	75	.575352324	1097
21776	1070	-.179481811	65	.762491277	61	.620310844	699
21779	1066	-.178226025	53	.799015925	43	.574921684	464
21782	1121	-.182164385	49	.724865022	49	.665153547	502
21811	1077D	-.113057108	61	.814274314	54	.566236736	639
21849	1323	-.145041833	52	.893206056	52	.425494501	544
21856	1328B	-.158601863	71	.861151912	49	.483453896	670
21888	1326	-.183551155	29	.880966079	28	.435235540	316
21902	1324	-.105880995	39	.923953195	35	.368587069	415
21913	1346	-.112365857	167	.936595917	171	.330697190	1932

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
21766	1069	49° 37' 03!!616	345° 29' 30!!548	- 199	655	811
21768	1074A	51° 28' 27!!373	344° 51' 28!!395	- 861	395	515
21769B	1088	53° 08' 59!!011	343° 42' 42!!603	- 914	1097	1572
21776	1070	49° 44' 19!!306	343° 51' 45!!495	- 1398	761	960
21779	1066	53° 00' 31!!044	342° 46' 35!!531	631	459	674
21782	1121	46° 25' 34!!435	344° 41' 02!!601	906	592	652
21811	1077D	54° 39' 32!!473	348° 42' 30!!881	- 3089	635	921
21849	1323	63° 17' 04!!669	341° 10' 36!!738	- 87	416	859
21856	1328B	59° 25' 25!!044	341° 50' 14!!669	404	570	1026
21888	1326	61° 48' 02!!366	337° 08' 00!!490	- 676	245	497
21902	1324	67° 27' 31!!514	343° 58' 21!!583	657	277	671
21913	1346	69° 32' 56!!444	341° 13' 58!!884	- 697	1182	3171

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
21928	1347A	-.127864439	104	.980660265	89	.148507184	1296
21928A	1347B	-.129406011	24	.985589472	27	.112373259	327
21986C	AMS 46	-.185893681	89	.964358297	73	.182597212	903
21990	1328	-.196928886	66	.901772548	62	.383347008	711
22003A	1502	-.208106583	39	.034489147	39	.977866901	305
22005	1500	-.204039773	55	.058378389	47	.977585615	509
22061	1497	-.262307747	61	.016592358	56	.964048614	593
22065	1502C	-.262597069	46	.057445009	46	.963858340	359
22162	1485	-.263690366	39	.124143737	39	.956688068	413
22209	1283C	-.204832448	52	.290577345	52	.934502579	514
22220	1467	-.229926766	36	.205493383	32	.951043213	353
22421	1298A	-.222176434	43	.419378233	42	.880218617	496

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
21928	1347A	78° 41' 57!!298	319° 16' 17!!773	85	420	2226
21928A	1347B	80° 08' 07!!035	310° 58' 13!!121	661	92	564
21986C	AMS 46	74° 52' 46!!439	314° 29' 14!!832	-1839	357	1541
21990	1328	64° 27' 22!!143	332° 48' 36!!061	- 930	487	1146
22003A	1502	1° 58' 32!!742	347° 59' 08!!629	627	518	150
22005	1500	3° 20' 43!!954	348° 12' 38!!111	620	855	257
22061	1497	0° 57' 05!!197	344° 46' 43!!987	-1330	985	338
22065	1502C	3° 17' 27!!821	344° 45' 36!!031	1112	601	205
22162	1485	7° 07' 50!!184	344° 35' 25!!018	171	680	247
22209	1283C	16° 53' 42!!904	347° 38' 12!!929	- 272	836	339
22220	1467	11° 51' 39!!340	346° 24' 31!!719	- 368	578	224
22421	1298A	24° 47' 42!!016	345° 50' 01!!833	22	761	418

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
22441	1297	-.239926137	56	.419813810	56	.875508727	443
22511	1298D	-.217497654	38	.519129717	37	.826561357	334
22534	1394	-.230927131	33	.544066549	32	.807396926	353
22617	1303	-.215346062	40	.673773531	38	.706325785	431
22631	1304B	-.233490546	51	.617530994	49	.751650410	439
22664	1304	-.267542779	50	.646821941	51	.717207888	538
22731	1321	-.237331153	55	.712912493	51	.658489799	515
22767	1381	-.264598309	64	.772768474	52	.577100053	574
22801	1368M	-.207968317	46	.818448171	45	.532891792	535
22819	1328F	-.217452885	82	.890970439	86	.397851964	1034
22875	1367	-.270630076	52	.855057151	50	.441033269	560
22891	1366	-.291825666	39	.812695731	37	.504543228	383

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
22441	1297	24° 49' 06.''761	344° 40' 29.''255	281	677	392
22511	1298D	31° 16' 25.''728	345° 15' 27.''490	4	481	337
22534	1394	32° 56' 17.''360	344° 02' 19.''352	1065	496	371
22617	1303	42° 22' 43.''773	343° 02' 40.''116	- 660	531	537
22631	1304B	38° 07' 01.''788	342° 44' 35.''751	730	575	515
22664	1304	40° 11' 50.''176	339° 32' 34.''026	3772	669	665
22731	1321	45° 31' 31.''836	340° 10' 47.''846	- 1583	595	681
22767	1381	50° 35' 42.''738	335° 22' 07.''369	198	574	829
22801	1368M	55° 02' 57.''364	338° 40' 51.''974	- 2538	507	786
22819	1328F	63° 01' 45.''099	331° 20' 25.''530	- 521	767	1639
22875	1367	58° 49' 09.''627	328° 27' 56.''100	- 979	441	878
22891	1366	54° 21' 07.''730	329° 57' 18.''337	174	344	578

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
22900	1328A	-.203813528	65	.900841225	67	.383705580	872
22901	1359C	-.206999399	77	.916918344	69	.343640088	805
22923	1358	-.221590794	40	.932515024	43	.282559290	535
23021	1498	-.320862438	35	.017307487	35	.947377288	291
23065	1512E	-.364147074	49	.058938082	42	.930000397	478
23112	1486D	-.310880964	34	.120317761	34	.943524192	267
23232	1438	-.338664598	75	.227670114	77	.910991921	677
23249	1412	-.349725282	49	.293599961	49	.890200378	384
23325	1406	-.328796127	72	.351342335	70	.877210541	685
23447	1399	-.349019416	74	.477283010	74	.806911378	577
23500	1392	-.306763325	16	.505630923	15	.806778903	164
23535	1390	-.338774469	67	.555191932	67	.759819747	520

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
22900	1328A	64° 15' 06.''987	332° 01' 26.''496	248	631	1388
22901	1359C	66° 22' 10.''824	328° 56' 11.''000	1456	506	1317
22923	1358	68° 56' 22.''956	321° 53' 43.''723	- 1281	300	887
23021	1498	0° 59' 28.''719	341° 17' 22.''318	674	476	191
23065	1521E	3° 22' 37.''953	338° 37' 00.''780	849	763	347
23112	1486D	6° 54' 20.''593	341° 45' 48.''637	1183	438	177
23232	1438	13° 11' 02.''017	339° 36' 25.''911	- 3102	1051	558
23249	1412	17° 03' 54.''416	338° 33' 07.''406	839	594	326
23325	1406	20° 33' 29.''510	339° 27' 10.''775	909	1030	621
23447	1399	28° 29' 48.''879	336° 36' 34.''950	625	813	615
23500	1392	30° 21' 43.''893	339° 10' 53.''702	572	228	175
23535	1390	33° 43' 03.''300	335° 58' 11.''070	289	691	604

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
23567	1391	-.364750156	64	.578184481	64	.729809867	494
23629	1315	-.326436497	63	.690674407	67	.644878170	540
23708	ACIC 121	-.304910320	112	.780215370	112	.545414932	870
24022	1512B	-.428750651	43	.027974856	44	.902148469	365
24082	1537	-.481728174	65	.026949072	63	.874920219	665
24140	1522	-.446643777	26	.103683767	26	.889490682	220
24161	1519	-.465848298	60	.112999970	51	.878743851	617
24197	1529	-.494966959	26	.174204208	26	.852413519	228
24241	1419	-.440057166	57	.212016544	50	.872454557	589
24349	1583	-.446755306	61	.394736818	73	.804259871	647
24468	1591	-.469032733	44	.485729991	44	.738171255	346
24526	1602	-.427084100	52	.565831534	52	.705396945	574
24532	1600	-.439066255	110	.524630448	101	.729977861	944

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
23567	1391	35° 19' 25.''366	333° 26' 40.''814	- 33	632	602
23629	1315	43° 41' 53.''903	333° 09' 05.''493	- 470	633	711
23708	ACIC 121	51° 18' 34.''172	330° 47' 34.''580	- 709	845	1283
24022	1512B	1° 36' 15.''369	334° 34' 49.''289	- 1320	562	315
24082	1537	1° 32' 44.''124	331° 09' 46.''675	- 1501	989	618
24140	1522	5° 56' 49.''409	333° 20' 13.''932	1248	337	190
24161	1519	6° 28' 54.''684	332° 04' 14.''177	1715	935	542
24197	1529	10° 01' 20.''972	329° 51' 27.''904	1692	336	220
24241	1419	12° 14' 30.''953	333° 14' 02.''722	- 193	874	548
24349	1583	23° 13' 19.''284	330° 56' 54.''348	1947	885	713
24468	1591	29° 02' 50.''034	327° 34' 05.''498	714	446	417
24526	1602	34° 27' 25.''510	328° 48' 25.''562	131	707	715
24532	1600	31° 37' 39.''988	328° 58' 26.''330	768	1169	1179

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
24671	1614	-.477117246	69	.612442983	69	.629580470	540
24682	1612	-.488252271	68	.623881571	75	.609281332	788
24707	1659	-.407143215	78	.770106207	69	.490805376	735
24751	1628	-.450502184	115	.716232190	77	.531610088	1213
24753	1635	-.456067818	48	.738108906	45	.496653506	456
24769	1668	-.469189104	84	.795463620	84	.381853801	652
24783	1636	-.484108355	48	.730666281	50	.480419369	574
24825	1708	-.422822138	62	.858006376	72	.290806354	709
25007	1520	-.508880137	25	.076501382	25	.857970671	244
25010	2481	-.516328784	36	.003540740	33	.856282640	297
25035	1535	-.536053833	60	.056421358	62	.843146197	652

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
24671	1614	37° 47' 10.''947	322° 50' 38.''139	- 783	599	743
24682	1612	38° 37' 35.''940	321° 17' 34.''047	-1006	836	1098
24707	1659	50° 22' 23.''324	320° 19' 22.''439	- 244	638	1122
24751	1628	45° 47' 13.''081	319° 43' 15.''844	- 1260	1103	1813
24753	1635	47° 35' 14.''193	317° 26' 21.''519	- 463	395	696
24769	1668	52° 44' 51.''123	309° 08' 26.''634	- 1119	455	1058
24783	1636	46° 58' 18.''616	314° 46' 51.''112	- 837	498	872
24825	1708	59° 06' 58.''927	304° 31' 09.''148	- 418	417	1172
25007	1520	4° 23' 07.''660	329° 19' 37.''000	804	361	229
25010	2481	0° 12' 10.''395	328° 54' 37.''787	- 150	440	283
25035	1535	3° 13' 55.''584	327° 33' 09.''704	1244	942	648

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
25091	1542D	-.593043260	58	.011855013	52	.804209509	627
25097	1538	-.594573478	72	.080005274	60	.800153366	726
25126	1530	-.523278491	43	.161165973	42	.837182022	470
25182	1555	-.583856553	91	.124610873	91	.803758316	1060
25286	1577	-.584254173	107	.265237298	94	.766360539	1002
25304	1581	-.509098772	37	.342562656	37	.790813868	291
25325	1579	-.526572144	103	.353739155	67	.773036866	881
25365	1578	-.560464411	38	.356741041	40	.747302012	416
25534	1605	-.536110896	110	.542567099	133	.646361233	1314
25616	1611	-.514438995	100	.663699983	72	.539493464	1145
25685	1613B	-.584801753	67	.654033612	67	.478665480	523
25820	1713	-.529392676	21	.802596021	27	.274109755	218

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
25091	1542D	0° 40' 47!"050	323° 35' 38!"588	-1222	850	697
25097	1538	4° 35' 18!"572	323° 23' 05!"657	142	966	827
25126	1530	9° 16' 17!"233	327° 59' 33!"582	581	676	469
25182	1555	7° 08' 58!"231	324° 00' 18!"149	2122	1471	1130
25286	1577	15° 23' 19!"838	322° 40' 44!"421	- 859	1292	1193
25304	1581	20° 00' 47!"104	327° 13' 40!"650	1665	400	322
25325	1579	20° 42' 58!"455	325° 44' 18!"061	- 4	1201	975
25365	1578	20° 54' 06!"784	323° 07' 50!"506	- 135	528	504
25534	1605	32° 51' 59!"032	320° 19' 36!"105	- 368	1546	1707
25616	1611	41° 40' 46!"752	316° 21' 42!"479	-3307	1072	1691
25685	1613B	40° 52' 27!"625	309° 18' 02!"279	- 979	447	809
25820	1713	53° 23' 45!"447	297° 22' 27!"433	- 388	126	363

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
26040	1540	-.644246007	56	.006387248	53	.765275290	523
26048	1542B	-.648818929	37	.085596947	29	.754806228	375
26088	1542A	-.685732258	46	.081278697	45	.723400940	413
26124	1559A	-.622984789	80	.144723421	71	.770042199	856
26157	1557	-.656034591	65	.174216198	71	.735057104	611
26199	1817	-.692769523	43	.197964317	37	.692241748	467
26219	1573	-.611426626	64	.293469756	62	.734469596	745
26257	1575	-.649651159	39	.276288495	39	.708320528	300
26520	1736	-.627928179	77	.508567407	77	.588659669	599
26562	1739	-.666002987	31	.526571467	34	.525975911	415
26652	1880A	-.654662865	109	.623361590	138	.422773164	1126
26688	1875	-.686869951	16	.688137256	23	.226332566	255

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Ref. No.	I. A. U. No.	Latitude	Longitude	$H_k^{W.a}$	$\sigma\{H_k^{W.a}\}$	$\sigma\{hor_k^{W.a}\}$
26040	1540	0° 21' 56!"986	319° 54' 27!"700	643	679	620
26048	1542B	4° 54' 54!"792	319° 19' 05!"491	- 1717	479	449
26088	1542A	4° 39' 42!"239	316° 31' 52!"519	125	507	521
26124	1559A	8° 18' 46!"126	321° 01' 34!"365	1754	1108	1009
26157	1557	10° 01' 39!"985	318° 15' 04!"523	905	764	757
26199	1817	11° 25' 39!"671	314° 58' 41!"400	- 1462	547	608
26219	1573	17° 04' 15!"485	320° 13' 24!"631	- 511	940	904
26257	1575	16° 02' 16!"771	317° 28' 25!"859	87	370	379
26520	1736	30° 34' 39!"655	313° 09' 04!"582	- 474	620	856
26562	1739	31° 49' 07!"538	308° 17' 59!"704	- 2184	390	612
26652	1880A	38° 39' 21!"650	302° 51' 13!"943	- 3566	891	1768
26688	1875	43° 34' 36!"833	288° 14' 15!"801	- 3001	106	433

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
26741	1728	-.642317569	90	.720082765	100	.256549661	1083
27002	1837	-.702273287	58	.020455494	51	.711287909	619
27037	1835A	-.736623348	35	.076257884	33	.671374307	394
27063	1838	-.760012766	52	.033618255	52	.649035686	407
27078	1833	-.778059641	44	.089961557	44	.621456917	398
27080A	AMS 11	-.787011252	48	.003702049	49	.613835591	581
27165	AMS 12	-.763891123	92	.151662080	83	.626455409	1063
27201	1814	-.701547275	62	.218228125	60	.679279280	682
27250	1813	-.757464979	86	.206561033	75	.621046409	981
27270	1818	-.776662898	36	.210518297	36	.594048176	276
27289A	ACIC 131	-.780216420	67	.298746833	67	.548746143	520
27336	1806	-.733002528	50	.366936737	50	.572559279	399

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
26741	1728	46° 09' 12.''617	291° 46' 20.''586	- 2688	517	1825
27002	1837	1° 10' 20.''521	315° 21' 55.''383	- 403	734	798
27037	1835A	4° 22' 31.''132	312° 20' 48.''157	- 719	445	527
27063	1838	1° 55' 35.''580	310° 29' 47.''989	- 3	460	553
27078	1833	5° 09' 44.''019	308° 36' 55.''051	- 279	423	559
27080A	AMS 11	0° 12' 45.''061	307° 57' 09.''824	- 3310	592	826
27165	AMS 12	8° 43' 39.''926	309° 21' 16.''753	- 889	1106	1495
27201	1814	12° 35' 50.''005	314° 04' 33.''945	1053	778	905
27250	1813	11° 54' 29.''156	309° 20' 54.''118	1841	1017	1383
27270	1818	12° 09' 00.''573	307° 24' 40.''982	362	287	395
27289A	ACIC 131	17° 23' 25.''226	305° 07' 10.''919	- 774	502	770
27336	1806	21° 31' 46.''347	307° 59' 38.''146	- 209	401	578

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
27517	1874	-.718506688	1	.578370385	1	.381788904	10
28022A	AMS 6	-.823130447	40	.022720446	30	.566648438	382
28106	1821	-.805085976	41	.158343489	39	.570707206	476
28112	1832	-.811851391	64	.120872962	54	.570582426	677
28178	1843	-.873532484	59	.182024088	60	.450296029	713
28270	1844	-.871373572	33	.202785290	31	.445072760	353
28355	1849	-.854865834	69	.359731555	51	.374450968	951
29024	1959	-.926383122	46	.049545800	57	.369202331	574
29061	1966	-.965841178	87	.019938182	63	.260078568	901
29066	1931A	-.956242033	69	.066052226	61	.280244392	845
29109	1845	-.905195104	142	.198375337	149	.374017371	1901
29128B	AMS 4	-.923975356	49	.181941623	46	.337138838	678
29151	1929	-.954748962	79	.119001464	77	.266799286	1154

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
27517	1874	35° 24' 24!!343	297° 59' 04!!516	- 3021	7	17
28022A	AMS 6	1° 18' 08!!824	304° 32' 37!!611	- 738	358	566
28106	1821	9° 06' 56!!233	305° 19' 55!!069	- 919	455	699
28112	1832	6° 56' 42!!032	305° 06' 00!!631	- 628	633	1002
28178	1843	10° 29' 35!!550	297° 16' 14!!120	- 905	535	1128
28270	1844	11° 42' 31!!575	297° 03' 23!!936	- 1301	260	562
28355	1849	21° 04' 44!!827	293° 39' 16!!302	361	553	1565
29024	1959	2° 50' 39!!376	291° 43' 45!!642	- 2652	356	940
29061	1966	1° 08' 30!!994	285° 04' 15!!399	771	339	1541
29066	1931A	3° 47' 32!!656	286° 20' 03!!111	- 2349	342	1437
29109	1845	11° 26' 59!!926	292° 26' 59!!691	- 1200	1207	3096
29128B	AMS 4	10° 28' 48!!890	290° 02' 45!!399	431	372	1125
29151	1929	6° 50' 42!!667	285° 36' 45!!810	- 2706	546	1939

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
30015A	ACIC 187	-.010923145	49	-.050076578	49	.999663989	381
30058	2947	-.054946234	29	-.086657438	27	.995992232	238
30080	2936A	-.088929106	56	-.005912422	45	.996465030	508
30095	2933	-.089904590	29	-.055491750	28	.994831350	248
30114	2963	-.013862207	26	-.147547874	23	.988926568	227
30186	ACIC 189	-.086500121	36	-.165883557	36	.982690382	283
30196	2970B	-.092368851	60	-.167096721	53	.980384883	614
30206	2992A	-.008342174	47	-.268582295	40	.962590607	438
30249	3042	-.049595042	64	-.292648881	48	.953679230	567
30376	3071	-.079193367	72	-.367277292	61	.925672967	663
30386	3074	-.086722484	82	-.365306030	76	.928711538	808

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
30015A	ACIC 187	- 2° 52' 03!!263	359° 22' 26!!272	1698	662	127
30058	2947	- 4° 57' 54!!181	356° 50' 32!!444	2196	410	84
30080	2936A	- 0° 20' 18!!992	354° 54' 00!!622	770	876	170
30095	2933	- 3° 10' 47!!000	354° 50' 10!!000	740	428	89
30114	2963	- 8° 29' 06!!406	359° 11' 48!!887	- 54	391	85
30186	ACIC 189	- 9° 32' 43!!046	354° 58' 10!!468	591	482	131
30196	2970B	- 9° 37' 50!!500	354° 37' 03!!562	- 2080	1044	266
30206	2992A	- 15° 35' 22!!643	359° 30' 12!!476	- 1055	733	228
30249	3042	- 17° 02' 15!!455	357° 01' 23!!079	- 2081	940	328
30376	3071	- 21° 34' 12!!237	355° 06' 36!!454	- 1709	1076	446
30386	3074	- 21° 23' 14!!871	354° 39' 54!!818	3017	1305	557

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
30416	3101	-.010292945	58	-.469398929	50	.883655873	575
30424	3083	-.029833498	35	-.440030491	28	.896888067	326
30465	3084	-.065547815	52	-.453009779	45	.890601231	475
30478	3088	-.079633875	42	-.480473292	39	.873009436	437
30484	3091A	-.083844815	36	-.441990810	32	.891924780	338
30497	3103	-.095462284	27	-.472516196	26	.875614760	221
30526	3471B	-.022426369	93	-.565490889	81	.824819838	991
30586	3116	-.088276344	44	-.567128002	38	.817848927	441
30609	3165	-.006323187	49	-.691332369	43	.720972869	491
30651	3153	-.055906463	31	-.614590326	27	.787385498	306
30683	3154	-.082809607	65	-.634268068	56	.768361673	647
30755	3204	-.050452235	61	-.751363480	52	.655129117	600
30772 A	AMS 57	-.079804957	33	-.725338173	40	.684931063	339

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
30416	3101	- 27° 58' 32.''437	359° 19' 57.''508	1120	885	482
30424	3083	- 26° 07' 15.''347	358° 05' 41.''471	- 934	510	261
30465	3084	- 26° 53' 52.''632	355° 47' 26.''334	2332	731	402
30478	3088	- 28° 43' 35.''965	354° 47' 16.''933	- 572	661	387
30484	3091A	- 26° 15' 37.''598	354° 37' 47.''023	- 1812	523	280
30497	3103	- 28° 12' 42.''497	353° 46' 40.''826	- 795	336	198
30526	3471B	- 34° 25' 27.''833	358° 26' 33.''162	531	1420	998
30586	3116	- 34° 35' 01.''335	353° 50' 22.''210	- 1475	627	452
30609	3165	- 43° 47' 47.''727	359° 29' 51.''031	- 1928	621	597
30651	3153	- 37° 54' 13.''714	355° 56' 19.''187	715	420	335
30683	3154	- 39° 22' 36.''114	353° 50' 55.''439	- 406	865	734
30755	3204	- 48° 49' 48.''850	355° 35' 46.''605	- 3230	684	799
30772A	AMS 57	- 46° 26' 53.''962	353° 21' 14.''870	1403	406	437

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Ref. No.	I. A. U. No	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
30798	3212A	-.097824348	60	-.785988660	51	.606696518	568
30823	3222	-.023007233	43	-.832012961	39	.552945950	421
30876	AMS 83	-.079010660	98	-.865558277	68	.491103072	940
30898	3233A	-.095911074	88	-.885356823	71	.454581462	788
30900	3268	-.005984420	37	-.900256731	34	.431939155	385
30907	AMS 81	-.003353476	78	-.974023351	54	.228324358	683
30937	AMS 82	-.038013290	76	-.975495931	67	.220260446	1236
30955	3278	-.058969427	85	-.953783782	71	.290745665	930
30972	3264	-.080218471	134	-.921258338	78	.372972823	1181
31019	2920	-.119177019	43	-.096850490	43	.988499047	336
31043	2935	-.140428769	58	-.030886388	59	.990502668	455
31055	2919	-.156149662	38	-.054126414	33	.986417331	369

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
30798	3212A	- 51° 58' 46.''540	350° 50' 25.''468	- 3977	598	797
30823	3222	- 56° 22' 10.''601	357° 37' 02.''585	- 1283	411	614
30876	AMS 83	- 60° 06' 53.''705	350° 51' 37.''227	- 2943	796	1441
30898	3233A	- 62° 18' 42.''631	348° 05' 09.''721	- 261	631	1231
30900	3268	- 64° 21' 58.''939	359° 12' 22.''430	- 2549	301	604
30907	AMS 81	- 76° 48' 21.''303	359° 09' 30.''738	751	302	1159
30937	AMS 82	- 77° 05' 40.''268	350° 12' 29.''368	1348	513	2093
30955	3278	- 72° 43' 19.''857	348° 32' 04.''986	- 1988	464	1561
30972	3264	- 67° 30' 18.''301	347° 51' 42.''536	- 4995	797	1911
31019	2920	- 5° 33' 21.''054	353° 07' 31.''420	620	577	143
31043	2935	- 1° 46° 06.''156	351° 55' 50.''357	1537	782	187
31055	2919	- 3° 06' 07.''980	351° 00' 17.''032	288	628	158

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
31115	3008A	-.118454959	50	-.150575424	44	.982690870	516
31126	3011	-.125849336	32	-.167253246	32	.977826493	247
31161	2918	-.168659030	44	-.115102346	38	.979362041	421
31216	3028	-.114945703	30	-.260164817	27	.958542931	255
31231	3004	-.131166065	44	-.211310440	38	.969199105	450
31236	3021	-.131898004	103	-.266150673	93	.953486964	934
31255	3029	-.156694537	47	-.252607853	39	.953735900	458
31290	2856	-.195866173	33	-.199739016	31	.959712543	280
31300	3031A	-.100310731	40	-.308088776	40	.945245811	313
31361	3022	-.167810336	37	-.311780308	37	.934725656	285
31463	3066A	-.161336890	53	-.463582176	47	.883500394	533

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
31115	3008A	- 8° 38' 59.''578	353° 07' 35.''931	2072	874	228
31126	3011	- 9° 37' 42.''122	352° 39' 58.''212	- 38	419	122
31161	2918	- 6° 36' 24.''217	350° 13' 43.''525	734	711	203
31216	3028	- 15° 04' 55.''692	353° 09' 42.''869	- 258	424	150
31231	3004	- 12° 11' 30.''160	352° 17' 33.''833	1048	753	236
31236	3021	- 15° 27' 22.''238	352° 07' 26.''864	- 2286	1532	585
31255	3029	- 14° 38' 49.''367	350° 40' 11.''688	- 1760	756	272
31290	2856	- 11° 31' 32.''681	348° 27' 54.''031	- 602	464	165
31300	3031A	- 17° 57' 29.''861	353° 56' 32.526	- 1330	513	205
31361	3022	- 18° 10' 30.''770	349° 49' 19.''810	- 800	462	200
31463	3066A	- 25° 55' 29.''769	349° 39' 04.''277	- 2429	808	469

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
31472	3066C	-.173852851	46	-.426000645	46	.886670531	361
31567	2748	-.161884865	39	-.575232490	34	.802621829	388
31592	2784A	-.194667840	65	-.520895945	71	.829836500	643
31643A	3139B	-.146357038	65	-.631924953	56	.761565637	637
31648	3182	-.140699387	131	-.685185129	82	.715599777	1113
31691	3190	-.197199847	60	-.618788023	53	.759826305	590
31715C	AMS 61	-.112461405	55	-.750656305	48	.650060712	524
31738	3238A	-.136733399	46	-.782178735	41	.606397240	456
31743	3197	-.142874173	157	-.731647059	91	.666719507	1148
31751	3186C	-.157918042	53	-.711692379	47	.682862244	482
31774	3198	-.176088867	48	-.747582578	42	.639612058	466
31790A	3186A	-.192136872	60	-.709540603	53	.676500440	589

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
31472	3066C	- 25° 14' 33.''297	348° 54' 23.''519	- 1838	556	314
31567	2748	- 35° 05' 23.''052	348° 35' 48.''167	1130	537	419
31592	2784A	- 31° 25' 47.''653	346° 47' 52.''591	- 1863	918	658
31643A	3139B	- 39° 10' 30.''736	349° 07' 17.''671	636	845	731
31648	3182	- 43° 12' 49.''027	348° 52' 35.''548	1180	1374	1389
31691	3190	- 38° 14' 51.''011	345° 27' 03.''097	- 763	771	690
31715C	AMS 61	- 48° 41' 21.''343	350° 11' 05.''645	- 1120	594	702
31738	3238A	- 51° 31' 29.''070	347° 17' 35.''438	- 1550	477	641
31743	3197	- 47° 01' 02.''699	347° 54' 17.''186	205	1296	1550
31751	3186C	- 45° 26' 78.''152	346° 58' 43.''475	- 1961	567	628
31774	3198	- 48° 24' 50.''362	344° 36' 26.''872	- 877	513	636
31790A	3186A	- 45° 15' 17.''486	344° 08' 40.''601	- 1724	686	773

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
31801	3251D	-.103875983	20	-.817227304	20	.564903972	200
31815	3236	-.110832564	32	-.853528956	27	.505214961	306
31829	3258	-.128933162	61	-.892593836	59	.430919587	601
31864	3237	-.163642817	40	-.847263535	35	.499463614	392
31867A	AMS 64	-.168321969	55	-.873941715	49	.453848445	547
31890	2709	-.194089755	57	-.802994624	52	.561881092	572
31901	3263A	-.108184374	63	-.911962817	55	.392648788	614
31932	3284	-.137332192	70	-.927906611	71	.344894284	693
31946	3295B	-.147624602	211	-.961732560	117	.223141116	1630
31955	3292	-.153117600	29	-.950652956	24	.262155913	313
31983	3256	-.189262697	147	-.930972390	79	.309431543	1049
31990	3257A	-.193259975	32	-.906657298	29	.371785873	338
32022	2922	-.228270070	41	-.023841895	36	.974079249	392

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
31801	3251D	- 54° 53' 56.''943	349° 34' 50.''522	- 1941	198	289
31815	3236	- 58° 47' 04.''551	347° 37' 35.''871	- 3447	272	463
31829	3258	- 63° 15' 20.''166	343° 20' 33.''253	- 835	465	946
31864	3237	- 58° 11' 13.''851	341° 51' 33.''422	- 5136	338	600
31867[A]	AMS 64	- 61° 01' 08.''132	339° 39' 04.''820	- 1665	435	855
31890	2709	- 53° 29' 14.''532	340° 56' 37.''059	- 1581	560	832
31901	3263A	- 65° 56' 04.''565	344° 35' 44.''923	- 2128	420	991
31932	3284	- 68° 11' 41.''894	338° 17' 17.''623	- 1023	424	1140
31946	3295B	- 74° 27' 12.''418	326. 30' 44.''538	- 3032	612	2797
31955	3292	- 72° 17' 19.''781	329° 42' 43.''377	- 3556	136	531
31983	3256	- 68° 42' 47.''622	328° 32' 53.''190	- 1497	537	1766
31990	3257A	- 65° 11' 44.''776	332° 32' 02.''041	- 2085	216	552
32022	2922	- 1° 21' 54.''510	346° 48' 39.''774	1308	655	209

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
32042	2923	-.243467396	50	-.027788687	48	.970010077	446
32107	2858A	-.205217103	42	-.173161657	42	.963259097	330
32176	2880	-.270793123	41	-.164842512	36	.948624913	394
32240	2858	-.246326190	42	-.207053182	41	.946644790	359
32255	2855	-.254793313	54	-.251053570	37	.932877693	511
32283	2839	-.284839128	29	-.234415329	29	.929219540	229
32299	2818	-.293098739	26	-.292069234	26	.910174073	204
32307	3055	-.199859934	41	-.372518672	40	.905004082	342
32372	2819C	-.275917897	47	-.328079448	47	.903449653	364
32372A	2819B	-.270039636	70	-.322087453	64	.907575058	732
32465	2778	-.267274094	44	-.455249198	40	.849129444	464
32482	2806	-.287569430	41	-.420240751	41	.859957227	322
32518	2754	-.215321336	44	-.583630795	42	.781061988	412

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
32042	2923	- 1° 35' 29.''792	345° 54' 36.''464	841	745	244
32107	2858A	- 9° 58' 18.''701	347° 58' 23.''705	- 29	551	190
32176	2880	- 9° 29' 10.''368	344° 04' 05.''340	340	641	260
32240	2858	- 11° 57' 05.''880	345° 24' 52.''302	- 275	586	236
32255	2855	- 14° 33' 11.''507	344° 43' 24.''998	- 1558	814	371
32283	2839	- 13° 33' 37.''402	342° 57' 28.''148	- 406	369	166
32299	2818	- 16° 59' 06.''478	342° 09' 00.''531	- 323	322	163
32307	3055	- 21° 53' 49.''180	347° 32' 48.''313	- 1959	536	277
32372	2819C	- 19° 09' 08.''517	343° 01' 01.''470	- 10	569	298
32372A	2819B	- 18° 47' 08.''739	343° 25' 48.''602	308	1136	597
32465	2778	- 27° 05' 06.''886	342° 31' 40.''633	- 254	672	458
32482	2806	- 24° 51' 55.''416	341° 30' 36.''291	- 1021	480	305
32518	2754	- 35° 46' 02.''291	344° 35' 15.''569	- 2569	556	463

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
32574	2762	- .277087161	60	- .546818099	53	.788786003	476
32629	2726	- .221165500	31	- .696577311	28	.682358233	301
32633	2738	- .231579420	39	- .638119435	37	.731744968	374
32688	2723	- .280741456	52	- .687882512	47	.668100526	448
32718	2708B	- .215887371	38	- .788272186	35	.574705080	379
32749	2707	- .245829018	59	- .797474782	56	.548923764	597
32769	2716D	- .269418049	73	- .791587028	73	.547261123	571
32818	2699A	- .218215198	134	- .887076937	134	.405512716	1039
32836	2694	- .232496157	46	- .867968866	47	.432432172	494
32916	2666	- .210242961	26	- .965152236	28	.162402026	323

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
32574	2762	- 33° 11' 13!!304	340° 38' 40!!159	- 1764	643	540
32629	2726	- 44° 0 9' 36!!302	342° 02' 29!!356	- 220	353	394
32633	2738	- 39° 44' 25!!635	342° 26' 19!!291	- 3239	470	459
32688	2723	- 43° 30' 26!!710	337° 12' 26!!801	- 1429	508	603
32718	2708B	- 52° 05' 17!!125	339° 24' 40!!906	- 1507	378	547
32749	2707	- 52° 58' 34!!975	335° 52' 31!!234	- 1987	571	879
32769	2716D	- 52° 22' 57!!826	333° 47' 19!!892	- 1138	546	847
32818	2699A	- 62° 33' 55!!223	331° 42' 51!!626	- 901	748	1676
32836	2694	- 60° 30' 18!!478	331° 44' 07!!460	- 4854	364	786
32916	2666	- 74° 36' 36!!711	307° 41' 03!!360	1820	107	556

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
32965	2666A	-.268339840	43	-.950948287	28	.162639439	389
33014A	AMS 200	-.318573133	105	-.045412915	95	.945896726	997
33059	2898	-.355518477	46	-.094860933	43	.929598202	477
33067	2899	-.367811152	38	-.069551446	38	.927369577	296
33107	2874	-.307899599	40	-.175541680	40	.935151356	314
33176	2874A	-.378885895	39	-.169077956	38	.909505628	330
33254	2838	-.353268022	42	-.246934187	42	.902241715	327
33285	2831	-.386093125	34	-.251537447	29	.886748673	360
33351	2835	-.352350002	35	-.313459133	36	.881559934	276
33428	2804	-.326664479	70	-.480427248	77	.811820709	712
33505	2763	-.310069408	47	-.552497643	47	.774577113	368
33556	2554	-.355639322	41	-.568681180	41	.740908159	382

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
32965	2666A	- 71° 44' 20!"048	301° 13' 11!"440	2397	117	671
33014 A	AMS 200	- 2° 36' 18!"422	341° 23' 12!"265	- 1502	1626	645
33059	2898	- 5° 26' 40!"412	339° 04' 15!"558	- 396	760	347
33067	2899	- 3° 59' 16!"623	338° 21' 57!"055	119	476	217
33107	2874	- 10° 06' 34!"355	341° 46' 32!"932	109	509	221
33176	2874A	- 9° 44' 14!"810	337° 23' 02!"938	- 572	519	264
33254	2838	- 14° 17' 51!"067	338° 37' 02!"758	- 161	511	269
33285	2831	- 14° 34' 42!"527	336° 28' 17!"549	- 1163	552	306
33351	2835	- 18° 16' 19!"297	338° 12' 50!"193	- 387	421	245
33428	2804	- 28° 46' 02!"078	338° 04' 51!"187	- 2981	969	790
33505	2763	- 33° 30' 45!"413	338° 11' 00!"166	1187	494	423
33556	2554	- 34° 40' 53!"964	334° 21' 31!"608	- 1024	483	466

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
33741	2592D	-.347477943	58	-.718309473	67	.601726950	555
33815	2627	-.318650405	94	-.852831586	77	.407278347	886
34017	2464C	-.416337409	69	-.073226413	65	.905414363	742
34074	2482	-.470422412	77	-.043028155	72	.880787288	823
34126	2464	-.428561804	41	-.162542820	40	.888528047	358
34182	2461	-.488297653	52	-.128430803	57	.846369946	603
34211	2832B	-.418375247	39	-.214225880	39	.882797252	300
34290	2462	-.493683939	56	-.203567402	53	.845812693	605
34339	2491	-.436793542	74	-.394448874	71	.806336758	725
34500	2537	-.400875640	73	-.508794313	72	.758374577	652
34535	ACIC 161	-.434012112	59	-.550800755	59	.712505880	459
34713	2598	-.414346489	67	-.732315474	67	.539009413	552

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
33741	2592D	- 45° 57' 03.''861	329° 59' 41.''818	- 1056	571	792
33815	2627	- 58° 46' 09.''005	321° 57' 38.''657	- 4581	583	1441
34017	2464C	- 4° 12' 09.''131	335° 18' 20.''058	- 1327	1151	603
34074	2482	- 2° 28' 02.''669	331° 53' 37.''077	- 926	1240	736
34126	2464	- 9° 21' 23.''628	334° 15' 02.''495	- 376	548	311
34182	2461	- 7° 22' 16.''596	330° 32' 13.''696	1793	893	564
34211	2832B	- 12° 22' 06.''500	334° 38' 34.''053	227	458	265
34290	2462	- 11° 44' 32.''277	329° 43' 43.''486	489	873	602
34339	2491	- 23° 16' 26.''601	331° 33' 19.''959	- 2994	996	793
34500	2537	- 30° 40' 24.''975	332° 08' 20.''898	- 4608	853	767
34535	ACIC 161	- 33° 25' 59.''073	328° 39' 10.''629	- 511	567	580
34713	2598	- 47° 07' 37.''712	322° 28' 59.''473	- 1304	491	780

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
34794	2282	-.492116612	122	-.748408810	117	.445976004	1451
35005	2483	-.508161375	33	-.051989535	31	.859699242	338
35151	2464B	-.550714256	50	-.110161741	50	.827579807	385
35243	2425	-.542883146	40	-.230441638	42	.808720742	439
35337	2419A	-.532184166	60	-.373184713	69	.758091326	786
35356	2419	-.559239907	44	-.367332769	45	.742409879	346
35408	2358	-.509542903	70	-.486673738	73	.708760262	837
35433	2383	-.530890641	37	-.433183906	37	.727412463	287
35491	2380A	-.597734172	38	-.413723941	38	.685036953	295
35556	2354	-.552854444	96	-.560867986	99	.613700742	1057
35650	2343	-.554172013	80	-.599854216	83	.578433575	956
35752	2295	-.549632677	99	-.728608373	126	.408229707	1023

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
34794	2282	- 48° 24' 51!!625	312° 11' 02!!920	1033	1005	2332
35005	2483	- 2° 58' 48!!375	329° 24' 46!!816	12	494	327
35151	2464B	- 6° 19' 25!!157	326° 21' 29!!373	269	553	397
35243	2425	- 13° 18' 37!!833	326° 07' 37!!486	1611	605	476
35337	2419A	- 21° 56' 40!!642	324° 55' 51!!383	- 2444	1002	943
35356	2419	- 21° 33' 51!!055	323° 00' 36!!521	- 995	445	419
35408	2358	- 29° 08' 27!!377	324° 17' 12!!605	- 1020	979	1090
35433	2383	- 25° 41' 19!!618	323° 52' 36!!285	- 1198	361	355
35491	2380A	- 24° 28' 06!!955	318° 53' 36!!347	- 1974	351	285
35556	2354	- 34° 10' 37!!762	317° 59' 08!!816	- 2740	1072	1510
35650	2343	- 36° 49' 36!!902	316° 13' 37!!726	1318	892	1415
35752	2295	- 46° 46' 53!!435	306° 36' 08!!818	- 332	584	1702

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
35783	2288	-.584285031	43	-.732496156	45	.349696219	520
36058	2448	-.653579233	299	-.080156283	280	.749976025	2800
36097	2443	-.695824171	42	-.077976622	38	.713207710	444
36113	2457	-.610849096	45	-.130681226	39	.780496159	476
36122A	ACIC 144	-.625919679	41	-.123459583	41	.769671178	319
36149	2433	-.646116201	78	-.194750749	70	.736240725	838
36173	2444	-.674168685	36	-.136638248	32	.725534689	383
36211	2432	-.615192571	52	-.209655469	47	.760826212	625
36216	2412	-.615570549	64	-.267357646	63	.741329832	749
36258	2396	-.652220054	122	-.282829484	79	.701185251	1344
36278	2417	-.671830340	48	-.287123376	48	.682616833	371
36294	2137	-.699305087	47	-.246526883	47	.670005192	363

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
35783	2288	- 47° 05' 20!'646	300° 54' 02!'298	197	278	868
36058	2448	- 4° 36' 23!'992	318° 55' 44!'146	- 3432	3541	3413
36097	2443	- 4° 28' 28!'921	315° 42' 24!'606	- 941	528	572
36113	2457	- 7° 30' 40!'571	321° 57' 06!'383	- 532	622	555
36122A	ACIC 144	- 7° 05' 38!'062	320° 52' 51!'444	- 512	426	369
36149	2433	- 11° 14' 41!'022	318° 43' 48!'692	- 2222	1028	1047
36173	2444	- 7° 51' 18!'167	317° 06' 06!'065	- 370	466	483
36211	2432	- 12° 05' 39!'643	321° 02' 29!'472	1107	803	743
36216	2412	- 15° 30' 26!'184	320° 17' 42!'433	- 20	913	942
36258	2396	- 16° 27' 15!'031	317° 04' 19!'254	- 2570	1542	1773
36278	2417	- 16° 41' 16!'305	315° 27' 22!'609	- 207	439	486
36294	2137	- 14° 16' 53!'383	313° 46' 27!'110	- 1121	423	483

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
36392	2157B	-.690131046	147	-.328959975	147	.642827508	1651
36528	2318	-.623785104	112	-.581330876	115	.522545890	1403
36552	2207	-.657574253	98	-.522627051	109	.542474119	1183
36648	2306A	-.641396499	84	-.687909179	75	.340044999	1002
37005	2447	-.703829111	46	-.054994422	42	.708132726	389
37019	2446	-.718565153	79	-.095676181	78	.689445131	1054
37066	AMS 10	-.766774149	66	-.062425262	65	.639011859	744
37089 A	2448A	-.785725558	97	-.097366713	99	.607250962	1173
37116	2435	-.710465384	67	-.159725713	64	.684744208	791
37151	ACIC 140	-.751629878	50	-.115243126	50	.648364588	388
37185	AMS 9	-.780451588	159	-.155742064	97	.606623970	1416
37243	2127	-.745134048	161	-.238464660	156	.621881027	1884

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
36392	2157B	- 19° 13' 42.''343	312° 58' 03.''222	- 1980	1745	2307
36528	2318	- 35° 32' 31.''203	309° 57' 10.''685	94	1150	2168
36552	2207	- 31° 30' 42.''396	309° 31' 16.''874	- 155	1036	1794
36648	2306A	- 43° 27' 30.''018	297° 55' 51.''246	208	524	1672
37005	2447	- 3° 09' 09.''982	315° 10' 28.''687	- 129	467	500
37019	2446	- 5° 29' 16.''695	313° 48' 54.''705	716	1215	1385
37066	AMS 10	- 3° 34' 43.''379	309° 48' 25.''359	153	782	1042
37089A	2448A	- 5° 35' 59.''750	307° 41' 55.''602	- 3829	1150	1701
37116	2435	- 9° 11' 41.''740	313° 56' 37.''867	- 741	907	1045
37151	ACIC 140	- 6° 37' 20.''242	310° 46' 53.''160	- 1213	437	527
37185	AMS 9	- 8° 57' 13.''433	307° 51' 25.''056	1175	1321	2101
37243	2127	- 13° 48' 15.''141	309° 50' 52.''871	- 1020	1967	2646

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
37269	ACIC 157	-.767354905	38	-.295226212	38	.569416148	292
37353	2142	-.755974914	73	-.336709969	64	.561813910	792
37405A	ACIC 158	-.707095850	63	-.453905711	63	.542225075	488
38004	AMS 7	-.808385341	74	-.040328129	74	.585112370	770
38041	1985	-.841698142	49	-.014987340	47	.538365846	534
38049	1992	-.846886663	51	-.090491469	54	.523246129	515
38074	2005	-.877456594	74	-.045730655	73	.474530545	1049
38081	1977	-.887639804	67	-.012551791	73	.458339327	623
38128	2092	-.827985078	77	-.179770660	77	.529941944	972
38411	2047	-.816206550	25	-.415074895	32	.405088295	372
39006	2007	-.900058603	97	-.063720463	81	.431942942	1014
39035	2004	-.933729815	73	-.049633852	68	.354021156	682

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
37269	ACIC 157	- 17° 10' 08.''742	306° 34' 38.''221	197	290	428
37353	2142	- 19° 40' 16.''920	306° 37' 06.''350	440	713	1189
37405A	ACIC 158	- 26° 59' 39.''166	307° 28' 55.''971	20	462	729
38004	AMS 7	- 2° 18' 51.''083	305° 53' 49.''782	- 2200	745	1126
38041	1985	- 0° 51' 33.''770	302° 36' 13.''466	- 1288	469	810
38049	1992	- 5° 11' 38.''348	301° 42' 34.''952	- 702	446	786
38074	2005	- 2° 37' 29.''160	298° 24' 16.''649	- 2434	854	1622
38081	1977	- 0° 43' 11.''476	297° 18' 35.''642	- 1620	474	988
38128	2092	- 10° 21' 47.''284	302° 37' 14.''841	- 1117	864	1465
38411	2047	- 24° 29' 25.''523	296° 23' 43.''748	2238	251	599
39006	2007	- 3° 39' 07.''326	295° 38' 11.''754	643	696	1633
39035	2004	- 2° 50' 43.''740	290° 45' 50.''718	- 308	358	1143

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
39049	2003	-.941723037	138	-.093766491	103	.317786556	1416
39128	2024	-.924480722	89	-.184154080	58	.330060495	698
39201A	ACIC 156	-.908369871	70	-.219360338	70	.355018491	546
40053	3610	.052454027	34	-.038150374	33	.998610875	290
40153	3611	.055619019	27	-.131474727	23	.990651213	269
40167	3579	.069289778	55	-.174369876	52	.981329200	587
40308	3533A	.006744855	61	-.388251746	49	.921898935	573
40310	3569A	.015520704	39	-.309347208	33	.951850377	389
40356	3545A	.051121101	33	-.360720668	34	.930903603	261
40370	3570	.074279251	38	-.302243638	38	.950555853	329
40373	3547A	.073908410	43	-.336409095	41	.939708892	414
40414	3484	.010949004	59	-.440966905	46	.896939714	548

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
39049	2003	- 5° 23' 22!!068	288° 38' 49!!497	- 2937	643	2395
39128	2024	- 10° 37' 30!!607	289° 38' 51!!764	- 2159	447	1142
39201A	ACIC 156	- 12° 40' 33!!680	291° 21' 49!!435	- 615	348	901
40053	3610	- 2° 11' 05!!363	3° 00' 24!!522	1243	503	83
40153	3611	- 7° 32' 53!!187	3° 12' 48!!365	1536	465	82
40167	3579	- 10° 03' 03!!849	4° 02' 19!!833	- 1554	1008	204
40308	3533A	- 22° 50' 15!!101	0° 25' 09!!061	593	920	403
40310	3569A	- 18° 00' 06!!107	0° 56' 03!!019	1699	644	222
40356	3545A	- 21° 09' 07!!427	3° 08' 35!!783	- 596	421	185
40370	3570	- 17° 35' 18!!785	4° 28' 05!!455	369	545	197
40373	3547A	- 19° 38' 27!!644	4° 29' 49!!467	1465	679	259
40414	3484	- 26° 10' 43!!153	0° 41' 57!!763	- 806	858	433

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
40455	3485A	.049847061	78	-.454888805	78	.888196310	610
40471	3532A	.079457683	45	-.418768558	43	.904033295	386
40509A	AMS 55	.009183859	40	-.593095493	33	.804220671	388
40530	3498A	.035439107	53	-.505756314	45	.862262508	524
40577	3460	.079116509	54	-.578170211	47	.810790397	549
40627	3445A	.022898260	49	-.670878439	43	.739445647	517
40653	3437	.056287329	57	-.635070675	50	.770806867	574
40667	3434	.063276862	57	-.676831398	50	.731493874	573
40708	AMS 59	.009535008	63	-.781257507	49	.622559407	623
40731	3421	.038104269	53	-.717993472	50	.693219345	493
40734A	AMS 58	.037811218	67	-.740172623	59	.669903971	705

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
40455	3485A	- 27° 04' 57!!622	3° 12' 43!!795	- 1477	941	524
40471	3532A	- 24° 46' 14!!371	5° 01' 22!!647	- 907	609	302
40509A	AMS 55	- 36° 24' 22!!299	0° 39' 15!!354	- 1202	546	406
40530	3498A	- 30° 22' 20!!899	2° 21' 12!!743	471	789	468
40577	3460	- 35° 21' 51!!204	5° 34' 23!!694	- 1807	782	559
40627	3445A	- 42° 12' 10!!506	1° 46' 25!!319	- 2276	676	602
40653	3437	- 39° 24' 37!!746	4° 10' 35!!574	544	777	638
40667	3434	- 42° 40' 14!!879	4° 56' 38!!345	- 2445	739	680
40708	AMS 59	- 51° 26' 47!!370	0° 52' 38!!868	- 1709	681	852
40731	3421	- 45° 57' 45!!174	3° 08' 46!!384	- 2157	602	623
40734A	AMS 58	- 47° 48' 27!!125	3° 13' 49!!812	- 1690	840	905

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
40787	3408A	.082463097	63	-.774774079	55	.626493885	637
40795	3404A	.097468961	34	-.750483861	30	.653158045	349
40807B	AMS 62	.006120029	53	-.877948662	45	.476548833	523
40820	3397B	.022589938	51	-.804147999	44	.591522759	511
40844	3386B	.044135864	40	-.841356227	38	.535680936	410
40868	3388	.064117808	42	-.883158409	36	.465170028	459
40882	3395	.086777070	40	-.822699124	31	.559714686	414
40896	3378	.091546378	61	-.863810430	61	.493747387	687
40898	3366A	.091964090	47	-.883225207	42	.457362906	490
40913	3356	.016700017	66	-.930081911	60	.365414463	724
40928B	AMS 76	.021904004	51	-.981468008	44	.196301145	588
40939	3324C	.036492213	79	-.995778606	89	.098481630	776

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{Wa}	$\sigma\{H_k^{Wa}\}$	$\sigma\{hor_k^{Wa}\}$
40787	3408A	- 50° 47' 58.''814	07° 29' 54.''696	- 374	708	864
40795	3404A	- 48° 39' 13.''467	08° 29' 14.''849	- 572	404	460
40807 B	AMS 62	- 61° 30' 17.''983	00° 44' 08.''789	- 1800	444	803
40820	3397B	- 53° 38' 32.''147	02° 11' 13.''317	- 2554	534	719
40844	3386B	- 57° 25' 39.''847	04° 42' 36.''286	- 2798	395	600
40868	3388	- 62° 00' 02.''823	07° 50' 52.''967	402	390	702
40882	3395	- 55° 27' 13.''866	08° 48' 46.''302	- 2048	408	598
40896	3378	- 59° 49' 44.''755	10° 30' 14.''422	- 1447	604	1041
40898	3366A	- 62° 09' 25.''594	11° 22' 08.''851	- 1978	403	759
40913	3356	- 68° 31' 50.''055	02° 37' 00.''072	- 992	486	1171
40928B	AMS 76	- 78° 37' 16.''592	06° 22' 00.''970	1992	226	1003
40939	3324C	- 83° 58' 45.''275	20° 19' 55.''587	2263	251	1341

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
40976A	AMS 75	.070724561	73	-.965136444	82	.254508126	847
40978	AMS 77	.079190097	32	-.981058632	30	.182073280	332
40980A	3362	.085808314	112	-.902404041	118	.418354320	1365
40982	3363A	.086548797	27	-.927398777	26	.362682022	278
40988A	3338	.089783528	60	-.986135992	43	.121740433	710
41023	3607B	.128780428	46	-.036305089	46	.991574179	355
41025	3607	.121794794	32	-.049652207	27	.992281634	319
41037	3615	.132452678	28	-.070327059	28	.989583317	221
41151	3613	.155689875	24	-.118981507	22	.981124020	249
41157	3580D	.157861314	59	-.177561625	53	.972462208	613
41158	3580C	.157071822	61	-.189571017	61	.969766774	471
41194	3728	.190456856	55	-.144623931	50	.972032148	559

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
40976A	AMS 75	- 74° 41' 36.''005	15° 31' 47.''760	1099	446	1416
40978	AMS 77	- 78° 33' 31.''932	23° 30' 21.''323	1648	130	567
40980A	3362	- 64° 40' 26.''744	11° 35' 28.''067	- 2856	903	2211
40982	3363A	- 68° 05' 49.''674	13° 25' 18.''433	- 785	183	452
40988A	3338	- 81° 16' 44.''925	36° 24' 31.''543	- 4049	216	1222
41023	3607B	- 2° 04' 45.''909	7° 23' 59.''474	975	612	136
41025	3607	- 2° 50' 35.''875	6° 59' 51.''385	1670	554	82
41037	3615	- 4° 01' 45.''167	7° 37' 24.''793	1533	381	89
41151	3613	- 6° 49' 47.''621	9° 01' 00.''518	869	428	85
41157	3580D	- 10° 13' 00.''357	9° 13' 13.''742	1851	1046	248
41158	3580C	- 10° 55' 18.''884	9° 12' 00.''804	918	794	249
41194	3728	- 8° 18' 25.''160	11° 05' 09.''267	1769	953	224

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
41202	3582	.108728557	72	-.223522467	67	.970257307	749
41218	3559A	.113029423	26	-.284021658	23	.953144642	261
41229	3550	.127710467	55	-.292407870	48	.947965107	552
41275	3743A	.178105692	72	-.256788443	63	.949586313	727
41278	3736	.179503712	29	-.282258755	23	.944048630	307
41365	3780	.163568366	42	-.354890135	38	.921134014	401
41368	3779	.167183632	85	-.387058243	67	.906770890	745
41428	3518	.124997776	48	-.481844517	42	.867265093	481
41467	3516	.160463354	65	-.471097836	58	.868265187	640
41476	3815	.177606881	48	-.467329840	40	.866672355	466
41493	3813A	.197737542	44	-.434137871	36	.879445727	423
41504	3499	.100016239	63	-.546411885	61	.831441338	528

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
41202	3582	- 12° 53' 42.''524	6° 23' 38.''325	2764	1267	343
41218	3559A	- 16° 29' 02.''525	6° 45' 46.''378	1675	435	141
41229	3550	- 16° 59' 53.''609	7° 40' 21.''819	391	915	313
41275	3743A	- 14° 53' 03.''609	10° 37' 22.''984	- 542	1214	389
41278	3736	- 16° 22' 07.''791	10° 45' 57.''038	2709	508	176
41365	3780	- 20° 46' 25.''636	10° 04' 09.''171	1033	648	275
41368	3779	- 22° 46' 17.''772	10° 26' 47.''227	- 2	1188	547
41428	3518	- 28° 48' 24.''371	8° 12' 05.''351	- 46	733	415
41467	3516	- 28° 04' 53.''949	10° 28' 14.''322	1360	982	543
41476	3815	- 27° 50' 42.''130	11° 34' 52.''533	923	712	402
41493	3813A	- 25° 42' 59.''921	12° 40' 18.''629	869	656	347
41504	3499	- 33° 07' 25.''478	6° 51' 33.''478	- 118	768	527

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
41539	3463	.134760296	36	-.595256088	32	.791542671	397
41544	3509A	.139660712	67	-.540134608	60	.830367082	643
41590	3809A	.196412401	55	-.501168470	51	.843100522	554
41629	3432	.121005295	25	-.690916738	20	.712602498	238
41654	3848	.155387610	49	-.646377629	55	.746304534	507
41677	3852	.177320619	35	-.674311362	32	.714121969	358
41680	3824C	.184095025	33	-.600738464	31	.778356112	329
41721	3435	.121507953	39	-.717340922	36	.683739076	389
41736	3407	.131323542	100	-.765178322	100	.629013380	781
41748	3406	.148174174	41	-.783516217	37	.601861979	413
41754	3881	.154391480	48	-.743116038	41	.647273459	456
41785	3879A	.186771135	52	-.759440007	45	.619611111	506

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
41539	3463	- 36° 33' 05!!381	9° 39' 43!!118	- 843	549	426
41544	3509A	- 32° 40' 43!!817	9° 32' 50!!310	660	945	616
41590	3809A	- 30° 04' 04!!608	13° 06' 50!!304	492	826	512
41629	3432	- 43° 42' 28!!471	9° 38' 14!!384	- 165	300	291
41654	3848	- 40° 17' 43!!027	11° 45' 41!!337	- 939	674	582
41677	3852	- 42° 30' 10!!352	13° 56' 41!!446	- 3385	456	432
41680	3824C	- 36° 54' 34!!390	13° 18' 24!!956	535	452	358
41721	3435	- 45° 55' 43!!838	10° 04' 36!!800	- 2747	472	492
41736	3407	- 49° 58' 38!!563	11° 47' 33!!543	- 1390	859	1079
41748	3406	- 51° 39' 09!!943	13° 49' 50!!748	- 1660	443	573
41754	3881	- 48° 09' 24!!384	13° 24' 57!!047	- 4332	526	603
41785	3879A	- 49° 33' 51!!766	16° 46' 28!!313	- 3871	559	690

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
41841	3377	.140064127	48	-.813215210	43	.562603096	496
41859A	AMS 65	.155641994	47	-.892488338	44	.419640808	481
41865	3374D	.162079638	48	-.852690366	44	.494697165	490
41883	3897	.187260686	48	-.829480297	44	.523684492	496
41891	3890B	.190044618	42	-.816089152	40	.543406818	454
41898	3902A	.198339473	34	-.880920343	32	.426990540	358
41945	3919A	.144081360	89	-.955735349	95	.257234811	1062
41945B	AMS 74	.144008242	24	-.955829756	21	.257878458	280
41953B	AMS 67	.152740115	40	-.933259513	38	.325161314	407
41974	AMS 73	.179651723	49	-.948868375	47	.263598245	496
41984	3917A	.179616501	38	-.948635404	34	.261462831	396
42036	ACIC 95	.209315852	53	-.066311415	53	.976557371	414

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{Wa}	$\sigma\{H_k^{Wa}\}$	$\sigma\{hor_k^{Wa}\}$
41841	3377	- 54° 30' 47.''882	13° 58' 47.''999	- 2209	493	716
41859A	AMS 65	- 63° 22' 00.''018	20° 20' 58.''140	- 2732	368	760
41865	3374D	- 58° 35' 44.''586	18° 08' 26.''009	- 1673	439	739
41883	3897	- 56° 09' 30.''750	19° 40' 34.''276	- 2305	474	728
41891	3890B	- 54° 48' 01.''209	19° 16' 34.''194	- 2253	445	659
41898	3902A	- 61° 52' 39.''922	24° 54' 54.''467	- 2017	278	562
41945	3919A	- 72° 51' 19.''359	29° 15' 14.''005	312	554	1774
41945B	AMS 74	- 72° 49' 41.''454	29° 10' 49.''801	739	146	469
41953B	AMS 67	- 68° 56' 46.''735	25° 09' 40.''155	28	250	669
41974	AMS 73	- 71° 25' 05.''025	34° 16' 33.''034	1833	251	832
41984	3917A	- 71° 30' 38.''072	34° 29' 16.''099	464	213	661
42006	ACIC 95	- 3° 47' 54.''924	12° 05' 51.''941	1628	703	201

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
42016	3687	.212061459	33	-.069628487	29	.975555336	335
42061	3648	.266007445	23	-.013727314	21	.964721422	233
42069	3688C	.269703915	45	-.092722128	41	.959377880	455
42094	3656A	.290691916	53	-.046469576	53	.956351402	411
42148	3722	.245183242	42	-.181469883	39	.953146565	438
42167	3727	.266430119	38	-.177477936	38	.947640197	293
42187	3730	.286766022	42	-.175261473	37	.941642355	439
42202	3735A	.206652478	38	-.221871336	38	.952513696	295
42250	3717	.256613599	43	-.208948512	39	.944718614	433
42267	3754	.264852032	59	-.277720152	55	.925501401	599
42359	3791	.251311460	49	-.389924166	47	.885761699	450
42450	3789	.253562734	42	-.407631165	44	.875566315	447

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
42016	3687	- 3° 59' 22.''561	12° 15' 49.''998	1326	575	125
42061	3648	- 0° 47' 09.''238	15° 24' 55.''420	1421	395	104
42069	3688C	- 5° 18' 56.''100	15° 42' 06.''965	1514	766	224
42094	3656A	- 2° 39' 42.''408	16° 54' 25.''696	1103	685	241
42148	3722	- 10° 26' 50.''227	14° 25' 32.''729	1333	733	230
42167	3727	- 10° 13' 13.''012	15° 42' 12.''199	439	483	185
42187	3730	- 10° 05' 44.''529	16° 56' 14.''974	- 311	728	247
42202	3735A	- 12° 49' 26.''735	12° 14' 27.''217	- 683	489	180
42250	3717	- 12° 02' 54.''586	15° 11' 47.''644	1740	719	242
42267	3754	- 16° 05' 33.''267	15° 58' 10.''586	3323	975	391
42359	3791	- 22° 57' 09.''166	15° 50' 23.''599	- 198	700	367
42450	3789	- 24° 05' 37.''057	16° 09' 03.''383	- 2545	692	368

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
42544	4048A	.240542508	50	-.545163065	41	.802542721	503
42559	3845	.253086548	37	-.597269648	33	.761421518	368
42631	3836	.230492263	47	-.613978576	47	.754974370	365
42647	3863A	.246372922	45	-.673964381	37	.695904192	430
42697	4004	.295563591	35	-.674508469	34	.675082652	346
42708A	3888E	.208985690	49	-.788199492	46	.576720734	505
42730	3869A	.236787173	55	-.708619604	50	.662849595	555
42752	3865B	.253153870	82	-.726688975	82	.636616237	637
42773	3865E	.269420890	39	-.737019020	36	.617958596	404
42819	3901	.216204698	45	-.897208183	42	.379659159	448
42845	3988B	.245601513	33	-.859564818	32	.444214644	343
42852	3985B	.256370145	39	-.823511574	37	.503642244	399

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
42544	4048A	- 33° 03' 06.''743	16° 41' 05.''328	- 749	716	515
42559	3845	- 36° 39' 46.''603	18° 23' 10.''074	475	497	411
42631	3836	- 37° 52' 33.''229	16° 58' 38.''397	72	480	430
42647	3863A	- 42° 23' 39.''969	19° 29' 44.''282	- 686	534	532
42697	4004	- 42° 28' 01.''077	23° 38' 40.''873	- 1690	412	446
42708A	3888E	- 52° 06' 29.''075	19° 55' 08.''199	- 2139	521	716
42730	3869A	- 45° 11' 33.''082	19° 39' 28.''993	- 2105	654	720
42752	3865B	- 46° 41' 13.''904	21° 41' 07.''830	- 2223	711	873
42773	3865E	- 47° 33' 05.''245	23° 33' 23.''386	- 2037	442	552
42819	3901	- 64° 02' 08.''771	29° 39' 36.''854	- 3594	320	717
42845	3988B	- 59° 26' 14.''467	28° 56' 15.''847	- 3046	277	534
42852	3985B	- 55° 32' 23.''926	26° 58' 39.''221	- 2128	362	599

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
42862	3985C	.260523604	33	-.829398349	30	.491687069	320
42906A	AMS 71	.201517702	36	-.966484402	39	.151902073	369
42915	3919C	.217747748	66	-.955103230	54	.197756574	635
42915A	AMS 72	.217468429	37	-.955192704	34	.198739355	347
42973A	AMS 68	.277944259	111	-.933582908	68	.235520275	1033
43029	3680	.323885657	31	-.094139932	26	.941478269	287
43078	3666	.376803352	51	-.084853624	48	.921513552	540
43100	3683	.308995082	39	-.106108095	39	.945241486	307
43148	3695	.339656016	76	-.183764464	75	.921952444	810
43223	3763	.329405036	74	-.236220191	74	.915104964	573
43348	ACIC 73	.348127621	58	-.382343983	58	.856297829	454
43405	4097	.305120676	51	-.459008532	51	.833403687	792

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
42862	3985C	- 56° 08' 32.''497	27° 55' 01.''818	- 2147	291	480
42906A	AMS 71	- 75° 21' 58.''942	52° 59' 28.''933	- 1934	131	634
42915	3919C	- 72° 52' 57.''334	47° 45' 16.''378	- 1092	269	1081
42915A	AMS 72	- 72° 51' 32.''963	47° 34' 35.''522	- 710	140	593
42973 A	AMS 68	- 68° 40' 58.''127	49° 43' 23.''597	3733	535	1728
43029	3680	- 5° 24' 05.''131	18° 59' 02.''938	127	477	160
43078	3666	- 4° 52' 17.''738	22° 14' 22.''072	- 1419	878	354
43100	3683	- 6° 05' 25.''242	18° 06' 08.''387	190	505	195
43148	3695	- 10° 35' 37.''532	20° 13' 27.''391	- 755	1317	533
43223	3763	- 13° 39' 05.''630	19° 47' 49.''420	1498	914	437
43348	ACIC 73	- 22° 28' 17.''531	22° 07' 27.''068	544	678	429
43405	4097	- 27° 20' 51.''415	20° 06' 30.''171	- 1435	1149	766

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
43468A	ACIC 74	.361633517	51	-.482209451	52	.797981800	401
43513	4047	.313170111	44	-.530145339	39	.789874070	460
43610C	ACIC 81	.311744550	49	-.609005016	49	.729362076	380
43770	4480	.376740463	69	-.706404518	69	.595878086	540
43781	4482	.384080664	63	-.714552861	56	.583806216	638
43797	3968	.394179448	69	-.778931418	82	.487043349	791
43920	3936B	.324775153	39	-.901394434	43	.284088853	400
44001	3667	.409334221	43	-.009769793	42	.910516965	389
44034	4227	.437582515	53	-.046745335	54	.897002490	571
44084	4226	.486356297	60	-.045091222	60	.871213890	466
44097	4225	.494625999	51	-.078396868	51	.864891630	511
44189	4222	.486746990	63	-.190813925	61	.853649730	680

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
43468A	ACIC 74	- 28° 49' 42.''771	24° 22' 45.''583	69	558	435
43513	4047	- 31° 57' 40.''068	21° 37' 38.''598	2632	643	486
43610C	ACIC 81	- 37° 31' 00.''106	23° 08' 34.''342	35	484	465
43770	4480	- 45° 03' 27.''430	32° 18' 10.''381	- 3470	567	767
43781	4482	- 45° 38' 16.''111	33° 20' 25.''961	- 927	684	886
43797	3968	- 51° 11' 13.''042	38° 59' 03.''594	- 589	689	1205
43920	3936B	- 64° 25' 11.''442	48° 49' 22.''833	- 1132	249	656
44001	3667	- 00° 33' 38.''539	24° 12' 24.''815	- 2878	623	280
44034	4227	- 02° 40' 53.''759	26° 00' 15.''820	- 1498	904	430
44084	4226	- 02° 35' 15.''129	29° 10' 20.''987	- 2098	712	415
44097	4225	- 04° 29' 56.''553	29° 45' 53.''868	- 1010	787	431
44189	4222	- 10° 59' 19.''994	29° 41' 29.''694	1781	1032	595

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
44322	4156	.427227192	55	-.320456454	58	.845374306	617
44324	4157A	.427843095	63	-.347443451	63	.833437020	491
44339	4108	.431988885	73	-.390825258	91	.811214151	1001
44443	4083A	.446742780	49	-.433301574	50	.781582097	385
44474	4079	.472984386	75	-.440047704	64	.762439254	950
44494	4083B	.499080402	57	-.439830437	57	.745584349	445
44501	4053	.399923702	76	-.512462081	55	.758927676	675
44611	4064	.408690982	30	-.618861671	31	.669130466	327
44618	4489A	.412229255	26	-.683568919	26	.602289924	269
44660 A	4064E	.464913684	86	-.606335265	86	.644106657	671
44761	4488	.465533682	48	-.719913287	47	.510466446	405
44789	4512	.483934114	120	-.796360230	91	.359714129	1309

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Ref. No.	I. A. U. No.	Latitude	Longitude	$H_k^{W\,a}$	$\sigma\{H_k^{W\,a}\}$	$\sigma\{hor_k^{W\,a}\}$
44322	4156	- 18° 41' 30.''340	26° 48' 38.''467	- 110	918	572
44324	4157A	- 20° 20' 53.''522	27° 10' 24.''957	- 1405	715	490
44339	4108	- 23° 02' 13.''987	28° 02' 10.''521	- 2237	1415	1033
44443	4083A	- 25° 42' 07.''554	29° 45' 06.''328	- 1565	527	430
44474	4079	- 26° 07' 32.''228	31° 48' 49.''240	- 1156	1278	1060
44494	4083B	- 26° 06' 54.''523	33° 47' 51.''438	- 1367	582	529
44501	4053	- 30° 51' 11.''419	27° 47' 14.''597	- 1280	906	763
44611	4064	- 38° 17' 01.''893	31° 24' 56.''585	- 1953	389	422
44618	4489A	- 43° 07' 27.''972	34° 23' 20.''997	- 41	294	368
44660A	4064E	- 37° 21' 15.''411	35° 49' 17.''777	- 1164	760	910
44761	4488	- 46° 10' 46.''105	42° 21' 50.''751	- 3852	376	607
44789	4512	- 52° 52' 04.''907	53° 22' 34.''060	- 1934	832	2134

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
44861	4514	.469390142	70	-.810803404	78	.343951470	773
45040A	AMS 204	.544406558	31	-.006824198	29	.837640552	326
45057	4286	.558347867	33	-.074055164	31	.825042827	328
45083	4239	.585235136	51	-.033164681	45	.810036552	475
45143	4292	.541658761	33	-.139474470	32	.827458068	296
45230A	ACIC 66	.533993881	52	-.203343227	52	.818047366	405
45324	ACIC 71	.523169420	67	-.348229916	67	.776043842	518
45331	4148	.535420797	79	-.317011135	58	.781335315	719
45340	4143	.544812373	51	-.306882921	49	.779118042	524
45441	4118	.540851951	34	-.412758199	38	.731871483	431
45498	4417A	.590734136	80	-.482633786	80	.646569766	624
45513	4427B	.511308531	126	-.536211073	122	.672067956	1600

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
44861	4514	- 54° 19' 57!''881	53° 46' 02!''779	- 3452	494	1262
45040A	AMS 204	- 00° 23' 28!''965	33° 01' 15!''571	- 1681	479	311
45057	4286	- 04° 15' 04!''832	34° 05' 17!''460	- 1798	484	313
45083	4239	- 01° 54' 02!''785	35° 50' 50!''478	- 209	689	469
45143	4292	- 08° 01' 38!''660	33° 12' 32!''351	- 2144	435	287
45230A	ACIC 66	- 11° 45' 29!''525	33° 08! 06!''557	- 3741	582	417
45324	ACIC 71	- 20° 24' 31!''670	33° 59' 09!''068	- 2422	705	583
45331	4148	- 18° 30' 17!''099	34° 25' 17!''145	- 2038	1011	754
45340	4143	- 17° 53' 23!''190	34° 57' 49!''915	- 1719	729	561
45441	4118	- 24° 23' 50!''556	36° 27' 51!''648	- 1281	552	512
45498	4417A	- 28° 51' 29!''795	42° 24' 58!''229	- 39	711	843
45513	4427B	- 32° 24' 52!''372	37° 15' 49!''809	551	1885	2068

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
45564 A	4425A	.566353501	75	-.544468423	85	.619150086	1135
45651	4442A	.552618262	73	-.614534103	73	.562440950	566
45711	4506	.510282133	77	-.715811152	55	.476451693	815
45750	4504	.556623702	165	-.704070728	116	.439143326	1462
46005	4241	.606422946	59	-.055075799	57	.791871987	570
46038 B	AMS 14	.638535816	75	-.084517952	56	.763434238	640
46101	4287	.604502238	61	-.117532468	61	.786331888	477
46109	4314A	.600138537	83	-.199263584	83	.773640066	804
46119	4320	.618765345	59	-.193141231	54	.759466400	575
46135	4312	.633342733	34	-.156197682	32	.757282887	330
46169	4315	.667304758	130	-.189508620	114	.716648382	1294
46219	4359	.615143014	66	-.295093697	66	.727958376	516

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
45564A	4425A	- 32° 58' 41".308	42° 27' 00".031	477	1205	1573
45651	4442A	- 37° 55' 54".995	44° 29' 43".036	- 540	564	826
45711	4506	- 45° 42' 58".273	46° 57' 49".077	- 191	727	1227
45750	4504	- 44° 48' 00".917	51° 43' 43".102	- 1398	1253	2239
46005	4241	- 3° 09' 38".238	37° 26' 42".824	- 1875	807	593
46038 B	AMS 14	- 4° 51' 14".029	39° 54' 32".706	- 1997	898	676
46101	4287	- 6° 45' 28".879	37° 33' 06".198	- 2126	659	524
46109	4314A	- 11° 30' 11".815	37° 48' 06".956	- 1399	1109	875
46119	4320	- 11° 09' 11".967	39° 10' 15".517	- 2641	783	636
46135	4312	- 8° 59' 26".905	39° 54' 24".998	- 871	450	364
46169	4315	- 10° 57' 10".830	42° 57' 28".925	- 4530	1704	1498
46219	4359	- 17° 12' 14".257	40° 11' 55".122	- 3998	662	627

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
46281	4336	.689317053	54	-.219693711	50	.689678529	567
46357	4387A	.648436664	79	-.379206144	79	.658854736	615
46467	4411	.663657483	89	-.473347336	88	.579754220	1206
46537	4610	.636544036	127	-.569743677	112	.521683195	1804
46565	4609	.664362107	200	-.550701006	139	.505285178	5946
47010A	AMS 21	.712635311	36	-.002294512	31	.699098220	397
47023	4255	.729514522	56	-.034785448	53	.680986230	449
47026	4257	.721178389	29	-.061917993	30	.687468629	288
47041	4256	.742987140	60	-.015214517	59	.665037050	599
47099	4258A	.793147765	48	-.093579079	39	.599242210	445
47162	4326	.764151193	27	-.120217512	23	.630129794	255
47175A	ACIC 63	.771093205	89	-.152859023	89	.615779957	691

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
46281	4336	- 12° 41' 49!!144	44° 59' 05!!932	- 800	709	695
46357	4387A	- 22° 18' 13!!798	44° 32' 36!!268	-1428	716	818
46467	4411	- 28° 14' 32!!474	48° 51' 37!!324	533	1242	1703
46537	4610	- 34° 41' 37!!321	50° 39' 48!!519	1693	1681	2663
46565	4609	- 33° 24' 57!!030	52° 44' 41!!806	- 33	5483	8770
47010 A	AMS 21	- 00° 07' 54!!086	45° 32' 57!!809	-2963	508	474
47023	4255	- 01° 59' 46!!737	46° 58' 13!!745	-2484	546	573
47026	4257	- 03° 33' 21!!839	46° 22' 15!!097	-3005	360	354
47041	4256	- 00° 52' 26!!951	48° 10' 07!!449	-4755	726	759
47099	4258A	- 05° 22' 40!!166	52° 55' 41!!073	-2668	495	603
47162	4326	- 06° 55' 13!!872	50° 29' 25!!907	-3965	298	333
47175 A	ACIC 63	- 08° 48' 19!!325	51° 23' 23!!353	-2491	757	958

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
47221	4338	.727568859	53	-.215327481	60	.649539604	523
47249	4377	.748645339	51	-.296980850	48	.591314131	414
47271	4343	.773425809	72	-.216555289	62	.592159097	708
47318	4396	.717687484	127	-.385122186	101	.576847412	1539
47380	4377A	.784057822	77	-.301772081	79	.541260469	654
47507	4577	.704979716	5	-.578523578	3	.412000399	37
47515	4576	.715258837	105	-.552273681	105	.427767205	815
48022	ACIC 61	.825068143	66	-.021779761	66	.561161381	516
48044	4658B	.841823580	78	-.040846971	78	.536148902	685
48051	4658A	.850153721	51	-.014083061	44	.520456074	451
48061	4656	.864995483	48	-.015974212	45	.498048493	451
48069	4688	.862204811	68	-.097593973	69	.493941690	582

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Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
47221	4338	- 12° 26' 59!!195	48° 14' 34!!823	-2066	619	680
47249	4377	- 17° 17' 28!!842	51° 41' 48!!179	-1461	442	580
47271	4343	- 12° 32' 02!!302	52° 33' 40!!308	-3709	752	987
47318	4396	- 22° 41' 51!!093	51° 12' 32!!846	-3351	1630	2141
47380	4377A	- 17° 34' 30!!647	55° 22' 53!!136	-1064	660	945
47507	4577	- 35° 19' 03!!867	59° 41' 50!!509	1242	26	60
47515	4576	- 33° 31' 51!!575	59° 07' 05!!064	- 360	631	1294
48022	ACIC 61	- 01° 15' 01!!510	55° 46' 43!!807	-3380	519	749
48044	4658B	- 02° 20' 36!!966	57° 30' 26!!470	-1921	699	983
48051	4658A	- 00° 48' 33!!934	58° 31' 31!!532	-5368	449	652
48061	4656	- 00° 55' 00!!799	60° 04' 02!!834	-3023	420	671
48069	4688	- 05° 36' 33!!719	60° 11' 32!!559	-2696	530	867

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Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
48118	4691	.812370238	64	-.180157850	54	.552489586	520
48194	4694A	.895801797	77	-.143762145	72	.417041835	703
48261 A	4695A	.859867282	107	-.218871489	88	.457582294	895
48281	4706	.882197598	150	-.213769998	112	.416903035	1393
48287	4699B	.882335431	39	-.272234635	29	.381235845	301
48331	ACIC 69	.837446988	126	-.316684606	126	.441871203	978
48351	4702	.858605940	5	-.316575541	8	.402318817	72
49004	4669	.901421441	78	-.048274130	70	.425623882	660
49042	4665A	.948040664	207	-.024214531	163	.310260721	1956
49073	4787	.978463174	161	-.032206803	144	.198190515	1601
49077	4782	.972323608	123	-.078063268	99	.214110235	918
49106	4690	.902297732	57	-.169824853	53	.390788435	523

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
48118	4691	- 10° 23' 28!''761	55° 46' 49!''961	-2046	560	725
48194	4694A	- 08° 16' 40!''437	65° 02' 08!''156	-2563	561	1101
48261A	4695A	- 12° 39' 51!''441	61° 58' 48!''435	-2907	802	1355
48281	4706	- 12° 21' 26!''377	64° 42' 20!''996	-1932	1197	2129
48287	4699B	- 15° 48' 49!''597	66° 37' 55!''173	-1766	229	477
48331	ACIC 69	- 18° 29' 33!''686	62° 10' 55!''352	-2734	785	1539
48351	4702	- 18° 27' 46!''070	64° 53' 36!''675	- 622	53	114
49004	4669	- 02° 46' 20!''889	64° 43' 29!''060	-3439	570	1013
49042	4665A	- 01° 23' 26!''048	71° 52' 42!''705	-3802	1325	3165
49073	4787	- 01° 50' 51!''913	78° 32' 58!''180	-1994	778	2698
49077	4782	- 04° 28' 59!''544	77° 34' 53!''021	-2304	501	1540
49106	4690	- 09° 47' 56!''210	66° 34' 56!''596	-3743	405	825

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	ξ_k^{wa}	$\sigma\{\xi_k^{wa}\}$	η_k^{wa}	$\sigma\{\eta_k^{wa}\}$	ζ_k^{wa}	$\sigma\{\zeta_k^{wa}\}$
49128	4769	.926274554	90	-.187060049	103	.325232066	915
49132	4663	.930781749	85	-.122482891	71	.338566798	711
49143	4665	.940243247	91	-.134939689	48	.303229313	766
49158	4767	.954971329	92	-.184639919	58	.227756691	754
49167	4772	.964199259	74	-.175802869	54	.192257040	613
49181	4783	.986196785	128	-.112409804	93	.101937493	1223

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DOD SELENODETIC CONTROL SYSTEM 1966

Ref. No.	I. A. U. No.	Latitude	Longitude	H_k^{wa}	$\sigma\{H_k^{wa}\}$	$\sigma\{hor_k^{wa}\}$
49128	4769	- 10° 47' 17!"075	70° 39' 10!"389	-1085	609	1488
49132	4663	- 7° 02' 58!"776	70° 00' 41!"106	-3493	486	1152
49143	4665	- 7° 46' 40!"097	72° 07' 31!"587	-5035	536	1231
49158	4767	- 10° 39' 04!"571	76° 35' 08!"818	-1795	425	1254
49167	4772	- 10° 08' 16!"595	78° 43' 24!"139	-2131	301	1035
49181	4783	- 6° 28' 06!"669	84° 05' 55!"040	-3818	416	2103