

SPECIFICATIONS
FOR
AERIAL PHOTOGRAPHY

SPECIFIC PROJECT DATA SECTION



Project Name: Chilean Earthquake Disaster Area

Project Location: Continental Chile between Latitude 37° S and 43° 30' S from the Pacific Ocean to the Argentine Border

Area to be Photographed: Approximately 160,000 square kilometers at
1:50,000; approximately 25,000 square kilometers
at 1:20,000; approximately 300 square kilometers
at 1:10,000

Flight Altitudes: 7,650 meters above average ground
3,060 meters above average ground
1,530 meters above average ground

Flight Plan: To be prepared by the contractors - to conform
to the requirements as specified below

Flight Direction: North-South (except as required otherwise) ~~4~~

Spacing of Flight Lines: The flight lines shall be so spaced as to provide
the minimum number of lines necessary to conform
with the requirements of sidelap and of Paragraphs
2A-03(c) and 2A-04(b). They shall be planned so
that sidelap will not exceed 30 percent at a ter-
rain elevation below 2000 meters, and shall ave-
rage 25 percent at terrain elevations above 2000
mete rs. Additional flight lines of minimum length
shall be interspersed to provide not less than a
minimum sidelap of 15 percent in areas of high
relief.

Minimum Sidelap: 10 percent, where terrain does not exceed 2000
meters; 15 percent above 2000 meters

Forward Lap: See Paragraph 2A-04(a)

Cameras to be Used: See Paragraph 2A-01

Minimum Number of Cameras: Two (2) at any one time

Minimum Number of Planes: Two (2) at any one time

Minimum Solar Altitude: Areas where terrain does not exceed 2000 meters.
25°; areas where terrain exceeds 2000, 30°

Minimum Size of Segment, Mapping Photography: Regular 1° quadrangles except for those fractional
portions of a quadrangle due to the size or shape
of the area to be photographed.

Flights, Mapping Photography: Flight lines to be accomplished will be indicated
on maps to be provided to flying personnel and to
the Contracting Officer.

Sequence of
Photography: Flights will be accomplished in a manner to
achieve all the photography in the shortest
period of time taking full advantage of all
suitable photographic weather.

Desired Commence-
ment date: January 2, 1961.

Photography to be
Accomplished: April 15, 1961, if weather permits in first
season, otherwise by April 15, 1962.

Delivery Date: See Paragraph 1-06



SPECIFICATIONS
FOR
AERIAL PHOTOGRAPHY

SECTION I - GENERAL PROVISIONS

1-01. Work to Be Done

The work to be done under these specifications consists of furnishing all services, material, supplies, and making such flights as may be necessary to cover completely with serial photographs, suitable for use with stereoscopic plotting equipment in the opinion of the Contracting Officer, the area described in Paragraph 1-02 hereof. Also to cover completely with supplemental serial photographs, suitable for intelligence study, the areas described in Paragraph 1-02 hereof. The Contractor will be required to furnish the serial negatives, one set of single weight, glossy contact prints, photographic indexes, and index negatives for photography of all areas to be photographed.

1-02. Area to be photographed

The areas to be photographed are shown on the "Area to be Photographed" map of Appendix "I" and further defined in the "Specific Data" section of Appendix I.

1-03. Quantities

The number of square kilometers upon which acceptance and payment shall be based is shown on the contract schedule and in the "Specific Data" Section of Appendix I.

1-04. Commencement, Prosecution, and Completion

(a) The Contractor will commence work within ten (10) calendar days after receipt of all necessary permits and licenses, and shall at all times after date of commencement and until completion of the work prosecute the work expeditiously, subject only to weather. The Contractor shall provide the minimum number of airplanes and cameras specified in the "Specific Data" section, together with the necessary photographic equipment and personnel and shall keep the necessary flying equipment and personnel for the work continuously during the season of favorable photographic weather, taking advantage of all days suitable for serial photography, including Sundays and holidays except as otherwise specified above.

(b) The contractor shall furnish the Contracting Officer weekly progress reports showing all photographic days, causes of non-photographic days, all flights and exposures made, time of commencing and completing the photography for each flight, the type and serial numbers of all cameras, cones, lenses, and magazines used; the type and license numbers of the photographic ship, of the pilots and photographers; names of the airports at which the planes are based.

(c) It shall be the responsibility of the Contractor to inspect each segment of the work to determine if the aerial photography is satisfactory in his opinion. The Contractor shall notify

the Contracting Officer when he has completed all flights and reflights necessary for completion of the work specified herein.

1-05. Risk

The Contractor shall assume all risk in connection with the execution of the contract and waive any claims against the Government of Chile for damages arising out of the performance of the work specified and shall agree to protect the Government of Chile from any claims for damages which may result from injury to property or personnel in connection with the work.

1-06. Delivery

(a) The contractor shall deliver the film to the Government of Chile at the completion of this project or any extensions or work in accordance with the OAS Mission Report of October 5, 1960. The materials completing delivery for each segment shall consist of the photographic index, the negative of the photographic index and the glossy contact prints. It is understood that the aerial photographic negatives for the areas of mapping may be used by the Contractor or subcontractors in their home offices to complete the map compilation, however, when this work is finished the negatives will be delivered to the Government of Chile. 000000

(b) The camera data shall be submitted to the Contracting Officer. These Camera data shall consist of the following: reports of the results of the camera calibration which shall include Items 2A-01(a) through 2A-01(g); certification, signed by the Contractor, that the cameras comply with the requirements of Paragraph 2A-1(i) through 2A-01(l); quantitative reports prepared in accordance with 2A-01(j) and 2A-01(k).

1-07. Inspection and Acceptance

Upon receipt of the aerial film by the Contracting Officer the aerial film will be inspected for compliance with the specifications. Upon receipt of complete materials by the Contracting Officer, the materials submitted will be inspected for compliance with the specifications. The Contractor will be notified by the Contracting Officer of acceptance of the photography upon agreement by both the Contractor and Contracting Officer.

1-08. Payment

Payment shall be made in accordance with the General Provisions of the Contract.

1-09. Ownership of Materials

All negatives exposed under this contract (regardless of whether or not they are acceptable), prints, photographic indexes, and photographic index negatives shall become the property of the Government of Chile. Upon completion of the work and receipt of notification from the Contracting Officer of the acceptance, the Contractor shall certify in writing to the Contracting Officer that all materials associated with this project have been delivered to the Contracting Officer. This certification shall tabulate an account

for all aerial negatives exposed on the project, all prints made therefrom, all photo-indexes, photo-index negatives, all materials furnished by the Government, and any other materials associated with the project. The disposition and date of disposition shall be stated thereon.

1-10. Requirements for Flight Personnel

The Flight Contractor shall use only experienced flight personnel. Minimum photographic flying hours experience for the pilots shall be 500 hours as an aerial photographic pilot, and for the photographers 100 hours on aerial photographic projects of similar nature.

1-11. Topographic Conditions

The Contractor is charged with making his own reconnaissance and estimate of the character of the terrain with regard to the difficulties involved.

1-12. Landing Fields

The Contractor will be responsible for making all necessary arrangements for use of airports, airfields, or emergency landing fields. The Contracting Officer will render such aid in this respect as falls within his power.

1-13. Work Covered by Prices

Prices set forth in the contract shall cover the entire cost for all work to be performed under the contract.

1-14. Liability of the Contractor

The Contractor will be responsible that his employees strictly observe the laws of Chile. He shall comply with the laws of Chile as to aircraft operations. It is further understood and agreed that the Contractor assumes all responsibility for the safety of his employees.

1-15. Weather

The Contractor must rely upon his own estimate of weather conditions.

1-16. Days Suitable for Aerial Photography

Photographs shall be taken only between the hours when solar altitude is greater than the minimum specified in the "Specific Data" section. The Contractor will be responsible for making his own estimate of weather conditions and no payment will be made for unsuitable photographs made due to inclement weather conditions. Any negative obscured by clouds of an area greater than 5% of the negative may be rejected.

1-17. Operations Inspection

All of the Contractor's facilities engaged in the work covered by this contract shall be open at all times for inspection by the Contracting Officer or his representative.

1.18. Subcontractors

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relating to this contract to insure the fulfillment of all contractual provisions by subcontractors.

1.19. Component Parts of Specifications

Component parts of the specifications are:

- (a) Section I - General Provisions
- (b) Section II - Technical Provisions
- (c) Specific Project Data Section

SPECIFICATIONS
FOR
AERIAL PHOTOGRAPHY

SECTION II - TECHNICAL PROVISIONS

Sub-Section A - Mapping Photography

2A-01. Cameras to be Used

(a) The photographs shall be made with a single lens precision aerial camera, type Fairchild T-12, Wild RC5A, Zeiss RMK 15/23 or equivalent. The focal plane must be set so that the calibrated focal length shall be 153 mm $\pm$ 2.0 mm. The camera shall function properly at the altitude specified and shall expose a 9" x 9" negative. The lens, focal plane, fiducial marks must be permanently fixed in rigid orientation with one another (see Paragraph 2A-01(f)). A method of recording the flight altitude on each exposure station shall be provided.

(b) Fiducial marks shall indicate the position of the perpendicular from the rear node of the lens to the film plane to within 0.002 inch. Lines connecting opposite pairs of fiducial marks shall intersect at 90°, plus or minus two minutes of arc.

(c) The lens shall resolve lines space sixteen (16) to the millimeter in any orientation in any part of the field extending to 45 degrees from its axis. The resolving power shall be Bureau of Standards or the National Research Council of Canada, resolving power tests with the lens installed in the camera and with the filter in place.

(d) When measured with the lens installed in the camera the optical distortion in any part of the field shall not exceed 0.02 of a millimeter. These displacements refer to distances computed using the calibrated focal length. The calibrated focal length shall be the focal length for which the value of the distortion, irrespective of sign, is a minimum within 45 degrees of the optical axis.

(e) Fixed dimensions lying in the focal plane shall be recorded on the camera calibration report. The measurements recorded shall be the distance between the two sets of fiducial marks as imaged on a sensitized glass plate exposed through the camera lens. The two measurements shall be taken at right angles to each other. The points used for taking the measurements shall be defined on the calibration report and the image of these points shall be recoverable on the exposed negative. The measurements shall be given to 0.01 mm and shall be accurate to within plus or minus 0.02 mm.

(f) If a glass plate is used to flatten the film in the focal plane that surface of the glass that is in contact with the film at the instant of exposure shall be flat to within plus or minus 0.0005 inch.

(g) The coincidence of the optical axis and the perpendicular from the rear node of the lens to the film plane shall be such that no asymmetry is indicated by the resolving power at the four edges of the film area.

(h) If a glass pressure plate is used the glass plate must be in place when the camera is calibrated.

(i) The camera shall be so constructed that if the lens, shutter cone, or magazine are disassembled and reassembled, the lens-focal plane relationship shall not be changed by more than plus or minus 0.05 millimeter which shall include dimensional changes arising from temperature or other variations likely to be encountered in use.

(j) The overall focal plane surface of the platen of the camera shall be flat, under operating conditions, to within plus or minus 0.0005 inch. The film shall be held flat in the focal plane, at the instant of exposure, to within plus or minus 0.0005 inch. The camera platen shall be tested by making one hundred evenly spaced measurements. The measurements shall be made at one (1) inch intervals over the full 9" x 9" surface of that portion of the platen used to flatten the film at the instant of exposure. The test readings shall be recorded and shall be accurate to within plus or minus 0.0001 inch. All operating stresses present at the instant of exposure shall be duplicated. The platen tested shall be positively identified by having the camera, cone, or magazine number of the unit permanently and irremovably worked thereon. This identifying number shall be noted on the report.

(k) Between-the-lens shutters, such that light is transmitted simultaneously to all parts of the emulsion plane when the shutter is open, shall be used. The efficiency of the shutter shall be at least 75% at the fastest speed. The speeds shall be accurate to within 10% of the marked value when tested at room temperature. The results of the efficiency test and the date of the test shall be recorded.

(l) An appropriate filter, flat within six fringes and plans parallel to within one minute, shall be used. The filter shall have a metallic coating designed so as to compensate for the falling off in illumination of the field as the half angular field is approached.

2A-02. Flight Altitude

The negatives shall be exposed at the flight altitude specified in the "Specific Data" section. Negatives shall not show a departure from that altitude by more than ± 5 percent.

2A-03. Flight Lines and Strips

(a) The number of flight lines shall be that number specified in the "Specific Data" section.

(b) Flight lines shall be planned by the Contractor in the manner and direction specified in the "Specific Data" section.

(c) The regular flight lines shall be as straight as possible. The mean bearings of adjacent strips shall be within 5 degrees of parallel. In no case shall the lack of parallelism between adjacent photographic strips, or sections thereof, be such as to prevent the sidelap between strips from conforming with the requirements of Paragraph 2A-04. No photographs shall be taken on "banks" between successive strips. Each flight shall be so photographed that the principal points of the first and last negative thereof shall fall on or outside of the boundaries of the specified area in order to assure that every point within the area shall appear on at least two consecutive photographs in the line of flight. All photographs in a flight line shall be continuous consecutive exposures, secured with a single approved camera magazine unit.

(d) When a flight line is broken, that end of the flight where the photography was discontinued must be covered by an overlap so as to provide continuous stereoscopic coverage.

(e) When any portion of any flight line is rejected, the rejected photography must be completely covered by a reflight. The reflight must extend sufficiently beyond each end of the rejected portion so as to provide continuous stereoscopic coverage.

2A604 Overlap

(a) Forward lap shall not be less than 53% nor more than 60% and shall average 56%. Any forward lap of less than 53% or greater than 60% throughout the entire width of the photograph (that dimension of the photograph normal to the flight direction) or strip shall be sufficient ground for rejection except where the displacement of images in the photograph, caused by abrupt changes in elevation within the area of forward overlap, approaches or exceeds the limiting values given above. Where photographs are taken under such conditions of terrain, there shall be no maximum value for the forward lap provided that, at some point along both the leading and trailing edges of the photographic overlap, normal to the flight direction, there is a point at which the forward lap is between 53% and 56%. This shall be determined by matching identical images on the two overlapping photographs and making the measurements to determine the percentage of lap along the edges of the photographs. It is further provided that computations must show that all forward lap in excess of 60% is due to the change in elevation within the area of forward lap. The minimum forward lap of 53% is effective in all cases.

(b) The minimum sidelap between adjacent strips shall be as specified in the "Specific Data" section. Sidelap will be determined after all deductions for crab, tilt, relief and other factors have been considered. For the purpose of measuring sidelap, the only portion of the flight considered is that portion on which all ground points covered by the flight are imaged on at least two consecutive photographs in the flight.

2A-05. Crab

Crab shall not exceed 10 degrees as measured from the line of flight, (the flight path, or "track" of the airplane as indicated by the principal points of the consecutive photographs). In

any series of two photographs the relative crab shall be limited by the conditions of Paragraph 2A-04.

2A-06 Tilt

Tilt shall not exceed 3 degrees for any exposure. The average tilt for a ten mile section shall not exceed 2 degrees and shall not exceed 1 degree for the entire project.

2A-07. Film

(a) Only fresh, fine-grained, panchromatic, topographic safety base serial film shall be used.

(b) Special low-shrinkage film base shall be used for the emulsion carrier. Uniform film shrinkage shall be limited to that amount which reduces the principal distance (perpendicular distance from film plane to the perspective center) of the film, after proper ratioing to the calibrated focal length, to not less than 151.0 mm. When cameras having calibrated focal lengths very near to 151.0 mm are used to expose the film, the above requirements may be modified at the discretion of the Contracting Officer. Differential film shrinkage shall be limited to that value defined in Paragraph 2B-01 (g) of the specifications.

SPECIFICATIONS
FOR
AERIAL PHOTOGRAPHY

SECTION II - TECHNICAL PROVISIONS

Sub-Section B - Exposure, Processing and Indexing Film

2B-01. Exposure, Processing and Drying Film

(a) The shutter speed shall be as fast as film, filter, and light conditions permit. In no case shall the ground speed in miles per hour exceed the flight height in thousands of feet divided by five times the shutter speed in seconds.

(b) All splices shall be of permanent nature and the film shall not be trimmed closer than forty-five (45) inches to an exposed negative.

(c) Rolls of mapping photography shall be numbered in consecutive order beginning with the numeral one. Fractional rolls may be spliced for spooling but each such portion of a roll shall bear its original roll number.

(d) Special care shall be exercised to insure the proper development and thorough fixation and washing of all film and to avoid rolling the film tightly on drums or in any way distorting it during processing and drying. The film shall not be developed by any method which subjects it to any appreciable tension. No method of drying shall be used which permits all of the weight of the film for more than three exposures being applied to any portion of the film as it is suspended. No means of suspension should be used which would tend to restrain any portion of the film from contraction as it dries. Drops of water shall not be allowed to stand on the emulsion side of the film at any time. Any drops of water which remain on the film after its final wash shall be removed by very gently wiping off by a properly directed jet of air.

2B-02. Prints

One set of single weight, glossy, contact prints shall be trimmed to the image edge. The prints supplied may be those used in preparation of the photographic index.

2B-03. Indexing

(a) Each exposure shall be numbered in consecutive order starting with exposure number one on roll number one. The numbering shall be continued in consecutive order through all rolls of the two types of photography.

(b) The titling data required on the first and last exposure of each continuous strip (or flight line) of the photography

shall be as shown on page 5, and 6.

(c) Each exposure shall have the titling data arranged in the same manner as shown on page 5.

(d) Each roll shall have on the clear portion of film at each end adjacent to the end exposures so that it will show on a slightly over-size print the following data: Name of contractor, type and serial number of lens and type and serial number of cone.

(e) Stamping machines and/or such other stamping devices, mechanical lettering guides, or equivalent equipment or freehand lettering shall be used with opaque ink for numbering the negatives. The ink shall be dry before the film is rewound onto the spool.

(f) The metal container for each roll of film, which will become the property of the Government, shall be labeled by affixing a completely filled-out form. An example of a completely fill-out form is attached hereto. (See page 6).

(g) The Contractor shall deliver one copy of a photographic index on double weight, semi-matte paper together with its film negative. The extend of the index shall be as specified under "Minimum Size of a Segment" in the "Specific Data" section. The photographic index negative and print shall be prepared at a scale of approximately one fifth (1/5) of the contact print scale. All photographic index negatives of the project shall be to a uniform scale to facilitate the matching of adjoining indexes. All photographic indexes shall be of uniform trim size. The trim size shall be 20 inches by 24 inches.

(h) A neatly executed title block shall include the following items: the project name; the contractor's name; type and serial number of the camera, cone, magazine, and lens; the calibrated focal length of lens (only those camera units used to secure photography shown on the photo-index sheet to which the block applies will be given); approximate scale of the photography; approximate scale of the photo-index and the sheet number and number of sheet comprising the photo-index.

HORIZONTAL AND VERTICAL CONTROL

Basic Control

A. Basic control is defined, for the purpose of these specifications, as that required to provide tie-points for the establishment of horizontal and vertical (bench levelling) picture point control necessary to meet map accuracy requirements as specified.

B. All basic horizontal control to be established by the Contractor shall be by triangulation or traverse of third or higher order accuracy from existing triangulation and traverse stations whose positions have been adjusted. In areas where basic control stations are not available, or have been disturbed by the earthquakes, traverses shall start and close upon a monument whose coordinate values are assumed. Later true coordinate values for the monuments will be established by the Chilean Government. When the horizontal control is determined by traverse, such traverse shall be a closed loop or shall close on another triangulation or traverse station of third order accuracy, and the traverse closure shall not exceed one part in 5,000 of the total traverse length. Where an astronomic azimuth is required in establishing the horizontal control, the actual observed error of the astronomic azimuth shall not exceed ten seconds.

C. The basic vertical (bench levelling) control shall be extended from, and closed on, points of third or higher order accuracy, and shall be of third order accuracy.

D. The check and closure criteria for third order accuracy will be as follows:

Triangulation:	Average triangle closure, 5 seconds check on base $1/5000$. Maximum triangle closure, 10 seconds.
Traverse:	Error of closure, $1/5000$ Angle closure, 6 seconds per angle.
Levelling:	Error of closure of circuit, 0.05 ft. times square root of length of level line in miles.

E. Horizontal and/or vertical coordinates of terrain features that have been identified on the aerial photographs, termed horizontal and/or vertical picture control points or picture points, shall be such as to provide the required map accuracy. Aerial photographs on which the images of these points have been identified by on-the-site inspection are termed control photographs. All existing permanently marked vertical control points of third or higher order accuracy, and all existing permanently marked horizontal control points of third or higher order accuracy where used for picture control points shall be pin-pricked and identified on the control photographs. The control photographs shall be delivered to the Contracting Officer upon completion of the map compilation.

Datum

All positions of horizontal control points and elevation

of bench marks shall be referred to the Chilean Datum when possible.

Information, Data, and Survey Records
to Be Furnished on Basic Control

The Contractor shall furnish to the Contracting Officer all the survey records and computations of survey data.

A. Field notebooks shall be carefully prepared and preserved. All data regarding the establishment of horizontal and vertical (bench levelling) control shall be recorded. Where existing control points are recovered and furnished by the Contracting Officer and are used by the Contractor in establishing the basic control, the notebooks shall contain information as to the general condition of the mark, adequacy of present description, exact letters and numbers stamped on the mark, and amended description and/or additional ties and sketch of locations as necessary to facilitate future recovery. Each notebook shall be numbered and shall be marked with a description of the contents on the cover.

B. Computations shall be keyed to the field notebooks by book and page number. All field records and computations shall be delivered to the Contracting Officer with the control data upon completion of the work.

SECTION II-B (Continued)

EXAMPLE OF TITLING DATA TO BE PLACED
ON EACH EXPOSURE

Date	Roll Number	Exposure N°.
(1)	(2)	(3)
2 Dec. 1960	3	456
← Limits of Exposed area →		



SECTION II-B (Continued)

SAMPLE OF A FILM CAN LABEL PROPERLY FILLED OUT

South Central Chile _____ Project Name _____ Roll N°s. _____
 Contract N°. _____ Contractor _____
 Exposure N°. _____ Through Exposure N° _____
 Calibrated focal length (in mm.) _____ Approximate Scale _____
 Type of Camera _____ Type of Lens _____

Titling Data for the First and Last Exposures of each
 Working Day and for each Block of Photography

	Roll N°	Exposure N°	Day	Month	Year	Time of Day	Flight Altitude above Sea Level	
1st Exposure								
Last Exposure								
1st Exposure								
Last Exposure								
1st Exposure								
Last Exposure								
1st Exposure								
Last Exposure								

SECTION II-B (Continued)

A SUGGESTED ARRANGEMENT OF THE INFORMATION TO BE INCLUDED
IN PHOTO-INDEX TITLE

(See Paragraph 2B-03 (g))

SOUTH CENTRAL CHILE

Aerial Photography By:

For: Government of Chile

(Contractor's Name)

Area: _____

Camera Serial N°. _____

Cone N°. _____

Magazine N°. _____

Planigon Lens, Serial N°. _____

Calibrated or equivalent Focal Length: _____

Approximate Scale of Photographs: _____

Approximate Scale of Index: _____

Sheet _____ of _____

TOPOGRAPHIC MAPS

Areas to Be Mapped

The areas to be mapped include various cities and/or towns in southern Chile as designated by the contract, and the areas surrounding each city or town. Approximately 220 square kilometers will be mapped.

Scale of Maps

Topographic maps at a scale of 1:2000 showing 1 meter contours will be prepared.

Map Content

A. Map sheets will be 20" x 30" in size.

B. Grid lines based on geodetic control on the Chilean Grid System shall be shown at 5 inch intervals on the final topographic maps. Match lines shall be provided for the map sheets so that adjacent sheets can be accurately joined.

C. All permanent control monuments, both horizontal and vertical, established to second order accuracy will be shown on the maps and identified in accordance with conventional symbols.

D. One meter contours will be shown. Every fifth contour will be accentuated. Spot elevations will be shown on all saddles, summits, bottom of depressions, road intersections, railroad and/or highway intersections, and these elevations shall be accurate to within at least one-fourth of the contour interval. Ninety percent (90%) of all elevations determined from the topographic maps shall have an accuracy with respect to true elevation of one-half contour interval or better; the remaining 10% of the elevations determined shall not be in error by more than one (1) contour interval.

E. Planimetry, Drainage and Styling:

1. All lettering, numbers, and symbols shall be in accordance with accepted standards. The plotted position of each plane coordinate grid line shall not vary more than one-hundredth (1/100) of an inch from true grid value on each map manuscript and each horizontal control point shall be plotted within similar accuracy.
2. All cultural features which are visible or identifiable on, or are interpretable from, the aerial photography will be shown. These features will include buildings, channels, ditches, reservoirs, roads, trails, railroads, ferry slips, fords,

quarries, ponds, pits, cemeteries, orchards, boundaries of wooded areas, major power transmission lines, and fence lines. Structures such as bridges, trestles, tunnels, piers, dams, power plants, transportation terminals and air-fields, oil, water and other storage tanks and the like shall be shown. Buildings and other dimensional objects shall be correctly outlined and oriented, and shall be to actual size, except that building dimensions smaller than representable by one-tenth ($1/10$) inch in size shall be shown as $1/10$ inch. Minor irregularities in building outlines not representable by one-twentieth ($1/20$) inch at map scale shall be ignored. Political subdivisions lines, boundary lines of corporate areas and government property shall also be shown on the map. Location of such lines shall be furnished by the Government.

3. Ninety percent (90%) of all well defined planimetric features on the map shall be plotted within $1/30$ th of an inch of their true positions and no such point shall be misplaced by more than $1/20$ th of an inch of its true position.
4. The widths of paved or traveled surface of all roads shall be shown to scale with the drafting carefully executed. The cleared widths along highway, electric transmission lines, etc., shall be drawn to scale. All woodlines which are well defined shall be plotted on the map within $1/20$ th of an inch of their true position.
5. Drainage features identifiable on the aerial photography shall be shown and in addition thereto, drainage lines, wherever defined by actual flow of water or shape of ground. In general, streams averaging twenty (20) feet or more in width shall be shown by a double line. Drainage features shall be plotted within $1/20$ th of an inch of their true position.
6. The names of cities, towns, villages, rivers, streams, roads and streets, supplied by the Government, shall be neatly lettered on the maps. The designations of State and Federal numbered highways shall also be lettered on the maps. All names and numbers shall be legible and clear in meaning and shall not interfere with map features.

quarries, ponds, pits, cemeteries, orchards, boundaries of wooded areas, major power transmission lines, and fence lines. Structures such as bridges, trestles, tunnels, piers, dams, power plants, transportation terminals and airfields, oil, water and other storage tanks and the like shall be shown. Buildings and other dimensional objects shall be correctly outlined and oriented, and shall be to actual size, except that building dimensions smaller than representable by one-tenth ($1/10$) inch in size shall be shown as $1/10$ inch. Minor irregularities in building outlines not representable by one-twentieth ($1/20$) inch at map scale shall be ignored. Political subdivisions lines, boundary lines of corporate areas and government property shall also be shown on the map. Location of such lines shall be furnished by the Government.

3. Ninety percent (90%) of all well defined planimetric features on the map shall be plotted within $1/30$ th of an inch of their true positions and no such point shall be misplaced by more than $1/20$ th of an inch of its true position.
4. The widths of paved or traveled surface of all roads shall be shown to scale with the drafting carefully executed. The cleared widths along highway, electric transmission lines, etc., shall be drawn to scale. All woodlines which are well defined shall be plotted on the map within $1/20$ th of an inch of their true position.
5. Drainage features identifiable on the aerial photography shall be shown and in addition thereto, drainage lines, wherever defined by actual flow of water or shape of ground. In general, streams averaging twenty (20) feet or more in width shall be shown by a double line. Drainage features shall be plotted within $1/20$ th of an inch of their true position.
6. The names of cities, towns, villages, rivers, streams, roads and streets, supplied by the Government, shall be neatly lettered on the maps. The designations of State and Federal numbered highways shall also be lettered on the maps. All names and numbers shall be legible and clear in meaning and shall not interfere with map features.

