

SYMBOL – A diagram, design, letter, or abbreviation placed on maps and charts, which by convention, usage, or reference to a legend is understood to stand for or represent a specific characteristic or object.

SYSTEMATIC ERROR – An error that occurs according to a known pattern or law. Systematic errors can be compensated for partially by corrections and appropriate measuring techniques.

T

T.B.M. (USGS and USC & GS) – Temporary bench mark. See TURNING BENCH MARK.

TIR – Thermal infrared.

TP – Turning point.

TABLELAND – Land elevated much above the level of the sea and generally offering no considerable irregularities of surface. 2) A flat or undulating elevated area; a plateau or mesa.

TABLEMOUNT – A seamount (roughly circular or elliptical in plan) generally deeper than 100 fathoms, the top of which has a comparatively smooth platform. Syn: SEAMOUNT; GUYOT.

TACHYMETRY, TACHEOMETRY – Surveying method used to denote the procedures for obtaining horizontal distances and differences in elevation by indirect methods, which are based on the optical geometry of the instruments employed. Sometimes referred to an optical distance measurement, telemetry, or stadia.

TALUS – A collection of fallen disintegrated material which has formed a slope at the foot of a cliff.

TANGENT – 1) That part of a traverse or alinement included between the point of tangency of one curve and the point of curvature of the next curve. 2) Sometimes applied to a long straight line of a traverse, especially on a route survey, whether or not the termini of the line are points of curve. See TANGENT* and SEMITANGENT.

TANGENTIAL DISTORTION – See LENS DISTORTION.

TANGENT PLANE – A plane that touches a curved surface of double curvature at one and only one point or that touches a curved surface of single curvature along one or more parallel straight lines which are elements of the surface, without intersecting the surface.

TANGENT SCREW – A knob mounted on a fine threaded screw giving a tangential movement for making the final setting to an instrument of precision, as a surveyor's transit.

TAPE – A steel, fabric or Invar ribbon used for direct distance measurement.

TAPE CORRECTION – A quantity or quantities applied to a taped distance to eliminate or reduce errors due to the physical condition of the tape and to the way in which it is used.

TARGET – A symmetrical pattern centered over a point to be recorded on a photograph. See PANEL.

TARGET IDENTIFICATION OR RECOGNITION – Process by which targets from image format data are identified by means of a decision rule.

TARGETING – The distinctive marking of a ground point with material of any kind, placed in a symmetrical contrasting pattern about the point to facilitate the identification and precise recovery of that point on an aerial photograph. Also called paneling.

TELESCOPE LEVEL – A sensitive spirit level attached to a transit's telescope, with its axis parallel to the telescope axis.

T-ELEVATION – A photogrammetrically determined elevation, shown on map manuscripts. The elevation figure is followed by the letter "T," as 1057T, to indicate that the elevation is unchecked. See SPOT ELEVATION.

TELLUROMETER – A trade name of an electronic measuring system.

TEMPERATURE CORRECTION – An amount added algebraically to a measurement to account for length changes due to thermal variance from standard conditions.

TEMPLET – 1) A representation of a photograph or a stereomodel for use in aerotriangulation. 2) The design-cross-section of a road, canal, etc. See SLOTTED TEMPLET TRIANGULATION.

TEMPLET LAYDOWN – See RADIAL TRIANGULATION.

TEMPLET MATCHING – An operation used to find out how well two photographs or images match one another.

TEMPORARY BENCH MARK – See BENCH MARK, NONMONUMENTED.

TERRACE – 1) A flat, level or nearly level, narrow area of land bordering a river or lake, bounded on at least one side by a definite steep slope rising upward from it, and on the other sides by downward slopes. 2) A low embankment of ridge of earth constructed across a slope to control surface runoff and minimize soil erosion. 3) Sloping ground cut into a succession of benches and steep inclines for purposes of cultivation.

TERRAIN – An area of ground considered as to its extent and topography.

TERRAIN FACTORS – Terrain factors consist of land forms, drainage features, the ground, the vegetation, and the cultural features or manmade changes in the surface of the earth.

TERRESTRIAL CAMERA – A phototheodolite; a camera for use on the ground.

TERRESTRIAL PHOTOGRAPH – A photograph of a portion of the earth's surface taken by a camera located on the ground.

TEXTURE – A distribution of grey tones and photographic features in a small area which produces easily recognizable discrete tonal features.

THEMATIC MAP – A map that portrays selected phenomena and/or factual contents.

THEORETICAL CORNER – A USGS term which designated corners on the map for which no evidence was found on the ground and which were located by land line adjustment.

THERMAL RADIATION – Electromagnetic radiation emitted by any substance as a consequence of the thermal excitation of its molecules.

THERMAL RESOLUTION – Image resolution expressed as a function of the minimum temperature difference between two objects of phenomena.

THETA – A Greek letter much used in mathematics. Usually the mapping angle in a Lambert Map projection.

THIRD ORDER LEVELS – Differential leveling which closes on higher order work with no lines longer than 30 miles. Maximum closing error 12 mm multiplied by square root of distances in kilometers.

THIRD ORDER MAGNITUDE RELIEF FEATURE – Features formed by destructive forces-erosional features, (such as gullies and valleys), residual features (such as peaks and ridges) and depositional features (such as deltas and moraines).

THIRD ORDER TRAVERSE – A closed survey with a maximum closing error of 1 in 5,000 which meets minimum standards for angle measurements and azimuths.

THIRD ORDER WORK – The lowest order of control survey for which monumentation is authorized. See CONTROL SURVEY CLASSIFICATION.

THREE-POINT METHOD – See RESECTION.

THREE POINT PROBLEM - The three point method. See RESECTION.

THREE WIRE LEVELING – A method for reading a level rod employing three cross wires which compares the average of the three readings with the middle wire reading, especially useful with a rod graduated in yards.

TICK MARK – A small mark placed along a line or edge of a map to indicate a point of measurement. See GRID TICK.

TIDAL BENCH MARK – A bench mark set to reference a tide staff at a tidal station. The elevation of the bench mark is determined with relation to the local tidal datum.

TIDELANDS – All coastal areas that are situated above mean low tide and below mean high tide, particularly as such areas are alternately uncovered and covered by the ebb and flow of the ordinary daily tides.

TIE – A survey connection from a point of known position to a point whose position is desired or a connection to close a survey on a previously determined point.

TIE POINT – 1) Point of closure of a survey, either on itself or on another survey. 2) A pass point common to two or more strips in aerotriangulation.

TIE STRIP – An overlay containing all planimetric and relief features in the area along the edge of a map or chart. It is used to insure matching of these features on adjoining sheets.

TILT – The angle at the perspective center between the photograph perpendicular and the plumbline. See X TILT and Y TILT.

TILT DISPLACEMENT – Displacement of images on a tilted photograph radial from its isocenter. Tilt displacement is outward or inward with respect to the isocenter, according to whether the images are on the low or high side of the isometric parallel (the low side is closest to the earth, or the object plane).

TILTING LEVEL – A leveling instrument in which the final leveling of the telescope is obtained by small controlled amount of rotation of the telescope about a horizontal axis.

TIP – Tilt of the aircraft at exposure of a photograph in which one wing is lower than the other.

TITLING – 1) That information lettered on photographic negatives for identification purposes. Supplementary information may be added for special purposes. 2) The placing of such information on the negatives.

TOLERANCE – The allowable variation from a standard or from specified conditions.

tone – Each distinguishable variation in shade of grey between black and white.

TONGUE – A low narrow strip of land, projecting into a body of water.

TOPOGRAPHIC EXPRESSION (USGS) – The effect achieved by shaping and spacing contour lines so that topographic features can be interpreted with ease and fidelity. Good expression is achieved by delineating the contours in appropriate relationship to each other, with due consideration of the scale and contour interval of the map. To achieve appropriate relationship, the contours sometimes must be adjusted (without exceeding accuracy tolerances) to (1) show features that otherwise might be missed; (2) emphasize significant characteristics of the

terrain; or (3) omit minor features that are relatively unimportant or that might lead to an incorrect interpretation of the terrain.

TOPOGRAPHIC FEATURE – A relief feature generally of third-order but sometimes of second-order magnitude. See RELIEF FEATURE.

TOPOGRAPHIC LICENSE – See CARTOGRAPHIC LICENSE.

TOPOGRAPHIC MAP (USGS) – A map which presents the horizontal and vertical positions of the features represented; distinguished from a planimetric map by the addition of relief in measurable form. A topographic map generally shows the same features as a planimetric map, but contour lines or comparable symbols are used to show mountains, valleys, and plains; and depth curves are used to show depths in bodies of water.

TOPOGRAPHIC SURVEY – A survey which has for its major purposes the determination of the configuration (relief) of the surface of the earth (ground) and the location of natural and man-made objects thereon.

TOPOGRAPHY – The features of the surface of the earth considered collectively as to form. A single feature, such as a mountain or valley, is termed a “*topographic feature*.” Topography is subdivided into hypsography (the relief features), hydrography (the water and drainage features), and culture (manmade features).

TOWER, SURVEYING – A structure used to elevate a surveying instrument so that lines of sight are above obstacles. A tower usually has two independent components, one built within the other; the inner component supports the instrument, and the outer component supports the observer and a signal.

TRACING PAPER METHOD – A system for updating minor detail on a map using newer aerial photos. Mutually identified image points are marked on tracing paper and the map position determined by graphical resection.

TRACING TABLE – An instrument used in conjunction with a direct-viewing double-projection plotter to observe the stereomodel, to make precise measurements in it, and to delineate mapworthy detail, including contours, on a map manuscript. The instrument includes a viewing screen (see platen) for observing corresponding imagery, a reference mark (see floating mark), and a vertical leadscrew with a scale or digital counter.

TRAIL – A pathway marked clearly enough to be followed on the ground or on photographs but not suitable for passenger cars.

TRANSFORMATION – The process of projecting (mathematically, graphically, or photographically) a photograph, or points on it, from its plane onto another plane by translation, rotation, and/or scale change. See RECTIFICATION.

TRANSFORMED PRINT – See TRANSFORMING PRINTER.

TRANSFORMING PRINTER (USGS) – A projection printer specifically designed for the transformation of intentionally tilted photographs according to preset parameters. The most common application is in the conversion of low-oblique photographs into equivalent “*vertical*” photographs, assuming a nominal value for the obliquity of the original photographs.

TRANSIT-STADIA SURVEY – A survey in which horizontal and vertical directions or angles are observed with a transit and distances are measured by stadia.

TRANSIT TRAVERSE – A traverse in which the angles are measured with a transit or theodolite and the lengths with a metal tape. See ELECTRONIC TRAVERSE.

TRANSPARENCY – A photographic print on a clear base, especially adaptable for viewing by transmitted light. Also, the light-transmitting capability of a material.

TRANSPONDER – A combined receiver and transmitter whose function is to transmit signals automatically when triggered by an interrogating signal.

TRANSVERSE – A map projection in which a meridian is treated as an equator.

TRANSVERSE LOW-OBLIQUE PHOTOGRAPHY – Twin-low oblique photography in which the two cameras of a couple are oriented so that the plane containing their optical axes is at right angles to the flight line.

TRANSVERSE MERCATOR MAP PROJECTION – A conformal map plotting system in which points on the ellipsoid are mathematically projected onto a cylinder whose axis is oriented 90° (transverse) to the axis of the ellipsoid. The cylinder surface may meet the ellipsoid at the map center or it may cut below the surface (secant) creating two meridians where the scale is exact. The secant form of this projection is the basis of State Plane Coordinate Systems where the zone extends north-south more than east-west.

TRAVERSE – a sequence of lengths and directions of lines connecting a series of stations, obtained from field measurements and used in determining positions of the stations. See CLOSED TRAVERSE, OPEN TRAVERSE, ELECTRONIC TRAVERSE and TRANSIT TRAVERSE.

TRIANGLE CLOSURE – An error of angular closure; the amount by which the sum of three measured angles of a triangle fails to equal 180° plus the spherical excess.

TRIANGLE OF ERROR – The triangle formed when three plotted rays intersect.

TRIANGULAR DIVISION METHOD – A system for updating minor detail on a map using newer aerial photos. Equivalent areas are divided into homologous triangles.

TRIANGULATION – A method of surveying in which the stations are points on the ground at the vertices of a chain or network of triangles. The angles of the triangles are measured instrumentally and the sides are derived by computation from selected sides or bases, whose lengths are obtained by direct measurement on the ground or by computation from other triangles. See ARC TRIANGULATION and AREA TRIANGULATION.

TRIANGULATION STATION – A marked point on the earth whose position is determined by triangulation.

TRIANGULATION TOWER – See TOWER, SURVEYING.

TRIBRACH – The three-arm base of a surveying instrument which carries the foot-screws used in leveling the instrument. See QUADRIBRACH.

TRIBUTARY – A river or stream which contributes its water to a main river by discharging it into the latter, from either side, and at any point along its course.

TRIGONOMETRIC LEVELING – The determination of differences of elevation from observed vertical angles and measured or computed horizontal or inclined distances.

TRILATERATION – A method of determining horizontal positions by measuring the lengths of triangle sides, usually with the use of electronic instruments.

TRIMETROGON CAMERA – An assembly of three cameras equipped with wide-angle Metrogon lenses, in which one of the cameras is vertical and the other two are 60 degree obliques.

TRIMETROGON MAPPING – A method of compiling map data from aerial photographs taken with an assembly of three cameras, one aimed vertically downward, the others to either side of the flight line at 60° from the vertical. This name was chosen originally because the cameras contained Metrogon wide-angle lenses. The angular coverage in a plane normal to the flight line exceeds 180°, providing overlap between the vertical and both oblique photographs as well as inclusion of both horizons.

TRIVET – A low support for a surveying instrument which is used where a tripod cannot be used.

TRUCK MOUNTED TOWER (USGS) – A surveying tower hinged to a motor truck which is equipped with a mechanical device for quickly hoisting the tower to or lowering it from a vertical position.

TRUE – Correct or actual values as differentiated from relative, measured or fictitious values, i.e., true north vs magnetic north, true sun vs fictitious sun, true altitude vs measured altitude. Depending on the use, “true” can have an exact meaning. The generally accepted interpretation is that true north means a meridian determined with respect to the earth’s axis by astronomic methods.

TRUE HORIZON – The trace on an oblique photograph of a horizontal plane passing through the perspective center.

TRUE NORTH – The direction of the earth’s axis of rotation. See preferred ASTRONOMIC NORTH.

TUNDRA – One of the level or undulating treeless plains characteristic of arctic regions, having a black muck soil and a permanently frozen subsoil.

TURNING BENCH MARK – A bench mark set during continuous leveling and used as a turning point.

TURNING POINT – A temporary point on which the rod is held, after a foresight has been made on it, while the instrument is moved to another station so that a backsight can be made on that elevation.

TWIN-LOW OBLIQUE PHOTOGRAPHS (USGS) – Photography with a twin-camera arrangement consisting of a pair of aerial cameras coupled rigidly together and exposed simultaneously. In Geological Survey practice wide-angle precision cameras are used with their respective optical axes in a common vertical plane, making an angle of 20° with a plumbline and 40° with each other.

U

UPS – Universal Polar Stereographic.

U.S.A.S.I. – U.S.A. Standards Institute (Formerly A.S.A.).

UTM – Universal Transverse Mercator.

U.V. – Ultra Violet.

ULTRAVIOLET ABSORBING FILTER – A haze cutting filter used mainly in photography with color films to avoid excessive bluishness and loss of contrast in the pictures; usual designations are U.V.; Haze; Wratten 2A.

ULTRAVIOLET RADIATION – Electromagnetic radiation of shorter wavelength than visible radiation but longer than X-Rays; roughly, radiation in the wavelength interval between 10 and 4000 angstrom units.

ULTRA-VIOLET RAYS – Radiant energy in the ultraviolet portion of the electromagnetic spectrum.

ULTRA-WIDE-ANGLE LENS – A lens having a coverage in excess of 100°. See SUPER WIDE ANGLE LENS.

UNCONTROLLED MOSAIC – A mosaic in which the photographs have not been positioned by reference to horizontal control.