

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.

UNDA – That part of the floor of the ocean which lies in the zone of wave action, and in which the bottom is repeatedly stirred and reworked by storm waves.

UNDAFORM ZONE – That part of the ocean floor which lies in the zone of wave action and in which, therefore, the bottom is repeatedly stirred and reworked by storm waves.

UNDERGROUND MARK – A surveying mark set and plumbed below the center of a surface mark and separated therefrom so as to preserve the station in case of accident to the surface mark.

UNDERWATER CONTOUR – A contour shown in an inundated area. See DEPTH CURVE.

UNITED STATES NATIONAL MAP ACCURACY STANDARDS – 1) Horizontal accuracy; For maps at publication scales larger than 1:20,000, 90 percent of all well-defined features, with the exception of those unavoidably displaced by exaggerated symbolization, will be located within 1/20 inch (0.85 mm) of their geographic positions as referred to the map projection; for maps at publication scales of 1:20,000 or smaller, 1/50 inch (0.05 mm). 2) Vertical accuracy: 90 percent of all contours and elevations interpolated from contours will be accurate within one-half of the basic contour interval. Discrepancies in the accuracy of contours and elevations beyond this tolerance may be decreased by assuming a horizontal displacement within 1/50 inch (0.50 mm). Commonly referred to as Map Accuracy Standards.

UNIVERSAL PLOTTER – A stereoplotter capable of compiling contour maps from vertical or oblique aerial photography as well as terrestrial photography. A true universal plotter will accept photographs from any focal length camera.

UNIVERSAL POLAR STEREOGRAPHIC – A map designed for military use based on a Polar Stereographic Projection covering to the poles from 84° N. and 80° S. latitudes.

UNIVERSAL PROJECTION PRINTER – See PROJECTION PRINTER.

UNIVERSAL TABLE FRAME – A supporting frame for stereoplotters, specially designed to accommodate the projectors of any of the various types of direct-viewing double-projection plotters.

UNIVERSAL TRANSVERSE MERCATOR PROJECTION – A special case of the transverse Mercator projection. Abbreviated as the UTM grid, it consists of 60 north-south zones, each 6° wide in longitude.

UNIVERSAL WATER CHARTS – A series of blank charts at 1:1,000,000 scale, published for each 4° band of latitude. They are used for aerial navigation over water or for plotting positions, distances, and courses in land travel over unmapped areas, such as in Antarctica.

UPDATING – Addition of recent changes to a map. See SKETCHMASTER, RADIAL LINE METHOD, TRIANGULAR DIVISION METHOD and REFLECTING PROJECTOR METHOD.

V

VABM – Vertical Angle Bench Mark.

VACUUM BACK – The back of a film magazine which is so constructed that a suction may be applied to keep the film flat and in the focal plane during the exposure.

VALLEY – Any hollow or low-lying land bounded by hill or mountain ranges.

VECTOR – 1) A quantity which has magnitude and direction. 2) One of a series of simultaneous equations.

VERNIER – A scale reading device using alinement of graduated marks named for Peter Werner, a mathematician, who used the name Pierre Vernier in his writings. See NONIUS*.

VERTICAL ANGLE – The angle between a horizontal plane and the surface of a cone passing thru the point of reference with the apex at the point of observation.

VERTICAL ANGLE, ASCENDING – A vertical angle, measured at the perspective center, between the true horizon and a ray to a point above the horizon.

VERTICAL ANGLE, DESCENDING – A vertical angle, measured at the perspective center, between the true horizon and a ray to a point below the horizon.

VERTICAL ANGLE BENCH MARK – A monumented point whose elevation is determined by trigonometric leveling.

VERTICAL ANGLE LEVELING – See TRIGONOMETRIC LEVELING.

VERTICAL COLLIMATOR – A nadir mounted telescope with leveling bubbles used as an optical plummet.

VERTICAL CONTROL – Survey data furnishing elevations to be used for a framework of subsidiary surveys.

VERTICAL CURVE – 1) A parabolic curve used as transition between different grades or slopes. 2) Synonym for BZ curve.

VERTICAL GEODETIC DATUM – The assumed or fixed elevation of a specific point or level surface, usually mean sea level.

- VERTICAL PHOTOGRAPH** – An aerial photograph taken with the camera axis vertical or as nearly vertical as practicable.
- VIDICON** – An imaging tube having a photo-sensitive surface and is a device used to convert image data from photographic format to electronic video signal format. An electron beam is scanned like a TV raster across the photo-sensitive surface and it generates a signal whose amplitude corresponds to the light intensity focused on the surface at each point. This electron beam signal is then amplified to a usable video signal.
- VIEWFINDER** – A device similar to a camera but with the ground glass in the focal plane of the lens. The viewfinder is mounted vertically in the floor of an airplane for the purpose of viewing the landscape and determining when photographs should be taken.
- VIGNETTING** – A gradual reduction in density of parts of the photographic image due to the stopping of some of the rays entering the lens. Thus, a lens mounting may interfere with the extreme oblique rays. An antivignetting filter is one that gradually decreases in density from the center toward the edges; it is used with many wide-angle lenses to produce a photograph of uniform density by cutting down the overexposure of the center of the photograph.
- VINCULUM** – A short horizontal line placed over the seconds digits of a numerically expressed angle or direction to indicate that the seconds are used in connection with a value of minutes 1 less than is recorded. A double vinculum indicates association with a value of minutes 2 less than is recorded.
- VOLCANO** – 1) A vent in the earth's crust from which molten lava, pyroclastic materials, volcanic gases, etc., issue. 2) A mountain which has been built up by the materials ejected from the interior of the earth through a vent.

W

- W/H** – Width-height ratio.
- WWV** – Radio time signal station call letters originally at Wheeling, West Virginia but now in Boulder, Colo.
- WWVH** – Radio time signal call letters for the Hawaii station.
- WARPED MODEL** – A photogrammetric model which will not fit the vertical control.
- WATER COTE** – A tradename for a dichromate coating.
- WATER GAP** – A pass in a mountain ridge through which a stream flows.
- WATER LEVELING** – A method of obtaining relative elevations by observing heights with respect to the surface of a body of still water.
- WAVELENGTH** – Displacement of a wave which occurs during one complete period. Wave Velocity = Frequency x Wavelength.
- WAVING THE ROD** – Slowly pivoting a leveling rod back and forth so the instrument operator can observe the smallest reading.
- WEIGHT** – The relative worth of an observed value or quantity, expressed numerically.
- WEIGHTED MEAN** – The value obtained by dividing the product of individual observations and their weights by the sum of all the weights.
- WIDE ANGLE LENS** – A lens having an angle of coverage between 75° and 100°.
- WIDTH BETWEEN FLIGHTS** – The distance between adjacent flight lines.
- WIDTH-HEIGHT RATIO** – In aerial photography, the ratio of the distance between adjacent flight lines to the flight height. In photogrammetry, the ratio of the width of a neat stereomodel (that is, the dimension normal to the flight lines) to the flight height. For some photographic conditions these two W/H values may not be exactly equal, but differences are usually insignificant.
- WIGGLING IN** – The process of setting an instrument on direct line between two fixed points by successive approximations and sightings.
- WING POINT** – A pass point at the extreme right or left of the flight line.
- WITNESS MARK** – A mark placed at a known distance and direction from a survey station to aid in its recovery and identification. Sometimes called witness post.
- WORLD AERONAUTICAL CHARTS (WAC)** – A standard series of 1:1,000,000-scale charts designed for aerial navigation. For areas outside the United States, this series has been superseded by the Operational Navigation Charts (ONC). For blank charts used over water or unmapped land areas, see UNIVERSAL WATER CHARTS.
- WRATTEN FILTER** – A trade name of any one of a series of filters used in photographic processes, bearing a designation keyed to its spectral transmission.

X

X AVIS – See **AXIS**.

X PARALLAX – See **ABSOLUTE STEREOSCOPIC PARALLAX**.

X TILT – The component of photograph tilt about the X axis; same as roll.

Y

YARD ROD – A level rod graduated in 100^{ths} of a yard so that the sum of three hair reading equals the foresight or backsight in feet.

YAW – 1) Rotation of an aircraft about a vertical axis causing deviation from flight line or crab. 2) Rotation of a camera or coordinate system about the Z axis. (Kappa K).

Y PARALLAX – The difference of the perpendicular distances of the two images of a point from the vertical plane containing the air base, indicating tilt in either or both photographs or of a difference in flight height and is confusing to a stereoscopic examination of the pair.

Y TILT – Component of photograph tilt about Y axis. Also (TIP).

Z

Z AXIS – See **AXIS, Z**.

ZTS – Zoom Transfer Scope.

ZEISS PARALLELOGRAM – A mechanical analog of the rays to a photo image from two photographs. The parallelogram allows mechanical separation of the ray intersection. See **BASE INSIDE** and **BASE OUTSIDE**.

ZOOM STEREOSCOPE – A binocular viewing instrument with a specially designed optical system that features independent variable enlargement in each eyepiece to enable common-scale stereoscopic viewing of corresponding images in overlapping photographs at different scales.