

CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS (NOTES omitted)

INSTRUMENTS

G01 MEASURING; TESTING (NOTES omitted)

G01C MEASURING DISTANCES, LEVELS OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY OR VIDEOGRAMMETRY (measuring liquid level [G01F](#); radio navigation, determining distance or velocity by use of propagation effects, e.g. Doppler effects, propagation time, of radio waves, analogous arrangements using other waves [G01S](#))

NOTES

1. In this subclass, the following term is used with the meaning indicated:
"navigation" means determining the position and course of land vehicles, ships, aircraft, and space vehicles.
2. Attention is drawn to the Notes following the title of class [G01](#).

WARNING

{In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.}

1/00	Measuring angles	3/22	• using a parallax triangle with variable angles and a base of fixed length at, near, or formed by the object
1/02	• Theodolites		
1/04	• • combined with cameras		
1/06	• • Arrangements for reading scales	3/24	• using a parallax triangle with fixed angles and a base of variable length in the observation station, e.g. in the instrument
1/08	• Sextants		
1/10	• • including an artificial horizon (G01C 1/14 takes precedence)	3/26	• using a parallax triangle with fixed angles and a base of variable length, at, near, or formed by the object
1/12	• • • with a stabilised mirror		
1/14	• • Periscopic sextants	3/28	• • with provision for reduction of the distance into the horizontal plane
3/00	Measuring distances in line of sight; Optical rangefinders (tapes, chains or wheels for measuring length G01B 3/00; active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves, G01S 17/48)	3/30	• • • with adaptation to the measurement of the height of an object, e.g. tachometers
3/02	• Details	3/32	• by focusing the object, e.g. on a ground glass screen
3/04	• • Adaptation of rangefinders for combination with telescopes or binoculars	5/00	Measuring height; Measuring distances transverse to line of sight; Levelling between separated points; Surveyors' levels (G01C 3/20, G01C 3/30 take precedence)
3/06	• • Use of electric means to obtain final indication	5/005	• {altimeters for aircraft (G01C 5/02 , G01C 5/06 take precedence)}
3/08	• • • Use of electric radiation detectors	5/02	• involving automatic stabilisation of the line of sight
3/085	• • • • {with electronic parallax measurement}	5/04	• Hydrostatic levelling, i.e. by flexibly interconnected liquid containers at separated points
3/10	• using a parallax triangle with variable angles and a base of fixed length in the observation station, e.g. in the instrument	5/06	• by using barometric means
3/12	• • with monocular observation at a single point, e.g. coincidence type (G01C 3/20 takes precedence)	7/00	Tracing profiles (by photogrammetry or videogrammetry G01C 11/00)
3/14	• • with binocular observation at a single point, e.g. stereoscopic type (G01C 3/20 takes precedence)	7/02	• of land surfaces
3/16	• • • Measuring marks	7/04	• • involving a vehicle which moves along the profile to be traced
3/18	• • with one observation point at each end of the base (G01C 3/20 takes precedence)	7/06	• of cavities, e.g. tunnels
3/20	• • with adaptation to the measurement of the height of an object	9/00	Measuring inclination, e.g. by clinometers, by levels
		9/005	• {specially adapted for use in aircraft}

- 9/02 . Details
- 9/04 . . Transmission means between sensing element and final indicator for giving an enlarged reading
- 9/06 . . Electric or photoelectric indication or reading means
- 2009/062 . . . {capacitive}
- 2009/064 . . . {inductive}
- 2009/066 . . . {optical}
- 2009/068 . . . {resistive}
- 9/08 . . Means for compensating acceleration forces due to movement of instrument
- 9/10 . by using rolling bodies {, e.g. spheres, cylinders, mercury droplets}
- 2009/102 . . {cylinders}
- 2009/105 . . {mercury droplets}
- 2009/107 . . {spheres}
- 9/12 . by using a single pendulum (plumb lines [G01C 15/10](#))
- 9/14 . . movable in more than one direction
- 9/16 . by using more than one pendulum
- 9/18 . by using liquids
- 2009/182 . . {conductive}
- 2009/185 . . {dielectric}
- 2009/187 . . {magnetic, e.g. ferromagnetic}
- 9/20 . . the indication being based on the inclination of the surface of a liquid relative to its container
- 9/22 . . . with interconnected containers in fixed relation to each other
- 9/24 . . in closed containers partially filled with liquid so as to leave a gas bubble
- 9/26 . . . Details
- 9/28 Mountings
- 9/30 Means for adjusting dimensions of bubble
- 9/32 Means for facilitating the observation of the position of the bubble, e.g. illuminating means
- 9/34 . . . of the tubular type, i.e. for indicating the level in one direction only
- 9/36 . . . of the spherical type, i.e. for indicating the level in all directions
- 11/00 Photogrammetry or videogrammetry, e.g. stereogrammetry; Photographic surveying**
- 11/02 . Picture taking arrangements specially adapted for photogrammetry or photographic surveying, e.g. controlling overlapping of pictures
- 11/025 . . {by scanning the object}
- 11/04 . Interpretation of pictures
- 11/06 . . by comparison of two or more pictures of the same area
- 11/08 . . . the pictures not being supported in the same relative position as when they were taken
- 11/10 using computers to control the position of the pictures
- 11/12 . . . the pictures being supported in the same relative position as when they were taken
- 11/14 with optical projection ([G01C 11/26 takes precedence](#))
- 11/16 in a common plane
- 11/18 involving scanning means
- 11/20 in separate planes
- 11/22 with mechanical projection ([G01C 11/26 takes precedence](#))
- 11/24 with optical-mechanical projection ([G01C 11/26 takes precedence](#))
- 11/26 using computers to control the position of the pictures
- 11/28 . . . Special adaptation for recording picture point data, e.g. for profiles
- 11/30 . . by triangulation
- 11/32 . . . Radial triangulation
- 11/34 . . . Aerial triangulation
- 11/36 . Videogrammetry, i.e. electronic processing of video signals {from a single source or } from different sources to give parallax or range information
- 13/00 Surveying specially adapted to open water, e.g. sea, lake, river or canal (liquid level metering [G01F](#))**
- 13/002 . {Measuring the movement of open water}
- 13/004 . . {vertical movement}
- 13/006 . . {horizontal movement}
- 13/008 . {measuring depth of open water}
- 15/00 Surveying instruments or accessories not provided for in groups [G01C 1/00](#) - [G01C 13/00](#)**
- 15/002 . {Active optical surveying means ([optical plumbing \[G01C 15/105\]\(#\)](#))}
- 15/004 . . {Reference lines, planes or sectors}
- 15/006 . . . {Detectors therefor}
- 15/008 . . {combined with inclination sensor}
- 15/02 . Means for marking measuring points
- 15/04 . . Permanent marks; Boundary markers
- 15/06 . . Surveyors' staffs; Movable markers
- 15/08 . . . Plumbing or registering staffs or markers over ground marks
- 15/10 . Plumb lines
- 15/105 . . {Optical plumbing}
- 15/12 . Instruments for setting out fixed angles, e.g. right angles
- 15/14 . Artificial horizons
- 17/00 Compasses; Devices for ascertaining true or magnetic north for navigation or surveying purposes (using gyroscopic effect [G01C 19/00](#))**
- 17/02 . Magnetic compasses
- 17/04 . . with north-seeking magnetic elements, e.g. needles
- 17/06 . . . Suspending magnetic elements
- 17/08 by flotation
- 17/10 . . . Comparing observed direction with north indication
- 17/12 by sighting means, e.g. for surveyors' compasses
- 17/14 by reference marks, e.g. for ships' compasses
- 17/16 by clinometers, e.g. for determining dip or strike of geological strata
- 17/18 . . . Supporting or suspending compasses, e.g. by gimbal, by flotation
- 17/20 . . . Observing the compass card or needle
- 17/22 by projection
- 17/24 Illumination
- 17/26 using electric pick-offs for transmission to final indicator, e.g. photocell
- 17/28 . . Electromagnetic compasses (with north seeking magnetic elements and having electric pick-offs [G01C 17/26](#))
- 17/30 . . . Earth-inductor compasses

- 17/32 . . . Electron compasses
- 17/34 . Sun- or astro-compasses
- 17/36 . Repeaters for remote indication of readings of a master compass
- 17/38 . Testing, calibrating, or compensating of compasses
- 19/00 Gyroscopes; Turn-sensitive devices using vibrating masses; Turn-sensitive devices without moving masses; Measuring angular rate using gyroscopic effects**
- 19/005 . {Measuring angular rate using gyroscopic effects}
- 19/02 . Rotary gyroscopes
- 19/025 . . {Gyroscopes functioning for short periods}
- 19/04 . . Details
- 19/06 . . . Rotors
- 19/065 {Means for measuring or controlling of rotors' angular velocity}
- 19/08 electrically driven ([G01C 19/14 takes precedence](#))
- 19/10 Power supply
- 19/12 fluid driven ([G01C 19/14 takes precedence](#))
- 19/14 Fluid rotors
- 19/16 Suspensions; Bearings
- 19/18 providing movement of rotor with respect to its rotational axes ([G01C 19/20](#), [G01C 19/24 take precedence](#))
- 19/20 in fluid
- 19/22 torsional
- 19/24 using magnetic or electrostatic fields
- 19/26 Caging, i.e. immobilising moving parts, e.g. for transport
- 19/28 Pick-offs, i.e. devices for taking-off an indication of the displacement of the rotor axis
- 19/30 Erection devices, i.e. devices for restoring rotor axis to a desired position ([for instrument indicating the vertical G01C 19/46](#))
- 19/32 Indicating or recording means specially adapted for rotary gyroscopes
- 19/34 for indicating a direction in the horizontal plane, e.g. directional gyroscopes
- 19/36 with north-seeking action by magnetic means, e.g. gyromagnetic compasses
- 19/38 with north-seeking action by other than magnetic means, e.g. gyrocompasses using earth's rotation
- 19/40 for control by signals from a master compass, i.e. repeater compasses
- 19/42 for indicating rate of turn; for integrating rate of turn
- 19/44 for indicating the vertical
- 19/46 Erection devices for restoring rotor axis to a desired position
- 19/48 operating by electrical means ([G01C 19/54 takes precedence](#))
- 19/50 operating by mechanical means ([G01C 19/54 takes precedence](#))
- 19/52 operating by fluid means ([G01C 19/54 takes precedence](#))
- 19/54 with correction for acceleration forces due to movement of instrument
- 19/56 Turn-sensitive devices using vibrating masses, e.g. vibratory angular rate sensors based on Coriolis forces
- 19/5607 using vibrating tuning forks ([double-ended tuning forks using planar vibrating masses suspended at opposite ends G01C 19/5719](#))
- 19/5614 Signal processing
- 19/5621 the devices involving a micromechanical structure
- 19/5628 Manufacturing; Trimming; Mounting; Housings
- 19/5635 using vibrating wires or strings
- 19/5642 using vibrating bars or beams
- 19/5649 Signal processing
- 19/5656 the devices involving a micromechanical structure
- 19/5663 Manufacturing; Trimming; Mounting; Housings
- 19/567 using the phase shift of a vibration node or antinode
- 19/5677 of essentially two-dimensional [2D] vibrators, e.g. ring-shaped vibrators
- 19/5684 the devices involving a micromechanical structure
- 19/5691 of essentially three-dimensional [3D] vibrators, e.g. wine glass-type vibrators
- 19/5698 using acoustic waves, e.g. surface acoustic wave gyros
- 19/5705 using masses driven in reciprocating rotary motion about an axis
- 19/5712 the devices involving a micromechanical structure
- 19/5719 using planar vibrating masses driven in a translation vibration along an axis
- 19/5726 Signal processing
- 19/5733 Structural details or topology
- 19/574 the devices having two sensing masses in anti-phase motion
- 19/5747 each sensing mass being connected to a driving mass, e.g. driving frames
- 19/5755 the devices having a single sensing mass
- 19/5762 the sensing mass being connected to a driving mass, e.g. driving frames
- 19/5769 Manufacturing; Mounting; Housings
- 19/5776 Signal processing not specific to any of the devices covered by groups [G01C 19/5607 - G01C 19/5719](#)
- 19/5783 Mountings or housings not specific to any of the devices covered by groups [G01C 19/5607 - G01C 19/5719](#)
- 19/58 Turn-sensitive devices without moving masses
- 19/60 Electronic or nuclear magnetic resonance gyrometers
- 19/62 with optical pumping
- 19/64 Gyrometers using the Sagnac effect, i.e. rotation-induced shifts between counter-rotating electromagnetic beams
- 19/66 Ring laser gyrometers
- 19/661 {details}
- 19/662 {signal readout; dither compensators}
- 19/664 {means for removing the dither signal}
- 19/665 {control of the cavity}
- 19/667 {using a multioscillator ring laser}
- 19/668 {Assemblies for measuring along different axes, e.g. triads}
- 19/68 Lock-in prevention

- 19/70 by mechanical means
- 19/72 . . . with counter-rotating light beams in a passive ring, e.g. fibre laser gyrometers
- 19/721 {Details, e.g. optical or electrical details}
- 19/722 {of the mechanical construction}
- 19/723 {Heterodyning fibre optic gyrometers}
- 19/725 {using nxn optical couplers, e.g. 3x3 couplers}
- 19/726 {Phase nulling gyrometers, i.e. compensating the Sagnac phase shift in a closed loop system}
- 19/727 {using a passive ring resonator}
- 19/728 {Assemblies for measuring along different axes, e.g. triads}
- 21/00** **Navigation; Navigational instruments not provided for in groups [G01C 1/00](#) - [G01C 19/00](#)** (measuring distance traversed on the ground by a vehicle [G01C 22/00](#); control of position, course, altitude or attitude of vehicles [G05D 1/00](#); traffic control systems for road vehicles involving transmission of navigation instructions to the vehicle [G08G 1/0968](#))
- 21/005 . . {with correlation of navigation data from several sources, e.g. map or contour matching ([G01C 21/30](#) takes precedence)}
- 21/02 . . by astronomical means ([G01C 21/24](#), [G01C 21/26](#) take precedence)
- 21/025 . . {with the use of startrackers}
- 21/04 . . by terrestrial means ([G01C 21/24](#), [G01C 21/26](#) take precedence)
- 21/06 . . involving measuring of drift angle; involving correction for drift
- 21/08 . . involving use of the magnetic field of the earth
- 21/10 . . by using measurements of speed or acceleration ([G01C 21/24](#), [G01C 21/26](#) take precedence)
- 21/12 . . executed aboard the object being navigated; Dead reckoning
- 21/14 . . . by recording the course traversed by the object ([G01C 21/16](#) takes precedence)
- 21/16 . . . by integrating acceleration or speed, i.e. inertial navigation
- 21/165 {combined with non-inertial navigation instruments}
- 21/1652 {with ranging devices, e.g. LIDAR or RADAR}
- 21/1654 {with electromagnetic compass}
- 21/1656 {with passive imaging devices, e.g. cameras}
- 21/166 {Mechanical, construction or arrangement details of inertial navigation systems}
- 21/18 Stabilised platforms, e.g. by gyroscope
- 21/183 {Compensation of inertial measurements, e.g. for temperature effects}
- 21/185 {for gravity}
- 21/188 {for accumulated errors, e.g. by coupling inertial systems with absolute positioning systems}
- 21/20 . . Instruments for performing navigational calculations ([G01C 21/24](#), [G01C 21/26](#) take precedence)
- 21/203 . . {specially adapted for water-borne vessels}
- 21/206 . . {specially adapted for indoor navigation}
- 21/22 . . Plotting boards
- 21/24 . . specially adapted for cosmonautical navigation
- 21/26 . . specially adapted for navigation in a road network
- 21/265 . . {constructional aspects of navigation devices, e.g. housings, mountings, displays ([G01C 21/3688](#) takes precedence)}
- 21/28 . . with correlation of data from several navigational instruments
- 21/30 . . . Map- or contour-matching
- 21/32 Structuring or formatting of map data
- 21/34 . . Route searching; Route guidance
- 21/3407 . . . {specially adapted for specific applications}
- 21/3415 {Dynamic re-routing, e.g. recalculating the route when the user deviates from calculated route or after detecting real-time traffic data or accidents}
- 21/3423 {Multimodal routing}
- 21/343 {Calculating itineraries (travelling salesman problem [G06Q 10/04](#); optimisation of routes [G06Q 10/047](#))}
- 21/3438 {Rendezvous; Ride sharing}
- 21/3446 . . . {Details of route searching algorithms, e.g. Dijkstra, A*, arc-flags or using precalculated routes}
- 21/3453 . . . {Special cost functions, i.e. other than distance or default speed limit of road segments}
- 21/3461 {Preferred or disfavoured areas, e.g. dangerous zones, toll or emission zones, intersections, manoeuvre types or segments such as motorways, toll roads or ferries}
- 21/3469 {Fuel consumption; Energy use; Emission aspects}
- 21/3476 {using point of interest [POI] information, e.g. a route passing visible POIs}
- 21/3484 {Personalized, e.g. from learned user behaviour or user-defined profiles}
- 21/3492 {employing speed data or traffic data, e.g. real-time or historical (traffic control systems for road vehicles involving transmission of navigation instructions to the vehicle [G08G 1/0968](#))}
- 21/36 . . . Input/output arrangements for on-board computers
- 21/3602 {Input other than that of destination using image analysis, e.g. detection of road signs, lanes, buildings, real preceding vehicles using a camera}
- 21/3605 {Destination input or retrieval}
- 21/3608 {using speech input, e.g. using speech recognition}
- 21/3611 {using character input or menus, e.g. menus of POIs (character input methods in general [G06F 3/0233](#))}
- 21/3614 {through interaction with a road map, e.g. selecting a POI icon on a road map}
- 21/3617 {using user history, behaviour, conditions or preferences, e.g. predicted or inferred from previous use or current movement}
- 21/362 {received from an external device or application, e.g. PDA, mobile phone or calendar application}
- 21/3623 {using a camera or code reader, e.g. for optical or magnetic codes}

- 21/3626 {Details of the output of route guidance instructions (traffic control systems for road vehicles involving transmission of navigation instructions to the vehicle [G08G 1/0968](#))}
- 21/3629 {Guidance using speech or audio output, e.g. text-to-speech (text to speech systems [per se G10L 13/00](#))}
- 21/3632 {Guidance using simplified or iconic instructions, e.g. using arrows ([G01C 21/365 takes precedence](#))}
- 21/3635 {Guidance using 3D or perspective road maps}
- 21/3638 {including 3D objects and buildings (three dimensional [3D] modelling, e.g. data description of 3D objects [G06T 17/00](#); geographic models [G06T 17/05](#))}
- 21/3641 {Personalized guidance, e.g. limited guidance on previously travelled routes}
- 21/3644 {Landmark guidance, e.g. using POIs or conspicuous other objects}
- 21/3647 {Guidance involving output of stored or live camera images or video streams}
- 21/365 {Guidance using head up displays or projectors, e.g. virtual vehicles or arrows projected on the windscreen or on the road itself}
- 21/3652 {Guidance using non-audiovisual output, e.g. tactile, haptic or electric stimuli}
- 21/3655 {Timing of guidance instructions}
- 21/3658 {Lane guidance}
- 21/3661 {Guidance output on an external device, e.g. car radio}
- 21/3664 {Details of the user input interface, e.g. buttons, knobs or sliders, including those provided on a touch screen; remote controllers; input using gestures}
- 21/3667 {Display of a road map ([G01C 21/3614 takes precedence](#); guidance using 3D or perspective road maps [G01C 21/3635](#))}
- 21/367 {Details, e.g. road map scale, orientation, zooming, illumination, level of detail, scrolling of road map or positioning of current position marker}
- 21/3673 {Labelling using text of road map data items, e.g. road names, POI names}
- 21/3676 {Overview of the route on the road map}
- 21/3679 {Retrieval, searching and output of POI information, e.g. hotels, restaurants, shops, filling stations, parking facilities ([G01C 21/3611 takes precedence](#))}
- 21/3682 {output of POI information on a road map ([G01C 21/3614](#), [G01C 21/3685 take precedence](#))}
- 21/3685 {the POI's being parking facilities}
- 21/3688 {Systems comprising multiple parts or multiple output devices (not client-server), e.g. detachable faceplates, key fobs or multiple output screens}
- 21/3691 {Retrieval, searching and output of information related to real-time traffic, weather, or environmental conditions (arrangements for giving variable traffic instructions [G08G 1/09](#))}
- 21/3694 {Output thereof on a road map}
- 21/3697 {Output of additional, non-guidance related information, e.g. low fuel level ([G01C 21/3679 takes precedence](#))}
- 21/38 . . {Electronic maps specially adapted for navigation; Updating thereof}
- 21/3804 . . {Creation or updating of map data}
- 21/3807 . . . {characterised by the type of data}
- 21/3811 {Point data, e.g. Point of Interest [POI]}
- 21/3815 {Road data}
- 21/3819 {Road shape data, e.g. outline of a route}
- 21/3822 {Road feature data, e.g. slope data}
- 21/3826 {Terrain data}
- 21/383 {Indoor data}
- 21/3833 . . . {characterised by the source of data}
- 21/3837 {Data obtained from a single source}
- 21/3841 {Data obtained from two or more sources, e.g. probe vehicles}
- 21/3844 {Data obtained from position sensors only, e.g. from inertial navigation}
- 21/3848 {Data obtained from both position sensors and additional sensors}
- 21/3852 {Data derived from aerial or satellite images}
- 21/3856 {Data obtained from user input}
- 21/3859 . . . {Differential updating map data}
- 21/3863 . . {Structures of map data}
- 21/3867 . . . {Geometry of map features, e.g. shape points, polygons or for simplified maps}
- 21/387 . . . {Organisation of map data, e.g. version management or database structures}
- 21/3874 {Structures specially adapted for data searching and retrieval}
- 21/3878 {Hierarchical structures, e.g. layering}
- 21/3881 {Tile-based structures}
- 21/3885 . . {Transmission of map data to client devices; Reception of map data by client devices}
- 21/3889 . . . {Transmission of selected map data, e.g. depending on route}
- 21/3893 . . . {Transmission of map data from distributed sources, e.g. from roadside stations}
- 21/3896 . . . {Transmission of map data from central databases}
- 22/00** **Measuring distance traversed on the ground by vehicles, persons, animals or other moving solid bodies, e.g. using odometers, using pedometers**
- 22/002 . . {for cycles}
- 22/004 . . {for golf carts }
- 22/006 . . {Pedometers}
- 22/008 . . {for skates}
- 22/02 . . by conversion into electric waveforms and subsequent integration, e.g. using tachometer generator ([G01C 22/002](#), [G01C 22/004](#), [G01C 22/006 take precedence](#))}
- 22/025 . . {Differential odometers}
- 23/00** **Combined instruments indicating more than one navigational value, e.g. for aircraft; Combined measuring devices for measuring two or more variables of movement, e.g. distance, speed or acceleration**
- 23/005 . . {Flight directors (indicating arrangements specially adapted for rotary gyroscopes [G01C 19/32](#))}

G01C

- 25/00 **Manufacturing, calibrating, cleaning, or repairing instruments or devices referred to in the other groups of this subclass** ([testing, calibrating or compensating compasses G01C 17/38](#))
- 25/005 . {initial alignment, calibration or starting-up of inertial devices}