

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](#).

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
[G01C 11/36](#) covered by [G01C 11/00-G01C 11/34](#)
2. 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	3/18	. . with one observation point at each end of the base (G01C 3/20 takes precedence)
1/02	. Theodolites	3/20	. . with adaptation to the measurement of the height of an object
1/04	. . combined with cameras	3/22	. using a parallactic triangle with variable angles and a base of fixed length at, near, or formed by the object
1/06	. . Arrangements for reading scales	3/24	. using a parallactic triangle with fixed angles and a base of variable length in the observation station, e.g. in the instrument
1/08	. Sextants	3/26	. using a parallactic triangle with fixed angles and a base of variable length, at, near, or formed by the object
1/10	. . including an artificial horizon (G01C 1/14 takes precedence)	3/28	. . with provision for reduction of the distance into the horizontal plane
1/12	. . . with a stabilised mirror	3/30	. . . with adaptation to the measurement of the height of an object, e.g. tachometers
1/14	. . Periscopic sextants	3/32	. by focusing the object, e.g. on a ground glass screen
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)	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)
3/02	. Details	5/005	. {altimeters for aircraft (G01C 5/02 , G01C 5/06 take precedence)}
3/04	. . Adaptation of rangefinders for combination with telescopes or binoculars	5/02	. involving automatic stabilisation of the line of sight
3/06	. . Use of electric means to obtain final indication	5/04	. Hydrostatic levelling, i.e. by flexibly interconnected liquid containers at separated points
3/08	. . . Use of electric radiation detectors	5/06	. by using barometric means
3/085	. . . . {with electronic parallax measurement}		
3/10	. using a parallactic triangle with variable angles and a base of fixed length in the observation station, e.g. in the instrument	7/00	Tracing profiles (by photogrammetry or videogrammetry G01C 11/00)
3/12	. . with monocular observation at a single point, e.g. coincidence type (G01C 3/20 takes precedence)		
3/14	. . with binocular observation at a single point, e.g. stereoscopic type (G01C 3/20 takes precedence)		
3/16	. . . Measuring marks		

7/02	. of land surfaces	11/14	. . . . with optical projection (G01C 11/26 takes precedence)
7/04	. . involving a vehicle which moves along the profile to be traced	11/16	. . . . . in a common plane
7/06	. of cavities, e.g. tunnels	11/18	. . . . . involving scanning means
9/00	Measuring inclination, e.g. by clinometers, by levels	11/20	. . . . . in separate planes
9/005	. { specially adapted for use in aircraft }	11/22	. . . . with mechanical projection (G01C 11/26 takes precedence)
9/02	. Details	11/24	. . . . with optical-mechanical projection (G01C 11/26 takes precedence)
9/04	. . Transmission means between sensing element and final indicator for giving an enlarged reading	11/26	. . . . using computers to control the position of the pictures
9/06	. . Electric or photoelectric indication or reading means	11/28	. . . Special adaptation for recording picture point data, e.g. for profiles
2009/062	. . . { capacitive }	11/30	. . by triangulation
2009/064	. . . { inductive }	11/32	. . . Radial triangulation
2009/066	. . . { optical }	11/34	. . . Aerial triangulation
2009/068	. . . { resistive }	2011/36	. { Videogrammetry, i.e. electronic processing of video signals from a single source or from different sources to give parallax or range information }
9/08	. . Means for compensating acceleration forces due to movement of instrument	13/00	Surveying specially adapted to open water, e.g. sea, lake, river or canal (liquid level metering G01F)
9/10	. by using rolling bodies {, e.g. spheres, cylinders, mercury droplets }	13/002	. { Measuring the movement of open water }
2009/102	. . { cylinders }	13/004	. . { vertical movement }
2009/105	. . { mercury droplets }	13/006	. . { horizontal movement }
2009/107	. . { spheres }	13/008	. { measuring depth of open water }
9/12	. by using a single pendulum { plumb lines G01C 15/10 }	15/00	Surveying instruments or accessories not provided for in groups G01C 1/00 - G01C 13/00
9/14	. . movable in more than one direction	15/002	. { Active optical surveying means (optical plumbing G01C 15/105) }
9/16	. by using more than one pendulum	15/004	. . { Reference lines, planes or sectors }
9/18	. by using liquids	15/006	. . . { Detectors therefor }
2009/182	. . { conductive }	15/008	. . { combined with inclination sensor }
2009/185	. . { dielectric }	15/02	. Means for marking measuring points
2009/187	. . { magnetic, e.g. ferromagnetic }	15/04	. . Permanent marks; Boundary markers
9/20	. . the indication being based on the inclination of the surface of a liquid relative to its container	15/06	. . Surveyors' staffs; Movable markers
9/22	. . . with interconnected containers in fixed relation to each other	15/08	. . . Plumbing or registering staffs or markers over ground marks
9/24	. . in closed containers partially filled with liquid so as to leave a gas bubble	15/10	. Plumb lines
9/26	. . . Details	15/105	. . { Optical plumbing }
9/28	. . . . Mountings	15/12	. Instruments for setting out fixed angles, e.g. right angles
9/30	. . . . Means for adjusting dimensions of bubble	15/14	. Artificial horizons
9/32	. . . . Means for facilitating the observation of the position of the bubble, e.g. illuminating means	17/00	Compasses; Devices for ascertaining true or magnetic north for navigation or surveying purposes (using gyroscopic effect G01C 19/00)
9/34	. . . of the tubular type, i.e. for indicating the level in one direction only	17/02	. Magnetic compasses
9/36	. . . of the spherical type, i.e. for indicating the level in all directions	17/04	. . with north-seeking magnetic elements, e.g. needles
11/00	Photogrammetry or videogrammetry, e.g. stereogrammetry; Photographic surveying	17/06	. . . Suspending magnetic elements
11/02	. Picture taking arrangements specially adapted for photogrammetry or photographic surveying, e.g. controlling overlapping of pictures	17/08	. . . . by flotation
11/025	. . { by scanning the object }	17/10	. . . Comparing observed direction with north indication
11/04	. Interpretation of pictures	17/12	. . . . by sighting means, e.g. for surveyors' compasses
11/06	. . by comparison of two or more pictures of the same area	17/14	. . . . by reference marks, e.g. for ships' compasses
11/08	. . . the pictures not being supported in the same relative position as when they were taken	17/16	. . . . by clinometers, e.g. for determining dip or strike of geological strata
11/10	. . . . using computers to control the position of the pictures	17/18	. . . Supporting or suspending compasses, e.g. by gimbal, by flotation
11/12	. . . the pictures being supported in the same relative position as when they were taken	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**
- 19/02 . Rotary gyroscopes
- 19/025 . . {[Special arrangements for gyros functioning during a short period](#)}
- 19/04 . . Details
- 19/06 . . . Rotors
- 19/065 {[Measurement or control of angular velocity, specifically adapted to gyrorotors](#)}
- 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 vibrators, e.g. ring-shaped vibrators
- 19/5684 the devices involving a micromechanical structure
- 19/5691 . . . of essentially three-dimensional 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 }
- 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 preceding 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 }
- NOTE**
This group does not adequately cover all aspects of this subject; see also [G01S 19/49](#); [G01S 19/47](#).
- 21/18 Stabilised platforms, e.g. by gyroscope
- 21/20 . . Instruments for performing navigational calculations ([G01C 21/24](#), [G01C 21/26](#) take precedence)
- 21/203 . . { Specially adapted for sailing ships }
- 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, i.e. combining two or more modes of transportation, where the modes can be any of, e.g. driving, walking, cycling, public transport }
- 21/343 { Calculating itineraries, i.e. routes leading from a starting point to a series of categorical destinations using a global route restraint, round trips, touristic trips ([travelling salesman problem G06Q 10/04](#); [optimisation of routes G06Q 10/047](#)) }
- 21/3438 { Rendez-vous, i.e. searching a destination where several users can meet, and the routes to this destination for these users; Ride sharing, i.e. searching a route such that at least two users can share a vehicle for at least part of the route }
- 21/3446 . . . { Details of route searching algorithms, e.g. Dijkstra, A*, arc-flags, 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, segments such as motorways, toll roads, 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. 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, fuel efficient driving, gear change, speeding, dangerous curve ahead, slippery road, school zone, speed traps, driving behaviour feedback, advertising, virtual billboards or road signs ([G01C 21/3679](#) takes precedence)}
- 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, acceleration**
 - 23/005 . {Flight directors (indicating arrangements specially adapted for rotary gyroscopes [G01C 19/32](#))}
- 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}