Beacons or beacon systems transmitting signals having a characteristic or characteristics capable of being detected by non-directional receivers and defining directions, positions, or position lines fixed relatively to the beacon transmitters; Receivers co-operating therewith (position fixing by co-coordinating a plurality of determinations of direction or position lines G01S 5/00)

1/02 . . using radio waves (G01S 19/00 takes precedence)
1/022 . . [Means for monitoring or calibrating]
1/024 . . [of beacon transmitters]
1/026 . . [of associated receivers]
1/028 . . [Simulation means, e.g. of beacon signals therefor (for teaching or training purposes G09B 9/00)]
1/04 . . Details
1/042 . . [Transmitters]

**WARNING**

Group G01S 1/042 is impacted by reclassification into groups G01S 1/0423, G01S 1/0426, G01S 1/0428, G01S 2201/00, G01S 2201/01, G01S 2201/02, G01S 2201/025, G01S 2201/03, G01S 2201/04, G01S 2201/05, G01S 2201/06, G01S 2201/07, and G01S 2201/08.

All groups listed in this Warning should be considered in order to perform a complete search.

1/0428 . . . [Signal details]

**WARNING**

Group G01S 1/0428 is incomplete pending reclassification of documents from group G01S 1/042.

Groups G01S 1/042 and G01S 1/0426 should be considered in order to perform a complete search.

1/045 . . . [Received]
Systems for determining direction or position line, i.e. path-difference systems using amplitude comparison of signals transmitted sequentially from antennas or antenna systems having differently-oriented overlapping directivity characteristics, e.g. equi-signal A-N type

the signals being transmitted sequentially from an antenna or antenna system having the orientation of its directivity characteristic periodically varied, e.g. by means of sequentially effective reflectors

using amplitude comparison of signals transmitted simultaneously from antennas or antenna systems having differently oriented transmitted sequentially from antennas or antenna systems having differently-oriented transmitted sequentially from antennas or antenna systems having differently-oriented transmitted sequentially from antennas or antenna systems having differently-oriented transmitted sequentially from antennas or antenna systems having differently-oriented

the synchronised signals being frequency modulations on carrier waves and the transit times being compared by measuring difference of instantaneous frequencies of received carrier waves

the synchronised signals being pulses or equivalent modulations on carrier waves and the transit times being compared by measuring the difference in arrival time of a significant part of the modulations [e.g. LORAN systems]

the synchronised signals being continuous waves or intermittent trains of continuous waves, the intermittency not being for the purpose of determining direction or position line and the transit times being compared by measuring the phase difference

(Systems in which the direction is determined by using an interferometric type transmitting antenna array)
wherein the phase angles of a plurality of direction-dependent envelope signals produced by a plurality of beams rotating at different speeds or in different directions are compared

Narrow-beam systems producing at a receiver a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the receiver from the beacon and a reference direction from the beacon; Overlapping broad beam systems defining a narrow zone and producing at a receiver a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the receiver from the beacon and a reference direction from the beacon

Timing the pulse-type envelope signals derived by reception of the beam

wherein a characteristic of the beam transmitted or of an auxiliary signal is varied in time synchronously with rotation or oscillation of the beam

Varying frequency of beam signal or of auxiliary signal

Varying phase-relationship between beam and auxiliary signal

Varying pulse timing, e.g. varying interval between pulses radiated in pairs

Superimposing direction-indicating intelligence signals, e.g. speech, Morse

Marker, boundary, call-sign, or like beacons transmitting signals not carrying directional information

[using pulse modulation, e.g. pulse frequency modulation]

using electromagnetic waves other than radio waves

WARNING

Group G01S 1/70 is impacted by reclassification into groups G01S 1/703, G01S 1/7032, G01S 1/7034, G01S 1/7036, G01S 1/7038, G01S 2201/00, G01S 2201/01, G01S 2201/02, G01S 2201/05, G01S 2201/06, G01S 2201/07, and G01S 2201/08.

All groups listed in this Warning should be considered in order to perform a complete search.

1/703 . . . [Details]

WARNING

Group G01S 1/703 is incomplete pending reclassification of documents from group G01S 1/70.

Groups G01S 1/70 and G01S 1/703 should be considered in order to perform a complete search.
Systems for determining direction or position lines spaced apart, i.e. path-difference systems directional transducers or transducer systems synchronised signals transmitted from non-
using a comparison of transit time of characteristics systems having differently-oriented transmitted from transducers or transducer scan axis }
displacement of the receiver from the conical-
signals which indicate at a mobile receiver any { Conical-scan beam beacons transmitting relative motion between beacon and receiver }
using the Doppler shift introduced by the signals being transmitted sequentially { the signals being transmitted }
from predetermined direction {(aerial arrangements for changing or varying the orientation or the shape of the directional pattern H01Q 3/00; combinations of different interacting aerial units for giving a desired directional characteristic H01Q 21/20; aerials or aerial systems providing at least two radiation patterns H01Q 25/00) }

1/75 . . . Transmitters

1/751 . . . Mounting or deployment thereof

1/752 . . . Collocated with electrical equipment other than beacons

1/753 . . . Signal details

1/76 . . . Systems for determining direction or position line

1/763 . . . using the Doppler shift introduced by the relative motion between beacon and receiver

1/766 . . . Conical-scan beam beacons transmitting signals which indicate at a mobile receiver any displacement of the receiver from the conical-scan axis

1/78 . . . using amplitude comparison of signals transmitted from transducers or transducer systems having differently-oriented characteristics

1/783 . . . the signals being transmitted sequentially

1/786 . . . the signals being transmitted simultaneously

1/80 . . . using a comparison of transit time of synchronised signals transmitted from non-directional transducers or transducer systems spaced apart, i.e. path-difference systems

1/802 . . . the synchronised signals being frequency modulations on carrier waves and the transit times being compared by measuring difference of instantaneous frequencies of received carrier waves

1/805 . . . the synchronised signals being pulses or equivalent modulations on carrier waves and the transit times being compared by measuring the difference in arrival time of a significant part of the modulations

1/807 . . . the synchronised signals being continuous waves or intermittent trains of continuous waves, the intermittency not being for the purpose of determining direction or position line and the transit times being compared by measuring the phase difference

1/82 . . . Rotating or oscillating beam beacons defining directions in the plane of rotation or oscillation

3/00 Direction-finders for determining the direction from which infrasonic, sonic, ultrasonic, or electromagnetic waves, or particle emission, not having a directional significance, are being received (position fixing by co-ordinating a plurality of determinations of direction or position lines G01S 5/00; for geophysical measurement G01C; telescope mountings G02B)

3/02 . . . using radio waves

3/023 . . . Monitoring or calibrating

3/026 . . . Simulating means therefor

3/04 . . . Details

3/043 . . . Receivers

3/046 . . . Displays or indicators

3/06 . . . Means for increasing effective directivity, e.g. by combining signals having differently oriented directivity characteristics or by sharpening the envelope waveform of the signal derived from a rotating or oscillating beam antenna (comparing amplitude of signals having differently oriented directivity characteristics to determine direction G01S 3/16, G01S 3/28)

3/065 . . . by using non-directional aerial

3/08 . . . Means for reducing polarisation errors, e.g. by use of Adcock or spaced loop antenna systems

3/085 . . . by using spaced loop aerial systems

3/10 . . . Means for reducing or compensating for quadrantal, site, or like errors

3/12 . . . Means for determining sense of direction, e.g. by combining signals from directional antenna or goniometer search coil with those from non-directional antenna (determining direction by amplitude comparison of signals derived by combining directional and non-directional signals G01S 3/24, G01S 3/34)

3/14 . . . Systems for determining direction or deviation from predetermined direction (aerial arrangements for changing or varying the orientation or the shape of the directional pattern H01Q 3/00; combinations of different interacting aerial units for giving a desired directional characteristic H01Q 21/20; aerials or aerial systems providing at least two radiation patterns H01Q 25/00)

3/143 . . . by vectorial combination of signals derived from differently oriented antennae

3/146 . . . by comparing linear polarisation components (polarisation details of antenna systems per se H01Q 21/245)
therefrom, i.e. path-difference systems using antennas spaced apart and measuring phase or time difference between signals using amplitude comparison of signals derived simultaneously from receiving antennas or antenna systems having differently-oriented directivity characteristics or from an antenna system having periodically-varied orientation of directivity characteristic derived from different combinations of signals from separate antennas, e.g. comparing sum with difference the separate antennas comprising one directional antenna and one non-directional antenna, e.g. combination of loop and open antennas producing a reversed cardioid directivity characteristic the separate antennas having differently-oriented directivity characteristics using amplitude comparison of signals derived simultaneously from receiving antennas or antenna systems having differently-oriented directivity characteristics derived directly from separate directional systems derived from different combinations of signals from separate antennas, e.g. comparing sum with difference (Automatic tracking systems) the separate antennas comprising one directional antenna and one non-directional antenna, e.g. combination of loop and open antennas producing a reversed cardioid directivity characteristic the separate antennas having differently-oriented directivity characteristics using adjustment of real or effective orientation of directivity characteristic of an antenna or an antenna system to give a desired condition of signal derived from that antenna or antenna system, e.g. to give a maximum or minimum signal. adjusting orientation of a single directivity characteristic to produce maximum or minimum signal, e.g. rotatable loop antenna or equivalent goniometer system the desired condition being maintained automatically the adjustment being varied periodically or continuously until it is halted automatically when the desired condition is attained using antennas spaced apart and measuring phase or time difference between signals therefrom, i.e. path-difference systems (the waves arriving at the aerials being frequency modulated and the frequency difference of signals therefrom being measured) the waves arriving at the antennas being continuous or intermittent and the phase difference of signals derived therefrom being measured the waves arriving at the antennas being pulse modulated and the time difference of their arrival being measured using a receiving antenna moving, or appearing to move, in a cyclic path to produce a Doppler variation of frequency of the received signal the apparent movement of the antenna being produced by coupling the receiver cyclically and sequentially to each of several fixed spaced antennas Conical-scan beam systems using signals indicative of the deviation of the direction of reception from the scan axis Rotating or oscillating beam systems using continuous analysis of received signal for determining direction in the plane of rotation or oscillation or for determining deviation from a predetermined direction in such a plane (G01S 3/14 takes precedence) Broad-beam systems producing in the receiver a substantially sinusoidal envelope signal of the carrier wave of the beam, the phase angle of which is dependent upon the angle between the direction of the transmitter from the receiver and a reference direction from the receiver, e.g. cardioid system wherein the phase angle of the signal is indicated by a cathode-ray tube wherein the phase angle of the signal is determined by phase comparison with a reference alternating signal varying in synchronism with the directivity variation Narrow-beam systems producing in the receiver a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the transmitter from the receiver and a reference direction from the receiver; Overlapping broad-beam systems defining in the receiver a narrow zone and producing a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the transmitter from the receiver and a reference direction from the receiver wherein the timing of the pulse-type envelope signal is indicated by cathode-ray tube (radar cathode-ray tube indicators providing co-ordinated display of distance and direction G01S 7/10) wherein the timing of the pulse-type envelope signal is determined by bringing a locally-generated pulse-type signal into coincidence or other predetermined time-relationship with the envelope signal Diversity systems specially adapted for direction-finding Multi-channel systems specially adapted for direction-finding, i.e. having a single antenna system capable of giving simultaneous indications of the directions of different signals (systems in which the directions of different signals are determined sequentially and displayed simultaneously G01S 3/04, G01S 3/14) using electromagnetic waves other than radio waves
3/7803 . . . (Means for monitoring or calibrating)
3/7806 . . . (using gamma or X-rays)
3/781 . . . Details
3/782 . . . Systems for determining direction or deviation from predetermined direction
3/783 . . . using amplitude comparison of signals derived from static detectors or detector systems
3/7835 . . . (using coding masks)
3/784 . . . using a mosaic of detectors
3/785 . . . using adjustment of orientation of directivity characteristics of a detector or detector system to give a desired condition of signal derived from that detector or detector system
3/786 . . . the desired condition being maintained automatically (i.e. tracking systems; (G01S 3/783 takes precedence))
3/7861 . . . (Solar tracking systems)
3/7862 . . . (mounted on a moving platform, e.g. space vehicle)
3/7864 . . . (T.V. type tracking systems)
3/7865 . . . (using correlation of the live video image with a stored image)
3/7867 . . . (Star trackers (navigation using star trackers G01C 21/025))
3/7868 . . . (using horizon sensors)
3/787 . . . using rotating reticles producing a direction-dependent modulation characteristic
3/788 . . . producing a frequency modulation characteristic
3/789 . . . using rotating or oscillating beam systems, e.g. using mirrors, prisms
3/80 . . . using ultrasonic, sonic or infrasonic waves
3/8003 . . . (Diversity systems specially adapted for direction finding)
3/8006 . . . (Multi-channel systems specially adapted for direction-finding, i.e. having a single aerial system capable of giving simultaneous indications of the directions of different signals)
3/801 . . . Details ((G01S 3/82, G01S 3/84, G01S 3/86 take precedence))
3/802 . . . Systems for determining direction or deviation from predetermined direction (sound-focusing or directing using electrical steering of transducer arrays, e.g. beam steering, in general G10K 11/34)
3/8022 . . . (using the Doppler shift introduced by the relative motion between source and receiver)
3/8025 . . . (Conical-scan beam systems using signals indicative of the deviation of the direction of reception from the scan axis)
3/8027 . . . (By vectorial composition of signals received by plural, differently-oriented transducers)
3/803 . . . using amplitude comparison of signals derived from receiving transducers or transducer systems having differently-oriented directivity characteristics
3/8032 . . . (wherein the signals are derived sequentially)
3/8034 . . . (wherein the signals are derived simultaneously)
3/8036 . . . (derived directly from separate directional systems)
3/8038 . . . (derived from different combinations of signals from separate transducers comparing sum with difference)
3/805 . . . using adjustment of real or effective orientation of directivity characteristics of a transducer or transducer system to give a desired condition of signal derived from that transducer or transducer system, e.g. to give a maximum or minimum signal
3/8055 . . . (adjusting orientation of a single directivity characteristic to produce maximum or minimum signal)
3/807 . . . the desired condition being maintained automatically
3/808 . . . using transducers spaced apart and measuring phase or time difference between signals therefrom, i.e. path-difference systems
3/8083 . . . (determining direction of source)
3/8086 . . . (determining other position line of source)
3/809 . . . Rotating or oscillating beam systems using continuous analysis of received signal for determining direction in the plane of rotation or oscillation or for determining deviation from a predetermined direction in such a plane
3/82 . . . with means for adjusting phase or compensating for time-lag errors
3/84 . . . with indication presented on cathode-ray tubes
3/86 . . . with means for eliminating undesired waves, e.g. disturbing noises

5/00 Position-fixing by co-ordinating two or more direction or position line determinations; Position-fixing by co-ordinating two or more distance determinations (using active systems G01S 13/00, G01S 15/00, G01S 17/000)
5/0009 . . . (Transmission of position information to remote stations (transmission of measured values in general, G08C; services making use of location of users or terminals, H04W 4/02))
5/0018 . . . (Transmission from mobile station to base station)
5/0027 . . . (of actual mobile position, i.e. position determined on mobile)
5/0036 . . . (of measured values, i.e. measurement on mobile and position calculation on base station)
5/0045 . . . (Transmission from base station to mobile station (G01S 5/009 takes precedence))
5/0054 . . . (of actual mobile position, i.e. position calculation on base station)
5/0063 . . . (of measured values, i.e. measurement on base station and position calculation on mobile)
5/0072 . . . (Transmission between mobile stations, e.g. anti-collision systems)
5/0081 . . . (Transmission between base stations)
5/009 . . . (Transmission of differential positioning data to mobile)
5/02 . . . using radio waves (G01S 19/00 takes precedence)
5/0205 . . . (Details)
5/021 . . . (Calibration, monitoring or correction (G01S 5/0252 takes precedence)
5/0215 . . . (interference or multipath issues related to signal reception)
5/0221 . . . (of receivers or network of receivers)
using ultrasonic, sonic, or infrasonic waves

using electromagnetic waves other than radio waves

Position of source determined by a plurality of spaced sources of known location

Emergency, distress or locator beacons

Determination of attitude (using inertial means)

Determination of absolute distances from a plurality of spaced points of known location

Details of systems according to groups

Auxiliary means for detecting or identifying radar signals or the like, e.g. radar jamming signals (multi-channel PRF-analysers, per se)

Road traffic radar detectors

Interference mitigation, e.g. reducing or avoiding non-intentional interference with other HF-transmitters, base station transmitters for mobile communication or other radar systems, e.g. using electro-magnetic interference [EMI] reduction techniques (means for anti-jamming G01S 7/36; auxiliary means for detecting or identifying radar signals or the like G01S 7/00)

Get traffic radar detectors

Interference mitigation, e.g. reducing or avoiding non-intentional interference with other HF-transmitters, base station transmitters for mobile communication or other radar systems, e.g. using electro-magnetic interference [EMI] reduction techniques (means for anti-jamming G01S 7/36; auxiliary means for detecting or identifying radar signals or the like G01S 7/00)

Auxiliary means for detecting or identifying radar signals or the like, e.g. radar jamming signals (multi-channel PRF-analysers, per se)
Details of pulse systems

7/06 . . . . . . . Cathode-ray tube displays [or other two-dimensional or three-dimensional displays (cathode ray oscilloscopes in general G01R 13/20)]

WARNING
Groups G01S 7/062 - G01S 7/24 are not complete pending a reorganization. See provisionally G01S 7/06

7/062 . . . . . . . [in which different colours are used]
7/064 . . . . . . . [using a display memory for image processing (G01S 7/298 takes precedence)]
7/066 . . . . . . . [with means for showing the history of the radar trails, e.g. artificial remanence]
7/068 . . . . . . . [with data-rate converters preceding the display, e.g. flicker free display, constant brightness display (G01S 7/298 takes precedence)]
7/08 . . . . . . . with vernier indication of distance, e.g. using two cathode-ray tubes
7/10 . . . . . . . Providing two-dimensional and co-ordinated display of distance and direction
7/12 . . . . . . . Plan-position indicators, i.e. P.P.I.
7/14 . . . . . . . Sector, off-centre, or expanded angle display
7/16 . . . . . . . Signals displayed as intensity modulation with rectangular co-ordinates representing distance and bearing, e.g. type B
7/18 . . . . . . . Distance-height displays; Distance-elevation displays, e.g. type RHL, type E
7/20 . . . . . . . Stereoscopic displays; Three-dimensional displays; Pseudo-three-dimensional displays
7/22 . . . . . . . Producing cursor lines and indicia by electronic means
7/24 . . . . . . . the display being orientated or displaced in accordance with movement of object carrying the transmitting and receiving apparatus, e.g. true-motion radar
7/28 . . . . . . . Details of pulse systems
7/2806 . . . . . . . [Employing storage or delay devices which preserve the pulse form of the echo signal, e.g. for comparing and combining echoes received during different periods]
7/2813 . . . . . . . [Means providing a modification of the radiation pattern for cancelling noise, clutter or interfering signals, e.g. side lobe suppression, side lobe blanking, null-steering arrays (specially adapted to secondary radar systems G01S 13/762: aerials or aerials systems H01Q 21/29, H01Q 25/00)]
7/282 . . . . . . . Transmitters
7/285 . . . . . . . Receivers
7/288 . . . . . . . Coherent receivers
2007/2883 . . . . . . . [using FFT processing]
2007/2886 . . . . . . . [using I/Q processing]
7/292 . . . . . . . Extracting wanted echo-signals
7/2921 . . . . . . . [based on data belonging to one radar period]
7/2922 . . . . . . . [by using a controlled threshold]
7/2923 . . . . . . . [based on data belonging to a number of consecutive radar periods]
7/2925 . . . . . . . [by using shape of radiation pattern]
7/2926 . . . . . . . [by integration]
7/2927 . . . . . . . [by deriving and controlling a threshold value]
7/2928 . . . . . . . [Random or non-synchronous interference pulse cancellers]
7/295 . . . . . . . Means for transforming co-ordinates or for evaluating data, e.g. using computers
7/2955 . . . . . . . [Means for determining the position of the radar coordinate system for evaluating the position data of the target in another coordinate system (G01S 7/24 takes precedence; sighting devices adapted for indirect laying of fire F41G 3/16; inertial navigation G01C 21/16)]
7/298 . . . . . . . Scan converters
7/32 . . . . . . . Shaping echo pulse signals; Deriving non-pulse signals from echo pulse signals
7/34 . . . . . . . Gain of receiver varied automatically during pulse-recurrence period, e.g. anti-clutter gain control
7/35 . . . . . . . Details of non-pulse systems
7/352 . . . . . . . [Receivers]
7/354 . . . . . . . [Extracting wanted echo-signals (Doppler systems G01S 13/50)]
2007/356 . . . . . . . [involving particularities of FFT processing]
2007/358 . . . . . . . [using I/Q processing]
7/36 . . . . . . . Means for anti-jamming, e.g. electronic counter-counter measures [ECM] (G01S 7/2813 takes precedence; identification of radar jamming signals G01S 7/201; random interference pulse cancellers G01S 7/2928)]
7/38 . . . . . . . Jamming means, e.g. producing false echoes ((identification of radar signals G01S 7/201))
7/40 . . . . . . . Means for monitoring or calibrating
7/4004 . . . . . . . [of parts of a radar system (see provisionally also G01S 7/40)]
7/4008 . . . . . . . [of transmitters]
2007/4013 . . . . . . . [involving adjustment of the transmitted power]
7/4017 . . . . . . . [of HF systems]
7/4021 . . . . . . . [of receivers]
7/4026 . . . . . . . [Antenna boresight]
2007/403 . . . . . . . [in azimuth, i.e. in the horizontal plane]
2007/4034 . . . . . . . [in elevation, i.e. in the vertical plane]
2007/4039 . . . . . . . [of sensor or antenna obstruction, e.g. dirt- or ice-coating]
2007/4043 . . . . . . . [including means to prevent or remove the obstruction]
2007/4047 . . . . . . . [heated dielectric lens, e.g. by heated wire]
7/4052 . . . . . . . [by simulation of echoes (analogue simulators in general G06G 7/78)]
7/4056 . . . . . . . [specially adapted to FMCW]
2007/406 . . . . . . . [using internally generated reference signals, e.g. via delay line, via RF or IF signal injection or via integrated reference reflector or transponder]
2007/4065 . . . . . . . [involving a delay line]
2007/4069 . . . . . . . [involving a RF signal injection]
2007/4073 . . . . . . . [involving an IF signal injection]
2007/4078 . . . . . . . [involving an integrated reference reflector or reference transponder]
2007/4082 . . . . . . . [using externally generated reference signals, e.g. via remote reflector or transponder]
of systems according to group G01S 17/00

7/4802 . . . (using analysis of echo signal for target characterisation; Target signature; Target-cross section)

7/4804 . . . (Auxiliary means for detecting or identifying lidar signals or the like, e.g. laser illuminators)

7/4806 . . . (Road traffic laser detectors)

7/4808 . . . (Evaluating distance, position or velocity data)

7/481 . . . Constructional features, e.g. arrangements of optical elements

7/4811 . . . (common to transmitter and receiver)

7/4812 . . . (transmitted and received beams following a coaxial path)

7/4813 . . . (Housing arrangements)

7/4814 . . . [of transmitters alone]

7/4815 . . . [using multiple transmitters]

7/4816 . . . [of receivers alone]

7/4817 . . . [relating to scanning]

7/4818 . . . [using optical fibres]

7/483 . . . Details of pulse systems

7/484 . . . Transmitters

7/486 . . . Receivers

7/4861 . . . Circuits for detection, sampling, integration or read-out

7/4863 . . . Detector arrays, e.g. charge-transfer gates

7/4865 . . . Time delay measurement, e.g. time-of-flight measurement, time of arrival measurement or determining the exact position of a peak (peak detection in noise, signal conditioning G01S 7/487)

7/4866 . . . [by fitting a model or function to the received signal]

7/4868 . . . [Controlling received signal intensity or exposure of sensor]

7/487 . . . Extracting wanted echo signals [. e.g. pulse detection]

7/4873 . . . [by deriving and controlling a threshold value]

7/4876 . . . [by removing unwanted signals (G01S 7/495 takes precedence)]

7/489 . . . Gain of receiver varied automatically during pulse-recurrence period

7/491 . . . Details of non-pulse systems

7/4911 . . . Transmitters

7/4912 . . . Receivers

7/4913 . . . Circuits for detection, sampling, integration or read-out

7/4914 . . . of detector arrays, e.g. charge-transfer gates

7/4915 . . . Time delay measurement, e.g. operational details for pixel components (signal extraction and conditioning G01S 7/493); Phase measurement

7/4916 . . . [using self-mixing in the laser cavity]

7/4917 . . . [superposing optical signals in a photodetector, e.g. optical heterodyne detection]

7/4918 . . . [Controlling received signal intensity, gain or exposure of sensor]

7/493 . . . Extracting wanted echo signals

7/495 . . . Counter-measures or counter-counter-measures [using electronic or electro-optical means]

7/497 . . . Means for monitoring or calibrating

7/4972 . . . [Alignment of sensor]

2007/4975 . . . [of sensor obstruction by, e.g. dirt- or ice-coating, e.g. by reflection measurement on front-screen]

2007/4977 . . . [including means to prevent or remove the obstruction]

7/499 . . . using polarisation effects

7/51 . . . Display arrangements

7/52 . . . of systems according to group G01S 15/00

7/52001 . . . [Auxiliary means for detecting or identifying sonar signals or the like, e.g. sonar jamming signals (multi-channel PRF-analysers per se G01R 23/155)]

7/52003 . . . [Techniques for enhancing spatial resolution of targets (beam formers in general G10K 11/34; G01S 7/52046 takes precedence)]

7/52004 . . . [Means for monitoring or calibrating (short-range imaging G01S 7/5205)]

7/52006 . . . [with provision for compensating the effects of temperature]

2007/52007 . . . [including adjustment of transmitted power]

2007/52009 . . . [of sensor obstruction, e.g. dirt- or ice-coating]

2007/52011 . . . [including means to prevent or remove the obstruction]

2007/52012 . . . [including a reference ground return]

2007/52014 . . . [including a reference reflector integrated in the sensor or transducer configuration]

7/52015 . . . [Diversity systems]

7/52017 . . . [particularly adapted to short-range imaging (G01S 7/53 takes precedence)]

7/52019 . . . [Details of transmitters]

7/5202 . . . [for pulse systems]

7/52022 . . . [using a sequence of pulses, at least one pulse manipulating the transmissivity or reflectivity of the medium]

7/52023 . . . [Details of receivers]

7/52025 . . . [for pulse systems (G01S 7/52034 takes precedence)]

7/52026 . . . [Extracting wanted echo signals (Doppler systems G01S 15/50: Doppler short range imaging systems G01S 15/8979)]
Means for monitoring or calibrating image data processing G06T 5/00

{Techniques for image enhancement involving oscilloscopes in general G01R 13/20

{Cathode ray tube displays (cathode ray equipment }

{ in association with ancillary recording with simulation of echoes }

{ using correction of medium-induced phase formers in general G10K 11/34

{ for elimination of side lobes or of grating lobes; for increasing resolving power (beam formers in general G10K 11/34)

{ using code signals (G01S 15/8959 takes precedence) }

{ using multibeam transmission}

{ using frequency diversity}

{ using coded signals (G01S 15/8959 takes precedence)

{ involving multilinie receive beamforming}

{ related to power management, e.g. saving power or prolonging life of electronic components (details of power supplies for ultrasonic medical diagnostic imaging devices A61B 8/56)

{ related to workflow protocols}

{ Constructional features (constructional features of transducers B06B; mounting transducers G10K 11/00)

{ Details of pulse systems (short-range imaging G01S 7/52017; methods or devices for transmitting, conducting or directing sound G10K 11/18)

{ Transmitters

{ Receivers

{ Extracting wanted echo signals (Doppler systems G01S 15/50)

{ using digital techniques}

{ using analogue techniques}

{ Gain of receiver varied automatically during pulse-recurrence period (for seismic signals G01V 1/245)

{ Means for transforming coordinates or for evaluating data, e.g. using computers

{ Scan converters
Systems using the reflection or reradiation of radio waves, e.g. radar systems; Analogous systems using reflection or reradiation of waves whose nature or wavelength is irrelevant or unspecified

NOTES

1. This group covers:
   • systems for detecting the presence of an object, e.g. by reflection or reradiation from the object itself, or from a transponder associated with the object, for determining the distance or relative velocity of an object, for providing a co-ordinated display of the distance and direction of an object or for obtaining an image thereof;
   • systems arranged for mounting on a moving craft or vehicle and using the reflection of waves from an extended surface external to the craft, e.g. the surface of the earth, to determine the velocity and direction of motion of the craft relative to the surface.

2. This group does not cover:
   • systems for determining the direction of an object by means not employing reflection or reradiation, which are covered by groups G01S 1/00 or G01S 3/00;
   • systems for determining distance or velocity of an object by means not employing reflection or reradiation, which are covered by group G01S 11/00.

13/00
13/003 [Bistatic radar systems; Multistatic radar systems]
13/006 [Theoretical aspects (G01S 7/418, G01S 13/9094, G01S 13/958 take precedence)]
13/02 [Systems using reflection of radio waves, e.g. primary radar systems; Analogous systems]
13/0209 [Systems with very large relative bandwidth, i.e. larger than 10 %, e.g. baseband, pulse, carrier-free, ultrawideband]
13/0218 [Very long range radars, e.g. surface wave radar, over-the-horizon or ionospheric propagation systems (for meteorological use G01S 13/95)]

2013/0227 [OTH, Over-The-Horizon radar]
2013/0236 [Special technical features]
2013/0245 [Radar with phased array antenna]
2013/0254 [Active array antenna]
2013/0263 [Passive array antenna]
2013/0272 [Multifunction radar]
2013/0281 [LPI, Low Probability of Intercept radar]
2013/029 [Antisteamth radar]

13/04 [Systems determining the presence of a target (based on relative movement of target G01S 13/56)]
13/06 [Systems determining position data of a target]
13/08 [Systems for measuring distance only (indirect measurement G01S 13/46)]
13/10 [Using transmission of interrupted pulse modulated waves (determination of distance by phase measurement G01S 13/32)]
13/103 [Particularities of the measurement of the distance (G01S 13/12, G01S 13/14, G01S 13/16, G01S 13/18 and G01S 13/20 take precedence)]
13/106 . . . . . . . (using transmission of pulses having some particular characteristics (G01S 13/12, G01S 13/22, G01S 13/24, G01S 13/26, G01S 13/28 and G01S 13/30 take precedence))

13/12 . . . . . . . wherein the pulse-reccurence frequency is varied to provide a desired time relationship between the transmission of a pulse and the receipt of the echo of a preceding pulse

13/14 . . . . . . . wherein a voltage or current pulse is initiated and terminated in accordance respectively with the pulse transmission and echo reception

13/16 . . . . . . . using counters

13/18 . . . . . . . wherein range gates are used

13/20 . . . . . . . whereby multiple time-around echoes are used or eliminated

13/22 . . . . . . . using irregular pulse repetition frequency (G01S 13/12 takes precedence)

13/222 . . . . . . . [using random or pseudorandom pulse repetition frequency]

13/225 . . . . . . . [with cyclic repetition of a non-uniform pulse sequence, e.g. staggered PRF]

13/227 . . . . . . . [with repetitive trains of uniform pulse sequences, each sequence having a different pulse repetition frequency]

13/24 . . . . . . . using frequency agility of carrier wave

13/26 . . . . . . . wherein the transmitted pulses use a frequency- or phase-modulated carrier wave

13/28 . . . . . . . with time compression of received pulses

13/282 . . . . . . . [using a frequency modulated carrier wave (G01S 13/286 takes precedence)]

13/284 . . . . . . . [using coded pulses]

13/286 . . . . . . . [frequency shift keyed]

13/288 . . . . . . . [phase modulated]

13/30 . . . . . . . using more than one pulse per radar period

13/32 . . . . . . . using transmission of continuous unmodulated waves, amplitude-, frequency- or phase-modulated waves

13/325 . . . . . . . [using transmission of coded signals, e.g. P.S.K. signals]

13/34 . . . . . . . using transmission of frequency-modulated waves and the received signal, or a signal derived therefrom, being heterodyned with a locally-generated signal related to the contemporaneous transmitted signal to give a beat-frequency signal

13/341 . . . . . . . wherein the rate of change of the transmitted frequency is adjusted to give a beat of predetermined constant frequency, e.g. by adjusting the amplitude or frequency of the frequency-modulating signal

13/342 . . . . . . . [using sinusoidal modulation]

13/343 . . . . . . . [using sawtooth modulation]

13/345 . . . . . . . [using triangular modulation]

13/346 . . . . . . . [using noise modulation]

13/347 . . . . . . . [using more than one modulation frequency]

13/348 . . . . . . . [using square or rectangular modulation, e.g. diplex radar for ranging over short distances]

13/36 . . . . . . . with phase comparison between the received signal and the contemporaneously transmitted signal

13/38 . . . . . . . wherein more than one modulation frequency is used

13/40 . . . . . . . wherein the frequency of transmitted signal is adjusted to give a predetermined phase relationship

13/42 . . . . . . . Simultaneous measurement of distance and other co-ordinates (indirect measurement G01S 13/46)

13/422 . . . . . . . [sequential lobing, e.g. conical scan]

13/424 . . . . . . . [Stacked beam radar]

13/426 . . . . . . . [Scanning radar, e.g. 3D radar (G01S 13/66 takes precedence)]

13/428 . . . . . . . [within the pulse scanning systems]

13/44 . . . . . . . Monopulse radar, i.e. simultaneous lobing

13/4409 . . . . . . . [HF sub-systems particularly adapted therefor, e.g. circuits for signal combination (multi-lobing aerials or aerial systems H01Q 25/00)]

13/4418 . . . . . . . [with means for eliminating radar-dependent errors in angle measurements, e.g. multipath effects]

13/4427 . . . . . . . [with means for eliminating the target-dependent errors in angle measurements, e.g. glint, scintillation effects]

13/4436 . . . . . . . [with means specially adapted to maintain the same processing characteristics between the monopulse signals]

13/4445 . . . . . . . [amplitude comparisons monopulse, i.e. comparing the echo signals received by an antenna arrangement with overlapping squinted beams]

13/4454 . . . . . . . [phase comparisons monopulse, i.e. comparing the echo signals received by an interferometric antenna arrangement]

13/4463 . . . . . . . [using phased arrays]

13/4472 . . . . . . . [with means specially adapted to airborne monopulse systems (clutter elimination using Doppler effect: G01S 13/449)]

13/4481 . . . . . . . [Monopulse hybrid systems, e.g. conopulse]

13/449 . . . . . . . [Combined with MTI or Doppler processing circuits]

13/46 . . . . . . . Indirect determination of position data

13/462 . . . . . . . [using multipath signals]

13/464 . . . . . . . [using only the non-line-of-sight signal(s), e.g. to enable survey of scene 'behind' the target only the indirect signal is evaluated]

13/466 . . . . . . . [by Trilateration, i.e. two antennas or two sensors determine separately the distance to a target, whereby with the knowledge of the baseline length, i.e. the distance between the antennas or sensors, the position data of the target is determined]

13/468 . . . . . . . [by Triangulation, i.e. two antennas or two sensors determine separately the bearing, direction or angle to a target, whereby with the knowledge of the baseline length, the position data of the target is determined]
Systems of measurement based on relative
speeds { ( coherent receivers G01S 7/288
objects or between objects moving at different
speeds ) }

Miss-distance indicators ( proximity fuze see
F42C 13/04; miss-distance indicators in general
F41J 5/12 )

 movement of target

MTi

between successive antenna scans, e.g. area
eliminating objects that have not moved
between successive antenna scans, e.g. area
MTi

for presence detection { ( presence detection
using near field arrangements G01V 3/00,
e.g. G01V 3/08; G01V 3/12; burglar, theft
or intruder alarms with electrical actuation
G08B 13/22 - G08B 13/26 ) }
13/756 . . . [using a signal generator for modifying the reflectivity of the reflector (G01S 13/758 takes precedence)]
13/758 . . . [using a signal generator powered by the interrogation signal]
13/76 . . . wherein pulse-type signals are transmitted
13/762 . . . [with special measures concerning the radiation pattern, e.g. S.L.S. (aerials or aerial systems providing at least two radiation patterns, e.g. providing sum and difference patterns, H01Q 25/00)]
13/765 . . . [with exchange of information between interrogator and responder]
13/767 . . . [Responders; Transponders (teaching or practice apparatus for gun-aiming or gun-laying using reflecting targets or active targets F41G 3/26)]
13/78 . . . discriminating between different kinds of targets, e.g. IFF-radar, i.e. identification of friend or foe (G01S 13/75, G01S 13/767 take precedence)
13/782 . . . . . . [using multimoding or selective addressing]
13/784 . . . . . . [Coders or decoders therefor; Degarbling systems; Defruiting systems]
13/785 . . . . . . [Distance Measuring Equipment [DME] systems]
13/787 . . . . . . . [co-operating with direction defining beacons]
13/788 . . . . . . . [Coders or decoders therefor; Special detection circuits]
13/79 . . . Systems using random coded signals or random pulse repetition frequencies, e.g. "Separation and Control of Aircraft using Non synchronous Techniques" [SECANT]]
13/82 . . . wherein continuous-type signals are transmitted
13/825 . . . [with exchange of information between interrogator and responder]
13/84 . . . . . . for distance determination by phase measurement
13/86 . . . Combinations of radar systems with non-radar systems, e.g. sonar, direction finder ([combination of sonar systems with non-sonar or non-radar systems G01S 15/86; combination of lidar systems with systems other than lidar, radar or sonar G01S 17/86])
13/862 . . . [Combination of radar systems with sonar systems]
13/865 . . . [Combination of radar systems with lidar systems]
13/867 . . . [Combination of radar systems with cameras]
13/87 . . . Combinations of radar systems, e.g. primary radar and secondary radar
13/872 . . . [Combinations of primary radar and secondary radar]
13/874 . . . [Combination of several systems for attitude determination (in general G01C, control of attitude G05D 1/08)]
13/876 . . . [Combination of several spaced transponders or reflectors of known location for determining the position of a receiver (G01S 13/874 takes precedence)]
13/878 . . . [Combination of several spaced transmitters or receivers of known location for determining the position of a transponder or a reflector (G01S 13/874 takes precedence)]
13/88 . . . Radar or analogous systems specially adapted for specific applications (electromagnetic prospecting or detecting of objects, e.g. near-field detection, G01V 3/00)
13/881 . . . [for robotics]
13/882 . . . [for altimeters (measuring height using barometric means G01C 5/06)]
13/883 . . . [for missile homing, autodirectors (missile guidance systems F41G 7/22)]
13/885 . . . [for ground probing (prospecting or detecting using electromagnetic waves G01V 3/12)]
13/886 . . . [for alarm systems (alarms with electrical actuation G08B 13/22)]
13/887 . . . [for detection of concealed objects, e.g. contraband or weapons]
13/888 . . . [through wall detection]
13/89 . . . . . . for mapping or imaging

**WARNING**

Group G01S 13/89 is impacted by reclassification into group G01S 13/895
Groups G01S 13/89 and G01S 13/895 should be considered in order to perform a complete search.

13/895 . . . . [Side looking radar [SLR]]

**WARNING**

Group G01S 13/895 is incomplete pending reclassification of documents from group G01S 13/89.
Groups G01S 13/89 and G01S 13/895 should be considered in order to perform a complete search.

13/90 . . . using synthetic aperture techniques, e.g. synthetic aperture radar [SAR] techniques

**WARNING**

Group G01S 13/90 is impacted by reclassification into groups G01S 13/9004, G01S 13/9019, G01S 13/9021, G01S 13/9027, G01S 13/904, G01S 13/9054, G01S 13/9056 and G01S 13/9089.
All groups listed in this Warning should be considered in order to perform a complete search.

13/9004 . . . [SAR image acquisition techniques]

**WARNING**

Group G01S 13/9004 is incomplete pending reclassification of documents from group G01S 13/90.
Groups G01S 13/90 and G01S 13/9004 should be considered in order to perform a complete search.

13/9005 . . . [with optical processing of the SAR signals]
WARNING

Group G01S 13/9019 is incomplete pending reclassification of documents from group G01S 13/90.
Groups G01S 13/90 and G01S 13/9019 should be considered in order to perform a complete search.

WARNING

Group G01S 13/9021 is incomplete pending reclassification of documents from group G01S 13/90.
Groups G01S 13/90 and G01S 13/9021 should be considered in order to perform a complete search.

WARNING

Group G01S 13/9023 is impacted by reclassification into group G01S 13/9092.
Groups G01S 13/9023 and G01S 13/9092 should be considered in order to perform a complete search.

WARNING

Group G01S 13/9027 is incomplete pending reclassification of documents from group G01S 13/90.
Groups G01S 13/90 and G01S 13/9027 should be considered in order to perform a complete search.

WARNING

Group G01S 13/904 is incomplete pending reclassification of documents from group G01S 13/90.
Group G01S 13/904 is also impacted by reclassification into groups G01S 13/9054 and G01S 13/9056.
All groups listed in this Warning should be considered in order to perform a complete search.
13/917 . . . [for marine craft or other waterborne vessels]

**WARNING**

Group G01S 13/917 is incomplete pending reclassification of documents from group G01S 13/91.

Groups G01S 13/91 and G01S 13/917 should be considered in order to perform a complete search.

13/92 . . . for velocity measurement
13/93 . . . for anti-collision purposes
13/931 . . . of land vehicles
2013/9314 . . . [Parking operations]
2013/9315 . . . [Monitoring blind spots]
2013/9316 . . . [combined with communication equipment with other vehicles or with base stations]
2013/9317 . . . [Driving backwards]
2013/9318 . . . [Controlling the steering]
2013/93185 . . . [Controlling the brakes]
2013/9319 . . . [Controlling the accelerator]
2013/932 . . . [using own vehicle data, e.g. ground speed, steering wheel direction]
2013/9321 . . . [Velocity regulation, e.g. cruise control]
2013/9322 . . . [using additional data, e.g. driver condition, road state or weather data]
2013/9323 . . . [Alternative operation using light waves]
2013/9324 . . . [Alternative operation using ultrasonic waves]
2013/9325 . . . [for inter-vehicle distance regulation, e.g. navigating in platoons]
2013/9327 . . . [Sensor installation details]
2013/93271 . . . [in the front of the vehicles]
2013/93272 . . . [in the back of the vehicles]
2013/93273 . . . [on the top of the vehicles]
2013/93274 . . . [on the side of the vehicles]
2013/93275 . . . [in the bumper area]
2013/93276 . . . [in the windshield area]
2013/93277 . . . [in the lights]
2013/9328 . . . [Rail vehicles]
2013/9329 . . . [cooperating with reflectors or transponders]
13/933 . . . of aircraft or spacecraft
13/934 . . . on airport surfaces, e.g. while taxing
13/935 . . . for terrain-avoidance
13/937 . . . of marine craft
13/95 . . . for meteorological use
13/951 . . . [ground based]
13/953 . . . [mounted on aircraft]
13/955 . . . [mounted on satellite]
13/956 . . . [mounted on ship or other platform]
13/958 . . . [Theoretical aspects]
15/00 Systems using the reflection or reradiation of acoustic waves, e.g. sonar systems

**NOTES**

1. This group covers:
   - systems for determining the position data of a target
   - systems for determining presence of a target
   - systems for determining the direction of an object
   - systems for determining the distance or relative velocity of an object
   - systems for measuring distance only
   - systems for determining the direction of an object by means not employing reflection or reradiation, which are covered by groups G01S 1/00 or G01S 3/00;
   - systems for determining distance or velocity of an object by means not employing reflection or reradiation, which are covered by group G01S 11/00.

2. This group does not cover:
   - systems for determining the direction of an object by means not employing reflection or reradiation, which are covered by groups G01S 1/00 or G01S 3/00.

15/003 . . . [Bistatic sonar systems; Multistatic sonar systems]
15/006 . . . [Theoretical aspects]
15/02 . . . using reflection of acoustic waves (G01S 15/66 takes precedence)
15/04 . . . Systems determining presence of a target
15/06 . . . Systems determining the position data of a target
15/08 . . . Systems for measuring distance only (indirect measurement G01S 15/46)
15/10 . . . using transmission of interrupted pulse-modulated waves (determination of distance by phase measurement G01S 15/32)
15/101 . . . [Particularities of the measurement of distance (G01S 15/12, G01S 15/14, and G01S 15/18 take precedence)]
15/102 . . . [using transmission of pulses having some particular characteristics]
15/104 . . . [wherein the transmitted pulses use a frequency- or phase-modulated carrier wave]
15/105 . . . [using irregular pulse repetition frequency]
15/107 . . . [using frequency agility of carrier wave]
15/108 . . . [using more than one pulse per sonar period]
15/12 . . . wherein the pulse-recurrence frequency is varied to provide a desired time relationship between the transmission of a pulse and the receipt of the echo of a preceding pulse
15/14 . . . wherein a voltage or current pulse is initiated and terminated in accordance respectively with the pulse transmission and echo reception
15/18 . . . wherein range gates are used
15/32 . . . [using transmission of continuous unmodulated waves, amplitude-, frequency-, or phase-modulated waves]
15/325 . . . [using transmission of coded signals, e.g. of phase-shift keyed [PSK] signals]
15/34 . . . [using transmission of frequency-modulated waves and the received signal, or a signal derived therefrom, being heterodyned with a locally-generated signal related to the contemporaneous transmitted signal to give a beat-frequency signal]
15/36 . . . . with phase comparison between the received signal and the contemporaneously transmitted signal

15/42 . . . Simultaneous measurement of distance and other co-ordinates (indirect measurement G01S 15/46)

15/46 . . . Indirect determination of position data

2015/465 . . . . . . [by Trilateration, i.e. two transducers determine separately the distance to a target, whereby with the knowledge of the baseline length, i.e. the distance between the transducers, the position data of the target is determined]

15/50 . . . Systems of measurement, based on relative movement of the target

15/52 . . . Discriminating between fixed and moving objects or between objects moving at different speeds

15/523 . . . . . . [for presence detection (burglar, theft or intruder alarms G08B 13/00, e.g. G08B 13/16)]

15/526 . . . . . . [by comparing echos in different sonar periods]

15/58 . . . Velocity or trajectory determination systems; Sense-of-movement determination systems (velocity measurement in imaging systems G01S 15/8979)

15/582 . . . . . . [using transmission of interrupted pulse-modulated waves and based upon the Doppler effect resulting from movement of targets]

15/584 . . . . . . [with measures taken for suppressing velocity ambiguities, i.e. anti-aliasing]

15/586 . . . . . . [using transmission of continuous unmodulated waves, amplitude-, frequency-, or phase-modulated waves and based upon the Doppler effect resulting from movement of targets]

15/588 . . . . . . [measuring the velocity vector]

15/60 . . . . . . wherein the transmitter and receiver are mounted on the moving object, e.g. for determining ground speed, drift angle, ground track

15/62 . . . . . . Sense-of-movement determination (G01S 15/588 takes precedence)

15/66 . . . Sonar tracking systems

15/74 . . . Systems using reradiation of acoustic waves, e.g. IFF, i.e. identification of friend or foe

15/86 . . . Combinations of sonar systems with lidar systems; Combinations of sonar systems with systems not using wave reflection

15/87 . . . Combinations of sonar systems

15/872 . . . . . . (Combination of several systems for attitude determination (using inertial means G01C 9/00, control of attitude G05D 1/08))

15/874 . . . . . . (Combination of several spaced transponders or reflectors of known location for determining the position of a receiver (G01S 15/872 takes precedence))

15/876 . . . . . . (Combination of several spaced transmitters or receivers of known location for determining the position of a transponder or a reflector (G01S 15/872 takes precedence))

15/878 . . . . . . [wherein transceivers are operated, either sequentially or simultaneously, both in bi-static and in mono-static mode, e.g. cross-echo mode]

15/88 . . . Sonar systems specially adapted for specific applications (seismic or acoustic prospecting or detecting G01V 1/00)

15/885 . . . . . . [Meteorological systems]

15/889 . . . for mapping or imaging

15/8902 . . . . . . [Side-looking sonar]

15/8904 . . . . . . [using synthetic aperture techniques]

15/8906 . . . . . . [Short-range imaging systems; Acoustic microscope systems using pulse-echo techniques]

15/8909 . . . . . . [using a static transducer configuration (sound-focusing or directing per se G10K 11/26)]

15/8911 . . . . . . [using a single transducer for transmission and reception]

15/8913 . . . . . . [using separate transducers for transmission and reception]

15/8915 . . . . . . [using a transducer array]

15/8918 . . . . . . [the array being linear]

15/892 . . . . . . [the array being curvilinear]

15/8922 . . . . . . [the array being concentric or annular]

15/8925 . . . . . . [the array being a two-dimensional transducer configuration, i.e. matrix or orthogonal linear arrays]

15/8927 . . . . . . [using simultaneously or sequentially two or more subarrays or subapertures]

15/8929 . . . . . . [using a three-dimensional transducer configuration]

15/8931 . . . . . . [co-operating with moving reflectors]

15/8934 . . . . . . [using a dynamic transducer configuration (mounting transducers, e.g. provided with mechanical moving or orienting device per se G10K 11/004)]

15/8936 . . . . . . [using transducers mounted for mechanical movement in three dimensions]

15/8938 . . . . . . [using transducers mounted for mechanical movement in two dimensions]

15/894 . . . . . . [by rotation about a single axis]

15/8943 . . . . . . [co-operating with reflectors]

15/8945 . . . . . . [using transducers mounted for linear mechanical movement]

15/8947 . . . . . . [using transducers movable by (electro)magnetic means]

15/895 . . . . . . [characterised by the transmitted frequency spectrum]

15/8952 . . . . . . [using discrete, multiple frequencies]

15/8954 . . . . . . [using a broad-band spectrum]

15/8956 . . . . . . [using frequencies at or above 20 MHz]

15/8959 . . . . . . [using coded signals for correlation purposes]

15/8961 . . . . . . [using pulse compression]

15/8963 . . . . . . [using pulse inversion]

15/8965 . . . . . . [using acousto-optical or acousto-electronic conversion techniques]

15/8968 . . . . . . [using acoustical modulation of a light beam (acousto-optical light control devices G02F 1/11, G02F 1/33)]

15/897 . . . . . . [using application of holographic techniques (holography per se G03H)]
NOTE

The note after group G01S 13/00 also applies to this group.

17/00 Systems using the reflection or reradiation of electromagnetic waves other than radio waves, e.g. lidar systems

NOTE

The note after group G01S 13/00 also applies to this group.

17/003 [Bistatic lidar systems; Multistatic lidar systems]
17/006 [Theoretical aspects]
for mapping or imaging

**WARNING**

Group G01S 17/89 is impacted by reclassification into group G01S 17/894.

Groups G01S 17/89 and G01S 17/894 should be considered in order to perform a complete search.

3D imaging with simultaneous measurement of time-of-flight at a 2D array of receiver pixels, e.g. time-of-flight cameras or flash lidar

**WARNING**

Group G01S 17/894 is incomplete pending reclassification of documents from group G01S 17/89.

Groups G01S 17/89 and G01S 17/894 should be considered in order to perform a complete search.

using synthetic aperture techniques

for anti-collision purposes

of land vehicles

of aircraft or spacecraft

for meteorological use

**Satellite radio beacon positioning systems; Determining position, velocity or attitude using signals transmitted by such systems**

**NOTE**

In this group, or in the patent documents classified in this group, the following abbreviations are often used:

- DGPS = Differential GPS
- Pseudolite = Pseudolite is a contraction of the term "pseudo-satellite," used to refer to the mimicking of GPS satellites (or of other navigation satellites) by other transceivers.
- WAAS = Wide Area Augmentation System

Satellite radio beacon positioning systems transmitting time-stamped messages, e.g. GPS [Global Positioning System], GLONASS [Global Orbiting Navigation Satellite System] or GALILEO

[Arrangements for jamming, spoofing or other methods of denial of service of such systems]

Details of the space or ground control segments

Cooperating elements; Interaction or communication between different cooperating elements or between cooperating elements and receivers

**NOTE**

The term "cooperating elements" designates additional elements or subsystems, including receivers of other users, which interact or communicate with the receiver or the satellite positioning system.

providing carrier phase data

providing aiding information

employing an initial estimate of the location of the receiver as aiding data or in generating aiding data

providing data for correcting measured positioning data

**WARNING**

Group G01S 19/07 is impacted by reclassification into groups G01S 19/071, G01S 19/072, G01S 19/073, and G01S 19/074.

All groups listed in this Warning should be considered in order to perform a complete search.

{DGPS corrections}

**WARNING**

Group G01S 19/071 is incomplete pending reclassification of documents from group G01S 19/07.

Groups G01S 19/07 and G01S 19/071 should be considered in order to perform a complete search.

{Ionosphere corrections}

**WARNING**

Group G01S 19/072 is incomplete pending reclassification of documents from group G01S 19/07.

Groups G01S 19/07 and G01S 19/072 should be considered in order to perform a complete search.

{Involving a network of fixed stations}

**WARNING**

Group G01S 19/073 is incomplete pending reclassification of documents from group G01S 19/07.

Groups G01S 19/07 and G01S 19/073 should be considered in order to perform a complete search.

{Providing integrity data, e.g. WAAS}

**WARNING**

Group G01S 19/074 is incomplete pending reclassification of documents from group G01S 19/07.

Groups G01S 19/07 and G01S 19/074 should be considered in order to perform a complete search.

providing integrity information, e.g. health of satellites or quality of ephemeris data

providing processing capability normally carried out by the receiver

providing dedicated supplementary positioning signals
19/11 . . . wherein the cooperating elements are pseudolites or satellite radio beacon positioning system signal repeaters

**WARNING**

Group G01S 19/11 is impacted by reclassification into group G01S 19/115.

Groups G01S 19/11 and G01S 19/115 should be considered in order to perform a complete search.

19/115 . . . { (Airborne or satellite based pseudolites or repeaters)

**WARNING**

Group G01S 19/115 is incomplete pending reclassification of documents from group G01S 19/11.

Groups G01S 19/11 and G01S 19/115 should be considered in order to perform a complete search.

19/12 . . . wherein the cooperating elements are telecommunication base stations

19/13 . . . Receivers

19/14 . . . specially adapted for specific applications

19/15 . . . Aircraft landing systems

19/16 . . . Anti-theft; Abduction

19/17 . . . Emergency applications

19/18 . . . Military applications

19/19 . . . Sporting applications

19/20 . . . Integrity monitoring, fault detection or fault isolation of space segment

19/21 . . . Interference related issues; [Issues related to cross-correlation, spoofing or other methods of denial of service (interference-related aspects in spread spectrum receivers per se H04B 1/7097)]

19/215 . . . [issues related to spoofing]

19/22 . . . Multipath-related issues

19/23 . . . Testing, monitoring, correcting or calibrating of receiver elements

19/235 . . . [Calibration of receiver components]

19/24 . . . Acquisition or tracking [or demodulation] of signals transmitted by the system [{synchronisation aspects of direct sequence spread spectrum modulation H04B 1/7073}]

19/243 . . . [Demodulation of navigation message]

19/246 . . . {involving long acquisition integration times, extended snapshots of signals or methods specifically directed towards weak signal acquisition]

19/25 . . . involving aiding data received from a cooperating element, e.g. assisted GPS

19/252 . . . {Employing an initial estimate of location in generating assistance data]

19/254 . . . {relating to Doppler shift of satellite signals}

19/256 . . . {relating to timing, e.g. time of week, code phase, timing offset}

19/258 . . . {relating to the satellite constellation, e.g. almanac, ephemeris data, lists of satellites in view}

19/26 . . . involving a sensor measurement for aiding acquisition or tracking

19/27 . . . creating, predicting or correcting ephemeris or almanac data within the receiver

19/28 . . . Satellite selection

19/29 . . . carrier, [including Doppler,] related

{[G01S 19/246 takes precedence]}

19/30 . . . code related {[G01S 19/246 takes precedence]}

19/31 . . . Acquisition or tracking of other signals for positioning

19/32 . . . Multimode operation in a single same satellite system, e.g. GPS L1/L2

19/33 . . . Multimode operation in different systems which transmit time stamped messages, e.g. GPS/GLONASS

19/34 . . . Power consumption

19/35 . . . Constructional details or hardware or software details of the signal processing chain

19/36 . . . relating to the receiver frond end

19/37 . . . Hardware or software details of the signal processing chain

19/38 . . . Determining a navigation solution using signals transmitted by a satellite radio beacon positioning system

19/39 . . . the satellite radio beacon positioning system transmitting time-stamped messages, e.g. GPS [Global Positioning System], GLONASS [Global Orbiting Navigation Satellite System] or GALILEO

**WARNING**

Group G01S 19/39 is impacted by reclassification into groups G01S 19/393 and G01S 19/396.

Groups G01S 19/39, G01S 19/393, and G01S 19/396 should be considered in order to perform a complete search.

19/393 . . . [Trajectory determination or predictive tracking, e.g. Kalman filtering]

**WARNING**

Group G01S 19/393 is incomplete pending reclassification of documents from group G01S 19/39.

Groups G01S 19/39 and G01S 19/393 should be considered in order to perform a complete search.

19/396 . . . {Determining accuracy or reliability of position or pseudorange measurements}

**WARNING**

Group G01S 19/396 is incomplete pending reclassification of documents from group G01S 19/39.

Groups G01S 19/39 and G01S 19/396 should be considered in order to perform a complete search.

19/40 . . . Correcting position, velocity or attitude

19/41 . . . Differential correction, e.g. DGPS [differential GPS]

19/42 . . . Determining position
by combining or switching between position solutions or signals derived from different satellite radio beacon positioning systems; by combining or switching between position solutions or signals derived from different modes of operation in a single system

by combining or switching between position solutions derived from different satellite radio beacon positioning systems

by combining or switching between signals derived from different satellite radio beacon positioning systems

by combining or switching between position solutions or signals derived from different modes of operation in a single system

using multipath or indirect path propagation signals in position determination

using carrier phase measurements, e.g. kinematic positioning; using long or short baseline interferometry

Carrier phase ambiguity resolution; Floating ambiguity; LAMBDA [Least-squares AMBiguity Decorrelation Adjustment] method

by combining measurements of signals from the satellite radio beacon positioning system with a supplementary measurement

the supplementary measurement being of a radio-wave signal type

the supplementary measurement being an inertial measurement, e.g. tightly coupled inertial

NOTE
This group does not adequately cover combining inertial navigation measurements with a non-inertial navigation instrument; also see G01C 21/165.

by combining or switching between position solutions derived from the satellite radio beacon positioning system and position solutions derived from a further system

whereby the further system is an inertial position system, e.g. loosely-coupled

NOTE
This group does not adequately cover combining inertial navigation measurements with a non-inertial navigation instrument; also see G01C 21/165.

whereby the position solution is constrained to lie upon a particular curve or surface, e.g. for locomotives on railway tracks

NOTE
This group does not adequately cover regarding map or contour matching also; see G01C 21/005 and G01C 21/30.

Relative positioning

Determining velocity

Determining attitude

using carrier phase measurements; using long or short baseline interferometry

Carrier phase ambiguity resolution; Floating ambiguity; LAMBDA [Least-squares AMBiguity Decorrelation Adjustment] method

Indexing scheme relating to beacons or beacon systems transmitting signals capable of being detected by non-directional receivers and defining directions, positions, or position lines fixed relatively to the beacon transmitters

WARNING
Group G01S 2201/00 is incomplete pending reclassification of documents from groups G01S 1/042, G01S 1/70, and G01S 1/74.

All groups listed in this Warning should be considered in order to perform a complete search.

adapted for specific applications or environments

WARNING
Group G01S 2201/01 is incomplete pending reclassification of documents from groups G01S 1/042, G01S 1/70, and G01S 1/74.

All groups listed in this Warning should be considered in order to perform a complete search.

Indoor positioning, e.g. in covered car-parks, mining facilities, warehouses

WARNING
Group G01S 2201/02 is incomplete pending reclassification of documents from groups G01S 1/042, G01S 1/70, and G01S 1/74.

All groups listed in this Warning should be considered in order to perform a complete search.

Indoor pedestrian positioning

WARNING
Group G01S 2201/025 is incomplete pending reclassification of documents from groups G01S 1/042, G01S 1/70, and G01S 1/74.

All groups listed in this Warning should be considered in order to perform a complete search.

Construction sites

WARNING
Group G01S 2201/03 is incomplete pending reclassification of documents from groups G01S 1/042, G01S 1/70, and G01S 1/74.

All groups listed in this Warning should be considered in order to perform a complete search.
Emergencies

**WARNING**

Group **G01S 2201/04** is incomplete pending reclassification of documents from groups **G01S 1/042**, **G01S 1/70**, and **G01S 1/74**.

All groups listed in this Warning should be considered in order to perform a complete search.

Sport

**WARNING**

Group **G01S 2201/05** is incomplete pending reclassification of documents from groups **G01S 1/042**, **G01S 1/70**, and **G01S 1/74**.

All groups listed in this Warning should be considered in order to perform a complete search.

Aircraft navigation

**WARNING**

Group **G01S 2201/06** is incomplete pending reclassification of documents from groups **G01S 1/042**, **G01S 1/70**, and **G01S 1/74**.

All groups listed in this Warning should be considered in order to perform a complete search.

Under water

**WARNING**

Group **G01S 2201/07** is incomplete pending reclassification of documents from groups **G01S 1/042**, **G01S 1/70**, and **G01S 1/74**.

All groups listed in this Warning should be considered in order to perform a complete search.

Marine or water borne applications

**WARNING**

Group **G01S 2201/08** is incomplete pending reclassification of documents from groups **G01S 1/042**, **G01S 1/70**, and **G01S 1/74**.

All groups listed in this Warning should be considered in order to perform a complete search.

Indexing scheme associated with group **G01S 5/00**, relating to position-fixing

- Transmission of position information to remote stations
- for traffic control, mobile tracking, guidance, surveillance or anti-collision
- for aircraft positioning relative to the ground
- for aircraft positioning relative to other aircraft
- for emergency situations
- for management of a communication system
- using a mobile telephone network