CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS
(NOTES omitted)

INSTRUMENTS

G01 MEASURING; TESTING
(NOTES omitted)

G01S RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES

NOTES

1. In this subclass, the following term is used with the meaning indicated:
   - "transponder" means an arrangement which reacts to an incoming interrogating or detecting wave by emitting a specific answering or identifying wave.
2. Attention is drawn to the Notes following the title of class G01 and to Note (1) following the title of subclass G09B.

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:
   G01S 7/26 covered by G01S 7/06
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 **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-ordinating 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.

1/0423 . . . . {Mounting or deployment thereof}

WARNING

Group G01S 1/0423 is incomplete pending reclassification of documents from group G01S 1/042.

Groups G01S 1/042 and G01S 1/0423 should be considered in order to perform a complete search.

1/0426 . . . . . {Collocated with electrical equipment other than beacons }

WARNING

Group G01S 1/0426 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.

1/0428 . . . . {Signal details}

WARNING

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

Groups G01S 1/042 and G01S 1/0428 should be considered in order to perform a complete search.

1/045 . . . {Receivers}

1/047 . . . {Displays or indicators (G01S 1/06 takes precedence)}
1/06 . . . Means for providing multiple indication, e.g. coarse and fine indications
1/08 . . Systems for determining direction or position line
1/10 . . . 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
1/12 . . . . 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
1/14 . . . using amplitude comparison of signals transmitted simultaneously from antennas or antenna systems having differently oriented overlapping directivity-characteristics
1/16 . . . . Azimuthal guidance systems, e.g. system for defining aircraft approach path, localiser system
1/18 . . . . Elevational guidance systems, e.g. system for defining aircraft glide path
1/20 . . . using a comparison of transit time of synchronised signals transmitted from non-directional antennas or antenna systems spaced apart, i.e. path-difference systems
1/22 . . . . 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
1/24 . . . . 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}
1/245 . . . . . {Details of receivers cooperating therewith, e.g. determining positive zero crossing of third cycle in LORAN-C}
1/26 . . . . . Systems in which pulses or time-base signals are generated locally at the receiver and brought into predetermined time-relationship with received signals, e.g. pulse duration coincides with time interval between arrival of significant part of modulation of signals received from first and second antennas or antenna systems
1/28 . . . . . wherein the predetermined time-relationship is maintained automatically {contains no documents}
1/30 . . . . 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
1/302 . . . . . {Systems in which the direction is determined by using an interferometric type transmitting antenna array}
1/304 . . . . . {Analogous systems in which a beat frequency, obtained by heterodyning the signals, is compared in phase with a reference signal obtained by heterodyning the signals in a fixed reference point and transmitted therefrom, e.g. LORAC (long range accuracy) or TORAN systems}
1/306 . . . . . {Analogous systems in which frequency-related signals (harmonics) are compared in phase, e.g. DECCA systems}
1/308 . . . . . {particularly adapted to Omega systems}
1/32 . . . . . Systems in which the signals received, with or without amplification, or signals derived therefrom, are compared in phase directly {contains no documents}
1/34 . . . . . Systems in which first and second synchronised signals are transmitted from both antennas or antenna systems and a beat frequency, obtained by heterodyning the first signals with each other is compared in phase with a beat frequency obtained by heterodyning the second signals with each other
1/36 . . . . . Systems in which a beat frequency, obtained by heterodyning the synchronised signals, is compared in phase with a reference signal having a phase substantially independent of direction {contains no documents}
1/38 . . . using comparison of [1] the phase of the envelope of the change of frequency, due to Doppler effect, of the signal transmitted by an antenna moving, or appearing to move, in a cyclic path with [2] the phase of a reference signal, the frequency of this reference signal being synchronised with that of the cyclic movement, or apparent cyclic movement, of the antenna
1/40 . . . . the apparent movement of the antenna being produced by cyclic sequential energisation of fixed antennas
1/42 . . . Conical-scan beacons transmitting signals which indicate at a mobile receiver any displacement of the receiver from the conical-scan axis, e.g. for "beam-riding" missile control
1/44 . . . Rotating or oscillating beam beacons defining directions in the plane of rotation or oscillation
1/46 . . . . Broad-beam systems producing at a receiver a substantially continuous 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 receiver from the beacon and a reference direction from the beacon, e.g. cardioid system
1/465 . . . . . {using time-varying interference fields}
1/48 . . . . . wherein the phase angle of the direction-dependent envelope signal is a multiple of the direction angle, e.g. for "fine" bearing indication {TACAN}
1/50 . . . . . wherein the phase angle of the direction-dependent envelope signal is compared with a non-direction-dependent reference signal, {e.g. VOR}

1/52 . . . . . 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

1/54 . . . . 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

1/56 . . . . . Timing the pulse-type envelope signals derived by reception of the beam

1/58 . . . . . wherein a characteristic of the beam transmitted or of an auxiliary signal is varied in time synchronously with rotation or oscillation of the beam

1/60 . . . . . Varying frequency of beam signal or of auxiliary signal

1/62 . . . . . Varying phase-relationship between beam and auxiliary signal

1/64 . . . . . Varying pulse timing, e.g. varying interval between pulses radiated in pairs

1/66 . . . . . Superimposing direction-indicating intelligence signals, e.g. speech, Morse

1/68 . . Marker, boundary, call-sign, or like beacons transmitting signals not carrying directional information

1/685 . . . {using pulse modulation, e.g. pulse frequency modulation}

1/70 . 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 2201/025, 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.

1/703 . . {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.

1/7032 . . . {Transmitters}

WARNING

Group G01S 1/7032 is incomplete pending reclassification of documents from group G01S 1/70.

Groups G01S 1/70 and G01S 1/7032 should be considered in order to perform a complete search.

1/7034 . . . . {Mounting or deployment thereof}

WARNING

Group G01S 1/7034 is incomplete pending reclassification of documents from group G01S 1/70.

Groups G01S 1/70 and G01S 1/7034 should be considered in order to perform a complete search.

1/7036 . . . . . {Collocated with electrical equipment other than beacons}

WARNING

Group G01S 1/7036 is incomplete pending reclassification of documents from group G01S 1/70.

Groups G01S 1/70 and G01S 1/7036 should be considered in order to perform a complete search.

1/7038 . . . . {Signal details}

WARNING

Group G01S 1/7038 is incomplete pending reclassification of documents from group G01S 1/70.

Groups G01S 1/70 and G01S 1/7038 should be considered in order to perform a complete search.

1/705 . . {using gamma or X-rays}

1/72 . using ultrasonic, sonic or infrasonic waves

1/725 . . {Marker, boundary, call-sign or like beacons transmitting signals not carrying directional information}

1/74 . . Details

WARNING

Group G01S 1/74 is impacted by reclassification into groups G01S 1/75, G01S 1/751, G01S 1/752, G01S 1/753, 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.

1/75 . . . {Transmitters}

WARNING

Group G01S 1/75 is incomplete pending reclassification of documents from group G01S 1/74.

Groups G01S 1/74 and G01S 1/75 should be considered in order to perform a complete search.

1/751 . . . . {Mounting or deployment thereof}

WARNING

Group G01S 1/751 is incomplete pending reclassification of documents from group G01S 1/74.

Groups G01S 1/74 and G01S 1/751 should be considered in order to perform a complete search.

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

WARNING

Group G01S 1/752 is incomplete pending reclassification of documents from group G01S 1/74.

Groups G01S 1/74 and G01S 1/752 should be considered in order to perform a complete search.

1/753 . . . . {Signal details}

WARNING

Group G01S 1/753 is incomplete pending reclassification of documents from group G01S 1/74.

Groups G01S 1/74 and G01S 1/753 should be considered in order to perform a complete search.

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 21/29; 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)}

3/16 . . . using amplitude comparison of signals derived sequentially from receiving antennas or antenna systems having differently-oriented directivity characteristics or from an antenna system having periodically-varied orientation of directivity characteristic

3/18 . . . . derived directly from separate directional antennas

3/20 . . . . derived by sampling signal received by an antenna system having periodically-varied orientation of directivity characteristic

3/22 . . . . derived from different combinations of signals from separate antennas, e.g. comparing sum with difference

3/24 . . . . . 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

3/26 . . . . . the separate antennas having differently-oriented directivity characteristics

3/28 . . . using amplitude comparison of signals derived simultaneously from receiving antennas or antenna systems having differently-oriented directivity characteristics

3/30 . . . . derived directly from separate directional systems

3/32 . . . . derived from different combinations of signals from separate antennas, e.g. comparing sum with difference

3/325 . . . . . {Automatic tracking systems}

3/34 . . . . . 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

3/36 . . . . . the separate antennas having differently-oriented directivity characteristics

3/38 . . . 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 (G01S 3/16, G01S 3/28 take precedence)

3/40 . . . . adjusting orientation of a single directivity characteristic to produce maximum or minimum signal, e.g. rotatable loop antenna or equivalent goniometer system

3/42 . . . . the desired condition being maintained automatically

3/44 . . . . the adjustment being varied periodically or continuously until it is halted automatically when the desired condition is attained

3/46 . . . using antennas spaced apart and measuring phase or time difference between signals therefrom, i.e. path-difference systems

3/465 . . . . {the waves arriving at the aerials being frequency modulated and the frequency difference of signals therefrom being measured}

3/48 . . . . the waves arriving at the antennas being continuous or intermittent and the phase difference of signals derived therefrom being measured

3/50 . . . . the waves arriving at the antennas being pulse modulated and the time difference of their arrival being measured

3/52 . . . using a receiving antenna moving, or appearing to move, in a cyclic path to produce a Doppler variation of frequency of the received signal

3/54 . . . . the apparent movement of the antenna being produced by coupling the receiver cyclically and sequentially to each of several fixed spaced antennas

3/56 . . . Conical-scan beam systems using signals indicative of the deviation of the direction of reception from the scan axis

3/58 . . . 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)

3/60 . . . . 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

3/62 . . . . . wherein the phase angle of the signal is indicated by a cathode-ray tube

3/64 . . . . . wherein the phase angle of the signal is determined by phase comparison with a reference alternating signal varying in synchronism with the directivity variation

3/66 . . . . 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

3/68 . . . . . 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)

3/70 . . . . . 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

3/72 . . Diversity systems specially adapted for direction-finding

3/74 . . 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)

3/78 . 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-dependant 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 17/00)**}**
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}

5/0226 . . . {of transmitters or network of transmitters (wireless system synchronisation per se H04B 7/2662)}
5/0231 . . . . {Emergency, distress or locator beacons}
5/0236 . . . {Receiving assistance data, e.g. base station almanac}
5/0242 . . . {locating transmitters to be used for positioning (G01S 5/0289 takes precedence)}
5/0247 . . {Determination of attitude (using inertial means G01C 9/00; control of attitude G05D 1/08)}
5/0252 . . {by comparing measured values with pre-stored measured or simulated values}
5/0257 . . {Hybrid positioning solutions (by coordinating position lines of different shape G01S 5/12)}
5/0263 . . . {employing positioning solutions derived from one of several separate positioning systems}
5/0268 . . . {employing positioning solutions derived from a single positioning system}
5/0273 . . {using multipath or indirect path propagation signals in position determination}
5/0278 . . {involving statistical or probabilistic considerations (G01S 5/0252, G01S 5/0294 take precedence)}
5/0284 . . {Relative positioning}
5/0289 . . . {of multiple transceivers, e.g. in ad hoc networks}
5/0294 . . {Tracking, i.e. predictive filtering, e.g. Kalman filtering}
5/04 . . Position of source determined by a plurality of spaced direction-finders
5/06 . . Position of source determined by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/12 takes precedence)
5/08 . . Position of single direction-finder fixed by determining direction of a plurality of spaced sources of known location
5/10 . . Position of receiver fixed by co-ordinating a plurality of position lines defined by path-difference measurements {, e.g. omega or decca systems} (G01S 5/12 takes precedence {; beacons and receivers cooperating therewith G01S 1/306, G01S 1/308})
5/12 . . by co-ordinating position lines of different shape, e.g. hyperbolic, circular, elliptical, radial (radar indicators providing co-ordinated display of direction and distance G01S 7/10)
5/14 . . Determining absolute distances from a plurality of spaced points of known location
5/145 . . . {Using a supplementary range measurement, e.g. based on pseudo-range measurements}
5/16 . using electromagnetic waves other than radio waves
5/163 . . {Determination of attitude (using inertial means G01C 9/00; control of attitude G05D 1/08)}
5/166 . . {using gamma or X-rays}
5/18 . using ultrasonic, sonic, or infrasonic waves
5/183 . . {Emergency, distress or locator beacons}
5/186 . . {Determination of attitude (using inertial means G01C 9/00; control of attitude G05D 1/08)}
5/20 . . Position of source determined by a plurality of spaced direction-finders
5/22 . . Position of source determined by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/28 takes precedence)
5/24 . . Position of single direction-finder fixed by determining direction of a plurality of spaced sources of known location
5/26 . . Position of receiver fixed by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/28 takes precedence)
5/28 . . by co-ordinating position lines of different shape, e.g. hyperbolic, circular, elliptical, radial (sonar indicators providing co-ordinated display of direction and distance G01S 7/62)
5/30 . . Determining absolute distances from a plurality of spaced points of known location

7/00 Details of systems according to groups G01S 13/00, G01S 15/00, G01S 17/00

7/003 . {Transmission of data between radar, sonar or lidar systems and remote stations (in general G08C)}
7/006 . . {using shared front-end circuitry, e.g. antennas (G01S 13/765, G01S 13/825 take precedence)}
7/02 . of systems according to group G01S 13/00
7/021 . . {Auxiliary means for detecting or identifying radar signals or the like, e.g. radar jamming signals (multi-channel PRF-analysers, per se G01R 23/155)}
7/022 . . . {Road traffic radar detectors}
7/023 . . {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 7/021)}
7/024 . . {using polarisation effects (in waveguides H01P 1/165; for aerials H01Q, e.g. H01Q 15/22, H01Q 15/24, H01Q 19/195)}
7/025 . . . {involving the transmission of linearly polarised waves}
7/026 . . . {involving the transmission of elliptically or circularly polarised waves}
2007/027 . . {Housing details, e.g. form, type, material, ruggedness}
2007/028 . . . {involving miniaturizing aspects, e.g. surface mounted device [SMD] packaging or housing}
7/03 . . Details of HF subsystems specially adapted therefor, e.g. common to transmitter and receiver
7/032 . . . {Constructional details for solid-state radar subsystems}
7/034 . . . {Duplexers (switching devices for waveguides H01P 1/10; transmit-receive switching in transceivers H04B 1/44)}
7/036 . . . . {involving a transfer mixer (mixers in general, H03D 7/00)}
7/038 . . . {Feedthrough nulling circuits}
7/04 . . Display arrangements
7/043 . . . {Synchronising the display device with the scanning of the antenna}
7/046 . . . {using an intermediate storage device, e.g. a recording/reproducing device (video recording in general H04N)}

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 RHI, 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 [ECCM] (G01S 7/2813 takes precedence; identification of radar jamming signals G01S 7/021; random interference pulse cancellers G01S 7/2928)}
7/38 . . Jamming means, e.g. producing false echoes {(identification of radar signals G01S 7/021)}
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}

2007/4086 . . . . . {in a calibrating environment, e.g. anechoic chamber}
2007/4091 . . . . . {during normal radar operation}
2007/4095 . . . . . {the external reference signals being modulated, e.g. rotating dihedral reflector or modulating transponder for simulation of a Doppler echo etc.}
7/41 . . using analysis of echo signal for target characterisation; Target signature; Target cross-section
7/411 . . . {Identification of targets based on measurements of radar reflectivity (G01S 7/415 takes precedence)}
7/412 . . . . {based on a comparison between measured values and known or stored values}
7/414 . . . {Discriminating targets with respect to background clutter}
7/415 . . . {Identification of targets based on measurements of movement associated with the target}
7/417 . . . {involving the use of neural networks}
7/418 . . . {Theoretical aspects}
7/42 . . Diversity systems specially adapted for radar
7/48 . 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 . . . {involving 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 . . . {involving a reference ground return}
2007/52014 . . . {involving 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 reflexivity 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)}

7/52028 . . . . . {using digital techniques}
7/5203 . . . . {for non-pulse systems, e.g. CW systems (G01S 7/52034 takes precedence)}
7/52031 . . . . . {Extracting wanted echo signals}
7/52033 . . . . {Gain control of receivers (for seismic signals G01V 1/245)}
7/52034 . . . . {Data rate converters}
7/52036 . . . . {using analysis of echo signal for target characterisation}
7/52038 . . . . . {involving non-linear properties of the propagation medium or of the reflective target}
7/52039 . . . . . {exploiting the non-linear response of a contrast enhancer, e.g. a contrast agent (diagnostic techniques involving the use of contrast agents A61B 8/481)}
7/52041 . . . . . {detecting modification of a contrast enhancer, e.g. detecting the destruction of a contrast agent by an acoustic wave, e.g. loss of correlation (diagnostic techniques involving the use of contrast agents A61B 8/481)}
7/52042 . . . . . {determining elastic properties of the propagation medium or of the reflective target (diagnostic techniques involving the measurement of strain A61B 8/485)}
7/52044 . . . . {Scan converters}
7/52046 . . . {Techniques for image enhancement involving transmitter or receiver (image enhancement by image data processing G06T 5/00)}
7/52047 . . . . {for elimination of side lobes or of grating lobes; for increasing resolving power (beam formers in general G10K 11/34)}
7/52049 . . . . {using correction of medium-induced phase aberration}
7/5205 . . . {Means for monitoring or calibrating}
7/52052 . . . . {with simulation of echoes}
7/52053 . . . {Display arrangements}
7/52055 . . . . {in association with ancillary recording equipment}
7/52057 . . . . {Cathode ray tube displays (cathode ray oscilloscopes in general G01R 13/20)}
7/52058 . . . . . {displaying one measured variable; A-scan display}
7/5206 . . . . . {Two-dimensional coordinated display of distance and direction; B-scan display}
7/52061 . . . . . {Plan position indication (PPI display); C-scan display}
7/52063 . . . . . {Sector scan display}
7/52065 . . . . . {Compound scan display, e.g. panoramic imaging}
7/52066 . . . . . {Time-position or time-motion displays}
7/52068 . . . . . {Stereoscopic displays; Three-dimensional displays; Pseudo 3D displays (G01S 15/8993 takes precedence)}
7/52069 . . . . . {Grey-scale displays}
7/52071 . . . . . {Multicolour displays; using colour coding; Optimising colour or information content in displays, e.g. parametric imaging}
7/52073 . . . . . {Production of cursor lines, markers or indicia by electronic means}
7/52074 . . . . . {Composite displays, e.g. split-screen displays; Combination of multiple images or of images and alphanumeric tabular information}
7/52076 . . . {Luminous indicators}
7/52077 . . . {with means for elimination of unwanted signals, e.g. noise or interference}
7/52079 . . . {Constructional features (constructional features of transducers B06B; mounting transducers G10K 11/00; constructional features of ultrasonic medical diagnostic devices A61B 8/44)}
7/5208 . . . . {with integration of processing functions inside probe or scanhead}
7/52082 . . . . {involving a modular construction, e.g. a computer with short range imaging equipment (modular ultrasonic medical diagnostic devices A61B 8/4411)}
7/52084 . . . . {related to particular user interfaces (special user input means for ultrasonic medical diagnostic devices A61B 8/467)}
7/52085 . . . {Details related to the ultrasound signal acquisition, e.g. scan sequences (control of medical diagnostic ultrasound devices A61B 8/54)}
7/52087 . . . . {using synchronization techniques (control of medical diagnostic ultrasound devices involving acquisition triggered by a physiological signal A61B 8/543)}
7/52088 . . . . . {involving retrospective scan line rearrangements (medical diagnostic ultrasound devices involving retrospective matching to a physiological signal A61B 8/5284)}
7/5209 . . . . {using multibeam transmission}
7/52092 . . . . . {using frequency diversity}
7/52093 . . . . . {using coded signals (G01S 15/8959 takes precedence)}
7/52095 . . . . {using multiline receive beamforming}
7/52096 . . . {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)}
7/52098 . . . {related to workflow protocols}
7/521 . . Constructional features {(constructional features of transducers B06B; mounting transducers G10K 11/00)}
7/523 . . Details of pulse systems {(short-range imaging G01S 7/52017; methods or devices for transmitting, conducting or directing sound G10K 11/18)}
7/524 . . . Transmitters
7/526 . . . Receivers
7/527 . . . . Extracting wanted echo signals {(Doppler systems G01S 15/50)}
7/5273 . . . . . {using digital techniques}
7/5276 . . . . . {using analogue techniques}
7/529 . . . . Gain of receiver varied automatically during pulse-recurrence period {(for seismic signals G01V 1/245)}
7/53 . . . . Means for transforming coordinates or for evaluating data, e.g. using computers
7/531 . . . . . Scan converters

7/533 . . . . . Data rate converters
7/534 . . Details of non-pulse systems {(short-range imaging G01S 7/52017)}
7/5345 . . . {Gain control of receivers (for seismic signals G01V 1/245)}
7/536 . . . Extracting wanted echo signals
7/537 . . Counter-measures or counter-counter-measures, e.g. jamming, anti-jamming {(in general H04K)}
7/539 . . using analysis of echo signal for target characterisation; Target signature; Target cross-section
7/54 . . with receivers spaced apart
7/56 . . Display arrangements {(short-range imaging G01S 7/52053)}
7/58 . . . for providing variable ranges
7/60 . . . for providing a permanent recording
7/62 . . . Cathode-ray tube displays {or other two-dimensional or three-dimensional displays}
7/6209 . . . . {providing display of one measured variable}
7/6218 . . . . {providing two-dimensional coordinated display of distance and direction}
7/6227 . . . . . {Plan-position indicators, i.e. P.P.I.}
7/6236 . . . . . {Sector-scan displays}
7/6245 . . . . {Stereoscopic displays; Three-dimensional displays; Pseudo-three dimensional displays}
7/6254 . . . . . {Grey-scale displays}
7/6263 . . . . {in which different colours are used}
7/6272 . . . . {producing cursor lines and indicia by electronic means}
7/6281 . . . . {Composite displays, e.g. split-screen, multiple images}
7/629 . . . . {the display being oriented or displaced in accordance with the movement of object carrying the transmitting and receiving apparatus}
7/64 . . Luminous indications (G01S 7/62 takes precedence {; short-range imaging G01S 7/52076})

11/00 Systems for determining distance or velocity not using reflection or reradiation (direction-finders G01S 3/00; position-fixing by co-ordinating two or more distance determinations G01S 5/00)

11/02 . using radio waves (G01S 19/00 takes precedence)
11/023 . . {using impedance elements varying with distance}
11/026 . . {using moving transmitters}
11/04 . . using angle measurements
11/06 . . using intensity measurements
11/08 . . using synchronised clocks (synchronisation of electronic clocks G04G 7/02)
11/10 . . using Doppler effect
11/12 . using electromagnetic waves other than radio waves
11/125 . . {using gamma or X-rays}
11/14 . using ultrasonic, sonic, or infrasonic waves
11/16 . using difference in transit time between electrical and acoustic signals

13/00 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.

13/003 . {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 . . . {Antistealth 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-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
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
2013/462 . . . . {using multipath signals}
2013/464 . . . . . {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}
2013/466 . . . . {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}
2013/468 . . . . {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}

13/48 . . . . using multiple beams at emission or reception

13/50 . . Systems of measurement based on relative movement of target

13/505 . . . {using Doppler effect for determining closest range to a target or corresponding time, e.g. miss-distance indicator (proximity fuze see F42C 13/04; miss-distance indicators in general F41J 5/12)}

13/52 . . . Discriminating between fixed and moving objects or between objects moving at different speeds {(coherent receivers G01S 7/288)}

13/522 . . . . using transmissions of interrupted pulse modulated waves

13/524 . . . . . based upon the phase or frequency shift resulting from movement of objects, with reference to the transmitted signals, e.g. coherent MTI (coherent receivers G01S 7/288)

13/5242 . . . . . {with means for platform motion or scan motion compensation, e.g. airborne MTI}

13/5244 . . . . . {Adaptive clutter cancellation (specially adapted for airborne MTI, G01S 13/5242)}

13/5246 . . . . . {post processors for coherent MTI discriminators, e.g. residue cancellers, CFAR after Doppler filters}

13/5248 . . . . . {combining a coherent MTI processor with a zero Doppler processing channel and a clutter mapped memory, e.g. MTD (Moving target detector), (area MTI G01S 13/538)}

13/526 . . . . . performing filtering on the whole spectrum without loss of range information, e.g. using delay line cancellers or comb filters {(G01S 13/5244 takes precedence)}

13/5265 . . . . . {IF cancellers, e.g. TACCAR systems}

13/528 . . . . . with elimination of blind speeds

13/53 . . . . . performing filtering on a single spectral line and associated with one or more range gates with a phase detector or a frequency mixer to extract the Doppler information, e.g. pulse Doppler radar {(G01S 13/5244 takes precedence)}

13/532 . . . . . using a bank of range gates or a memory matrix

13/534 . . . . . based upon amplitude or phase shift resulting from movement of objects, with reference to the surrounding clutter echo signal, e.g. non coherent MTi, clutter referenced MTi, externally coherent MTi

13/536 . . . . using transmission of continuous unmodulated waves, amplitude-, frequency-, or phase-modulated waves

13/538 . . . . eliminating objects that have not moved between successive antenna scans, e.g. area MTi

13/56 . . . . 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)}

13/58 . . . Velocity or trajectory determination systems; Sense-of-movement determination systems {(systems applied to the controlling of traffic G01S 13/92)}

13/581 . . . . {using transmission of interrupted pulse modulated waves and based upon the Doppler effect resulting from movement of targets}

13/582 . . . . . {adapted for simultaneous range and velocity measurements}

13/583 . . . . {using transmission of continuous unmodulated waves, amplitude-, frequency-, or phase-modulated waves and based upon the Doppler effect resulting from movement of targets}

13/584 . . . . . {adapted for simultaneous range and velocity measurements}

13/585 . . . . {processing the video signal in order to evaluate or display the velocity value}

13/586 . . . . . {using, or combined with, frequency tracking means}

13/587 . . . . . {using optical means (optical computing devices in general G06E)}

13/588 . . . . {deriving the velocity value from the range measurement}

13/589 . . . . {measuring the velocity vector}

13/60 . . . . wherein the transmitter and receiver are mounted on the moving object, e.g. for determining ground speed, drift angle, ground track (G01S 13/64 takes precedence)

13/605 . . . . . {using a pattern, backscattered from the ground, to determine speed or drift by measuring the time required to cover a fixed distance}

13/62 . . . . Sense-of-movement determination {(G01S 13/589 takes precedence)}

13/64 . . . . Velocity measuring systems using range gates

13/66 . Radar-tracking systems; Analogous systems where the wavelength or the kind of wave is irrelevant

13/68 . . for angle tracking only

13/685 . . . {using simultaneous lobing techniques}

13/70 . . for range tracking only

13/72 . . for two-dimensional tracking, e.g. combination of angle and range tracking, track-while-scan radar

13/723 . . . {by using numerical data}

13/726 . . . . {Multiple target tracking}

13/74 . Systems using reradiation of radio waves, e.g. secondary radar systems; Analogous systems

13/75 . . using transponders powered from received waves, e.g. using passive transponders {, or using passive reflectors}

13/751 . . . {wherein the responder or reflector radiates a coded signal}

13/753 . . . . {using frequency selective elements, e.g. resonator}

13/755 . . . . {using delay lines, e.g. acoustic delay lines}

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)}

13/781 . . . . {Secondary Surveillance Radar [SSR] in general}

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}

13/9011 . . . . . {with frequency domain processing of the SAR signals in azimuth (G01S 13/9005 takes precedence)}

13/9017 . . . . . {with time domain processing of the SAR signals in azimuth (G01S 13/9005 takes precedence)}

13/9019 . . . . . {Auto-focussing 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.

13/9021 . . . . {SAR image post-processing techniques}

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.

13/9023 . . . . . {combined with interferometric techniques}

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.

13/9027 . . . . . {Pattern recognition for feature extraction}

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.

13/9029 . . . . . {specially adapted for moving target detection within a single SAR image or within multiple SAR images taken at the same time}

13/904 . . . . {SAR modes}

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.

13/9041 . . . . . {Squint mode}

13/9043 . . . . . {Forward-looking SAR}

13/9047 . . . . . {Doppler beam sharpening mode}

13/9052 . . . . . {Spotlight mode}

13/9054 . . . . . {Stripmap mode}

WARNING

Group G01S 13/9054 is incomplete pending reclassification of documents from groups G01S 13/90 and G01S 13/904.

Groups G01S 13/90, G01S 13/904 and G01S 13/9056 should be considered in order to perform a complete search.

13/9056 . . . . . {Scan SAR mode}

WARNING

Group G01S 13/9056 is incomplete pending reclassification of documents from groups G01S 13/90 and G01S 13/904.

Groups G01S 13/90 and G01S 13/904 and G01S 13/9056 should be considered in order to perform a complete search.

13/9058 . . . . . {Bistatic or multistatic SAR}

13/9064 . . . . . {Inverse SAR [ISAR]}

13/9076 . . . . . {Polarimetric features in SAR}

13/9082 . . . . . {Rotating SAR [ROSAR]}

13/9088 . . . . . {Circular SAR [CSAR, C-SAR]}

13/9089 . . . . . {SAR having an irregular aperture}

WARNING

Group G01S 13/9089 is incomplete pending reclassification of documents from group G01S 13/90.

Groups G01S 13/90 and G01S 13/9089 should be considered in order to perform a complete search.

13/9092 . . . . . {combined with monopulse techniques}

WARNING

Group G01S 13/9092 is incomplete pending reclassification of documents from group G01S 13/9023.

Groups G01S 13/9023 and G01S 13/9092 should be considered in order to perform a complete search.

13/9094 . . . . {Theoretical aspects}

13/91 . . for traffic control (G01S 13/93 takes precedence)

WARNING

Group G01S 13/91 is impacted by reclassification into group G01S 13/917.

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

13/913 . . . {for landing purposes}

2013/916 . . . {Airport surface monitoring [ASDE]}

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 taxiing
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 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.

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}
15/89 . . 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)}

15/8972 . . . . . {with optical reconstruction of the image}
15/8975 . . . . . {using acoustical image/electron beam converter tubes (tubes therefor H01J 31/495)}
15/8977 . . . . {using special techniques for image reconstruction, e.g. FFT, geometrical transformations, spatial deconvolution, time deconvolution (digital image processing per se G06T 1/00)}
15/8979 . . . . {Combined Doppler and pulse-echo imaging systems}
15/8981 . . . . . {Discriminating between fixed and moving objects or between objects moving at different speeds, e.g. wall clutter filter}
15/8984 . . . . . {Measuring the velocity vector}
15/8986 . . . . . {with measures taken for suppressing velocity ambiguities, i.e. anti-aliasing}
15/8988 . . . . . {Colour Doppler imaging}
15/899 . . . . {Combination of imaging systems with ancillary equipment}
15/8993 . . . . {Three dimensional imaging systems}
15/8995 . . . . {Combining images from different aspect angles, e.g. spatial compounding}
15/8997 . . . . {using synthetic aperture techniques}
15/93 . . for anti-collision purposes
15/931 . . . of land vehicles
2015/932 . . . . {for parking operations}
2015/933 . . . . . {for measuring the dimensions of the parking space when driving past}
2015/934 . . . . . {for measuring the depth, i.e. width, not length, of the parking space}
2015/935 . . . . . {for measuring the contour, e.g. a trajectory of measurement points, representing the boundary of the parking space}
2015/936 . . . . . {for measuring parking spaces extending transverse or diagonal to the driving direction, i.e. not parallel to the driving direction}
2015/937 . . . . {sensor installation details (constructional features of transducers G01S 7/521 and B06B; casing of transducers, e.g. housing, cover or filler details, G10K 9/22; mounting of transducers, i.e. fixture, fitting or holder details, G10K 11/004)}
2015/938 . . . . . {in the bumper area (radar in bumper area G01S 2013/93275; bumper with obstacle sensor of electric or electronic type B60R 19/483)}
2015/939 . . . . . {vertical stacking of sensors, e.g. to enable obstacle height determination}
15/96 . . for locating fish

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}
17/02 . Systems using the reflection of electromagnetic waves other than radio waves (G01S 17/66 takes precedence)
17/04 . . Systems determining the presence of a target
17/06 . . Systems determining position data of a target
17/08 . . . for measuring distance only (indirect measurement G01S 17/46; active triangulation systems G01S 17/48; passive systems using a parallactic triangle G01C 3/10, G01C 3/22, G01C 3/24, G01C 3/26)
17/10 . . . . using transmission of interrupted pulse-modulated waves (determination of distance by phase measurements G01S 17/32)
17/14 . . . . . wherein a voltage or current pulse is initiated and terminated in accordance with the pulse transmission and echo reception respectively, e.g. using counters
17/18 . . . . . wherein range gates are used
17/26 . . . . . wherein the transmitted pulses use a frequency-modulated or phase-modulated carrier wave, e.g. for pulse compression of received signals
17/32 . . . . using transmission of continuous unmodulated waves, amplitude-, frequency-, or phase-modulated waves
17/34 . . . . . using transmission of continuous 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
17/36 . . . . . with phase comparison between the received signal and the contemporaneously transmitted signal
17/42 . . . Simultaneous measurement of distance and other co-ordinates (indirect measurement G01S 17/46)
17/46 . . . Indirect determination of position data
17/48 . . . . Active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves (passive systems using a parallactic triangle G01C 3/10, G01C 3/22, G01C 3/24, G01C 3/26; active systems for automatic generation of focusing signals G02B 7/32)
17/50 . . Systems of measurement based on relative movement of target
17/58 . . . Velocity or trajectory determination systems; Sense-of-movement determination systems
17/66 . Tracking systems using electromagnetic waves other than radio waves
17/74 . Systems using reradiation of electromagnetic waves other than radio waves, e.g. IFF, i.e. identification of friend or foe
17/86 . Combinations of lidar systems with systems other than lidar, radar or sonar, e.g. with direction finders
17/87 . Combinations of systems using electromagnetic waves other than radio waves
17/875 . . for determining attitude
17/88 . Lidar systems specially adapted for specific applications

17/89 . . 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.

17/894 . . . 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.

17/90 . . . using synthetic aperture techniques

17/93 . . for anti-collision purposes

17/931 . . . of land vehicles

17/933 . . . of aircraft or spacecraft

17/95 . . for meteorological use

19/00 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 mimicing of GPS satellites (or of other navigation satellites) by other transceivers.
- WAAS = Wide Area Augmentation System

19/01 . Satellite radio beacon positioning systems transmitting time-stamped messages, e.g. GPS [Global Positioning System], GLONASS [Global Orbiting Navigation Satellite System] or GALILEO

19/015 . . {Arrangements for jamming, spoofing or other methods of denial of service of such systems}

19/02 . . Details of the space or ground control segments

19/03 . . 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.

19/04 . . . providing carrier phase data

19/05 . . . providing aiding information

19/06 . . . . employing an initial estimate of the location of the receiver as aiding data or in generating aiding data

19/07 . . . 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.

19/071 . . . . {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.

19/072 . . . . {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.

19/073 . . . . {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.

19/074 . . . . . {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.

19/08 . . . providing integrity information, e.g. health of satellites or quality of ephemeris data

19/09 . . . providing processing capability normally carried out by the receiver

19/10 . . . 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

19/421 . . . . {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}

19/423 . . . . . {by combining or switching between position solutions derived from different satellite radio beacon positioning systems}

19/425 . . . . . {by combining or switching between signals derived from different satellite radio beacon positioning systems}

19/426 . . . . . {by combining or switching between position solutions or signals derived from different modes of operation in a single system}

19/428 . . . . {using multipath or indirect path propagation signals in position determination}

19/43 . . . . using carrier phase measurements, e.g. kinematic positioning; using long or short baseline interferometry

19/44 . . . . . Carrier phase ambiguity resolution; Floating ambiguity; LAMBDA [Least-squares AMBiguity Decorrelation Adjustment] method

19/45 . . . . by combining measurements of signals from the satellite radio beacon positioning system with a supplementary measurement

19/46 . . . . . the supplementary measurement being of a radio-wave signal type

19/47 . . . . . 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.

19/48 . . . . by combining or switching between position solutions derived from the satellite radio beacon positioning system and position solutions derived from a further system

19/49 . . . . . 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.

19/50 . . . . 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.

19/51 . . . . Relative positioning

19/52 . . . Determining velocity

19/53 . . . Determining attitude

19/54 . . . . using carrier phase measurements; using long or short baseline interferometry

19/55 . . . . . Carrier phase ambiguity resolution; Floating ambiguity; LAMBDA [Least-squares AMBiguity Decorrelation Adjustment] method

2201/00 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.

2201/01 . 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.

2201/02 . . 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.

2201/025 . . . 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.

2201/03 . . 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.

2201/04 . . 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.

2201/05 . . 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.

2201/06 . . 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.

2201/07 . . 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.

2201/08 . . 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.

2205/00 Indexing scheme associated with group G01S 5/00, relating to position-fixing

2205/001 . Transmission of position information to remote stations

2205/002 . . for traffic control, mobile tracking, guidance, surveillance or anti-collision

2205/003 . . . for aircraft positioning relative to the ground

2205/005 . . . for aircraft positioning relative to other aircraft

2205/006 . . for emergency situations

2205/007 . . for management of a communication system

2205/008 . . using a mobile telephone network