CPC   COOPERATIVE PATENT CLASSIFICATION

G   PHYSICS
(NOTES omitted)

INSTRUMENTS

G01   MEASURING; TESTING
(NOTES omitted)

G01V   GEOPHYSICS; GRAVITATIONAL MEASUREMENTS; DETECTING MASSES OR OBJECTS; TAGS (means for indicating the location of accidentally buried, e.g. snow-buried, persons A63B 29/02)

NOTES

1. This subclass covers radar, sonar, lidar or analogous systems specifically designed for geophysical use. Radar, sonar, lidar or analogous systems, or details of such systems, if of a general interest, are also classified in subclass G01S.
2. In this subclass, the following term is used with the meaning indicated:
   • "tags" means arrangements cooperating with a detecting field, e.g. near field, and designed to produce a specific detectable effect; "tags" also means active markers capable of generating a detectable field.
3. In this subclass, the geophysical methods apply both to the earth and to other celestial objects, e.g. planets.
4. Attention is drawn to the Notes following the title of class G01.

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

   G01V 3/11   covered by   G01V 3/101, G01V 3/104
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   **Seismology; Seismic or acoustic prospecting or detecting**

NOTE

Groups G01V 1/44 - G01V 1/52 take precedence over groups G01V 1/001 - G01V 1/393 G01V 1/42

1/001   . {Acoustic presence detection}
1/003   . {Seismic data acquisition in general, e.g. survey design (G01V 1/3808, G01V 1/42 take precedence)}
1/005   . . {with exploration systems emitting special signals, e.g. frequency swept signals, pulse sequences or slip sweep arrangements}
1/006   . . {generating single signals by using more than one generator, e.g. beam steering or focusing arrays (G01V 1/13, G01V 1/3861 take precedence)}
1/01   . Measuring or predicting earthquakes
1/02   . Generating seismic energy {(G01V 1/003 takes precedence)}
1/04   . . Details
1/047   . . . Arrangements for coupling the generator to the ground
1/0475   . . . . {for controlling "Ground Force"}
1/053   . . . . for generating transverse waves
1/06   . . . Ignition devices (G01V 1/393 takes precedence)
1/08   . . . . involving time-delay devices
1/09   . . . Transporting arrangements, e.g. on vehicles (G01V 1/38 takes precedence)

1/104   . . using explosive charges (G01V 1/157 takes precedence)
1/108   . . . by deforming or displacing surfaces of enclosures
1/112   . . . . for use on the surface of the earth
1/116   . . . where pressurised combustion gases escape from the generator in a pulsating manner, e.g. for generating bursts
1/13   . . . Arrangements or disposition of charges to produce a desired pattern in space or time
1/133   . . using fluidic driving means, e.g. highly pressurised fluids; {using implosion}(G01V 1/104 takes precedence)
1/135   . . . by deforming or displacing surfaces of enclosures {, e.g. by hydraulically driven vibroseis™}
1/137   . . . which fluid escapes from the generator in a pulsating manner, e.g. for generating bursts {, airguns}
1/143   . . using mechanical driving means {, e.g. motor driven shaft}(G01V 1/104, G01V 1/133 take precedence)
1/145   . . . by deforming or displacing surfaces {, e.g. by mechanically driven vibroseis™}
1/147   . . . using impact of dropping masses
1/153   . . . using rotary unbalanced masses
1/155   . . . using reciprocating masses
1/157   . . using spark discharges; using exploding wires

1/159	. . {using piezoelectric or magnetostrictive driving means (generating mechanical vibrations by using piezoelectric or magnetostrictive effect in general, B06B 1/06, B06B 1/08)}
1/16	. Receiving elements for seismic signals; Arrangements or adaptations of receiving elements
1/162	. . {Details}
1/164	. . . {Circuits therefore}
1/166	. . . {Arrangements for coupling receivers to the ground}
1/168	. . {Deployment of receiver elements (G01V 1/3843 takes precedence)}
1/18	. . Receiving elements, e.g. seismometer, geophone {or torque detectors, for localised single point measurements}
1/181	. . . {Geophones}
1/182	. . . . {with moving coil}
1/183	. . . . {with moving magnet}
1/184	. . . . {Multi-component geophones}
1/185	. . . . {with adaptable orientation, e.g. gimballed}
1/186	. . . {Hydrophones}
1/187	. . . . {Direction-sensitive hydrophones}
1/188	. . . . {with pressure compensating means}
1/189	. . . {Combinations of different types of receiving elements}
1/20	. . Arrangements of receiving elements, e.g. geophone pattern
1/201	. . . {Constructional details of seismic cables, e.g. streamers (integrated optoseismic systems G01V 1/226; line connectors in general H01R, transducer mountings in general G10K 11/004)}
1/202	. . . . {Connectors, e.g. for force, signal or power}
2001/204	. . . . {Reinforcements, e.g. by tensioning cables}
2001/205	. . . . {Internal damping}
2001/207	. . . . {Buoyancy}
1/208	. . . . {having a continuous structure (detecting traffic G08G, transducers in general G10K)}
1/22	. Transmitting seismic signals to recording or processing apparatus
1/223	. . {Radioseismic systems}
1/226	. . {Optoseismic systems}
1/24	. Recording seismic data
1/242	. . {Seismographs}
1/245	. . {Amplitude control for seismic recording (control of amplification in general H03G)}
1/247	. . {Digital recording of seismic data, e.g. in acquisition units or nodes}
1/26	. Reference-signal-transmitting devices, e.g. indicating moment of firing of shot
1/28	. Processing seismic data, e.g. for interpretation or for event detection (G01V 1/48 takes precedence)
1/282	. . {Application of seismic models, synthetic seismograms}
1/284	. . {Application of the shear wave component and/or several components of the seismic signal}
1/286	. . . {Mode conversion}
1/288	. . {Event detection in seismic signals, e.g. microseismics (G01V 1/36 takes precedence)}
1/30	. . Analysis (G01V 1/50 takes precedence)
1/301	. . . {for determining seismic cross-sections or geostructures}
1/302	. . . . {in 3D data cubes}
1/303	. . . {for determining velocity profiles or travel times}
1/305	. . . . {Travel times}
1/306	. . . {for determining physical properties of the subsurface, e.g. impedance, porosity or attenuation profiles}
1/307	. . . {for determining seismic attributes, e.g. amplitude, instantaneous phase or frequency, reflection strength or polarity}
1/308	. . . {Time lapse or 4D effects, e.g. production related effects to the formation (fluid flow per se E21B 47/00)}
1/32	. . Transforming one recording into another {or one representation into another}
1/325	. . . {Transforming one representation into another}
1/34	. . Displaying seismic recordings {or visualisation of seismic data or attributes}
1/345	. . . {Visualisation of seismic data or attributes, e.g. in 3D cubes}
1/36	. . Effecting static or dynamic corrections on records, e.g. correcting spread; Correlating seismic signals; Eliminating effects of unwanted energy
1/362	. . . {Effecting static or dynamic corrections; Stacking}
1/364	. . . {Seismic filtering (G01V 1/37 takes precedence)}
1/366	. . . . {by correlation of seismic signals}
1/368	. . . . {Inverse filtering}
1/37	. . . specially adapted for seismic systems using continuous agitation of the ground {, e.g. using pulse compression of frequency swept signals for enhancement of received signals}
1/375	. . . . {Correlating received seismic signals with the emitted source signal}
1/38	. specially adapted for water-covered areas (G01V 1/28 takes precedence)
1/3808	. . {Seismic data acquisition, e.g. survey design}
1/3817	. . {Positioning of seismic devices}
1/3826	. . . {dynamic steering, e.g. by paravanes or birds}
1/3835	. . . {measuring position, e.g. by GPS or acoustically}
1/3843	. . {Deployment of seismic devices, e.g. of streamers (equipment for marine deployment in general B63B)}
1/3852	. . . {to the seabed}
1/3861	. . {control of source arrays, e.g. for far field control}
1/387	. . Reducing secondary bubble pulse, i.e. reducing the detected signals resulting from the generation and release of gas bubbles after the primary explosion
1/393	. . Means for loading explosive underwater charges, e.g. combined with ignition devices
1/40	. specially adapted for well-logging
1/42	. . using generators in one well and receivers elsewhere or vice versa (G01V 1/52 takes precedence)
1/44	. . using generators and receivers in the same well (G01V 1/52 takes precedence)
1/46	. . . Data acquisition
1/48	. . . Processing data
1/50	. . . . Analysing data
1/52	. . Structural details

1/523	. . .	{Damping devices}
2001/526	. . .	{Mounting of transducers}

3/00 **Electric or magnetic prospecting or detecting; Measuring magnetic field characteristics of the earth, e.g. declination, deviation**

3/02	.	operating with propagation of electric current
3/04	. .	using dc
3/06	. .	using ac
3/08	.	operating with magnetic or electric fields produced or modified by objects or geological structures or by detecting devices (with electromagnetic waves G01V 3/12)
3/081	. .	{the magnetic field is produced by the objects or geological structures (characterised by the method of magnetic field measurement G01R 33/00)}
3/082	. .	{operating with fields produced by spontaneous potentials, e.g. electrochemical or produced by telluric currents (G01V 3/26 takes precedence)}
3/083	. .	{Controlled source electromagnetic [CSEM] surveying}
2003/084	. . .	{Sources}
2003/085	. . .	{Receivers}
2003/086	. . .	{Processing}
3/087	. .	{the earth magnetic field being modified by the objects or geological structures}
3/088	. .	{operating with electric fields (G01V 3/082 takes precedence)}
3/10	. .	using induction coils
3/101	. . .	{by measuring the impedance of the search coil; by measuring features of a resonant circuit comprising the search coil (measuring impedance or characteristics derived therefrom G01R 27/00, e.g. quality factor G01R 27/26)}
3/102	. . . .	{by measuring amplitude}
3/104	. . .	{using several coupled or uncoupled coils (G01V 3/101 takes precedence)}
3/105	. . . .	{forming directly coupled primary and secondary coils or loops}
3/107	. . . . .	{using compensating coil or loop arrangements}
3/108	. . . .	{the emitter and the receiver coils or loops being uncoupled by positioning them perpendicularly to each other}
3/12	.	operating with electromagnetic waves {(operating with millimetre waves G01V 8/005)}
3/14	.	operating with electron or nuclear magnetic resonance
3/15	.	specially adapted for use during transport, e.g. by a person, vehicle or boat
3/16	. .	specially adapted for use from aircraft (G01V 3/165 - G01V 3/175 take precedence)
3/165	. .	operating with magnetic or electric fields produced or modified by the object or by the detecting device (with electromagnetic waves G01V 3/17)
3/17	. .	operating with electromagnetic waves {(operating with millimetre waves G01V 8/005)}
3/175	. .	operating with electron or nuclear magnetic resonance
3/18	.	specially adapted for well-logging
3/20	. .	operating with propagation of electric current
3/22	. . .	using dc
3/24	. . .	using ac

3/26	. .	operating with magnetic or electric fields produced or modified either by the surrounding earth formation or by the detecting device (with electromagnetic waves G01V 3/30)
3/265	. . .	{Operating with fields produced by spontaneous potentials, e.g. electrochemicals or produced by telluric currents}
3/28	. . .	using induction coils
3/30	. .	operating with electromagnetic waves
3/32	. .	operating with electron or nuclear magnetic resonance
3/34	. .	Transmitting data to recording or processing apparatus; Recording data
3/36	.	Recording data (G01V 3/34 takes precedence)
3/38	.	Processing data, e.g. for analysis, for interpretation, for correction
3/40	.	specially adapted for measuring magnetic field characteristics of the earth

5/00 **Prospecting or detecting by the use of ionising radiation, e.g. of natural or induced radioactivity**

5/02	.	specially adapted for surface logging, e.g. from aircraft
5/025	. .	{specially adapted for use from aircraft}
5/04	.	specially adapted for well-logging
5/045	. .	{Transmitting data to recording or processing apparatus; Recording data}
5/06	. .	for detecting naturally radioactive minerals
5/08	. .	using primary nuclear radiation sources or X-rays {(, e.g. for inducing radioactivity; investigating or analysing materials by the use of wave or particle radiation, e.g. X-rays, neutrons G01N 23/00)}
5/085	. . .	{using another radioactive source}
5/10	. . .	using neutron sources {(neutron generating tubes H05H 5/00; neutron sources using isotopes G21G 4/00)}
5/101	. . . .	{and detecting the secondary Y-rays produced in the surrounding layers of the bore hole}
5/102	. . . . .	{the neutron source being of the pulsed type}
5/104	. . . .	{and detecting secondary Y-rays as well as reflected or back-scattered neutrons}
5/105	. . . . .	{the neutron source being of the pulsed type}
5/107	. . . .	{and detecting reflected or back-scattered neutrons}
5/108	. . . . .	{the neutron source being of the pulsed type}
5/12	. . .	using gamma or X-ray sources {(gamma sources using isotopes G21G 4/00; X-ray tubes H01J 35/00)}
5/125	. . . .	{and detecting the secondary gamma- or X-rays in different places along the bore hole}
5/14	. . .	using a combination of several sources, e.g. a neutron and a gamma source
5/145	. . . .	{using a neutron source combined with a gamma- or X-ray source}
5/20	.	Detecting prohibited goods, e.g. weapons, explosives, hazardous substances, contraband or smuggled objects
5/22	. .	Active interrogation, i.e. by irradiating objects or goods using external radiation sources, e.g. using gamma rays or cosmic rays
5/222	. . .	measuring scattered radiation

5/223	. . .	{Mixed interrogation beams, e.g. using more than one type of radiation beam}
5/224	. . .	{Multiple energy techniques using one type of radiation, e.g. X-rays of different energies}
5/226	. . .	using tomography
5/228	. . .	{using stereoscopic means}
5/232	. . .	{having relative motion between the source, detector and object other than by conveyor (G01V 5/226 takes precedence)}
5/234	. . .	{Measuring induced radiation, e.g. thermal neutron activation analysis}
5/26	. .	Passive interrogation, i.e. by measuring radiation emitted by objects or goods
5/271	. .	{using a network, e.g. a remote expert, accessing remote data or the like}
5/281	. .	{detecting special nuclear material [SNM], e.g. Uranium-235, Uranium-233 or Plutonium-239}

7/00 **Measuring gravitational fields or waves; Gravimetric prospecting or detecting**

7/005	.	{using a resonating body or device, e.g. string (G01V 7/08 - G01V 7/12 take precedence; measuring resonant frequency of mechanical vibrations G01H 13/00; measuring frequency per se G01R 23/00)}
7/02	.	Details
7/04	. .	Electric, photoelectric, or magnetic indicating or recording means
7/06	. .	Analysis or interpretation of gravimetric records
7/08	.	using balances
7/10	. .	using torsion balances, e.g. Eötvös balance
7/12	.	using pendulums
7/14	.	using free-fall time
7/16	.	specially adapted for use on moving platforms, e.g. ship, aircraft

8/00 **Prospecting or detecting by optical means**

NOTE

This group covers the use of {millimetre waves,}infrared, visible or ultraviolet light.

8/005	.	{operating with millimetre waves, e.g. measuring the black losey radiation}
8/02	.	Prospecting
8/10	.	Detecting, e.g. by using light barriers (by reflection from the object G01S 17/00)
8/12	. .	using one transmitter and one receiver
8/14	. . .	using reflectors
8/16	. . .	using optical fibres
8/18	. . .	using mechanical scanning systems
8/20	. .	using multiple transmitters or receivers
8/22	. . .	using reflectors
8/24	. . .	using optical fibres
8/26	. . .	using mechanical scanning systems

9/00 **Prospecting or detecting by methods not provided for in groups G01V 1/00 - G01V 8/00**

9/002	.	{using fields or radiation detectable only by persons susceptible therefor, e.g. radio-esthesis, dowsing}
9/005	.	{by thermal methods, e.g. after generation of heat by chemical reactions}
9/007	.	{by detecting gases or particles representative of underground layers at or near the surface (analysing earth materials G01N 33/24; analysing gases per se G01N)}
9/02	.	Determining existence or flow of underground water

11/00 **Prospecting or detecting by methods combining techniques covered by two or more of main groups G01V 1/00 - G01V 9/00**

11/002	.	{Details, e.g. power supply systems for logging instruments, transmitting or recording data, specially adapted for well logging, also if the prospecting method is irrelevant (means for transmitting well survey signals E21B 47/12; signal transmission systems in general G08C; transmission in general H04B)}
11/005	. .	{Devices for positioning logging sondes with respect to the borehole wall (centralising devices for drilling rods or pipes E21B 17/10; setting or locking tools in boreholes E21B 23/00; locating objects in boreholes E21B 47/09)}
11/007	.	{using the seismo-electric effect}

13/00 **Manufacturing, calibrating, cleaning, or repairing instruments or devices covered by groups G01V 1/00 – G01V 11/00**

15/00 **Tags attached to, or associated with, an object, in order to enable detection of the object** (record carriers for use with machines having a detectable tag or marker G06K 19/00)

20/00 **Geomodelling in general**

NOTE

This group covers geomodelling or geomodels wherein no prospecting, detecting or measuring technique is specified or relevant.

99/00 **Subject matter not provided for in other groups of this subclass**

2200/00		**Details of seismic or acoustic prospecting or detecting in general**
2200/10	.	Miscellaneous details
2200/12	. .	Clock synchronization-related issues
2200/14	. .	Quality control
2200/16	. .	Measure-while-drilling or logging-while-drilling

2210/00		**Details of seismic processing or analysis**
2210/10	.	Aspects of acoustic signal generation or detection
2210/12	. .	Signal generation
2210/121	. . .	Active source
2210/1212	. . . .	Shot
2210/1214	. . . .	Continuous
2210/1216	. . . .	Drilling-related
2210/123	. . .	Passive source, e.g. microseismics
2210/1232	. . . .	Earthquakes
2210/1234	. . . .	Hydrocarbon reservoir, e.g. spontaneous or induced fracturing
2210/1236	. . . .	Acoustic daylight, e.g. cultural noise
2210/125	. . .	Virtual source
2210/127	. . .	Cooperating multiple sources
2210/129	. . .	Source location
2210/1291	. . . .	Air
2210/1293	. . . .	Sea

2210/1295	. . . .	Land surface
2210/1297	. . . .	Sea bed
2210/1299	. . . .	Subsurface, e.g. in borehole or below weathering layer or mud line
2210/14	. .	Signal detection
2210/142	. . .	Receiver location
2210/1421	. . . .	Air
2210/1423	. . . .	Sea
2210/1425	. . . .	Land surface
2210/1427	. . . .	Sea bed
2210/1429	. . . .	Subsurface, e.g. in borehole or below weathering layer or mud line
2210/144	. . .	with functionally associated receivers, e.g. hydrophone and geophone pairs
2210/16	. .	Survey configurations
2210/161	. . .	Vertical seismic profiling [VSP]
2210/163	. . .	Cross-well
2210/165	. . .	Wide azimuth
2210/167	. . .	Very long offset
2210/169	. . .	Sparse arrays
2210/20	.	Trace signal pre-filtering to select, remove or transform specific events or signal components, i.e. trace-in/trace-out (removing noise G01V 2210/32)
2210/21	. .	Frequency-domain filtering, e.g. band pass
2210/22	. .	Time-domain filtering
2210/23	. .	Wavelet filtering
2210/24	. .	Multi-trace filtering
2210/242	. . .	F-k filtering, e.g. ground roll
2210/244	. . .	Radon transform
2210/25	. .	Transform filter for merging or comparing traces from different surveys
2210/26	. .	Modulation or demodulation, e.g. for continuous sources
2210/27	. .	Other pre-filtering
2210/30	.	Noise handling (trace signal pre-filtering G01V 2210/20)
2210/32	. .	Noise reduction
2210/322	. . .	Trace stacking
2210/324	. . .	Filtering
2210/3242	. . . .	Flow noise
2210/3244	. . . .	Cultural noise
2210/3246	. . . .	Coherent noise, e.g. spatially coherent or predictable
2210/3248	. . . .	Incoherent noise, e.g. white noise
2210/34	. .	Noise estimation (quality control G01V 2200/14)
2210/36	. .	Noise recycling, i.e. retrieving non-seismic information from noise
2210/38	. .	Noise characterisation or classification
2210/40	.	Transforming data representation (for pre-filtering purposes G01V 2210/20)
2210/41	. .	Arrival times, e.g. of P or S wave or first break
2210/42	. .	Waveform, i.e. using raw or pre-filtered trace data
2210/43	. .	Spectral
2210/44	. .	F-k domain
2210/45	. .	F-x or F-xy domain
2210/46	. .	Radon transform
2210/47	. .	Slowness, e.g. tau-pi
2210/48	. .	Other transforms
2210/50	.	Corrections or adjustments related to wave propagation (noise handling G01V 2210/30)
2210/51	. .	Migration
2210/512	. . .	Pre-stack
2210/514	. . .	Post-stack
2210/52	. .	Move-out correction
2210/522	. . .	Dip move-out [DMO]
2210/53	. .	Statics correction, e.g. weathering layer or transformation to a datum
2210/532	. . .	Dynamic changes in statics, e.g. sea waves or tidal influences
2210/54	. .	Borehole-related corrections
2210/542	. . .	Casing
2210/544	. . .	Invasion zone
2210/55	. .	Array focusing; Phased arrays
2210/56	. .	De-ghosting; Reverberation compensation
2210/57	. .	Trace interpolation or extrapolation, e.g. for virtual receiver; Anti-aliasing for missing receivers
2210/58	. .	Media-related
2210/582	. . .	Dispersion
2210/584	. . .	Attenuation
2210/586	. . .	Anisotropic media
2210/588	. . .	Non-linear media
2210/59	. .	Other corrections
2210/60	.	Analysis
2210/61	. .	Analysis by combining or comparing a seismic data set with other data
2210/612	. . .	Previously recorded data, e.g. time-lapse or 4D
2210/6122	. . . .	Tracking reservoir changes over time, e.g. due to production
2210/6124	. . . . .	Subsidence, i.e. upwards or downwards
2210/614	. . .	Synthetically generated data
2210/616	. . .	Data from specific type of measurement
2210/6161	. . . .	Seismic or acoustic, e.g. land or sea measurements
2210/6163	. . . .	Electromagnetic
2210/6165	. . . .	Gravitational
2210/6167	. . . .	Nuclear
2210/6169	. . . .	using well-logging
2210/62	. .	Physical property of subsurface
2210/622	. . .	Velocity, density or impedance
2210/6222	. . . .	Velocity; travel time
2210/6224	. . . .	Density
2210/6226	. . . .	Impedance
2210/624	. . .	Reservoir parameters
2210/6242	. . . .	Elastic parameters, e.g. Young, Lamé or Poisson
2210/6244	. . . .	Porosity
2210/6246	. . . .	Permeability
2210/6248	. . . .	Pore pressure
2210/626	. . .	with anisotropy
2210/63	. .	Seismic attributes, e.g. amplitude, polarity, instant phase
2210/632	. . .	Amplitude variation versus offset or angle of incidence [AVA, AVO, AVI]
2210/64	. .	Geostructures, e.g. in 3D data cubes
2210/641	. . .	Continuity of geobodies
2210/642	. . .	Faults
2210/643	. . .	Horizon tracking
2210/644	. . .	Connectivity, e.g. for fluid movement
2210/645	. . .	Fluid contacts
2210/646	. . .	Fractures
2210/647	. . .	Gas hydrates
2210/65	. .	Source localisation, e.g. faults, hypocenters or reservoirs

2210/66	. .	Subsurface modeling
2210/661	. . .	Model from sedimentation process modeling, e.g. from first principles
2210/663	. . .	Modeling production-induced effects
2210/665	. . .	using geostatistical modeling
2210/6652	. . . .	Kriging
2210/667	. . .	Determining confidence or uncertainty in parameters
2210/67	. .	Wave propagation modeling
2210/671	. . .	Raytracing
2210/673	. . .	Finite-element; Finite-difference
2210/675	. . .	Wave equation; Green's functions
2210/677	. . .	Spectral; Pseudo-spectral
2210/679	. . .	Reverse-time modeling or coalescence modelling, i.e. starting from receivers
2210/70	.	Other details related to processing
2210/72	. .	Real-time processing
2210/74	. .	Visualisation of seismic data