G01V  GEOPHYSICS; GRAVITATIONAL MEASUREMENTS; DETECTING MASSES OR OBJECTS (detecting or locating foreign bodies for diagnostic, surgical or person-identification purposes A61B; means for indicating the location of accidentally buried, e.g. snow-buried persons A63B 29/02; investigating or analysing earth materials by determining their chemical or physical properties G01N; measuring electric or magnetic variables in general, other than direction or magnitude of the earth's field G01R; electronic or nuclear magnetic resonance arrangements G01R 33/20; radar, sonar or analogous methods in general, detecting masses or objects involving these methods G01S)

NOTES
1. In this subclass, the geophysical methods apply both to the earth and to other celestial objects, e.g. planets.
2. Attention is drawn to the Notes following the title of class G01.

WARNINGS
1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   - 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 (measurement of sonic vibrations G01H; alarm systems G01B))
1/003 . . . (Seismic data acquisition in general, e.g. survey design (G01V 1/3808, G01V 1/42 takes 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 focussing arrays (G01V 1/13, G01V 1/3861 takes precedence))
1/008 . . (Earthquake measurement or prediction (event detection for microseismic events G01V 1/288))
1/02 . . Generating seismic energy ((G01V 1/003 takes precedence); blasting in general F42; nuclear explosives G21J)
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™}
Processing seismic data, e.g. analysis, for in general G01D

Recording seismic data (transforming one recording; recording measured values)

H04B in general G08C

Processing apparatus (signal transmitting systems; transmission systems in general) Transmitting seismic signals to recording or

Arrangements or adaptations of receiving elements (electromechanical transducers H04R; receiving elements for seismic signals (e.g. seismometer, geophone or torque detectors, for localised single point measurements)

G01V 1/3843

Reference-signal-transmitting devices, e.g. acquisition units or nodes}

Digital recording of seismic data, e.g. in

Amplitude control for seismic recording (control of amplification in general H03G)

Seismographs

Optoseismic systems

Radioseismic systems

Arrangements for coupling receivers to the ground

Deployment of receiver elements (G01V 1/3843 takes precedence)

Receiving elements, e.g. geophone pattern

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)

Connectors, e.g. for force, signal or power

Reinforcements, e.g. by tensioning cables

Internal damping

Buoyancy

Traffic G08G, transducers in general G10K)

Transmitting seismic signals to recording or processing apparatus (signal transmitting systems in general G08C; transmission systems in general H04B)

Radioseismic systems

Optoseismic systems

Recording seismic data (transforming one recording into another G01V 1/32; recording measured values in general G01D)

Seismographs

Amplitude control for seismic recording (control of amplification in general H03G)

Digital recording of seismic data, e.g. in acquisition units or nodes

Reference-signal-transmitting devices, e.g. indicating moment of firing of shot

Processing seismic data, e.g. analysis, for interpretation, for correction (G01V 1/48 takes precedence)
Electric or magnetic prospecting or detecting (by optical means G01V 8/00); Measuring magnetic field characteristics of the earth, e.g. declination, deviation (for navigation, for surveying G01C; measuring direction or magnitude of magnetic fields or magnetic flux in general G01R 33/02)

- operating with propagation of electric current
- using dc
- using ac
- operating with magnetic or electric fields produced or modified by objects or geological structures or by detecting devices (with electromagnetic waves G01V 3/12); measuring the magnetic field characteristics of the earth G01V 3/40
- operating with fields produced by spontaneous potentials, e.g. electrochemical or produced by telluric currents (G01V 3/26 takes precedence)
- [Mounted transducers]
- [Damping devices]
- [Processing data]
- [Recording data]
- [Mounting of transducers]
- [Damping devices]
- [Processing]
- [Mounting of transducers]
- [Damping devices]
- [Recording data]
- [Sources]
- [Receivers]
- [Processing]
- [Sources]
- [Receivers]
- [Processing]
- [Sources]
- [Receivers]
- [Processing]
Gravimetric prospecting or detecting
Measuring gravitational fields or waves;
7/00

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
(measurement of characteristics of light G01J; optical scanning systems G02B 26/10; discharge tubes detecting the presence of radiation H01L 40/00; H01J 47/00; semiconductor devices sensitive to light H01L 31/00)

NOTE
This group covers the use of [millimetre waves,] infra-red, visible or ultra-violet 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; counting of objects carried by a conveyor G06M 7/00; signalling or calling arrangements G08R; detecting movement of traffic to be counted or controlled G08G 1/01; proximity switches H03K 17945, H03K 17965)

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 the preceding groups

15/00 Tags attached to, or associated with, an object, in order to enable detection of the object (record carriers for use with machines G06K 19/00; signs, labels G09P)

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

99/005 [Geomodels or geomodelling, not related to particular measurements]

2200/00 Details of seismic or acoustic prospecting or detecting in general

2200/10 Miscellaneou 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

2210/122 Shot

2210/124 Continuous

2210/126 Drilling-related

2210/123 Passive source, e.g. microseisms

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 Subsurface, e.g. in borehole or below weathering layer or mud line 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
Tracking reservoir changes over time, e.g. due to production

Subsidence, i.e. upwards or downwards

Synthetically generated data

Data from specific type of measurement

Seismic or acoustic, e.g. land or sea measurements

Electromagnetic

Gravitational

Nuclear

using well-logging

Physical property of subsurface

Velocity, density or impedance

Velocity; travel time

Density

Impedance

Reservoir parameters

Elastic parameters, e.g. Young, Lamé or Poisson

Porosity

Permeability

Pore pressure

with anisotropy

Seismic attributes, e.g. amplitude, polarity, instant phase

Amplitude variation versus offset or angle of incidence [AVA, AVO, AVI]

Geostructures, e.g. in 3D data cubes

Continuity of geobodies

Faults

Horizon tracking

Connectivity, e.g. for fluid movement

Fluid contacts

Fractures

Gas hydrates

Source localisation, e.g. faults, hypocenters or reservoirs

Subsurface modeling

Model from sedimentation process modeling, e.g. from first principles

Modeling production-induced effects

using geostatistical modeling

Kriging

Determining confidence or uncertainty in parameters

Wave propagation modeling

Raytracing

Finite-element; Finite-difference

Wave equation; Green's functions

Spectral; Pseudo-spectral

Reverse-time modeling or coalescence modelling, i.e. starting from receivers

Other details related to processing

Real-time processing

Visualisation of seismic data