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| 1 | **VEHICLE CONTROL, GUIDANCE, OPERATION, OR INDICATION** |
| 2 | .Remote control system |
| 3 | .Aeronautical vehicle |
| 4 | ..Altitude or attitude control or indication |
| 5 | ...Rate of change (e.g., ascent, decent) |
| 6 | ....Angle of attack |
| 7 | ...Air speed or velocity measurement |
| 8 | ...Threshold or reference value |
| 9 | ....Warning signal or alarm |
| 10 | ...Compensation for environmental conditions |
| 11 | ...Auto pilot |
| 12 | ....Inner/outer loop |
| 13 | ...Spacecraft or satellite |
| 14 | ..Flight condition indicating system |
| 15 | ..With indication or control of take-off |
| 16 | ..With indication or control of landing |
| 17 | ...I.L.S. or radar guidance |
| 18 | ...Profile of descent |
| 19 | .Railway vehicle |
| 20 | ..Railway vehicle speed control |
| 21 | .Marine vehicle |
| 22 | .Electric vehicle |
| 23 | .Automatic route guidance vehicle |
| 24 | ..On-board computer interact with a host computer |
| 25 | ..Storage or planning of route information |
| 26 | ...Modification or correction of route information |
| 27 | ..Artificial intelligence (e.g., fuzzy logic) |
| 28 | ..Having image processing |
| 36 | .Vehicle subsystem or accessory control |
| 37 | ..Suspension control |
| 38 | ...Attitude change suppressive control (e.g., antiroll or antipitch) |
| 39 | ...Fail-safe system |
| 40 | ...Artificial intelligence (e.g., fuzzy logic) |
| 41 | ..Steering control |
| 42 | ...Feedback, transfer function or proportional and derivative (P&D) control |
| 43 | ...Fail-safe system |
| 44 | ...Artificial intelligence (e.g., fuzzy logic) |
| 45 | ..Control of vehicle safety devices (e.g., airbag, seat-belt, etc.) |
| 46 | ...By integrating the amplitude of the input signal |
| 47 | ...By frequency or waveform analysis |
| 48 | ..Cooperative or multiple control (e.g., suspension and braking) |
| 49 | ..Vehicle equipment position control (e.g., seat, mirror, door, window, headrest, or headlamp) |
| 50 | .Construction or agricultural-type vehicle (e.g., crane, forklift) |
| 51 | .Transmission control |
| 52 | ..Semiautomatic control (e.g., switchable between automatic and manual) |
| 53 | ..And other vehicle control |
| 54 | ...Engine output control |
| 55 | ..By changing shift map, schedule, or pattern |
| 56 | ...Having a plurality of preset maps, schedules, or patterns |
| 57 | ..Fuzzy logic |
| 58 | ..Adaptive control |
| 59 | ...Model or learning means (e.g., neural network) |
| 60 | ...Feedback control (e.g., closed loop) |
| 61 | ....Using a transmission ratio as feedback control |
| 62 | ..Fail-safe control (e.g., preventing a gear shift) |
| 63 | ...Responsive to faulty sensor |
| 64 | ..Indicating a completion of a shift or a shift to be completed |
| 65 | ..Responsive to road, external, or ambient condition |
| 66 | ..Time regulated operations |
| 67 | .Clutch control |
| 68 | ..Adaptive control |
| 69 | .Control of power distribution between vehicle axis or wheels (e.g., four wheel drive vehicle) |

70   .Indication or control of braking, acceleration, or deceleration
71   ..Antiskid, antilock, or brake slip control
72   ...During cornering or turning of vehicle
73   ...On split coefficient surface (u)
74   ...Having particular means to determine a reference value for wheel slippage or pseudo-vehicle speed
75   ....Correction or modification
76   ...Fail-safe system
77   ...Artificial intelligence (e.g., fuzzy logic)
78   ...Control of brake pressure
79   ....Having speed variation responsive means (e.g., acceleration, deceleration)
80   ....Having coefficient of friction or road condition determining means
81   ....Four wheel drive, electric, or heavy vehicles
82   ..Antispin, traction control, or drive slip control
83   ...Control of brake pressure
84   ...Control of engine torque
85   ....Having throttle valve positioning
86   ....Having fuel cutting or ignition timing retarding
87   ...Control of transmission torque
88   ...Restricting differential operation
89   ...Four wheel drive vehicle
90   ...Having particular slip threshold, target slip ratio, or target engine torque determining means
91   ...Integrated with antiskid or other vehicle control system (e.g., cruise control, suspension)
92   ...Fail-safe system
93   ..Vehicle speed control (e.g., cruise control)
94   ...Having gradient responsive control to suppress hunting, overshooting, or undershooting
95   ....By transmission shifting control

96   ...Having inter-vehicle distance or speed control
97   ...Fail-safe system
98   ...Artificial intelligence (e.g., fuzzy logic)
99   .With indicator or control of power plant (e.g., performance)
100  ..Gas turbine, compressor
101  ..Internal-combustion engine
102  ...Digital or programmed data processor
103  ....Control of air/fuel ratio or fuel injection
104  .....Controlling fuel quantity
105  .....Controlling timing
106  .....Artificial intelligence (e.g., fuzzy logic)
107  .....Fail-safe system
108  .....Exhaust gas circulation (EGC)
109  .....Detection of O2 concentration
110  ....Speed, acceleration, deceleration
111  ....Vibration, roughness, knock
112  ....Engine stop, fuel shutoff
113  ....Starting, warmup
114  ....Backup, interrupt, reset, or test
115  ....Specific memory or interfacing device
116  .With indication or control to maintain fixed position
117  .Traffic analysis or control of surface vehicle
118  ..With determination of traffic density
119  ..With determination of traffic speed
120  .Traffic analysis or control of aircraft
121  ..With speed control or order
122  ..With course diversion
123  .With indication of fuel consumption rate or economy of usage
124  .Determining balance or center of gravity (e.g., load distribution of vehicle)
29.1 .Vehicle diagnosis or maintenance determination

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| 29.2 | ..Failure detection initiates subsequent vehicle control |
| 29.3 | ..For multiple vehicles (e.g., fleet, etc.) |
| 29.4 | ..Indication of maintenance interval |
| 29.5 | ...Caused by oil condition degradation |
| 29.6 | ..Vehicle or device identification |
| 29.7 | ..Detection of faulty sensor |
| 29.8 | ...By applying signal to test sensor |
| 29.9 | ...Fault prediction |
| 30.1 | ...Inhibiting fault indication |
| 30.2 | ...Using mathematical model |
| 30.3 | ...Plausibility, verification or confirmation of sensor output |
| 30.4 | ...Utilizing time related property of sensor output (e.g., period or frequency, etc.) |
| 30.5 | ...By specific comparison with sensor output |
| 30.6 | ....Mutual comparison of plural identical sensors |
| 30.7 | ....Comparison of sensor with output of different type sensor |
| 30.8 | ....Comparing current sensor output with previously stored value thereof |
| 30.9 | ....Sensor output compared to range of values |
| 31.1 | ....Sensor output compared to threshold |
| 31.2 | .....Variable or dynamic |
| 31.3 | ...Including event counter |
| 31.4 | ..Diagnosis or maintenance need determined externally to vehicle |
| 31.5 | ...Having particular communication link (e.g., Internet, satellite, etc.) with external site |
| 31.6 | ..Determining repair needed to correct fault |
| 31.7 | ..Validation or confirmation of fault |
| 31.8 | ..Determining likely cause of fault |
| 31.9 | ..Failure prediction |
| 32.1 | ..Trend analysis |
| 32.2 | ..Data recording following vehicle collision |
| 32.3 | ..Including vehicle location determination |
| 32.4 | ...By satellite positioning system (e.g., GPS, etc.) |
| 32.5 | ..Including vehicle distance travelled determination |
| 32.6 | ..Including data security (e.g., encryption, password, etc.) |
| 32.7 | ..Having internal vehicle network to distribute diagnosis or maintenance data therein |
| 32.8 | ..Active testing (i.e., providing input to system) |
| 32.9 | ..Using mathematical model |
| 33.1 | ..Calibration |
| 33.2 | ..Including portable or handheld element (e.g., linked to an On Board Diagnostic system, etc.) |
| 33.3 | ...Having removable data recording device |
| 33.4 | ..Storing operational history (e.g., data logging, etc.) |
| 33.5 | ..Pass, fail or inconclusive status |
| 33.6 | ..Utilizing time related property of fault signal (e.g., duration, etc.) |
| 33.7 | ..Including signal comparison |
| 33.8 | ...To range of values |
| 33.9 | ...To threshold |
| 34.1 | ....Variable or dynamic |
| 34.2 | ..Customized for particular vehicle type or model |
| 34.3 | ..Having plural diagnostic processors |
| 34.4 | ..Diagnosis or maintenance of specific vehicle subsystem |
| 400 | **NAVIGATION** |
| 408 | .Employing position determining equipment |
| 409 | ..For use in a map database system |
| 410 | ...Including route searching or determining |
| 411 | ....Route correction, modification or verification |
| 412 | .....Including satellite positioning system (e.g., GPS, etc.) |
| 413 | .....Cancellation of newly corrected or modified route |
| 414 | .....Based on traffic condition (e.g., congestion, etc.) |
| 415 | .....Based on weather condition |

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| 416 | .....Regenerating entirely new route from current position |
| 417 | .....Having particular off-route detection |
| 418 | .....User interface |
| 419 | ......Audio |
| 420 | ....Remote route searching or determining |
| 421 | .....Route information sent to user in successive portions |
| 422 | ....For plural moving bodies |
| 423 | ....Based on real time condition (e.g., traffic, weather, etc.) |
| 424 | ....Based on user driving history |
| 425 | ....Based on user input preference |
| 426 | .....Point of interest (POI) or landmark |
| 427 | .....Using speech recognition |
| 428 | ....Having audio or visual route guidance |
| 429 | .....Using color to differentiate route portion |
| 430 | ....Having particular storage or retrieval of data |
| 431 | ...Having audio or visual route guidance |
| 432 | ....Plural mode display |
| 433 | ....Pedestrian guidance |
| 434 | .....Within building |
| 435 | ....Prohibitive indication (e.g., do not enter, etc.) |
| 436 | ....Visual guidance having enhanced realism (e.g., 3 dimensional, etc.) |
| 437 | ....Detailed route intersection guidance |
| 438 | ....Including point of interest (POI) or landmark |
| 439 | ....Providing supplemental information (e.g., environmental condition, etc.) |
| 440 | ....Guidance by text |
| 441 | ....Audio guidance other than speech |
| 442 | ....Providing indication of off-route condition |
| 443 | ....Using speech recognition or synthesis |
| 444 | ....Having particular mounting of guidance device to vehicle |
| 445 | ...Having location correction |
| 446 | ....By map matching |
| 447 | .....Of multiple locations |
| 448 | .....Using terrain recognition |
| 449 | ....Correcting for terrestrial magnetic field |
| 450 | ...Updating existing user map database |
| 451 | ....Data sent to user from remote location |
| 452 | .....Data sent in increments |
| 453 | .....Per user request |
| 454 | ...Having particular presentation of location along with data from map database |
| 455 | ....Having variable map scale |
| 456 | ....Inhibiting presentation change |
| 457 | ...Conditionally changed presentation |
| 458 | ....Bird's eye view |
| 459 | ....Field within field |
| 460 | ....Vehicle having fixed position within the presentation along with navigational map moving relative thereto |
| 461 | ...Including map data storage or retrieval |
| 462 | ....Selecting from plural storage devices to obtain map data |
| 463 | ....Using hard drive |
| 464 | ....Using cassette tape |
| 465 | ..Determination of estimated time of arrival (ETA) |
| 466 | ..Determination of along-track or cross-track deviation |
| 467 | ..Including way point navigation |
| 468 | ..Using satellite positioning system (e.g., Global Positioning System (GPS), etc.) |
| 469 | ...Having accuracy improvement of position or location |
| 470 | ....Having multiple antennas or receivers (e.g., differential GPS, etc.) |
| 471 | .....Including plural widely separated fixed GPS stations (e.g., Wide Area Augmentation System (WAAS), etc.) |
| 472 | ....Having a self-contained position computing mechanism (e.g., dead-reckoning, etc.) |
| 473 | ....Correcting multiple diverse errors |
| 474 | ....Anti-jamming |
| 475 | ....Dilution of precision compensating |

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| 476 | ....Isolating data from error producing satellite |
| 477 | ....Integer ambiguity resolution |
| 478 | ....Correcting clock signal error |
| 478.5 | ....Multipath distortion reduction |
| 479 | ....Using filter |
| 480 | .....Kalman |
| 481 | ....Using artificial intelligence (e.g., neural network, etc.) |
| 482 | ...Plural object location determination (e.g., fleet, etc.) |
| 483 | ...Multi-mode (e.g., stand alone/ network assisted, etc.) |
| 484 | ...Having communication link to external ground site |
| 485 | ....Location or position determined at external ground site |
| 486 | ...Having security processing (e.g., password, encryption, etc.) |
| 487 | ...User interface |
| 488 | ....Speech recognition or speech synthesized output |
| 489 | ...Using vector processing |
| 490 | ...Having power conservation |
| 491 | ...Portable |
| 492 | ..Using VHF omnidirectional radio range/distance measuring equipment (VOR/DME) (e.g., Tacan, etc.) |
| 493 | ..Using hyperbolic lines of position (e.g., Loran, Decca, etc.) |
| 494 | ..Using non-inertial dead-reckoning apparatus |
| 495 | ...Having accuracy improvement of position or location |
| 496 | ....Correction for ellipticity of earth |
| 497 | ....Wind speed correction |
| 498 | ...Wheel sensor provides distance or heading information |
| 499 | ...Including integrator |
| 500 | ..Using inertial sensing (e.g., Inertial Navigation System (INS), etc.) |
| 501 | ...Having correction by non-inertial sensor |
| 502 | ...Using four or more accelerometers |
| 503 | ...Including Doppler effect in inertial sensing signal processing |
| 504 | ...Including gravitational effect in inertial sensing signal processing |
| 505 | ...Having error correction of inputs to or outputs from an inertial sensing device |
| 506 | ....Plural diverse signals |
| 507 | ....Velocity |
| 508 | ....Azimuth |
| 509 | ....By filtering |
| 510 | .....Kalman |
| 511 | ...Including matrix processing |
| 512 | ...Including vector processing |
| 513 | ..Using star tracker |
| 514 | ..Including radar or optical ground scanner |
| 515 | ..Emergency use |
| 516 | ..Location dependent distribution of information to user |
| 517 | ..Transmission of location information to remote site |
| 518 | ..Error correction |
| 519 | ..Object tracking |
| 520 | ..Conversion of location coordinates |
| 521 | ..Including history log |
| 522 | ..Using computer network (e.g., Internet, etc.) |
| 523 | ..Using imaging device |
| 524 | ..Using neural network |
| 525 | ..Using magnetometer |
| 526 | ..Portable |
| 527 | .Determination of travel data based on distance measured from a starting point |
| 528 | .Aircraft preflight route search |
| 529 | .Great circle route search |
| 530 | .Including compensated direction finder (e.g., for compass deviation, etc.) |
| 531 | .Space orbit or path |
| 532 | .Employing map database system |
| 533 | ..Including route searching or determining |
| 534 | .Having error or fault correction |
| 535 | ..Using filter |
| 536 | ...Kalman |
| 537 | .Using computer network (e.g., Internet, etc.) |
| 538 | .Having user interface |
| 539 | ..Speech recognition or synthesis |

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| 540 | .Having particular data storage or retrieval |
| 541 | .Portable |
| 300 | **RELATIVE LOCATION** |
| 301 | .Collision avoidance |
| 302 | .Course to intercept |

## FOREIGN ART COLLECTIONS

FOR 000 **CLASS-RELATED FOREIGN DOCUMENTS**

Any foreign patents or non-patent litera-
ture from subclasses that have been
reclassified have been transferred
directly to FOR Collections listed below.
These Collections contain ONLY foreign
patents or non-patent literature. The par-
enthetical references in the Collection
titles refer to the abolished subclasses
from which these Collections were derived.

**VEHICLE CONTROL, GUIDANCE,
OPERATION, OR INDICATION (701/
1)**

FOR 100 .Vehicle diagnosis or maintenance
            indication (701/29)
FOR 101 ..Indication of maintenance
            interval (701/30)
FOR 102 ..Self-test (701/31)
FOR 103 ..Vehicle or device ID (701/32)
FOR 104 ..Plural processors or external
            processor (701/33)
FOR 105 ..Detection of faulty sensor
            (701/34)
FOR 106 ..With data recording device
            (701/35)
FOR 107 **NAVIGATION (701/200)**
FOR 108 .Determination of travel data
            based on the start point and
            destination point (701/201)
FOR 109 ..Route pre-planning (701/202)
FOR 110 ..Great circle route (701/203)
FOR 111 .Determination of E.T.A. (701/
            204)
FOR 112 .Determination of along-track or
            cross-track deviations (701/
            205)
FOR 113 .Employing way point navigation
            (701/206)
FOR 114 .Employing position determining
            equipment (701/207)

FOR 115 ..For use in a map data base
            system (701/208)
FOR 116 ...Including route searching or
            determining device (701/209)
FOR 117 ....Route correction,
            modification, or verification
            (701/210)
FOR 118 ...Having audio or visual route
            guidance (701/211)
FOR 119 ...Having variable map scale
            (701/212)
FOR 120 ..Using Global Positioning System
            (GPS) (701/213)
FOR 121 ...Means to improve accuracy of
            position or location (701/214)
FOR 122 ....Having multiple GPS antennas
            or receivers (e.g.,
            differential GPS) (701/215)
FOR 123 ....Having an self-contained
            position computing means
            (e.g., dead reckoning) (701/
            216)
FOR 124 ..Using dead-reckoning apparatus
            (701/217)
FOR 125 ..Using R-O (D.M.E. and path) or
            Tacan equipment (701/218)
FOR 126 ..Using Loran or Shoran or Decca
            equipment (701/219)
FOR 127 ..Using inertial sensor (701/220)
FOR 128 ...With correction by noninertial
            sensor (701/221)
FOR 129 ..Using star tracker (701/222)
FOR 130 ..With radar or optical ground
            scanner (701/223)
FOR 131 .With indicated course correction
            (compass deviation) (701/224)
FOR 132 .Determining range without range
            measurement (701/225)
FOR 133 .Space orbits or paths (701/226)