

CPC**COOPERATIVE PATENT CLASSIFICATION****B64G****COSMONAUTICS; VEHICLES OR EQUIPMENT THEREFOR**

(apparatus for, or methods of, winning materials from extraterrestrial sources

[E21C 51/00](#))**NOTES**

1. This subclass covers only vehicles, equipment or the like, which are specially adapted for cosmonautics.
2. This subclass does not cover vehicles and equipment applicable to both cosmonautics and aeronautics, which are covered by the appropriate aeronautical subclasses of class [B64](#).
3. In this subclass, the following term is used with the meaning indicated:
 - "cosmonautics" includes all transport outside the earth's atmosphere, and thus includes artificial earth satellites, and interplanetary and interstellar travel.

B64G 1/00**Cosmonautic vehicles**[B64G 1/002](#)

. {Launch systems}

[B64G 1/005](#)

. . {Air launch}

[B64G 1/007](#)

. . {Orbit transfer}

[B64G 1/10](#). Artificial satellites; Systems of such satellites; Interplanetary vehicles ([space shuttles B64G 1/14](#); [radio transmission systems using satellites H04B 7/185](#))[B64G 1/1007](#). . {Communications satellites ([communications aspects H04B 7/185](#))}[B64G 1/1014](#). . {Navigation satellites ([navigation systems G01S 5/145](#))}[B64G 1/1021](#)

. . {Earth observation satellites}

[B64G 2001/1028](#)

. . . {using optical means for mapping, surveying or detection, e.g. of intelligence}

[B64G 2001/1035](#)

. . . {using radar for mapping, surveying or detection, e.g. of intelligence}

[B64G 2001/1042](#)

. . . {specifically adapted for meteorology}

[B64G 1/105](#)

. . {Space science}

[B64G 2001/1057](#)

. . . {specifically adapted for astronomy}

[B64G 2001/1064](#)

. . . {specifically adapted for interplanetary, solar or interstellar exploration}

[B64G 2001/1071](#)

. . . . {Planetary landers intended for the exploration of the surface of planets, moons or comets}

[B64G 1/1078](#)

. . {Maintenance satellites}

[B64G 1/1085](#)

. . {Swarms and constellations}

[B64G 2001/1092](#)

. . {Special features of modular spacecraft systems}

[B64G 1/12](#)

. . manned

[B64G 1/14](#)

. Space shuttles

[B64G 1/16](#). Extraterrestrial cars ([land vehicle aspects B60 to B62](#))[B64G 1/22](#)

. Parts of, or equipment specially adapted for fitting in or to, cosmonautic vehicles

[B64G 1/222](#)

. . {Appendage deployment mechanisms}

- B64G 2001/224 . . {Inflatable space structures}
- B64G 1/226 . . {Special coatings for spacecraft}
- B64G 2001/228 . . {Damping of high-frequency vibration effects on spacecraft elements, e.g. by using acoustic vibration dampers}
- B64G 1/24 . . Guiding or controlling apparatus, e.g. for attitude control ([jet-propulsion plants F02K](#); navigation or navigational instruments, [see the relevant subclass, e.g. G01C](#); automatic pilots [G05D 1/00](#))
- B64G 1/242 . . . {Orbits and trajectories}
- B64G 2001/245 . . . {Spacecraft attitude control, e.g. attitude control algorithms}
- B64G 2001/247 . . . {Advanced control concepts for autonomous, robotic spacecraft, e.g. by using artificial intelligence, neural networks or autonomous agents}
- B64G 1/26 . . . using jets
- B64G 1/28 . . . using inertia or gyro effect
- B64G 1/281 {Spin-stabilised spacecraft}
- B64G 1/283 {using reaction wheels}
- B64G 1/285 {using momentum wheels}
- B64G 1/286 {using control momentum gyroscopes (CMGs)}
- B64G 1/288 {using gyroscopes as attitude sensors}
- B64G 1/32 . . . using earth's magnetic field
- B64G 1/34 . . . using gravity gradient
- B64G 1/36 . . . using sensors, e.g. sun-sensors, horizon sensors
- B64G 1/361 {using star sensors}
- B64G 1/363 {using sun sensors}
- B64G 1/365 {using horizon or Earth sensors}
- B64G 1/366 {using magnetometers}
- B64G 1/368 {using gravimeters}
- B64G 1/38 . . . damping of oscillations, e.g. nutation dampers
- B64G 1/40 . . Arrangements or adaptations of propulsion systems ([B64G 1/26](#) takes precedence; propulsion plants per se, [see the relevant subclasses e.g. F02K, F03H](#))
 - B64G 1/401 . . . {Liquid propellant rocket engines ([per se F02K 9/42](#))}
 - B64G 1/402 . . . {Propellant tanks; Feeding propellants ([in general F02K 9/44](#))}
 - B64G 1/403 . . . {Solid propellant rocket engines ([per se F02K 9/08](#))}
 - B64G 1/404 {Hybrid rocket engines ([per se F02K 9/72](#))}
 - B64G 1/405 . . . {Ion or plasma engines ([per se F03H 1/00](#))}
 - B64G 1/406 . . . {Arcjets and other resistojets}
 - B64G 1/407 . . . {Solar sailing (includes also attitude control using solar sailing)}
 - B64G 1/408 . . . {Nuclear spacecraft propulsion}
 - B64G 1/409 . . . {Unconventional spacecraft propulsion systems}
- B64G 1/42 . . Arrangements or adaptations of power supply systems ([power supply systems per se, see the relevant subclasses](#))
- B64G 1/421 . . . {Non-solar power generation}

B64G 1/422	. . . . {Nuclear power generation}
B64G 1/423	. . . . {Fuel cells}
B64G 1/425	. . . {Power storage}
B64G 1/426	. . . . {Flywheels}
B64G 1/427	. . . . {Thermal power storage}
B64G 1/428	. . . {Power distribution and management}
B64G 1/44	. . . using radiation, e.g. deployable solar arrays (solar cells per se H01L 31/00)
B64G 1/443	. . . . {Photovoltaic cell arrays}
B64G 1/446	. . . . {Thermal solar power generation}
B64G 1/46	. . Arrangements or adaptations of devices for control of environment or living conditions (space suits B64G 6/00)
B64G 1/48	. . . for treatment of the atmosphere (B64G 1/50 takes precedence; air conditioning in general F24F)
B64G 1/50	. . . for temperature control (temperature control in general G05D 23/00)
B64G 1/503	. . . . {Radiator panels}
B64G 1/506	. . . . {Heat pipes}
B64G 1/52	. . Protection, safety or emergency devices; Survival aids (life-saving in general A62)
B64G 2001/525	. . . {Survival aids}
B64G 1/54	. . . Protection against radiation (against radiation in general G21F)
B64G 1/543	. . . . {protecting the crew in manned spacecraft}
B64G 1/546	. . . . {shielding electronic equipment}
B64G 1/56	. . . Protection against meteorites (meteorite detectors B64G 1/68)
B64G 1/58	. . . Thermal protection, e.g. heat shields (thermal insulation in general F16L 59/00 ; chemical aspects, see the relevant classes)
B64G 1/60	. . Crew or passenger accommodations
B64G 1/62	. . Systems for re-entry into the earth's atmosphere; Retarding or landing devices
B64G 1/64	. . Systems for coupling or separating cosmonautic vehicles or parts thereof, e.g. docking arrangements
B64G 1/641	. . . {Interstage or payload connectors}
B64G 2001/643	. . . . {Dispensers for arranging multiple satellites in a single launcher}
B64G 1/645	. . . {Separators}
B64G 1/646	. . . {Docking or rendez-vous systems}
B64G 1/648	. . . {Tethers}
B64G 1/66	. . Arrangements or adaptations of apparatus or instruments, not otherwise provided for (instruments per se, see the relevant classes, e.g. aerials for use in satellites H01Q 1/28)
B64G 1/68	. . . of meteorite detectors
B64G 3/00	Observing or tracking cosmonautic vehicles (radio or other waves systems for navigating or tracking G01S)

B64G 4/00	Tools specially adapted for use in space
B64G 2004/005	<ul style="list-style-type: none">• {Robotic manipulator systems for use in space}
B64G 5/00	Ground equipment for vehicles, e.g. starting towers, fuelling arrangements (B64G 3/00 takes precedence)
B64G 2005/005	<ul style="list-style-type: none">• {Systems for launching spacecraft from a platform at sea}
B64G 6/00	Space suits
B64G 7/00	Simulating cosmonautic conditions, e.g. for conditioning crews (simulators for teaching or training purposes G09B 9/00)
B64G 2007/005	<ul style="list-style-type: none">• {Space simulation vacuum chambers}
B64G 9/00	Cosmonautics not otherwise provided for
B64G 2700/00	Space travel; artificial satellites; space exploration
B64G 2700/24	<ul style="list-style-type: none">• Stabilisation, orientation and oscillation damping of spacecraft
B64G 2700/66	<ul style="list-style-type: none">• Aerials and collapsible aerials of spacecraft