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*(* ***पहला पुनरीक्षण*** *)*

**Glossary of Aeronautical and Astronautical Terms**

**Part 5 Aerodynes Heavier-Than-Air Aircraft**

*( First Revision )*

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मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली 110002

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

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FOREWORD

This Indian Standard (Part 5) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Air and Space Vehicles Sectional Committee had been approved by the Transport Engineering Division Council.

This standard was first published in 1982. The present revision has been taken up with a view to incorporating the modifications found necessary as a result of experience gained on the use of this standard. Also, in this revision, the standard has been brought into the latest style and format of Indian Standard, and references to   
Indian Standards, wherever applicable have been updated.

This standard is one of a series of Indian Standards on the glossary of aeronautical and astronautical terms.   
Other parts in this series are:

|  |  |
| --- | --- |
| Part 1 | General |
| Part 2 | Motion of aircraft |
| Part 3 | Structure |
| Part 4 | Aerodynamics |
| Part 6 | Space terms |
| Part 7 | Air traffic and ground services |
| Part 8 | Power plant |

The present standard provides standard definitions of technical terms relating to aeronautics, astronautics and related subjects. Terms in general use in other branches of engineering are also included where they have some special relevance to aeronautics or astronautics. The other parts of the standard cover terms specific to a particular feature, type of aircraft, equipment and services.

Each term has been, assigned a 4-digit or 5-digit number. The first one (or two) digit, in the thousandth place, represents the part number. This part number with the following digit in the hundredth place represents the section. The last two digits represent the position of the definition within a section. Thus, the term 5215 is the 15th definition of section 52 which is in part 5.

The following International Standards available on the subject have been referred by the Committee in the course of preparation of this standard:

1. BS : 185 ‘Aero-nautical and astronautical terms’

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

*Indian Standard*

GLOSSARY OF AERONAUTICAL AND ASTRONAUTICAL TERMS

**PART 5 AERODYNES (HEAVIER-THAN-AIR AIRCRAFT)**

*( First Revision )*

**1 SCOPE**

This part covers the standard definitions for terms relating to aircraft heavier-than-air (Aerodynes).

**2 REFERENCES**

This standard does not contain any cross reference.

**3 TERMINOLOGY**

**SECTION 51 COMPLETE AIRCRAFT**

| **No.** | **Term** | **Definition** |
| --- | --- | --- |
| **5101** | Aeroplane | A power driven heavier-than-air aircraft with supporting surfaces which remain fixed under given conditions of flight. |
| **5102** | Canard aeroplane | An aeroplane with the surfaces providing the requisite longitudinal stability and control in front of the main plane. |
| **5103** | Landplane | An aeroplane capable of operating from a land surface. |
| **5104** | skiplane | A landplane provided with skis as a mass of support on snow-covered or ice-covered terrain. |
| **5105** | Pusher aeroplane | An aeroplane fitted with pusher propellers. |
| **5106** | Seaplane | An aeroplane capable of operating from a water surface |
| **5107** | Float seaplane | A seaplane provided with floats as its means of support on water. |
| **5108** | Flying boat  (boat seaplane) | A seaplane whose main body or hull is also the means of support on water |
| **5109** | Tractor aeroplane | An aeroplane fitted with tractor propellers. |
| **5110** | Amphibian | An aircraft capable of operating from either a land or a water surface. |
| **5111** | Coleopter | An aircraft- having an annular wing, with the engine and body mounted within the annulus, and designed to take off and land with its wing axis verlical. |
| **5112** | Convertiplane | An aeroplane capable, by a mechanical conversion in the air, of landing and taking off vertically |
| **5113** | Glider | non-power-driven heavier-than-air aircraft (*see* **5301**) |
| **5114** | Sailplane | A glider designed to utilize only atmospheric currents for sustained free flight |
| **5115** | Towed glider | A glider which relies on towing for sustained free flight. |
| **5115A** | Powered glider  (motor glider) | A glider with a small power plant for short bursts of power for take off and/or in between gliding phases |
| **5116** | Kite | A non-power-driven heavier-than-air aircraft without controls, anchored or towed by a line. |
| **5117** | Mixed-power-plant aircraft | An aircraft whose power plant embodies more than one type of engine, each being usually appropriate to a particular flight regime. |
| **5118** | Monoplane | An aeroplane or glider with one pair of wings (*see* NOTE under **5123**). |
| **5119** | High-wing monoplane | Monoplane in which the wings are located at or near (shoulder-wing) the top of the fuselage. |
| **5120** | Low-wing monoplane | A monoplane in which the wings are located at or near the bottom of the fuselage |
| **5121** | Mid-wing monoplane | A monoplane in which the wings are located approximately midway between the top and bottom of the fuselage. |
| **5122** | Parasol monoplane | A monoplane in which the wings are united in a separate structure above the fuselage |
| **5123** | Multiplane | An aeroplane or glider with two or more sets of wings usually one above another, for example, biplane or triplane  NOTE — Monoplane, biplane, triplane and multiplane are also used as adjectives associated with a particular component, for example, biplane rudder, triplane tail, etc. |
| **5124** | Ornithopter | A heavier-than-air aircraft supported in flight chiefly by the reaction of the air on wings to which a flapping motion is imparted. |
| **5125** | Rotor raft | A heavier-than-air aircraft which derives lift from a rotor or rotors |
| **5126** | Compound rotorcraft | An aircraft utilizing in flight features of both aeroplane and rotorcraft |
| **5127** | Cyclogyro  (paddle-plane) | A rotorcraft on which the rotor is similar in form to a paddle wheel, power-driven about a horizontal axis |
| **5128** | Gyroplane | A rotorcraft with non-power-driven rotor(s) rotating about axes which are vertical or nearly so, when the aircraft is in horizontal flight. |
| **5129** | Helicopter | A rotorcraft deriving lift from power-driven rotor(s) rotating about axes which are vertical, or nearly so, when the aircraft is in horizontal flight. |
| **5130** | Sesquiplane | A biplane in which one pair of wings is of substantially less span than the other pair. |
| **5131** | Stol aircraft | A heavier-than-air aircraft designed to take off and land with a short ground run, either by the provision of powered lift or by the use of special aerodynamic devices. |
| **5132** | Tail-less aircraft  (Flying wing) | An aircraft with its longitudinal control surfaces incorporated  in the main plane |
| **5133** | Variable-sweep aircraft (swing-wing-aircraft) | An aircraft in which the sweep of the main plane can be varied in flight. |
| **5134** | Vtol aircraft | A heavier-than-air aircraft provided with powered lift, which can take off and land along a substantially vertical path. |
| **5135** | V/stol aircraft | A Vtol aircraft which can also take off and land with a short ground run, particularly when operating at an increased weight. |

**SECTION 52 SHAPE AND DISPOSITION OF SURFACES**

| **No.** | **Term** | **Definition** |
| --- | --- | --- |
| **5201** | Aerofoil | A body so shaped as to produce aerodynamic reaction normal to the direction of its motion through the air without excessive drag. |
| **5202** | Annular aerofoil | An aerofoil generated by the rotation of its section about an axis substantially parallel to its chord and thus having an annular cross-section normal to that axis. |
| **5203** | Slotted aerofoil | An aerofoil having one or more air passages (or slots) connecting its two surfaces to delay separation (*see* **4479**) and consequent stall. |
| **5204** | Slat | An auxiliary, cambered aerofoil positioned forward of the main aerofoil so as to form a slot. |
| **5205** | Aerofoil section | The shape of the boundary of a section of an aerofoil in a plane parallel to its plane of symmetry. |
| **5206** | Aileron drop | The simultaneous downward or positive deflection of the ailerons on both sides of an aeroplane or glider. |
| **5207** | Aileron up-float | The simultaneous upward or negative deflection of the ailerons on both sides of an aeroplane or glider. |
| **ANGLES** | |  |
| **5208** | Control surface angle | The angle between the chord of the control surface and the chord of the corresponding fixed surface (for example, aileron angle, elevator angle, elevon angle, rudder angle). |
| **5209** | Decalage | The angle between the chord of the upper plane of a biplane and that of the lower plane in a section parallel to the plane of symmetry. |
| **5210** | Dihedral | The angle at which, in an aeroplane or glider, the port and starboard parts of the main plane or tailplane are inclined upwards to the transverse plane of reference. If the inclination is downwards, the angle is termed anhedral or negative dihedral. |
| **5211** | Sweep  (back or forward) | The angle in plan between a specified spanwise line along an aerofoil and the normal to the plane of symmetry. For an aerofoil as a whole, the quarter-chord line is preferred, but any other specified line, such as the leading on trailing edge, may be taken for a particular purpose. |
| **5212** | Tail-setting angle | The angle between the root chord of the main supporting surface and the chord of the tailplane. |
| **5213** | Wash-in | Increase in angle of incidence towards the tip of a wing or other aerofoil |
| **5214** | Wash-out | Decrease in angle of incidence towards the tip of wing or other aerofoil |
| **AREAS** | |  |
| **5215** | Gross wing area | 1. The area of the surface bounded by the two wing tips and the leading and trailine edges continued to intersect in the plane of symmetry. 2. The area of the surface bounded by the two wing tips, the leading and trailing edges and by straight lines joining their intersections (ignoring fillets) with the fuselage and wing nacelles. |
| **5216** | Net wing area | The gross wing area less the part covered by the fuselage |
| **5217** | Aspect ratio | The ratio of the square of the span to the gross area of an aerofoil. |
| **5218** | Camber | 1. Curvature of the median line of an aerofoil section: more generally, the curvature of a surface. 2. The ratio of the maximum height of the median line above the chord to the chord length |
| **5219** | Conical camber | The camber of an aerofoil having a surface derived from a cone  (not necessarily right circular) with its apex lying in the plane of symmetry of the aircraft |
| **5220** | Chord | The straight line through the centre of curvature at the leading and trailing edges of an aerofoil section. |
| **5221** | Standard mean chord  (first mean chord) | A chord of length equal to the gross wing area divided by the span. |
| **5222** | Aerodynamic mean chord (second mean chord) | A chord of length defined by:  where *C* = chord length at distance y from the plan of   symmetry;  *b =* span; and  *S* = gross wing area |
| **5223** | Chord length | The length of that part of the chord which is intercepted by the aerofoil section boundary. |
| **5224** | Chord position | The position of the chord as defined by the co-ordinates (x, y, z) of its quarter-chord point referred to body axes and its inclination (0) to the x-y plane. |
| **5225** | Quarter-chord line | The line through the quarter-chord points of an aerofoil. |
| **5226** | Quarter-chord point | The point on the chord of an aerofoil section at one quarter of the chord length behind the leading edge. |
| **5227** | Gap | Of a multiplane. The distance between the leading edge of a plane and of the one below it, measured parallel to the normal body axis. |
| **5228** | Geometric twist | Variation, along the span of a wing or other aerofoil, of the angle between the chord and a fixed datum. (*see* **4102**). |
| **5229** | Leading edge | a) The forward edge of an aerofoil or other body moving through the air.  b) The forward portion of the structure of an aerofoil. |
| **5230** | Supersonic leading edge | A leading edge designed for flight at supersonic speed, its sweep being greater than the complement of the Mach angle. The component of the stream velocity normal to the leading edge is, therefore, sonic. |
| **5231** | Medium line  (centre line)  (camber line) | Of an aerofoil. A line, each point of which is equidistant from the upper and lower boundaries of the aerofoil section, the distance being measured normal to the chord. |
| **5232** | Ogive | 1. The outline of a Gothic arch; and 2. The solid of revolution produced by rotating such an outline about its centreline. |
| **5233** | Tangent ogive | An ogive whose tangent at its base is parallel to its centreline. |
| **5234** | Overhang | 1. The extent to which the ‘tip of one of two superimposed planes projects beyond the tip of the other; and 2. The distance from the outer point of support to the tip of a plane. |
| **5235** | Rigging | The relative adjustment or alignment of the different components of an aircraft. |
| **5236** | Rigging angle of incidence | The angle between the chord of the main plane or tailplane and the horizontal when the aeroplane is in the rigging position.  NOTE — Not to be confused with aerodynamic angle of incidence, 4104. |
| **5237** | Rigging position | The attitude in which, with the lateral axis horizontal, an arbitrary longitudinal datum line is also horizontal |
| **5238** | Span | 1. of an aeroplane. The distance between the wingtips; and 2. of an aerofoil. The length along a specified line. |
| **5239** | Stagger | Of a multiplane. The distance between the leading edge of a plane and of the one below it, measured parallel to the longitudinal body axis. |
| **5240** | Thickness/chord ratio (thickness ratio) | The ratio of the maximum thickness of an aerofoil section measured perpendicular to the chord, to the chord length. |
| **5241** | Trailing edge | 1. The rear edge of an aerofoil or other body moving through the air; and 2. The rearward portion of the structure of an aerofoil. |
| **5242** | Wave rider | A lifting body, designed for flight at supersonic or hypersonic speeds, which relies essentially on a shockwave, or system of shockwaves, beneath its lower surface for producing its lift force |
| **5243** | Channel-wing | A wing formed, in the way of the propeller, into an open semi-circular channel through which the slipstream from a propeller passes. |
| **5244** | Delta wing | A wing of triangular planform. |
| **5245** | Gull wing | A wing whose inboard section has pronounced dihedral and whose outboard section has either anhedral or markedly less dihedral. |
| **5246** | M-wing | A wing whose inboard section is swept forward and whose outboard section is swept back, thus forming roughly an M in plan view. |
| **5247** | Tapered wing | A wing in which there is progressive decrease in chord length from root to tip. |
| **5248** | W-wing | A wing whose inboard section is swept back and whose outboard section is swept forward, thus forming roughly a W in plan view. |

**SECTION 53 COMPONENT PARTS**

| **No.** | **Term** | **Definition** |
| --- | --- | --- |
| **5301** | Airframe | A power-driven heavier-than-air aircraft without its engine(s). |
| **5302** | Control lock  (gust lock) | A mechanical device designed to safeguard, by a positive lock, the control surface and flying control system against damage in high winds or gusts when the aircraft is parked. |
| **5303** | Doping | Treatment of a fabric surface to tauten, strengthen or render it air-tight. |
| **5304** | Fence | A projection from the surface of the wing and extending chordwise to modify the wing surface pressure distribution. |
| **5305** | Fin | A fixed vertical surface designed to provide directional stability. A fin projecting from the upper or lower surface of the body is referred to as dorsal or ventral respectively. |
| **5306** | Plane (Aerofoil) | A body so shaped as to produce aerodynamic reaction normal to the direction of its motion through the air without excessive drag. |
| **5307** | Main plane | The main supporting surface of an aircraft, usually divided into port and starboard wings |
| **5308** | Noseplane  (fore plane) | An aerofoil fixed, movable or adjustable in flight, located forward of the main plane contributing to longitudinal control and/or stability. |
| **5309** | Stub plane | A short length of plane projecting from the fuselage or hull (usually forming a part thereof) to which an aerofoil can be connected |
| **5310** | Ailplane | An aerofoil fixed, movable or adjustable in flight, located after of the main plane, contributing to longitudinal control and/or stability. |
| **5311** | All moving tail (flying tail) (slab tail) | A tailplane such that the movement of the whole surface is  used for longitudinal control |
| **5312** | Supporting surfaces | Surfaces, the primary function of which is to provide lift for an aircraft. |
| **5313** | Tail unit  (empennage) | The combination of stabilizing and controlling surfaces  situated at the rear of an aircraft. |
| **5314** | Wing | A main supporting surface of an aircraft. This may be divided into inner, outer and wing-tip sections. (*see* **5307**). |
| **5315** | Centre section | The middle or central section of a wing, to which the outer wing panels are attached. Where a wing has no clearly defined central section, the centre section is considered to lie between points of attachment of the wing to the fuselage or fuselage struts. |
| **FLIGHT CONTROLS** | |  |
| **5316** | Aerodynamic balance | 1. Reduction of the hinge moment opposing rotation of a central surface by so disposing the surface that part of it is forward of the hinge or by fitting a balance tab to it; and 2. A device to reduce the hinge moment of the control surface. |
| **5317** | Horn balance | A localized balance area at the tip of a control surface. This may be shielded by a surface in front |
| **5318** | Shrouded balance | A balance with control area forward of its hinge and operating within a space bounded by shrouds which form part of the aerofoil contour. |
| **5319** | Internal balance | A shrouded balance with an overhang which leaves a small gap between itself and a shaped part of the aerofoil structure, so as to control aerodynamically the state of balance at any position. |
| **5320** | Sealed internal balance | An internal balance in which the overhang gap is sealed with a brush or by a flexible partition. |
| **5321** | Ailerons | Pairs of control surfaces, normally situated at the trailing edge of the wing structure, designed to control an aircraft in roll by their differential movement |
| **5322** | Anti-yaw ailerons  (frise ailerons) | Ailerons which maintain a smooth upper surface with the wing when moved down, but have a nose which projects below the lower surface when moved up, thus increasing the drag of the down-moving wing |
| **5323** | Differential ailerons | Ailerons geared so that, when they are deflected, the up-going aileron moves through a different angle from the down-going aileron. In practice, the up-going aileron moves through the greater angle, in order to reduce adverse yaw and/or to lessen the pilot’s effort. |
| **5324** | Slotted aileron | An aileron whose leading edge is so shaped that the slot between it and the wing improves the flow over its upper surface when the aileron is deflected downwards. |
| **5325** | Air brake, dive brake | Any device primarily used to increase drag of an aircraft at will. |
| **5326** | Dive flap | A flap-type air brake used to reduce the limiting velocity of an aircraft. |
| **5327** | Automatic control | The state in being when the control surfaces and/or engine controls are automatically operated in accordance with signals detected by instruments and with no pilot control through flying controls. |
| **5328** | Autopilot (automatic pilot automatic flight control system) | A control system which will automatically manoeuvre the aircraft into, and stabilize it with respect to, a demanded flight condition determined by a computer (human or otherwise) inside or outside the aircraft. |
| **5329** | Auto-stabilizer | An automatic device which improves the natural stability of an aircraft by operating control surfaces independently or as part of a pilot control system in such a way that the human pilot retains continuous control through his normal flying controls. |
| **5330** | Balanced surface | control surface embodying aerodynamic balance |
| **5331** | Control column | The lever, or the pillar supporting a handwheel, or its equivalent, by which the longitudinal and lateral controls are operated. |
| **5332** | Control surface (motivator) | An aerofoil or part thereof which moves to produce changes in the forces and/or moments acting on an aircraft in order to control it. (An output element of a flight control system). |
| **5333** | Elevator | A flap-type control surface designed to control an aircraft in pitch. |
| **5334** | Elevons | Control surfaces combining the functions of ailerons and elevators. When placed on the tail, they are sometimes called tailerons. Elevons in the form of all-moving wing tips have been referred to occasionally as controllers or stabilizers. |
| **5335** | Feel | The sensations of force and displacement experienced by the pilot, from the air forces on the control surface, through those limbs which are in contact with the flying controls. |
| **5336** | Artificial feel system | A device which simulates or augments natural feel when the control surfaces are operated mechanically. Its purpose is to provide additional information regarding the state of control in order to simplify the pilot’s task |
| **5337** | Q feel system | An artificial feel system in which the feel force is Proportional to the square of the equivalent airspeed. |
| **5338** | Spring feel system | An artificial feel system in which the load required to move a flying control in the absence of air forces is dependent on the displacement from the trimmed conditions. |
| **5339** | Flap | Any surface usually forming part of the rear portion of a wing, adjustable in flight, the primary function of which is to increase the lift. |
| **5340** | Blown flap | Flap over the upper surface of which air or some other gas is ejected with sufficient momentum to increase its effectiveness. |
| **5341** | Dive flap | *See* **5326** |
| **5342** | Droop flap, leading-edge flap | A flap at the leading edge of a wing, deflected downward to increase camber and thus improve stalling characteristics. |
| **5343** | Extension flap | A flap, the movement of which increases the effective chord length of the aerofoil, for example fowler flap, gouge flap. |
| **5344** | Plain flap | A flap forming the rear portion of the aerofoil and moving as a whole. |
| **5345** | Recovery flap | A flap, the operation of which so alters the pitching moment characteristics of an aircraft that recovery from a dive is automatic, or is made easier to the pilot. |
| **5346** | Slotted flap | A flap whose leading edge is so shaped that the slot or slots between it and the wing improve the flow over its upper surface when the flap is deflected downwards. |
| **5347** | Split flap | A flap inset into the lower surface of fhe aerofoil. |
| **5348** | Suction flap | A flap whose effectiveness is increased by boundary-layer suction. |
| **5349** | Flight control system | The arrangement of all control elements which enables control forces and torques to be brought into play by the human pilot or otherwise. |
| **5350** | Channel | That section of a flight control system which determines the application of a particular control surface, for example, elevator channel. |
| **5351** | Multiple channel | A channel containing multiple components connected together in such a way that alternative lanes exist for producing control surface application. |
| **5352** | Irreversible control system  (irreversible control) | A flight control system in which the control surface can be moved freely by the pilot but cannot be moved by aerodynamic forces alone. |
| **5353** | Power-assisted control  system | A flight control system in which a power amplifier is placed between the flying control and the control surface to supplement the pilot’s direct effort. |
| **5354** | Powered control system | A flight control system in which a power amplifier is placed between the flying control and the control surface |
| **5355** | Flying controls | Input elements directly moved by the human pilot or otherwise, to operate the control surfaces. |
| **5356** | Jet flap | A sheet of high velocity air or some other gas ejected near the rear of a wing at an angle to the main air stream to increase the lift, thus performing the function of a flap |
| **5357** | Manoeuvre demand control  system | A pilot control system in which the control surface deflections are automatically adjusted In accordance with the motion of the aircraft in such a way that a unique predetermined manoeuvre follows a single input by the pitot. |
| **5358** | Reaction control | Control of aircraft attitude and position by the reaction from compressed gas issuing from nozzles or by the thrust from jet engines |
| **5359** | Rudder | A control surface designed to control an aircraft in yaw. |
| **5360** | Rudder bar | The foot-bar by which the rudder is operated. |
| **5361** | Rudder pedals | Pedals by which the rudder is operated. |
| **5362** | Spoiler | A light, controllable device fitted on the upper surface of wings  (usually at the rear), used for disturbing or spoiling air flow and thereby delay separation (*see* **4479**). |
| **5363** | Interceptor | A spoiler mounted to intercept the airflow through a slot.  NOTE — The term is also used to describe a type of military air craft. |
| **5364** | Stick pusher | A device which gives a forward push to the control column when the aircraft approaches a hazardous stalled condition, thereby producing a nose-down pitch |
| **5365** | Stick shaker | A device which vibrates the control column to indicate approach to a hazardous stalled condition |
| **5366** | Tab | A fixed or hinged rear portion of a control surface or flap. |
| **5367** | Balance tab | A tab designed to reduce the effort required to operate a control surface. |
| **5368** | Controlled tab | A balance tab controllable in flight. |
| **5369** | Geared tab | A balance tab mechanically linked to a control surface so that its angular movement is determined by that of the control surface. |
| **5370** | Servo tab | A balance tab directly operated by the pilot to produce forces which in turn move the main surface. |
| **5371** | Spring tab | A balance tab, the angular movement of which is geared to the compression or extension of a spring embedded in the main control circuit. The primary purpose is to reduce the pilot’s effort at high airspeeds. |
| **5372** | Trimming tab | A tab, the setting of which in relation to the main surface is separately adjustable by the pilot. |
| **5373** | Trimming strip  (trailing edge card,  trailing edge strip | A strip of metal or length of cord or wire, adjustable only on the ground, applied to the trailing edge of a control surface to modify fhe balance or trim. |
| **5373A** | Fly by wire | Method of actuating control surfaces by non-mechanical means, such as electrical or light signals |
| **FUSELAGE, HULL, NACELLES** | | |
| **5374** | Afterbody | 1. Of a flying boat hull. The portion aft of the step; and 2. Generally. The rear portion of a fuselage or nacelle. |
| **5375** | Cabin | An enclosure for housing crew and/or passengers or cargo. |
| **5376** | Pressure cabin | A cabin in which means are provided to maintain the air pressure at a higher level than the ambient air pressure. |
| **5377** | Capsule | A pressurized compartment of an aircraft, housing crew members and capable of being ejected in an emergency. |
| **5378** | Cockpit | A compartment housing the pilot(s). |
| **5379** | Ejection gun | The explosively-operated ram mechanism of an ejection seat or capsule, or other body. |
| **5380** | Ejection seat | A seat capable of being ejected in any emergency to carry the occupant and his equipment clear of the aircraft. |
| **5381** | End plate | A plate or surface at the end of an aerofoil, attached in a substantially vertical plane parallel to the direction of flight. Its effect is similar to that of increased aspect ratio. |
| **5382** | Face curtain | A flexible sheet, installed at the top of an ejection seat, which is pulled down to fire the ejection gun and to protect the face, oxygen mask, etc against wind blast during ejection. |
| **5383** | Flight deck | The compartment in an aircraft containing the operating stations of the flight crew. |
| **5384** | Forebody | 1. Of a fiying boat hull. The portion forward of the step; and 2. Generally. The forward portion of a fuselage or nacelle. |
| **5385** | Fuselage | The main structural body of an aircraft other than a flying boat or boat amphibian. |
| **5386** | Gosport | A flexible voice-tube between two cockpits in an aeroplane, used especially between a flying instructor and a student. |
| **5387** | Hull | The main structural and flotation body of a flying boat or boat amphibian. |
| **5388** | Nacelle | A streamlined structure on an aircraft, separate from the fuselage, for housing crew, engines or other items of load. |
| **5389** | Pod | A nacelle supported externally from a fuselage or wing. |
| **5390** | planing bottom | The part of the under-surface of a hull or float designed to provide hydrodynamic lift. |
| **5391** | Sponson  (stub) | A projection from a hull to give lateral stability on water. |
| **5392** | Step | A discontinuity in the under-surface of a hull or flat to facilitate take off. |
| **5393** | Tail boom | A cantilever carrying the tail unit of an aircraft in, which the fuselage does not perform this function. |

**SECTION 54 LANDING GEAR**

| **No.** | **Term** | **Definition** |
| --- | --- | --- |
| **5401** | Landing gear | The part of an aircraft (other than the hull of a flying boat) provided for its support and movement over land, water or other surface, and for absorbing the shock on landing. It comprises the main supports (incorporating wheels, skids, skis) and auxiliary items, such as nose-wheels, tail-wheels or skids and wing-tip floats. |
| **5402** | Nose-wheel landing gear  (tricycle landing gear) | A landing gear with a nose-wheel undercarriage. |
| **5403** | Tail-wheel landing gear | A landing gear with a tail-wheel undercarriage. |
| **5404** | Rrrester hook (arresting hook) | A hook on an aircraft to engage arresting gear. |
| **CASTORING WHEEL** | |  |
| **5405** | Axle offset | The length of the common normal to the castor axis and to the wheel axis. |
| **5406** | Castor length | The distance between the centre of the tyre contact area and the intersection of the ground with the castor axis produced. |
| **5407** | Shimmy | An oscillation of a castoring wheel about the castor axis. It is excited when the wheel travels on a surface whose coefficient of friction exceeds a critical value. |
| **5408** | Shimmy damper | A damper designed for suppressing shimmy. |
| **5409** | Float | A water-tight body giving buoyancy and stability in roll on water to a seaplane or amphibian and enabling it to take off and land. |
| **5410** | Flotation gear | Emergency flotation appliances for aircraft. |
| **5411** | Hydrofoil | A surface, similar in form to an aerofoil, on a seaplane or amphibian hull or float to facilitate takeoff by providing hydrodynamic lift. |
| **5412** | Oleo  (oleo leg)  (oleo strut > | A telescopic structural member designed to dissipate the emergency at landing by the passage of oil under pressure through an orifice. |
| **5413** | Pedestal | The pillar connecting a ski to the aircraft. |
| **5414** | Retraction lock | A device preventing inadvertent retraction of the undercarriage. |
| **5415** | Spat | A fairing around the wheel of a fixed landing gear. |
| **5416** | Torque links | A linkage to prevent relative rotation between telescopic members. |
| **5417** | Track | The distance between the outer points of contact of the port and starboard main undercarriages. |
| **5418** | Undercarriage | A major assembly of the landing gear (main, nose, tail). |
| **5419** | Bicycle undercarriage | A main landing gear using two wheels or pairs of wheels in tandem. |
| **5420** | Bogie undercarriage | An undercarriage carrying a pair or pairs of tandem wheels pivoted at the end of a central strut. |
| **5421** | Cross-wind undercarriage | An undercarriage which permits an aircraft to move crabwise in a straight line down a runway in the presence of a cross-wind. |
| **5422** | Retractable undercarriage | An undercarriage which can be withdrawn from its operative position, usually into the structure, to reduce drag. |
| **5423** | Up-and-down lock | A lock on a retractable undercarriage to hold it in either the retracted or the operative position. |
| **5424** | Wheel base | The fore-and-aft distance between the main-wheel centre and the nose-wheel or tail-wheel centre. |
| **5425** | Wheel turning radius | The effective rolling radius of a pneumatic-tyred wheel. It is the radius of the circle whose circumference is equal to the distance moved forward by the wheel during a single revolution. |

**SECTION 55 INSTRUMENTS**

| **No.** | **Term** | **Definition** |
| --- | --- | --- |
| **FLIGHT INSTRUMENTS** | |  |
| **5501** | Air-mileage | An indicating instrument which shows continuously and automatically the air distance flown. |
| **5502** | Air-mileage unit | An instrument which derives continuously and automatically the air distance flown and feeds this function into other automatic instruments. |
| **5503** | Air-position indicator | An indicating instrument which shows continuously and automatically the air position of an aircraft by calculation from inputs of heading and air speed. |
| **5504** | Air sextant | An instrument which determines the altitude of a celestial body, employing a special device to provide an artificial horizon. It may be fitted with a periscopic averaging, integrating or other special device. |
| **5505** | Airspeed indicator  (ASI) | An instrument which indicates the airspeed as derived simply from the stagnation or total pressure. |
| **5506** | Maximum safe airspeed indicator | An airspeed indicator with an additional pointer which shows automatically the indicated airspeed corresponding to a predetermined limiting Mach number. In addition, there may be a mark on the dial showing the maximum permissible airspeed. |
| **5507** | Altimeter | Device for indicating altitude. |
| **5508** | Barometric altimeter  (pressure altimeter) | An aneroid barometer graduated to indicate altitude according to a standard atmosphere. |
| **5509** | Cabin altimeter | An altimeter to indicate the equivalent altitude in a pressure cabin. |
| **5510** | Height indicator | An instrument in an aircraft for indicating the distance between it and the surface vertically beneath. |
| **5511** | Radio altimeter | A height indicator working on the radar principle. |
| **5512** | Artificial horizon | An instrument with a self-contained vertical gyro which displays the attitude of the aircraft elevation, and bank. |
| **5513** | Blind-flying instruments | Instruments specifically designed to supply a pilot with information sufficient for him to fly an aircraft using instruments only. |
| **5514** | Cable-angle indicator | An indicator showing the angle in the vertical plane, at the point of attachment, between a towing cable and the longitudinal axis of the towing or towed aircraft. |
| **5515** | Chronometric tachometer | An instrument used to measure rev/min by the motion of a gear in a measured interval of time. |
| **5516** | Dive-angle indicator | An instrument for indicating the angle between the vertical and the flight path of an aircraft in a dive. |
| **5517** | Flight instrument system | An arrangement of sensors and displays giving to the pilot information on the speed, orientation and flight path of an aircraft relative to a known datum. |
| **5518** | Attitude director indicator | An instrument display which combines the functions of an attitude indicator and a flight director display. Other information to assist the pilot in a given manoeuvre, such as radio altitude, ILS deviation, and speed variation, is sometimes shown. |
| **5519** | Attitude indicator | An instrument which displays the attitude of an aircraft in elevation and bank (and sometimes heading) the attitude information being transmitted from remote sensors and servo repeated within the instrument. |
| **5520** | Flight director display | A display in which one or more symbols are shown related to a datum, the deviation of the symbols from the datum being controlled by processed information. By flying the aircraft to keep the symbols at the datum, the pilot carries out a predetermined manoeuvre in a prescribed manner. |
| **5521** | Head-up-display | A display such that the readings of a group of flight instruments or other information can be superimposed upon the pilot’s forward field of view. |
| **5522** | Gyro  (gyroscope) | A spinning rotor, usually in a gimbal system, provided with one or more additional degrees of freedom. |
| **5523** | Azimuth gyro | A gyroscopic instrument used in aircraft to establish an arbitrary azimuth datum and to measure the aircraft heading relative to it. |
| **5524** | Caging device | A device for locking the gimbals of a gyro. |
| **5525** | Directional gyro | An azimuth gyro with a direct display and means for setting the datum to a specified compass heading. |
| **5526** | Free gyro | gyro which is free from constraint. |
| **5527** | Integrating rate gyro | A gyro with one degree of freedom other than the spinning one and so constrained that the deflection of the spin axis relative to the case is the time integral of the angular velocity of the case. |
| **5528** | Rate gyro | A gyro with one degree of freedom other than the spinning one and so constrained that the deflection of the spin axis relative to the case is a measure of the angular velocity of the case. |
| **5529** | Vertical gyro | A gyroscopic instrument used in aircraft to establish a vertical datum and to measure the aircraft attitude relative to it. |
| **5530** | Incidence indicator  (angle of attack indicator) | An instrument for indicating the angle in the plane of symmetry between the flight path and longitudinal axis of an aircraft. |
| **5531** | Machmeter | An instrument for measuring the Mach number. |
| **5532** | Navigation display | A display of quantities defining the position of the aircraft relative to an arbitrary datum. It is common to obtain merely the plan position relative to the earth. |
| **5533** | Pitot tube  (impact tube) | A tube, with an open end facing up-stream, wherein at subsonic speeds the pressure is equal to the total pressure. |
| **5534** | Pressure head | device which combines the pitot tube and static pressure tube in a form suitable for mounting on an aircraft. |
| **5535** | Side-force meter | An instrument for measuring changes in the external side force acting upon it, excluding gravity. If suitably positioned, it will give an approximate measurement of the sideslip. |
| **5536** | Sideslip display  (sideslip indicator) | An instrument which displays variations in sideslip. |
| **5537** | Sideslip meter | An instrument for measuring the angle of sideslip. |
| **5538** | Static vent | A small aperture in a plate fixed to form part of the fuselage and located appropriately for measuring the ambient static air pressure. |
| **5539** | Static-pressure tube | A small tube with an aperture or apertures for measuring the ambient static pressure. |
| **5540** | Statoscope | An instrument for indicating small changes in altitude or variations from a pre-set altitude. |
| **5541** | Turn indicator | An instrument for indicating the rate of turn of an aircraft about the vertical axis. |
| **5542** | Turn-and-slip indicator  (turn-and-sideslip  indicator) | An instrument which combines the functions of a turn indicator and a side-force meter. |
| **5543** | Vertical speed indicator  (rate-of-climb indicator,  Variometer) | An instrument indicating the rate of climb or descent. |
| **5544** | Yaw meter | An instrument which detects changes in direction of air flow. By usage, the term is not restricted to instruments detecting changes in yaw. |
| **TEST INSTRUMENTS** | |  |
| **5545** | Accelerometer | An instrument for measuring acceleration, for example, indicating accelerometer, maximum-reading accelerometer, recording accelerometer. |
| **5546** | Counting accelerometer  (statistical accelerometer) | An accelerometer recording the number of times the acceleration has exceeded any or all of a number of predetermined values. Usually also records airspeeds and/ or altitude at pre-set intervals. |
| **5547** | Fatigue load meter  (fatigue meter) | A simple form of counting accelerometer presenting digital records of acceleration only and for a limited number of values. |
| **5548** | Impact accelerometer | An accelerometer used to measure the deceleration of an aircraft on landing. |
| **5549** | Integratlng accelerometer | A device, incorporating an accelerometer, which performs a single integration of the acceleration to derive the velocity and a second integration to derive the distance travelled. |
| **5550** | Airflow meter | An instrument for measuring the flow of air in ducts. |
| **5551** | Automatic observer | An apparatus for recording automatically the readings of a specified set of instruments in flight. |
| **5552** | Flight-path recorder | An instrument for recording the angle of the flight path to the horizontal. |
| **5553** | Flight recorder | A device recording information about the behaviour of an aircraft, its crew and/or the ambient conditions in flight. |
| **5554** | Vg recorder | A flight recorder giving (usually graphically) simultaneous values of indicated airspeed and acceleration. |
| **5555** | VgH recorder | A flight recorder giving (usually graphically) simultaneous values of indicated airspeed and acceleration and altitude. |
| **5556** | VH recorder | A flight recorder giving (usually graphically) simultaneous values of indicated airspeed and altitude. |
| **5557** | Hot-wire anemometer | An anemometer in which the speed of an airstream is deduced by the change in resistance of an electrically heated wire exposed to the stream. |
| **5558** | Noise meter  (audiometer) | An instrument for the measurement of some quality characteristic of the strength of a noise, for example, sound pressure level or intensity. |
| **5559** | Objective noise meter | A noise meter operating objectively, that is, without requiring from the user any subjective judgement of the magnitude of the quantity under measurement. |
| **5560** | Subjective noise meter | An instrument for the measurement of loudness by aural comparison with a reference sound. |
| **5561** | Pitot comb | A group of pitot tubes deployed for simultaneous measurement of kinetic pressure at a number of points in an airflow. |
| **5562** | Recording altimeter  (altitude recorder) | An instrument by which variation in altitude is recorded against time. |

**SECTION 56 LOADINGS AND WEIGHTS**

| **No.** | **Term** | **Definition** |
| --- | --- | --- |
| **5601** | CG datum point | An arbitrarily chosen fixed point from which distances are measured to the centres of gravity of the various loads carried for the purpose of determining the position of the centre of gravity of the loaded aircraft. |
| **5602** | Load sheet | A document indicating, interalia, how the load is distributed and the resulting position of the centre of gravity of the aircraft. |
| **LOADING AND LOAD FACTORS** | |  |
| **5603** | Load factor  (operational) | The actual payload as a percentage of the maximum permissible payload on a particular flight. |
| **5604** | Power loading | The gross weight of an aircraft divided by the horsepower of the engine(s). |
| **5605** | Span loading | The gross weight of an aeroplane or glider divided by the square of the span. |
| **5606** | Surface loading | The mean normal force per unit area carried by a particular aerofoil under specified aerodynamic conditions. |
| **5607** | Wing loading  (gross wing loading) | Gross weight divided by gross wing area. |
| **5608** | Net wing loading | Gross weight divided by net wing area. |
| **LOADS** | |  |
| **5609** | Disposable load | 1. Of a military aircraft. The fuel, oil and armament stores; and 2. Of a civil aircraft. The crew, fuel, oil and payload. |
| **5610** | Maximum disposable load | The maximum licensed take-off weight less the empty weight of the aircraft. The empty weight includes all fixed equipment, fixed ballast, unusable fuel supply, undrainable oil, engine coolant and hydraulic fluid. |
| **5611** | Payload  (commercial load) | That part of the useful load from which revenue is derived (that is, passengers, mail and freight). |
| **5612** | Useful load | The gross weight less the basic weight or weight empty. |
| **WEIGHTS** | |  |
| **5613** | All-up weight  (total weight) | The total weight of an aircraft with the crew and contents on any particular occasion. |
| **5614** | Basic weight | That weight which includes all items declared as fixed operating equipment and trapped fuel and oil, to which it is only necessary to add the ‘variable’ or ‘expendable’ load items for the various missions. |
| **5615** | Certified landing  (CL) weight | The design gross weight at which an aircraft capable of V/STOL is permitted to land conventionally. |
| **5616** | Certified take off  (CTO) weight | The design gross weight at which an aircraft capable of V/STOL is permitted to take off conventionally. |
| **5617** | Design gross weight | The design weight at which it is expected that an aircraft will meet the relevant specified airworthiness requirements. |
| **No.** | **Term** | **Definition** |
| **5618** | Dry weight | For operational purposes, the gross weight of the aircraft less fuel. |
| **5619** | Gross weight | The weight of an aircraft with its crew and contents. |
| **5620** | Maximum weight | The maximum flying weight of an aircraft permissible under the regulations obtaining irrespective of operating conditions. |
| **5621** | Maximum landing weight | The maximum weight at which an aircraft is permitted, due to design or operational limitations, to land except in an emergency. |
| **5622** | Maximum licensed take-off weight | Maximum take-off weight, according to the airworthiness certificate. |
| **5623** | Maximum take-off weight | The weight of the aircraft above which all weight must be in fuel or load in the wing. |
| **5624** | Operating weight  (aircraft prepared for  service weight)  (APS weight) | The weight of an aircraft equipped for flight. Normally comprises the ‘basic weight’ plus those ‘variable’ items, which remain substantially constant for the type of mission. These include oil, crew, crew’s baggage, steward’s equipment and emergency and extra equipment that may be carried. |
| **5625** | Tare weight | For design purposes, the standard weight of a type of aircraft complete in flying order but without crew, fuel, oil, removable equipment or payload. |
| **5626** | VTOL weight | The maximum gross weight of a particular aircraft at which VTOL is possible. |
| **5627** | Weight empty | For operational purposes, the measured weight of an individual aircraft less non-mandatory removal equipment and disposable load. |

**SECTION 57 ROTOR CRAFT**

| **No.** | **Term** | **Definition** |
| --- | --- | --- |
| **5701** | Alpha-one angle | The angle between the blade-span axis, viewed in the plane of rotation from the blade trailing edge, and the laghinge axis. |
| **5702** | Blade azimuth angle | The angle, in plan view, between the downwind position (or plane or symmetry) and a line passing through the centre of the rotor hub and lag hinge, measured in the direction of rotation. |
| **5703** | Blade pitch angle  (blade angle) | The acute angle between the line of zero lift of a blade section and the plane of no feathering. |
| **5704** | Coning angle | The angle between the longitudinal axis of a blade and the tip-path plane |
| **5705** | Delta-three angle | The acute angle between the normal to the blade axis in plan view and the flapping-hinge axis. |
| **5706** | Flapping angle | The angle between the blade-span axis and the plane of no feathering. Blade flapping motion is the variation with azimuth angle of the blade flapping angle. |
| **5707** | Axial flow | The component of the air flow normal to the tip-path plane. |
|  | **BLADES** |  |
| **5708** | Articulated blade | a) A blade connected to the rotor head by flapping, lag and  feathering hinges (fully articulated).  b) A blade connected to the rotor head by either a flapping or a lag hinge and a feathering hinge. |
| **5709** | Blade damper | A device for damping the motion of a rotor blade about the lag hinge. |
| **5710** | Blade loading | The thrust of the rotor divided by the total area of the rotor blades. |
| **5711** | Rigidly-mounted blade | A blade which has no pivoted connection to the shaft other than a feathering hinge. |
| **5712** | Disc area | The area of circle described by the tips of the blades. |
| **5713** | Disc loading | The thrust of the rotor divided by the rotor disc area. |
| **5714** | Drag link | An adjustable link between each blade and the hub of certain rotors, used to maintain the angular spacing between the blades. |
| **5715** | Drag stop | A limit stop used in a rotor\*to prevent excessive horizontal movement of a blade in azimuth. |
| **5716** | Equivalent blade chord | The chord of an imaginary rectangular blade of the same tip radius as a non-rectangular blade giving the same torque (or thrust). |
| **5717** | Feathering | Variation with azimuth angle of the blade pitch angle about the feathering hinge. |
| **5718** | Aping | Angular oscillation of a blade about the flapping hinge. |
| **5719** | Ground resonance | A mechanical vibration of a rotorcraft on the ground or other surface when the rotor is in operation, caused by coupling between the periodic motion of the rotor and oscillation of the aircraft on its landing wheels. |
| **HINGES** | |  |
| **5720** | Feathering hinge | A blade pivot, which allows the blade pitch angle to be varied. |
| **5721** | Flapping hinge | A blade pivot which allows the flapping angle to vary. |
| **5722** | Delta hinge | A flapping hinge which is obliquely inclined to a plane normal to the axis of the rotor hub. |
| **5723** | Lag hinge  (drag hinge) | A blade pivot which allows the blade to be displaced angularly in azimuth. |
| **5724** | In-plane oscillation | Angular oscillation of a blade about the lag hinge. |
| **5725** | Inflow ratio | The ratio of the total velocity of the axial flow through the rotor disc to the rotor tip speed. |
| **5726** | No-feathering axis | The axis through the centre of rotation of the rotor with respect to which there is no variation of blade pitch angle with azimuth angle. |
| **5727** | Offset ratio | The ratio of the distance of the centre of the flapping or lag hinge from the centre of the rotor hub to the rotor radius. |
| **OPERATING CONDITIONS** | |  |
| **5728** | Autorotation | That condition of flight of a rotorcraft wherein there is free and continuous rotation of the rotor when it is not power driven (*see* also **4111**). |
| **5729** | Normal propeller state | The operating condition of a rotor when the rotor thrust is in the opposite direction to the axial flow through and outside the rotor disc area. |
| **5730** | Vortex-ring state | The operating condition of a rotor when the axial flow through the rotor disc is in the opposite direction to the axial flow outside the rotor disc area and to the rotor thrust. |
| **5731** | Windmill-brake state | The operating condition of a rotor when the rotor thrust and the axial flow through and outside the rotor disc area are all in the same direction. |
| **PITCH CONTROL** | |  |
| **5732** | Collective pitch control | A control by which an equal alteration of blade pitch angle is imposed on all the blades independently of their azimuthal position. |
| **5733** | Control advance | The phase angle by which the controlled change of cyclic pitch variation is displaced in azimuth from the direction of control-lever displacement. |
| **5734** | Cyclic pitch control  (azimuthal control) | A control by which the blade pitch angle is varied sinusoidally with the blade azimuth position. |
| **5735** | Rotor | A system of rotating aerofoils. |
| **5736** | Auxiliary rotor  (anti-torque rotor,  tail rotor) | A rotor, the primary function of which is to counterbalance the torque reaction of the main rotor in a rotorcraft and/or to change the motion of the aircraft about one of the body axes. |
| **5737** | Control rotor | A small servo rotor, mounted coaxially with the main rotor on certain helicopters, the displacement of which by the pilot causes the main rotor to be displaced to direct the thrust. By a damping action, the control rotor usually also contributes to the stability of the helicopter. |
| **5738** | Jet rotor | A rotor driven by jet reaction devices mounted within or upon the rotor blades, usually at the tips. |
| **5739** | Main rotor | A rotor, the primary function of which is to provide lift. |
| **5740** | See-saw rotor  (teetering rotor) | A rotor system, usually of two blades, wherein the blades are attached rigidly to a central head which is in turn attached flexibly (that is, by gimbals) to the rotor shaft. |
| **5741** | Rotor head | The entire rotor assembly less the rotor blades. |
| **5742** | Rotor hub | The central rotating member of the rotor head which carries the blade arms and hinge assemblies. |
| **5743** | Rotor radius | The distance of the blade tip from the centre of the rotor hub for zero lag angle and zero or built-in coning angle. |
| **5744** | Solidity | The ratio of the total blade area of a rotor to the disc area. |
| **5745** | Tip speed | The mean angular velocity of the rotor multiplied by the rotor radius. |
| **5746** | Tip-speed ratio  (advance ratio) | The ratio of the component of the aircraft’s forward speed in the no-feathering plane (or tip-path plane) to the rotor tip speed. This is approximately equivalent to the ratio of the velocity of the rotorcraft along the flight path to the rotor tip speed. |
| **5747** | Tip-path plane | The plane substantially containing the path described by the blade tips as they rotate. |

**ANNEX A**

(*Foreword*)

**COMMITTEE COMPOSITION**

Air and Space Vehicles Sectional Committee Sectional Committee, Ted 14

| *Organization* | *Representative*(*s*) |
| --- | --- |
| Indian National Space Promotion and Authorisation Centre (IN-SPACe), Ahmedabad | Shri Rajeev jyoti**(*Chairperson*)** |
| Aeronautical Development Agency, Bengaluru | Shri D. K. P. Sinha  Shri Rammohan V. Kaki (*Alternate*) |
| Airbus Group India Private limited, Bengaluru | Shri George Suraj DSA |
| Airports Authority of India, New Delhi | Shri D. Dilip Kumar |
| CSIR - National Aerospace Laboratories, Bengaluru | Shri Shri Thennavarajan S. |
| Department of Defence Production, Ministry of Defence, New Delhi | Shri Arindam Chaudhary |
| Directorate General of Aeronautical Quality Assurance, Ministry of Defence, New Delhi | Shri Sanjay Kumar Sharma  Shri Mukesh Chand Meena (*Alternate*) |
| Directorate of Naval Air Material, Ministry of Defence | Shri Abhijat Phand |
| Gas Turbine Research Establishment, Bengaluru | Shri D. Nagaraju |
| Hindustan Aeronautics Limited, Bengaluru | Shri Pratap Panda  Shri Sushil Kumar (*Alternate*) |
| Indian Institute of Technology Ropar, Punjab | Shri Dhiraj Kumar Mahajan |
| Indian National Space Promotion and Authorisation Centre (IN-SPACe), Ahmedabad | Shri Paragjyoti Garg |
| Indian Space Research Organization - U R Rao Satellite Centre, Bengaluru | Shri Raghavendra Kulkarni  Shri Rayan Kutty P. P. (*Alternate*) |
| Indian Space Research Organization - Vikram Sarabhai Space Centre, Thiruvananthapuram | Shri P. Ramkumar  Shri Jayakumar M. (*Alternate* I)  Shri Govind (*Alternate* II) |
| Indian Space Research Organization, Bengaluru | Dr A. K. Anil Kumar  Shri Manish Saxena (*Alternate*) |
| In Personal Capacity | Shri A. V. Joshi |
| In Personal Capacity | Shri S. C. Shrimali |
| BIS Directorate General | Shri A. P. D. Dwivedi, Scientist ‘F’/ and Head (Transport Engineering) [Representing Director General (*Ex-officio*)] |

*Member Secretary*

Mr Ravindra Beniwal

Scientist ‘D’/Joint Director

(Transport Engineering)