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BUREAU OF INDIAN STANDARDS

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भारतीय मानक मसौदा

**वैमानिकी और खगोलीय शब्दों की शब्दावली
भाग 3 संरचना**

(पहला पुनरीक्षण)

Draft Indian Standard

**GLOSSARY OF AERONAUTICAL AND ASTRONAUTICAL TERMS
PART 3 STRUCTURE**

(First Revision)

ICS: 49.020

Air and Space Vehicles Sectional Committee, TED 14 **Last date for receipt of comments is 09/07/2024**

FOREWORD

(Formal Clause to be added later)

This standard is one of a series of Indian Standards on the glossary of Aeronautical and Astronautical terms. Other standards in this series are:

IS 7879 (Part 1) : 1975 Under revision (Doc No. 20706)	Glossary of Aeronautical and Astronautical Terms: Part 1 General
IS 7879 (Part 2) : 1975 Under revision (Doc No. 20708)	Glossary of Aeronautical Terms: Part 2 Motion of Aircraft
IS 7879 (Part 4) : 1980 Under revision (Doc No. 20757)	Glossary of Aeronautical and Astronautical Terms: Part 4 Aerodynamics

IS 7879 (Part 5) : 1982 Under revision (Doc No. 20760)	Glossary of Aeronautical and Astronautical Terms: Part 4 Aerodynes (Heavier - Than - Air - Aircraft)
IS 7879 (Part 6) : 1978 Under revision (Doc No. 20763)	Glossary of Aeronautical and Astronautical Terms: Part 6 Space Terms
IS 7879 (Part 7) : 1984 Under revision (Doc No. 21135)	Glossary of Aeronautical and Astronautical Terms: Part 7 Air Traffic And Ground Services
IS 7879 (Part 8) : 1987 Under revision (Doc No. 20768)	Glossary of Aeronautical and Astronautical Terms: Part 8 Power Plant

Provides standard definitions of technical terms peculiar 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.

This standard consists of a series of parts, each part covering terms specific to a particular feature, type of aircraft, equipment, service, etc.

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 3405 is the 5th definition of Section 34, which is in Part 3.

Where two or more synonymous terms are in use, the term which is favoured is given first, with the intention that it should gradually displace the others. The alternative terms are given below the preferred terms in less prominent type.

An Indian Standard Glossary of space terms covering definitions pertaining to rockets, missiles, etc. is also under preparation.

This standard was first published in 1975. 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.

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

- a) BS 185 'Aeronautical and Astronautical terms.

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

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

**GLOSSARY OF AERONAUTICAL AND ASTRONAUTICAL TERMS
PART 3 STRUCTURE**

(First Revision)

1 SCOPE

This part covers the standard definitions for terms relating to the structures of an aircraft.

2 REFERENCES

This standard does not contain any cross reference.

3 TERMINOLOGY

SECTION 31 — GENERAL

No.	Term	Definition
3101	Buckling	A structural deformation due initially to instability under load irrespective of whether the deformation is elastic or permanent and whether it leads at once to collapsed or not.
3102	Creep Buckling	Critical terminal buckling resulting from slow and steady increase in the deformation of a structure under constant load.
3103	Thermal Buckling	Buckling induced wholly or in part by thermal stress or by thermal distortion.
3104	Factor of Safety	The factor by which a limit load is multiplied to produce the load to be used in the design of an aircraft or part of an aircraft. It is introduced to provide a margin of strength against loads greater than the limit loads, and

No.	Term	Definition
		against uncertainties in materials, construction, load estimation and stress analysis.
3105	Proof Factor	The factor of safety corresponding to the proof load.
3106	Ultimate Factor	The factor of safety corresponding to the load, which is, regarded as the ultimate for design purposes, that is, the fully factored load.
3107	Fineness Ratio	The ratio of the length of a body to its maximum transverse dimension or, sometimes, to some equivalent dimension.
3108	Flexural Centre	Flexural centre of a cross-section is defined as a point in that section at which a shear force can be applied without producing a rotation of that section in its own plane.
3109	Flight Envelope (Manoeuvring V-n Diagram)	A diagram in which, for a particular aircraft type, the specified design normal accelerations (as multiples of g) form the ordinates and the corresponding equivalent airspeeds the abscissae. The boundary of the diagram forms a closed figure, which defines the design limits for the aircraft concerned.
3110	Fully-Factored Load	The maximum load, which a structure is required to be capable of withstanding.
3111	Geodetic Construction	A method of making curved space frames in which the principal structural members follow geodesics in the surface, so that the forces set up in the members are either tensile or compressive.
3112	Gust Alleviation Factor (Alleviation Factor)	A correction factor, which allows for gust shape, aircraft flexibility, freedom in pitch and delay in the growth of the lift increment. The factor is applied to the increment in acceleration found from a simple calculation of the response to a sharp-edged gust in which no allowance is made for these effects.
3113	Gust Envelope (Gust V-n Diagram)	A diagram in which, for a particular aircraft type, the gust load factors form the ordinates and the corresponding equivalent airspeeds the abscissae, and on which contours of constant vertical gust velocity can be drawn.

No.	Term	Definition
		It is often superimposed on the flight envelope because of the common abscissae.
3114	Gust Frequency	The number of discrete gusts encountered per unit horizontal distance (usually one mile) having vertical velocity equal to or greater than a given value.
3115	Integral Construction	The formation of a structural member as a single whole instead of by the assembly of a large number of separate elements.
3116	Limit Load (Unfactored Load)	The maximum load expected to be applied, in a particular condition of operation, to the aircraft or to any part of it.
3117	Load Diffusion	The process, by which variation along any length of a structure of transverse distribution of stress, due to direct loads applied in the direction of that length, is established.
3118	Shear Lag	The type of load diffusion in which the lag of longitudinal displacement of one part of a transverse section relative to that of another results primarily from shear loading applied along lines parallel to the length of the structure.
3119	Load Factor	The ratio of the total load in a specified direction (usually along the normal axis) to the weight of the aircraft. Such load may arise from the aerodynamic forces, gravity, ground or water reaction, or from combinations of these forces.
3120	Primary Structure	Those portions of the structure the failure of which would seriously endanger the aircraft in flight.
3121	Proof Load	The load which a structure is required to withstand and still remain serviceable.
3122	Reserve Factor	The ratio of the ultimate load of a structure to the fully-factored load.
3123	Sharp-Edged Gust	A hypothetical discrete vertical (or side) gust in which the velocity of the air changes abruptly, that is, the gust gradient distance is zero.

No.	Term	Definition
3124	Strain Gauge	A device, embodying a sensing element attached to the structure, which provides a direct measurement of strain at the point of attachment.
3125	Rosette	A set of strain gauges at a point on the surface of a structure, so arranged that the state of plane strain at the point can be fully determined.
3126	Wire Strain Gauge	A common form of strain gauge in which the sensing element comprises one or more lengths of fine wire, the change in whose electrical resistance under load provides a measure of the strain.
3127	Stressed-Skin Structure	A structure covered with sheet, which contributes substantially to its strength and stiffness.
3128	Temperature Stress	A stress induced when a structure embodying materials with different coefficients of linear expansion is exposed to a temperature other than that prevailing at the time of assembly.
3129	Test Frame	An apparatus for subjecting aircraft structures to loads representing those occurring in operation. It comprises loading and supporting frameworks and a control mechanism for the application of loads by hydraulic rams or other means.
3130	Thermal Stress (Temperature Gradient Stress)	The stress induced within a structure by changes in temperature.
3131	Ultimate Load	The maximum load, which a structure is capable of withstanding.
SECTION 32 — DETAIL PART		
3201	Blister	A streamlined protuberance on an aircraft, designed to house equipment, to afford a place for observation or for other purposes.
3202	Boat-Tail	The rear portion of an elongated body, as a rocket, having cross-sectional area decreasing toward the rear.
3203	Bulkhead	A transverse dividing wall within a structure.

No.	Term	Definition
3204	China	The extreme side member of the planning bottom running approximately parallel to the keel in side elevation.
3205	Clamshell	Describes doors or other structural parts which open and close in the manner of clamshells.
3206	DV Window (Panel)	A quick-opening cockpit window (panel) allowing direct vision.
3207	Explosive Bolt	A quick release device actuated by a small explosive charge detonated by an electrical or other signal.
3208	Fairing	A secondary structure added to any part to reduce its drag.
3209	Fillet	A fairing at the junction of two surfaces to improve the airflow.
3210	Fin Post	The principal structural member of a fin, usually carrying the rudder.
3211	Former	A structural member, the primary purpose of which is to pre-serve form or shape and to which the external skin is attached. In general, it carries structural loads.
3212	Frame	<ul style="list-style-type: none"> a) Generally, a plane structure transverse to the axis of a tube and maintaining the shape of the cross section of the tube; and b) Specifically, a structural member lying in a transverse plana of a fuselage, hull or nacelle, and following the periphery.
3213	Spar Frame	A specially strong frame in the plane of any spar.
3214	Keelson	A longitudinal member forming part of the main structure of a hull or float and running internally along the bottom.
3215	Longer on	A main longitudinal member of a fuselage or nacelle.
3216	Monocoque	A type of structure whose strength end rigidity depends upon the outer surface, usually with strong circumferential members.

No.	Term	Definition
3217	Panel	A portion of a stiffened sheet together with its stiffeners.
3218	Plate	<ul style="list-style-type: none"> a) In structural theory, a portion of an unstiffened sheet; and b) A sheet having thickness greater than a specified amount.
3219	Rib	A member, which maintains the required contour of the covering material of planes or control surfaces, end which may also act as a structural member.
3220	Nose Rib	A former between the front spar and leading edge of an aerofoil.
3221	Rudder Post	The principal structural member of a rudder, usually carrying the hinges (<i>see</i> 3231).
3222	Sandwich	A structural component consisting of two parallel, or nearly parallel, faces attached to either side of a core of material of different properties.
3223	Core	The material between the faces of a sandwich. It stabilizes them and may carry direct load.
3224	Corrugated Sandwich	A sandwich In which the core is built up from sheet having longitudinal corrugations, enabling it to carry direct load in the longitudinal direction.
3225	Faces	The external skins of a sandwich.
3226	Honeycomb Sandwich	A sandwich in which the cord is formed of thin-walled small cells, often, but not necessarily, hexagonal in shape. It is usual to assume that the core will carry negligible direct load parallel to the faces.
3227	Sheet	Material of which the thickness is small in comparison with the other dimensions.
3228	Shell	A curved structure formed of sheet (either stiffened or unstiffened) generally closed on itself as in a tube.
3229	Skin	Sheet covering a framework of stiffeners.

No.	Term	Definition
3230	Spar	A principal spanwise structural member of an aerofoil or control surface.
3231	Stem Post	A single member terminating the fuselage, hull or float (<i>see 3221</i>).
3232	Stiffener	A member attached to a sheet to restrain its movement normal to the surface.
3233	Stringer	A stiffener, which also assists the sheet to carry direct load in the direction of its length.
3234	Strut	A structural member intended to resist compression.
3235	Drag Struts	Struts incorporated in the framework of an aerofoil to carry the loads induced by the air forces in the plane of the aerofoil.
3236	Interplane Struts	Struts connecting a plane to the plane above or below.
3237	Wires and-drag Wires	Wires or cables incorporated in the framework of an aerofoil and in its plane, complementary to the drag wires and resisting forces in the opposite direction.
3238	Anti-lift Wires (Landing Wires)	Wires to resist forces in the opposite direction to the lift.
3239	Drag Wires	Wires or cables incorporated in the framework of an aerofoil and in its plane, to resist forces in the general direction of the drag.
3240	Incidence Wires	Wires or cables bracing the main plane structure in the plane of a pair of front and rear struts.
3241	Lift Wires (Flying Wires)	Wires or cables the principal function of which is to transfer the lift of the main planes to the main structure.
3242	Streamline — Wire	A wire the cross section of which is elongated to reduce its drag.
SECTION 33 — AEROELASTICITY		
3301	Aeroelastic Divergence	The aeroelastic instability which results when the rate of change of aerodynamic forces or couples with

No.	Term	Definition
		displacement exceeds that of the elastic restoring forces or couples.
3302	Divergence Speed	The lowest equivalent air speed at which aeroelastic divergence occurs.
3303	Aeroelasticity	A branch of mechanics, which treats of the phenomena resulting from the Interaction of aerodynamic, inertial and elastic forces.
3304	Aerothermoelasticity	That branch of aero elasticity in which aerodynamic heating of the structure is considered.
3305	Aileron Buzz (Control Surface Buzz)	An oscillation of limited amplitude, of a control surface about its hinge. It can occur at high subsonic and transonic speeds.
3306	Buffeting	An irregular oscillation of any part of an aircraft produced and maintained directly by an eddying flow.
3307	Damping (Material Damping)	The damping intrinsic to the material of the structure.
3308	Structural Damping	The total damping of a built-up structure.
3309	Flight Flutter Test	A flight test during which the structure of an aircraft is excited in order to observe its behavior and to deduce its flutter characteristics.
3310	Flutter	A sustained oscillation due to the interaction between aero- dynamic forces, elastic reactions and inertia.
3311	Anti-symmetrical Flutter	Flutter in which the components on port and starboard sides of an aircraft undergo, at any instant, equal but asymmetrical displacement with respect to the plane of symmetry.
3312	Asymmetrical Flutter	Flutter in which the components on the port and starboard sides of an aircraft undergo, at any instant, asymmetrical and unequal displacements with respect to the plane of symmetry.
3313	Classical Flutter (Coupled Flutter)	Flutter which occurs because of coupling (inertial, aerodynamic or elastic) between two or more degrees of freedom.

No.	Term	Definition
3314	Flutter Speed	The lowest equivalent airspeed at which flutter occurs.
3315	Stalling Flutter	Flutter in one or more degrees of freedom around the angle of stall.
3316	Symmetrical Flutter	Flutter in which the components on the port and starboard sides of an aircraft undergo, at any instant, equal and symmetrical displacements with respect to the plane of symmetry.
3317	Frequency Parameter (Reduced Frequency)	The ratio of the product of the frequency of an oscillation and a representative length of an oscillating system to the true airspeed.
3318	Mass-Balance Weight	A mass normally attached to a control surface forward of the hinge line, for the purpose of reducing or eliminating the inertial coupling between angular movement of the control and some other degree of freedom of the aircraft.
3319	Distributed Mass-Balance Weight	A mass-balance weight, which is distributed along the span of the control surface.
3320	Remote Mass-Balance Weight	A mass-balance weight, which is connected to the control surface by a series of links.
3321	Normal Mode of Vibration	A mode of free vibration of an undamped system.
3322	Reference Section	A section of a structure, the displacements of which are taken as the co-ordinates in a semi-rigid representation.
3323	Resonance Test (Shake Test)	A test in which forced oscillation over a range of frequencies is applied to a structure with the object of determining the natural frequencies and modes of oscillation of the structure.
3324	Reversal of Control	The condition in which the displacement of a control surface produces a moment on the aircraft in a reverse sense because of excessive structural distortion.
3325	Reversal Speed	The lowest equivalent airspeed at which reversal of control occurs.

No.	Term	Definition
3326	Semi-rigid Theory	An approximate theory of elastic structures in which the theoretical infinite number of degrees of freedom is represented by a finite number, each being associated with an invariable mode.
3327	Static Balance	The condition of a control surface in which the mass-balance is such that the centre of mass lies on the hinge axis.
3328	Stiffness Criterion	A relationship between the stiffness and other properties of a structure which, when satisfied, is sufficient to prevent flutter or other type of instability or loss of control.
3329	Virtual Inertia (Mass)	That part of the effective inertia (mass) of an oscillating body which is due to the presence of the surrounding air and is proportional to the density of that air.
SECTION 34 — FATIGUE		
3401	Acoustic Fatigue	Fatigue due to repeated loading produced by sound waves.
3402	Acoustic Fatigue Test	A test in which a specimen is subjected to acoustic loading in a test channel or reverberant chamber, or in the open.
3403	Discrete Frequency Test	A test in which the specimen is subjected to sound waves of only one frequency.
3404	Random Frequency Test	A test in which the specimen is subjected simultaneously to sound waves covering a broad band of frequencies.
3405	Endurance	The number of stress cycles to failure at a constant amplitude and constant mean stress, preferably given as a fraction or multiple of 10^2 cycles. In programme loading, endurance may be expressed as the number of programmes to failure.
3406	Fail-Safe Structure	A structure which retains, after the Initiation of a fracture or crack, sufficient strength and stiffness for the operation of the aircraft with an acceptable standard of safety until such fracture or crack is detected by normal inspection procedure.

No.	Term	Definition
3407	Fatigue Life	The operational life of an aircraft or component, expressed as a number of flying hours or flights or of applications of load during which the general level of structural safety is not appreciably lowered by fatigue.
3408	Fatigue Limit	The highest level of alternating stress for a given mean stress at which the endurance is infinite.
3409	Fatigue Strength	The alternating stress at a specified mean stress which causes failure at a given number of cycles.
3410	Fatigue Strength Reduction Factor	The ratio of the fatigue strength of a plain specimen to that of a similar specimen with a stress concentration, under the same external loads.
3411	Fatigue Test Tank	A water tank, with the necessary ancillary equipment, in which a scaled body (for example, the pressure cabin of an aircraft) is wholly immersed and subjected to cyclic variations of internal water pressure. Provision may also be made for the simultaneous imposition of cyclic loading to the remainder of the aircraft.
3412	Fluctuating Load Cycles (Repeated Load Cycle)	A load cycle in which the load does not change sign usually with zero minimum load.
3413	Reversed Load Cycle	A load cycle with zero mean load.
3414	Geometric Stress Concentration Factor	That which arises solely from the shape of the part, as derived from elastic theory or from strain measurements during which the material remains elastic throughout.
3415	Loads (Mean Load)	The average of the algebraic values of the maximum and minimum loads of the fatigue loading cycle.
3416	Alternating Load	The excursion from the mean load.
3417	Range of Load	The difference between maximum and minimum loads.
3418	Load Ratio	The ratio of the minimum to the maximum load.

No.	Term	Definition
3419	Near Field	The region in the vicinity of a noise source in which the fluid particle velocity is not necessarily in the direction of travel of the wave, and an appreciable tangential velocity may exist at any point. In this region the acoustic intensity is not simply related to the sound pressure squared.
3420	Programme Loading	A set of predetermined loads, applied in a definite order and repeated until failure or for a specified number of times.
3421	Random Loading	A random sequence of loads defined by a continuous spectrum of known statistical properties.
3422	Randomized Loading	A set of predetermined loads, applied repeatedly, each time in random order until failure or for the required number of times.
3423	S-N Diagram	A diagram in which the logarithm of endurance is plotted, as abscissa, against the alternating stress (semi-log plot) or Its logarithm (log-log plot), as ordinate.
3424	Safe Life	That life during which the probability of fatigue failure is below a specified low level.
3425	Semi-range/Mean Stress Diagram	A diagram in which contours of constant endurance are plotted with alternating stress as ordinate and mean stress as abscissa.
3426	Shock Call Noise	A phenomenon which may occur in the efflux of a jet engine with certain nozzle configurations and super-critical pressure ratios. It can give rise to high sound intensities contained within a relatively small bandwidth.
3427	Spectral Density	The mean square value of the quantity in a band one cycle per second wide, centred at a specified frequency.
3428	Narrow Band Loading	Sinusoidal loading of constant spectral density over a band- width appreciably less than one octave.
3429	Wide Band loading	Sinusoidal loading of constant spectral density over a band- width greater than one octave.
3430	Strain Concentration Factor	The ratio of the highest strain to a reference strain calculable from simple theory.

No.	Term	Definition
3431	Stress Concentration	A local increase in the intensity of a stress field in a region surrounding a discontinuity. The discontinuity may be one of shape (for example, hole, notch, crack, surface defect), metallurgical origin (for example, inclusion) or local distribution of load (for example, pin-joint).
3432	Stress Concentration Factor	The ratio of the highest stress to a reference stress calculable from simple theory.
3433	Mean Stress	The average of the algebraic values of the maximum and minimum stresses of the fatigue loading cycle.
3434	Alternating Stress	The excursion from the mean stress.
3435	Range of Stress	The difference between maximum and minimum stresses.
3436	Stress Ratio	The ratio of the minimum to the maximum stress.
3437	Thermal Fatigue	Fatigue produced by fluctuations of temperature.
3438	Ultrasonic	In acoustics, pertaining to frequencies above those detectable by the human ear, often taken as higher than 20 000 vibrations per second.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

AIR AND SPACE VEHICLES SECTIONAL COMMITTEE SECTIONAL COMMITTEE, TED 14

<i>Organization</i>	<i>Representative(s)</i>
IN Personal Capacity	SHRI DILIP B BHATT (<i>Chairman</i>)
Adani Aerospace and Defence Limited, Bengaluru	SHRI SAMPATHKUMARAN S T
Aeronautical Development Agency, Bengaluru	SHRI D K P SINHA SHRI RAMMOHAN V KAKI (<i>Alternate</i>)
Aeronautical Development Establishment, Bengaluru	SHRI A VAMSIKRISHNA SHRI RANJITH T (<i>Alternate</i>)
Air India, New Delhi	SHRI MATHEW PANICKER
Airports Authority of India, New Delhi	SHRI D DILIP KUMAR
Bharat Dynamics Limited, Hyderabad	SHRI J K MISHRA SHRI KV SUBBA REDDY (<i>Alternate</i>)
CSIR - National Aerospace Laboratories, Bengaluru	SHRI VEERA SESA KUMAR SHRI S RAVISHANKAR (<i>Alternate</i>) DR. SAPTHAGIRI G (<i>Alternate</i>)
Centre for Military Air worthiness and Certification, Bengaluru	SHRI P JAYAPAL SHRI R KAMALAKANNAN (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
Defence Research and Development Organization, Research Centre Imarat, Hyderabad	DR. S KARUNANIDHI SHRI SSSBS SUBBA RAO (<i>Alternate</i>)
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 (<i>Alternate</i>)
Directorate General of Civil Aviation, New Delhi	SHRI BHARAT LAL SHRI VEERENDRA KUMAR KABIR (<i>Alternate</i>) SHRI ASEEM KUMAR
Directorate of Naval Air Material, Ministry of Defence	SHRI D D DARKE SHRI R RAJESH (<i>Alternate</i>)
GAIL (India) Limited, New Delhi	SHRI KAUSHIK DAS
Gas Turbine Research Establishment, Bengaluru	SHRI G DEVEANANDA SHRI D NAGARAJU (<i>Alternate</i>)
Godrej Aerospace, Mumbai	SHRI AMOL BANSI THORAT
HQ Maintenance Command, Indian Air Force	SHRI F J D'SOUJA SHRI V. K. GOEL (<i>Alternate</i>)
Hindustan Aeronautics Limited, Bengaluru	SHRI PRATAP PANDA SHRI SUSHIL KUMAR (<i>Alternate</i>)
Indian Institute of Science, Bengaluru	DR. SATISH L. DR. L. UMANAND (<i>Alternate</i>) DR. SUBBA REDDY B (<i>Alternate</i>)
Indian Institute of Technology Madras, Chennai	PROF. HARISHANKAR RAMCHANDRAN
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 (<i>Alternate</i>)
Indian Space Research Organization - Vikram Sarabhai Space Centre, Thiruvananthapuram	SHRI P. RAMKUMAR SHRI JAYAKUMAR M SHRI GOVIND (<i>Alternate</i>)
Indian Space Research Organization, Bengaluru	DR. A K ANIL KUMAR SHRI MANISH SAXENA (<i>Alternate</i>)
Larsen and Toubro Limited, Mumbai	SHRI LAXMESH B.H. SHRI JAMBUNATHAN G (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
Society of Indian Aerospace Technologies and Industries, Bengaluru	SHRI FRANCIS XAVIER
Sundram Fasteners Limited, Chennai	SHRI ATUL KUMAR AGRAWAL
In personal capacity	SHRI MANOHAR SIDANA
In personal capacity	SHRI S C SHRIMALI
BIS Directorate General	SHRI P.V. SRIKANTH, SCIENTIST 'D' & HEAD (TED) [REPRESENTING DIRECTOR GENERAL (EX-OFFICIO)]

MEMBER SECRETARY
MR. SHIVAM AGGARWAL
SCIENTIST C / DEPUTY DIRECTOR
(TRANSPORT ENGINEERING DEPARTMENT)