

S. No	Title	Type of the Instrument	Science Objectives	Frequency/wavelength/Mode of operation	Pointing direction requirement
1	S-Band Synthetic Aperture Radar (SAR)	Imaging Radar	Global mapping of Venus at a spatial resolution of 20-30m	Frequency: 2.5 GHz; Pulse Width: 60 ms; PRF: 3350 Hz; Antenna: 3.5 m (Prime Focal Reflector); Chirp Bandwidth: 15 MHz (for 30° look angle); Range Resolution: 20m;	Antenna to be mounted on Venus Viewing Panel.
2	Advanced Radar for Topside Ionosphere and subsurface sounding	Ionospheric Radar	Ionospheric and subsurface studies	Frequency: 0.1 - 10 MHz (Ionospheric Mode) and 10 - 20 MHz (Subsurface mode); Inter Pulse Period (IPP): 100 Hz (10 msec) (Ionospheric Mode) and 500 Hz-1000 Hz (2 msec) (Subsurface mode)	Nadir view
3	Ultra Violet (UV) Imaging Spectroscopy Telescope	UV Spectrometer and Imager	Probe the Venusian upper (~ 55 km to 75 km) atmosphere in wavelength of 200 nm to ~ 400nm (MUV) to study the UV unknown absorber responsible for the contrast features observed in at ~ 340 - 400 nm	Spectral range: 200nm to 400nm; Spectral Resolution: Better than 0.5nm;	Nadir Pointing towards Venus
4	Venus Thermal Camera	IR Camera	Measurement of Brightness Temperature of Venus using 8-12 μm spectral band to address Planetary Scale atmospheric feature and Venusian Clouds.	Wavelength: 8 to 12 μm; IFOV: 880x880mrad FOV: ±(9.1°x7.3°); GSD: 500m @ 500km and 50000 m @ 50000 km; Swath: 160 km x 128 km @ 500 km; 16000 km x 12800 km @ 50000 km; Pixels Size; 17/30(mm); NEdT: -0.3K (at 230K);	Pointing accuracy of 0.1° is required.
5	Cloud Monitoring Camera	UV Camera	Monitoring of the super rotation of atmosphere through tracking of contrasting features (generated by unknown absorbers) in clouds in ultraviolet range.	Wavelength: 283 & 365nm; Bandwidth-20 nm; FOV: ±5.7°; Resolution (km) : 0.2 km @ 500km and 24 km @ 60000 km; Swath: 100km @ 500km	Pointing accuracy of 0.1° is required.
6	Venus Atmospheric SpectroPolarimeter	NIR Spectro-Polarimeter	Study of H ₂ O and CO ₂ global abundance and their vertical profiles through spector polarimetric technique	Spectral range: 0.9 – 1.7 μm; Spectral band-width: 2.5 nm @ 1.5 μm; FOV: 2° ; Detector: InGaAs pixelated linear detector (256 each);	+/- 1° with respect to Nadir
7	Airglow photometer	Optical photometry (both during night and day)	To detect Oxygen green and red line from the Venusian atmosphere during both night and daytime	Central wavelengths: OI 557.7 nm and OI 630.0 nm; Bandwidths: 0.6 nm; Number of Pixels: 128 x 128 pixel array; FOV: 6° ;	Limb viewing
8	Radio Occultation Experiment	Radio Science Experiment	Study of characteristics of near-equatorial, and low latitude Venusian atmosphere and ionosphere.	Stable S band and X band; Ultra stable oscillator (10 MHz); Output Level: 7 dBm into 50Ω; Allan Variance(1 – 30sec): ≤1.2 x 10 ⁻¹³	~ 0.05°
9	Venus Ionospheric Electron Temperature Analyser	In-situ probe	To characterize the electron temperature variations in the Venusian Ionosphere	Circular Electrode 150 mm dia divided into two semi-circles separated by 10 mm gap (2 Nos.); Detectors- Channel Electron Multiplier (CEM)/Faraday Cup; Electron energy distribution and density in the electron density range of 10 ³ – 10 ⁶ cm ⁻³ ;	Measurements in the satellite wake need to be avoided.
10	Retarding Potential Analyser	Retarding potential analyser	Study the Venusian ionosphere: its morphology, compositions and energy distribution of ions in the ionosphere.	Energy/wavelength range: Ion-mode: 0 to 40 V; Electron mode: -75 to 0V Voltage resolution: 0.0649 V (corresponds to 0.5 amu) Current resolution: 0.1 pA Instrument Specifications Total ion concentration: 10 – 10 ⁶ cm ⁻³ ; Ion temperature: 100 – 5000 K; Ion drift velocity: 0.01 – 2.0 km/s; Concentrations of up to four abundant ions; Total electron concentration: 10–10 ⁶ cm ⁻³ ; Ionospheric electron temperature: 100-25000 K; Solar wind electron temperature: 25000-5x10 ⁵ K; Solar wind electron concentration: 0.5-100 cm ⁻³ ;	Sensors face towards the ram direction

11	Venus Neutral and Ion Mass Analyzer (VENIMA) For Venus Orbiter Mission	Atmospheric and ionospheric study	Mapping of Neutral species and charged ions in the mass range of 1 – 200 amu with mass resolution of >100	Species to be measured: Neutral gas species and charged ions; Mass range: 1 – 200 amu; Mass resolution (M/DM) > 100;	Instrument should point in ram direction of the spacecraft
12	Venus Ionospheric Plasma wave detector (VIPER)	Electric & Magnetic Field Sensors Electric: Langmuir Probe, Triaxial orthogonal monopoles Magnetic Fluxgate & search-coil magnetometers	Study plasma waves which are predicted to exist in Venus such as electron & ion cyclotron, ion acoustic & mix-mode waves	(a) Langmuir Probe: Dynamic range: $10^2 - 10^6$ cm ⁻³ ; (b) Electric Monopole antenna: LF dynamic range: 1 – 100 Hz; HF dynamic range: 100 Hz – 15 kHz; Resolution: 1 Hz; (c) Triaxial search-coil magnetometer: Magnetic field range: 0 to ± 100 nT; Frequency range: 10 Hz - 40 kHz; Resolution: 0.1 nT; (d) Triaxial flux-gate magnetometer: Magnetic field range: 0 to ± 100 nT; Resolution: 0.1 nT; Accuracy: 0.5 nT;	Not critical