"Venera-D" mission

Spacecraft and orbits



Mission and spacecraft (Orbiter) targets

Mission targets:

- To investigate Venus with remote and contact methods.
- To amplify the volume of the fundamental explorations made by previous spacecraft ("Venera", "Vega", "Mariner" missions etc.) and spacecraft of recent and present days ("Venus Express", "Akatsuki" etc.).

Orbiter targets:

- To transport the Lander and the detachable payload up to desired points near Venus.
- To assure that the onboard payload could get the scientific information of required volume and expected quality.
- To transmit the scientific information to Earth from the onboard payload and to receive/retransmit the scientific information to Earth from the Lander and the other payload.
- To make a photo/video recordings of the selected regions of the Venus clouds/surface using the onboard payload.





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"Venera-D" mission

Navigation and ballistics



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VD Workshop October, 2019

Communications



Orbiter:

- 1 × HGA (transmit) Orbiter-Earth antenna (variants):
 - Ka-band, 12000 Mbytes/h;
 - X-band, 225 Mbytes/h.
- 4 × LGA (transmit -receive) Orbiter-Earth, X-band, pretty slow.
- 1 × MGA (receive) Orbiter-detach.payload, 420 MHz, 4-350 Mbytes/h.
- 2 × LGA (transmit -receive) Orbiter-detach.payload, 420 MHz, 15 Kbytes/h.
- 1 × LGA (receive) Orbiter-LLISSE, 150 MHz.

Lander:

- 2 × LGA (transmit -receive) Lander-Orbiter, 420 MHz.
- 9 × MGA (transmit) Lander-Orbiter, 420 MHz, 345 Mbytes/2h or 397 Mbytes/3h.

Conclusions

- 1) Orbiter can observe Venus from the orbit 500×72000 km.
- 2)Orbiter can communicate with the Lander, LLISSEs, aerial platforms, other detachable elements, cubesats, subsatellites in L1/L2 and Earth using a bunch of antennas. But not simultaneously!
- 3) Launch using Angara-A5 rocket career with its upper stage (KVTK).
- 4) Target launch windows are in 2026, 2028, 2029 and 2031. SC is designed to be universal for any of the launch windows.
- 5) Technical solutions for the Orbiter mostly depend on the onboard (regarding the accomodation) and detachable payload (regarding using robotic arms or smth else and amount of it) needs.

To Venus together !

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