

- I. Venus Long-Life Surface Platform
- II. Venus III book
- III. Venus 2016 Conference Oxford
- IV. Open Mic I: Venus UHF data relay standard?**
- V. Open Mic II: Venus 360 VR film



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Working Group for Venus data relay?

- At Mars, there is an agreed UHF protocol for data relay from landers/rovers.
- Establishing this at Venus would be beneficial for all in situ proposals, in particular long-lived ones.
- Reduces requirement to carry one's own data relay orbiter.
- Increases data return from *in situ elements* and also for *cubesats/smallsats*.
- Helps to measure *position* and *velocity* of in situ elements.

Requirements of a Venus data relay standard

- Capable of 1- or 2-way communication
- Should be at a frequency where atmosphere is largely transparent (e.g. UHF or S-band)
- Should be small and light: ***low resource requirement*** for orbiter.
- Should aid ***position determination*** of in situ elements. (e.g. monitor Doppler shift of received frequency)
- ***Bonus feature***: passive listening mode could be used to detect RF emission from lightning.

Venus data relay standard

- Venus mission developments underway in US, Europe, Russia, China, India
- COSPAR-sponsored IVEWG may be an appropriate body to support a Venus data relay working group, so that we can have discussions with e.g. China.
- Please consider this in your roadmaps.
- ***Vision 2050*** for Venus should certainly include data relay infrastructure, maybe even Venus GPS(!?).
- Your advice / support / participation would be welcome!

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 - V. **Open Mic II: Eurovenus films & 360° VR film**

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EuroVenus outreach films

- Can be found via www.eurovenus.eu
 - 6x ~10 minute episodes
 - Intro
 - Winds
 - Temperature
 - Volcanoes (SO₂)
 - Transit
 - Future
 - Full documentary – 52 minutes
 - Venus Express legacy session videos
 - 360° VR film
 - All produced by White Fox Pictures (Lyon), with EU-funding
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- A large radio telescope dish is shown in a desert landscape. The dish is a large, white, triangular structure with a grid of panels. A person is standing in the foreground, providing a sense of scale. The background shows a clear blue sky and a sandy desert floor.

360° VR film: A Journey to Venus

- Join astronomers as they observe Venus from Hawaii
- Step inside the domes & control rooms at CFHT & IRTF
- Experience what it's like to step on the surface of Venus*



- Great for outreach! Please use & share widely!
- Best on VR headsets e.g. Oculus Rift / Gear VR
- Find it on youtube (search "*Journey to Venus 360*")
- I will share link to VEXAG on facebook
- I can send you original file for offline use

**(pressure temperature & CO₂ not included)*