

# The Manual for Bepi\_SPP\_VCO\_widget\_v2\_LIN ('BSV\_widget')

**Version number:** 2.0

**OS:** Linux 64 bits

**Last update:** 2020/06/29

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## Description of the BSV\_widget:

'BSV\_widget' is a visualization tool of Venus/Mercury observation conditions from three spacecraft and from the Earth. The three spacecraft are Akatsuki (VCO), Parker (or, SOLAR PROBE PLUS, SPP), BepiColombo (Bepi). Locations of spacecraft are predicted conditions, so all users should use this widget to check a feasibility of your coordinated ground-based observations, and should contact spacecraft teams to confirm a real observation that may differ from this widget by a few min to a few hours.

The widget may be updated with new available kernels. And this will be named with number # in the file name "v2.#"

BSV\_widget does not require any installation process, and even can run in a USB memory stick.

## References of the surface image data:

LIR wave (Kouyama et al. 2018, <https://doi.org/10.1002/2017GL075792>)

LIR thermal tide (Kouyama et al. 2019, <https://doi.org/10.1029/2019GL083820>)

## How to use? Follow 1.-7.

The screenshot shows the BSV\_widget interface with the following callouts:

- 1. Select a type of figure**: Points to the 'Type of figure' dropdown menu, which is currently set to 'Locations of spacecraft'.
- 2. Type a specific time in YYYY-MM-DD hh:mm:ss (UTC)**: Points to the 'Date' input field, which contains '2020-10-15 03:00:00'.
- 3. Click to display**: Points to the 'Display' button.
- 4. Type a directory to save the displayed figure**: Points to the 'Directory to save' input field, which contains '/home/yjlee'.
- 5. Type a file name to save. Specify a format: .png, .jpg, .ps, .gif**: Points to the 'File name to save' input field, which contains 'BC\_20201015\_0300UT.ps'.
- 6. Click to save**: Points to the 'Save' button.
- 7. Click to close**: Points to the 'Close' button. A note below this callout states: 'Your parameters will be saved for the next time use.'

Additional callouts include:

- (optional) Your jpeg image can be plotted over the planetary globes. But an image must cover Lon (-180, 180) from left to right, and Lat (90, -90) from top to bottom.**: Points to the 'Venus surface image' and 'Mercury surface image' sections.
- (optional)**: Points to the 'None' option in the 'Venus surface image' dropdown.
- (optional)**: Points to the 'None' option in the 'Mercury surface image' dropdown.
- (optional)**: Points to the 'Select file' button next to the 'Magellan' option in the 'Venus surface image' section.
- (optional)**: Points to the 'Select file' button next to the 'MESSENGER DEM' option in the 'Mercury surface image' section.
- (optional)**: Points to the 'Nightside transparency' slider, which is currently set to 50.

### History of updates:

- 2020/03/11 BSV\_widget\_v1.0 is prepared. (a previous body is 'VCO\_widget\_v3')
- 2020/05/07 BSV\_widget\_WIN/LIN\_v1.1 with the updated kernels
- 2020/06/29 BSV\_widget\_WIN/LIN\_v2.0
  - added the thermal tide image option (Kouyama et al. 2019)
  - updated BepiColombo's spk kernel ([bc\\_mpo\\_fcp\\_00082\\_20181020\\_20251102\\_v01.bsp](https://naif.jpl.nasa.gov/pub/naif/unlabeled/body_data/bepicolombo/bc_mpo_fcp_00082_20181020_20251102_v01.bsp))

### Acknowledgements:

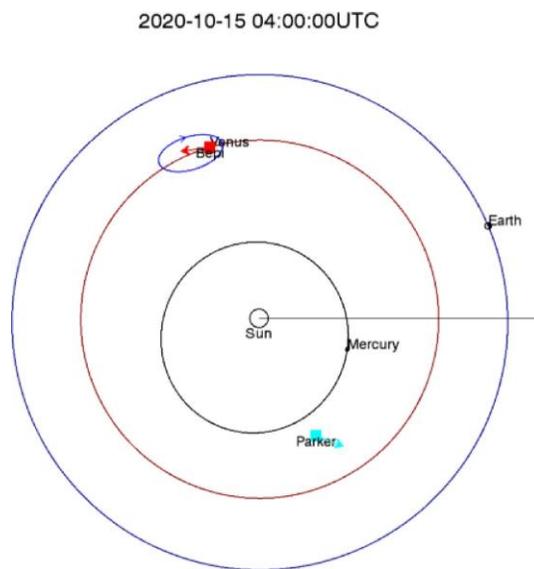
This LINUX version was compiled at a machine of EHU, Bilbao, Spain, thanks to Ricardo Hueso and Javier Peralta. Thanks to Angelos Vourlidas for the SPP information, and the Akatsuki team for the predicted kernel. The spice kernel of BepiColombo is publicly available at

<https://www.cosmos.esa.int/web/spice/bepicolombo> (doi: 10.5270/esa-dwuc9bs).

Also thanks to Ko-ichiro Sugiyama, Shin-ya Murakami, Toru Kouyama, Takao M. Sato, Takehiko Satoh, Ralph Lorenz, Takeshi Imamura, and Masataka Imai for help/comments on the VCO\_widget series.

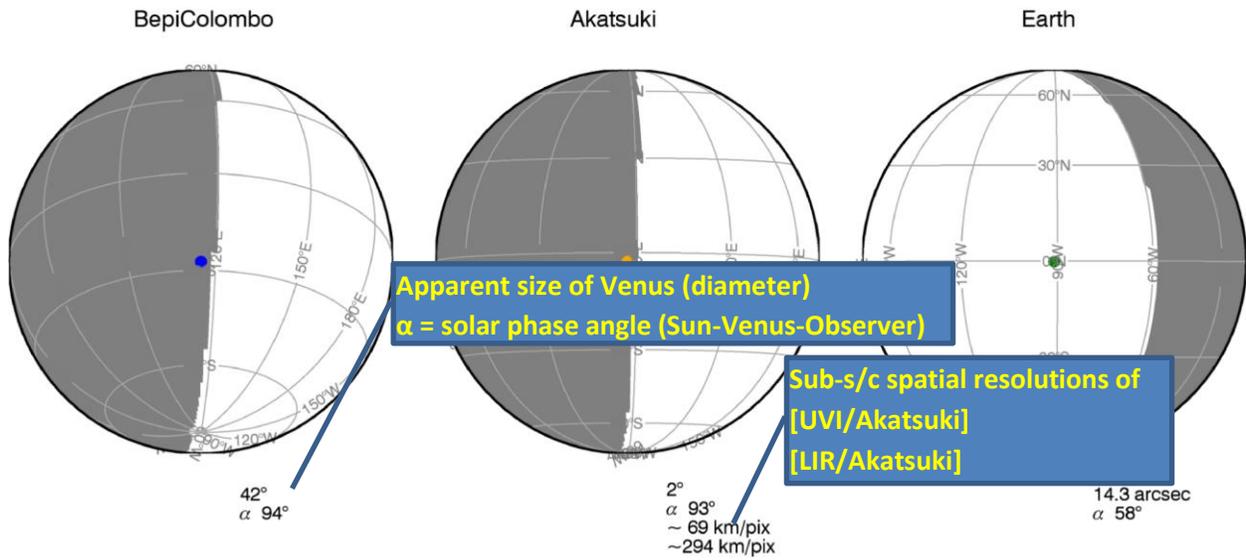
**Contact about this widget:** Send an e-mail to Yeon Joo Lee, [y.j.lee@astro.physik.tu-berlin.de](mailto:y.j.lee@astro.physik.tu-berlin.de).

### Example image 1:



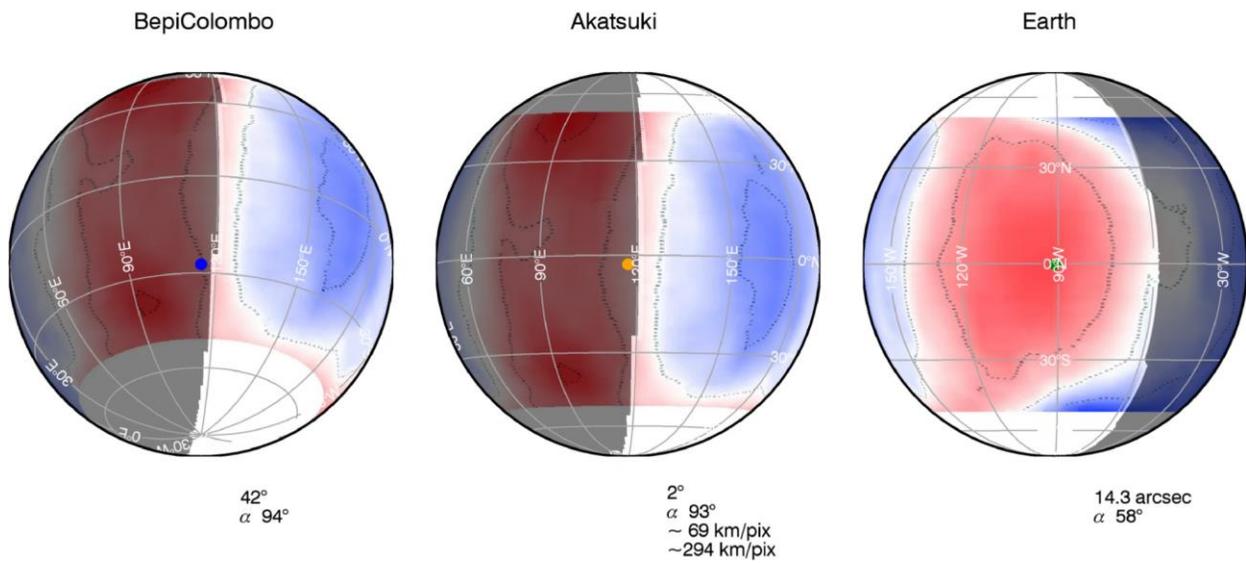
### Example image 2:

Venus  
2020-10-15 04:00:00UTC



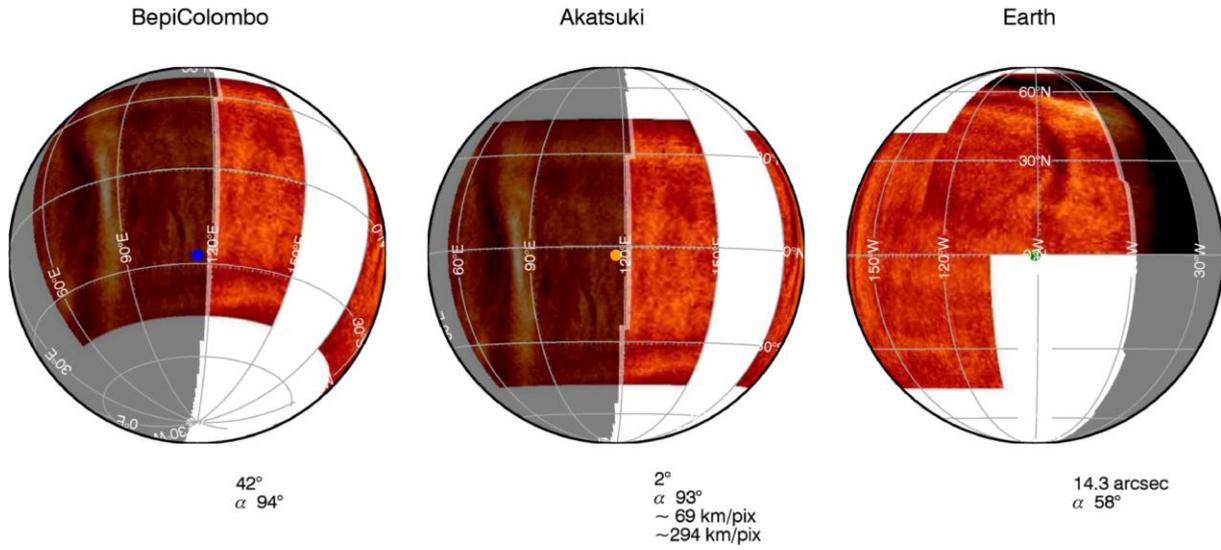
Example image 3:

Venus  
2020-10-15 04:00:00UTC



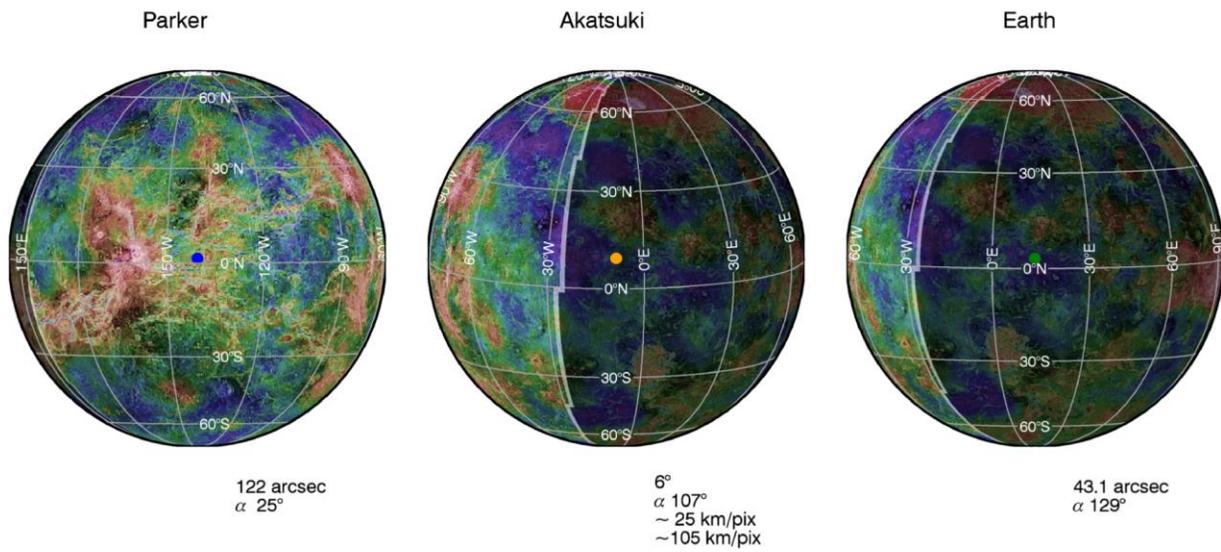
Example image 4:

Venus  
2020-10-15 04:00:00UTC



Example image 5:

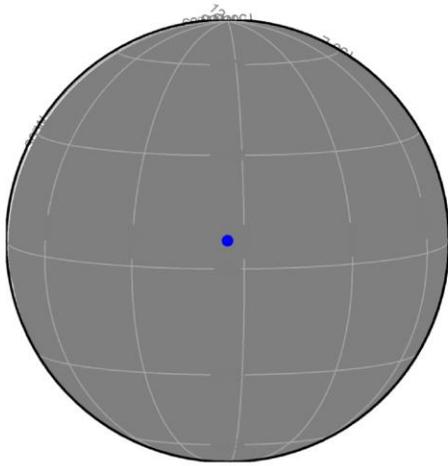
Venus  
2020-07-01 00:00:00UTC



Example image 6:

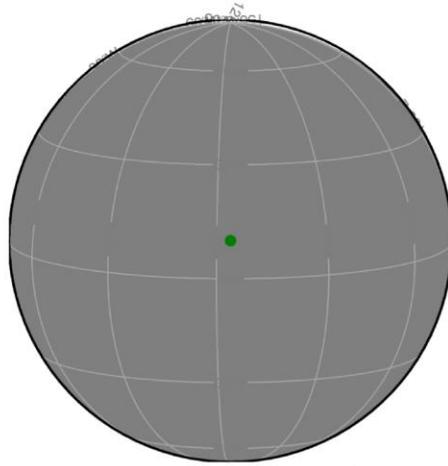
Mercury  
2020-07-01 00:00:00UTC

BepiColombo



15 arcsec  
 $\alpha$  169°

Earth



11.97 arcsec  
 $\alpha$  170°