

# UCSD Iterative Interplanetary Scintillation (IPS) Analyses During the BepiColombo - Solar Orbiter Venus Close Pass of 09-10 August 2021



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<http://ips.ucsd.edu/>

# **BepiColombo - Solar Orbiter Venus Pass of August 2021**

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## **Introduction:**

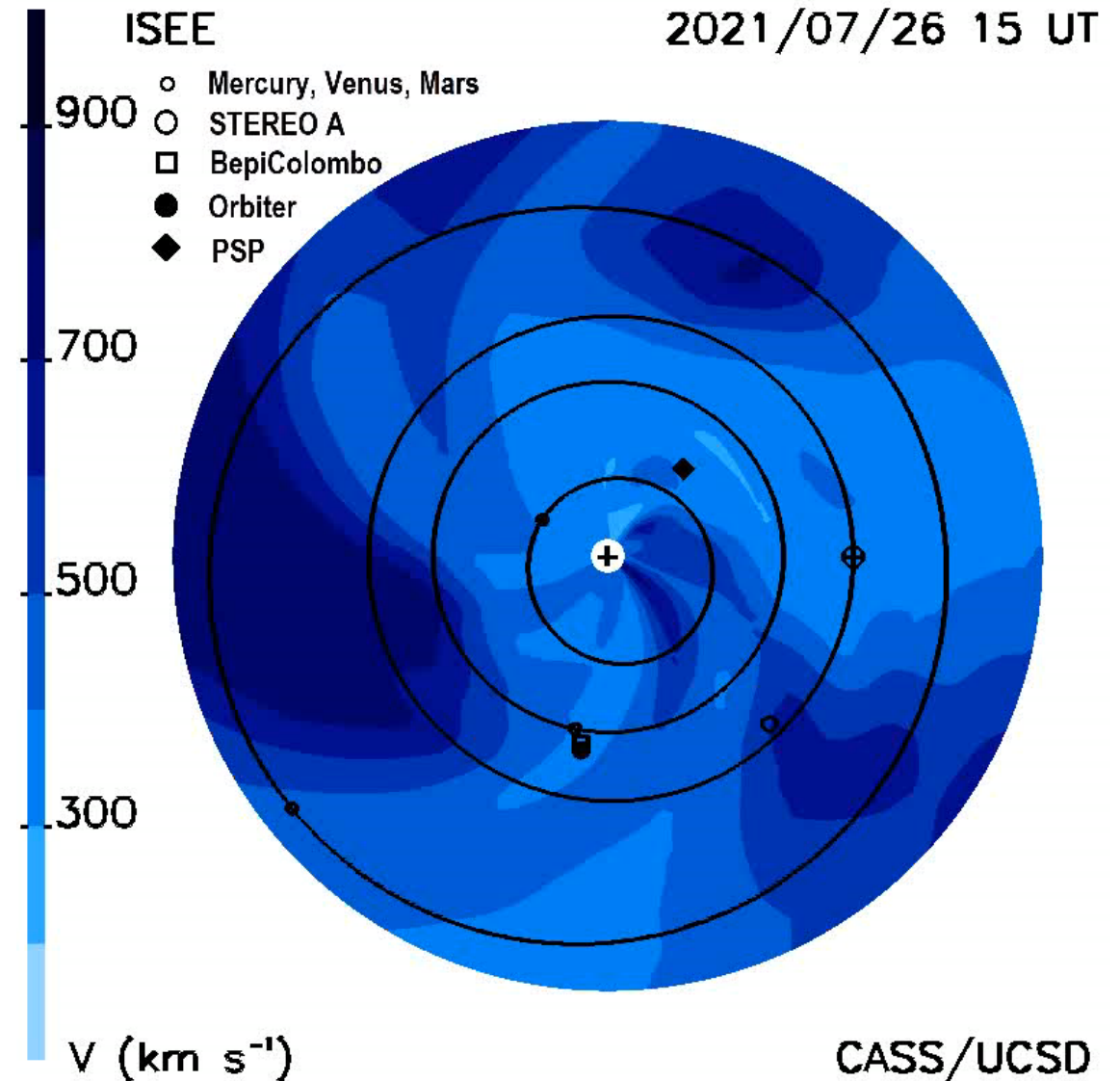
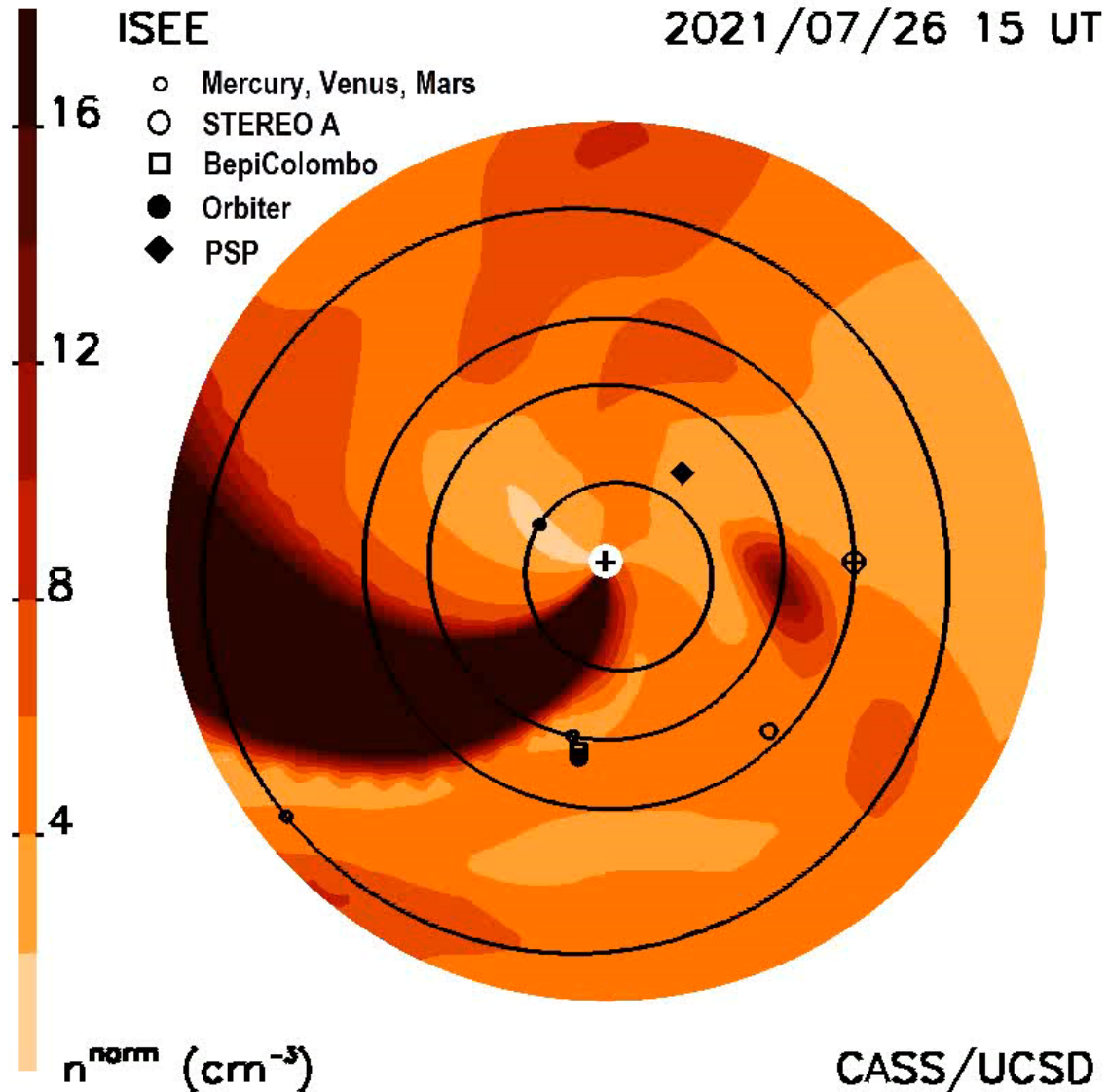
**BepiColombo – Solar Orbiter – Akatsuka - Venus**

**Interplanetary Scintillation – IPS (Our Contribution)**

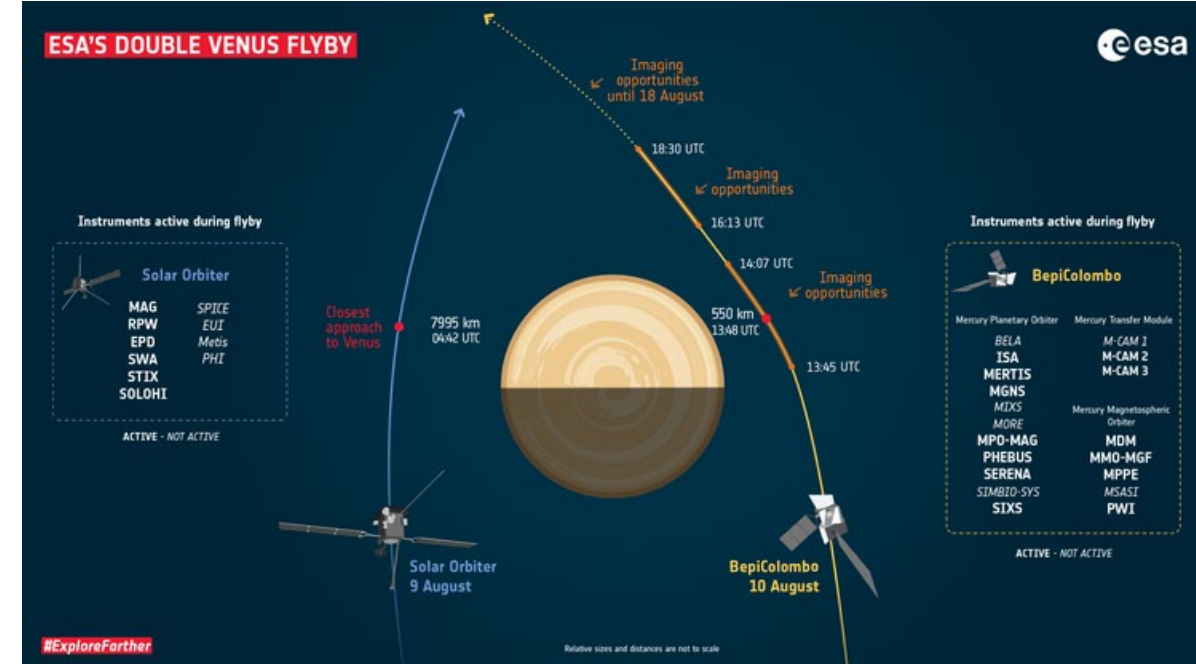
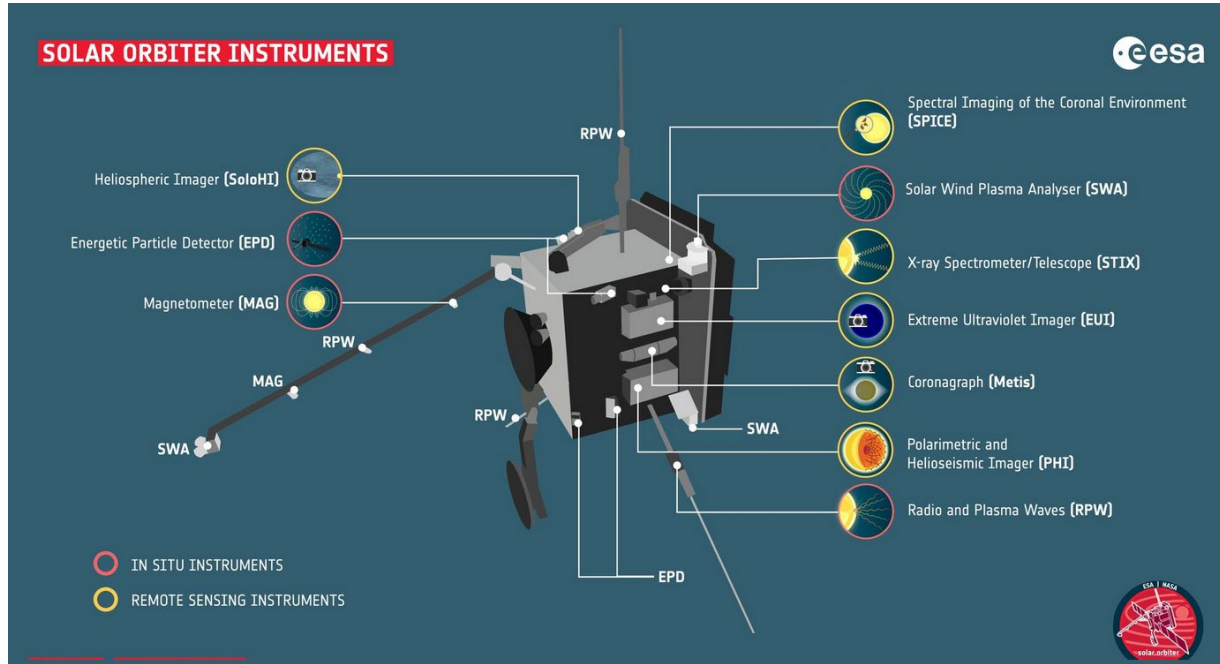
**Predictions and Forecasts - Current Progress in Providing In-situ Measurements at Different Locations**

**Potential Synergistic Measurements**

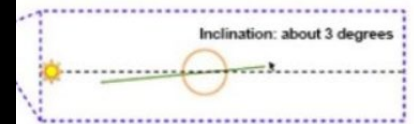
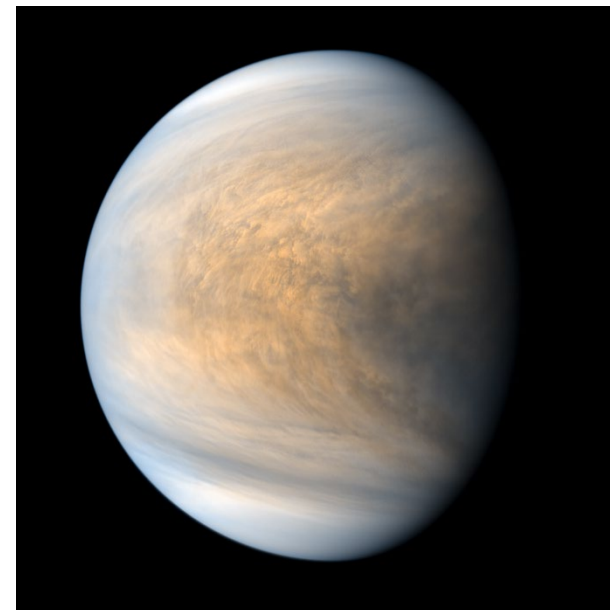
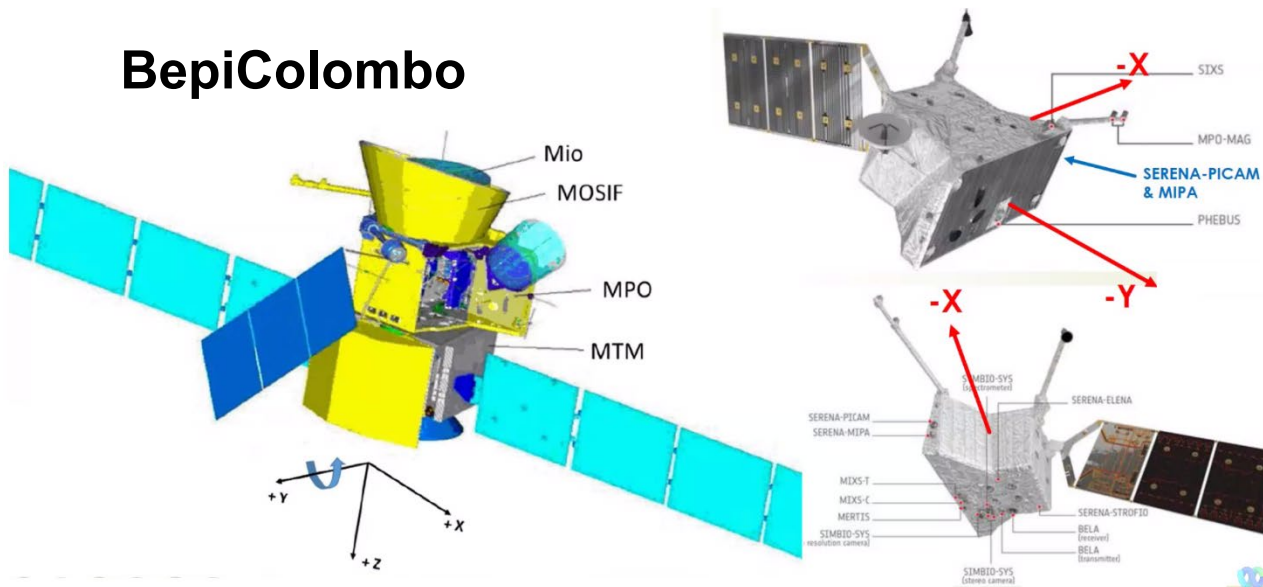
# BepiColombo - Solar Orbiter Venus Pass of August 2021



# BepiColombo - Solar Orbiter Venus Pass of August 2021



## BepiColombo



The AKATSUKI is now flying on Venus orbit

Period: about 13 days and 14 hours

Inclination: about 3 degrees (It will shift to about 25 degrees in two years)

Periapsis altitude: 400 km

Apoapsis altitude: 440,000 km

The AKATSUKI is in good health after Venus orbit insertion.

# BepiColombo - Solar Orbiter Venus Pass of August 2021

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08-08 22:48:21



# BepiColombo - Solar Orbiter Venus Pass of August 2021

## ISEE IPS Heliospheric Analysis



ISEE IPS array near Mt. Fuji



ISEE IPS array systems

# BepiColombo - Solar Orbiter Venus Pass of August 2021

Jackson, B.V., et al., 2011, *Adv. in Geosciences*, 30, 93-115;

Jackson et al., 2013, *Solar Phys.*, 258, 151-165

<http://ips.ucsd.edu/> or [http://ips.ucsd.edu/high\\_resolution\\_predictions/](http://ips.ucsd.edu/high_resolution_predictions/)

## UCSD Prediction and Forecast Analyses

UCSD and other  
IPS Web pages (2021)

### Websites:

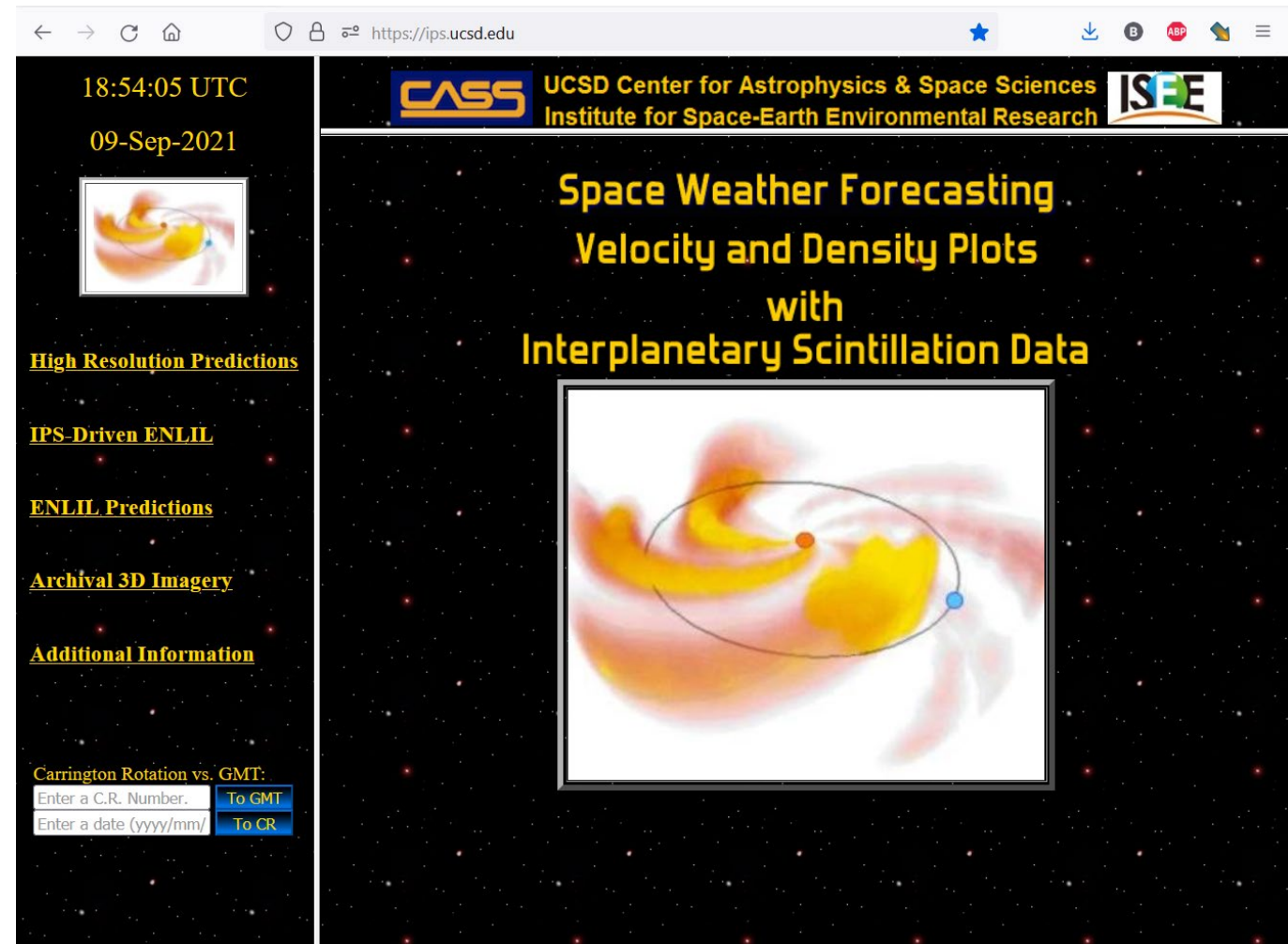
ISEE: <http://stsw1.stelab.nagoya-u.ac.jp/index-e.html>

USCD: [https://ips.ucsd.edu/high\\_resolution\\_predictions](https://ips.ucsd.edu/high_resolution_predictions)

CCMC: <https://iswa.ccmc.gsfc.nasa.gov/lswaSystemWebApp/>

KSWC: <http://www.spaceweather.go.kr/models/ips>

GMU: <http://spaceweather.gmu.edu/projects/enlil/>



The screenshot shows a web browser window with the URL <https://ips.ucsd.edu>. The page header includes the CASS logo (UCSD Center for Astrophysics & Space Sciences) and the ISEE logo (Institute for Space-Earth Environmental Research). The main content area features a large plot titled "Space Weather Forecasting Velocity and Density Plots with Interplanetary Scintillation Data". The plot shows a complex, multi-colored structure (yellow, orange, red, white) against a black background with stars. A white oval is overlaid on the plot, with a blue dot and a red dot on its perimeter. The left sidebar contains the following text: "18:54:05 UTC", "09-Sep-2021", a small image of a solar flare, and several navigation links: "High Resolution Predictions", "IPS-Driven ENLIL", "ENLIL Predictions", "Archival 3D Imagery", and "Additional Information". At the bottom of the sidebar, there is a section for "Carrington Rotation vs. GMT" with two input fields: "Enter a C.R. Number." with a "To GMT" button, and "Enter a date (yyyy/mm/)" with a "To CR" button.

Web analysis runs “automatically” using Linux on a P.C.

# BepiColombo - Solar Orbiter Venus Pass of August 2021



https://ips.ucsd.edu/high\_resolution\_predictions



20:32:12 UTC

09-Sep-2021



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[Predictions D, V](#)

[Predictions MAG](#)

[Bz, V Forecasts](#)

[Planet, S/C D, V](#)

[Planet, S/C Br, Bt](#)

[Real-Time Archive](#)



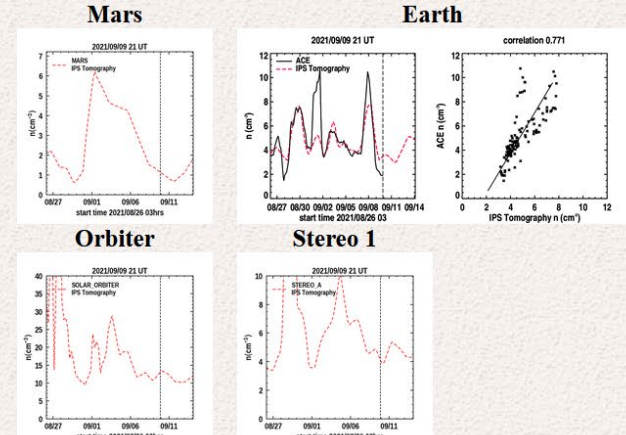
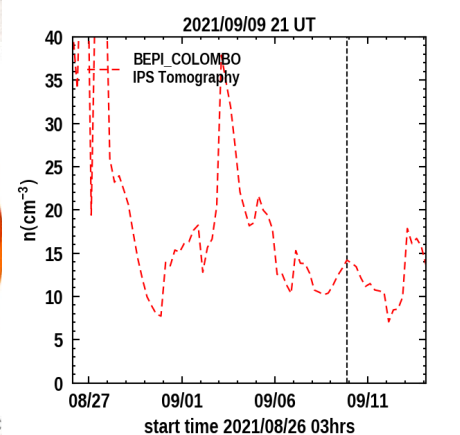
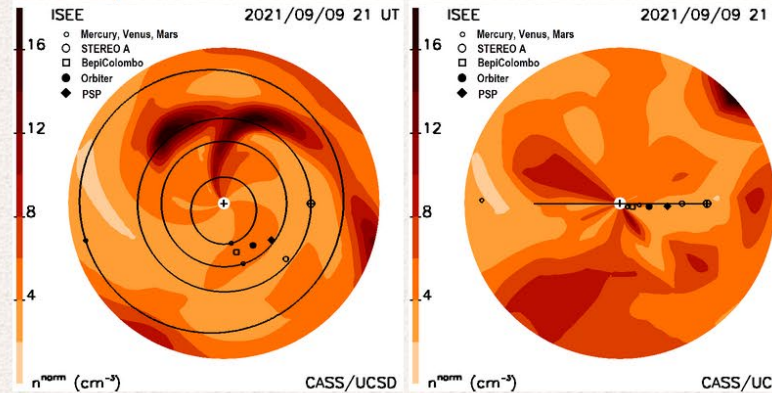
UCSD Center for Astrophysics & Space Sciences  
Institute for Space-Earth Environmental Research



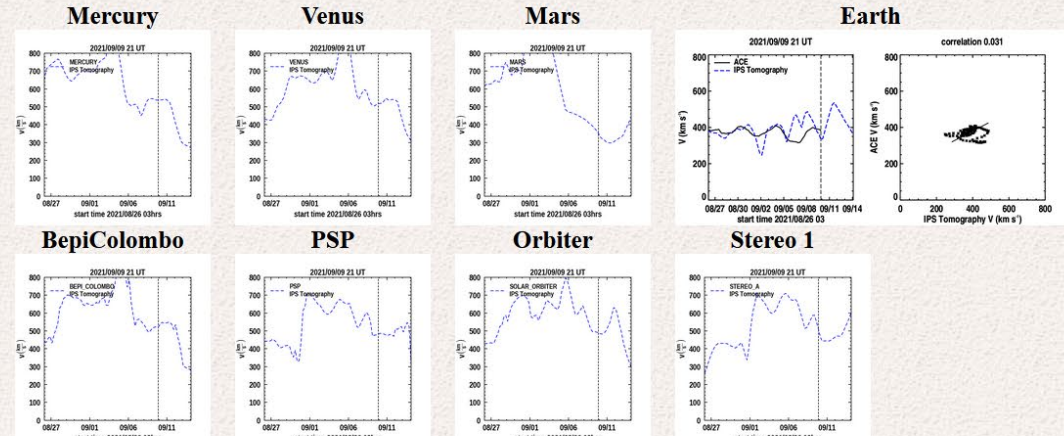
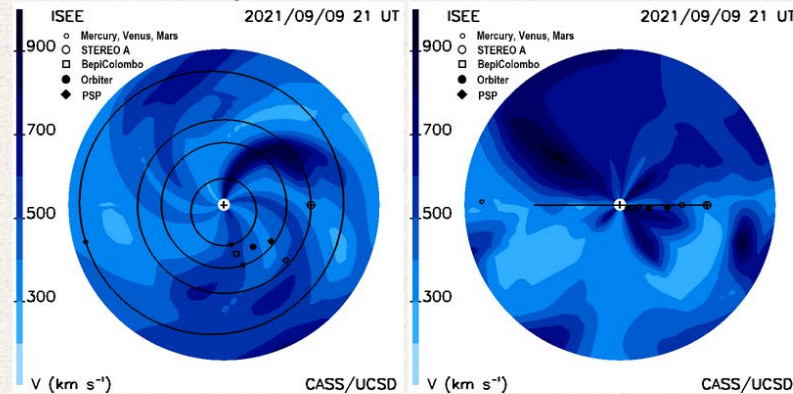
## Space Weather Forecasting at Planetary and Spacecraft Locations with IPS Data (6-hour updates)

This is a Kinematic Model run of the ISEE, Japan Interplanetary Scintillation (IPS) analysis providing density and velocity of the solar wind and the detail of the orbits of the inner planets. Also included are the spacecraft locations of the Parker Solar Probe, BepiColombo, and Solar Orbiter. More imagery of these same real-time data that are Earth-based and at somewhat different resolution can be found from this same left page or at: [http://ips.ucsd.edu/IPS-ENLIL\\_predictions](http://ips.ucsd.edu/IPS-ENLIL_predictions) or [http://ips.ucsd.edu/ENLIL\\_predictions](http://ips.ucsd.edu/ENLIL_predictions).

### Density



### Radial Velocity

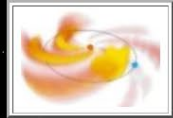




# BepiColombo - Solar Orbiter Venus Pass of August 2021

18:44:40 UTC

09-Sep-2021



[Home](#)

[Predictions D, V](#)

[Predictions MAG](#)

[Bz, V Forecasts](#)

[Planet, S/C D, V](#)

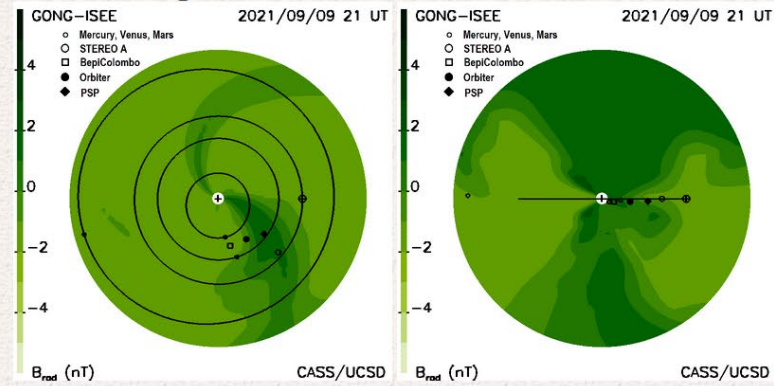
[Planet, S/C Br, Bt](#)

[Real-Time Archive](#)

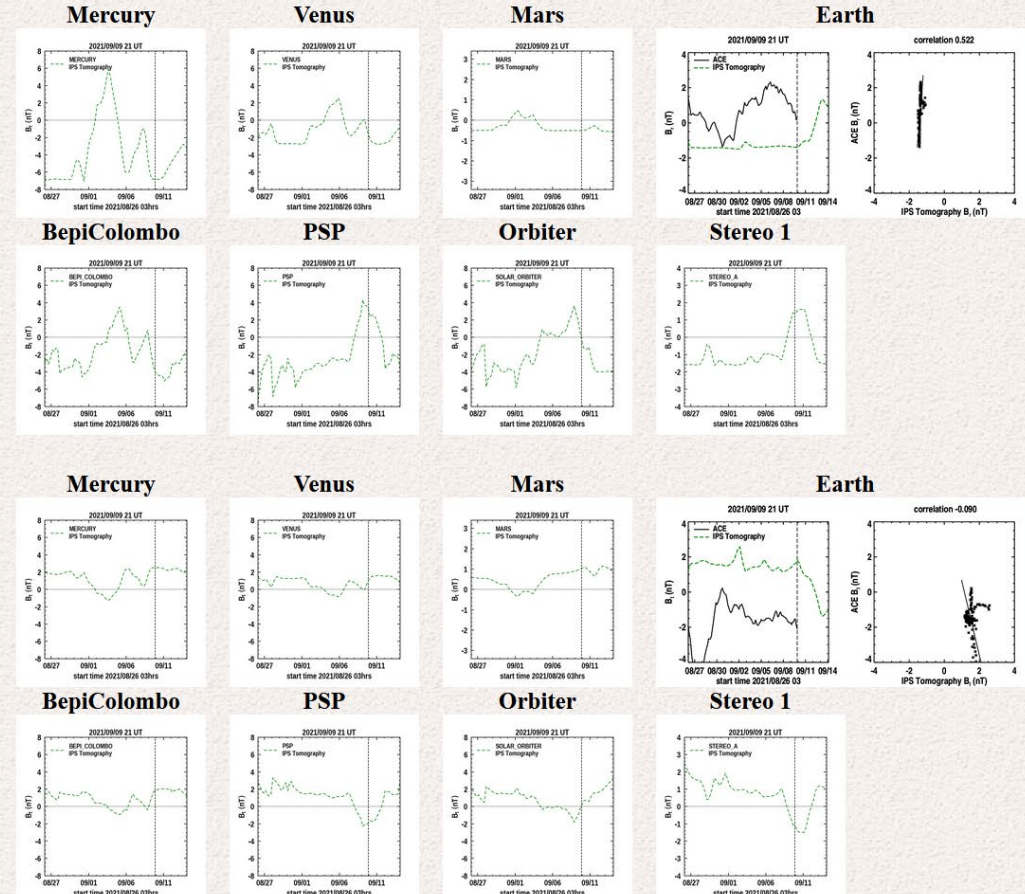
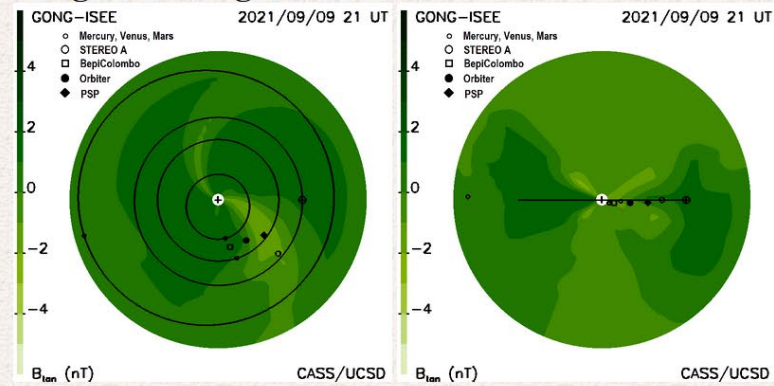
## Space Weather Forecasting at Planetary and Spacecraft Locations with IPS Data (6-hour updates)

This is a Kinematic Model run of the ISEE, Japan Interplanetary Scintillation (IPS) analysis showing radial and tangential magnetic field (in RTN coordinates) and the detail of the orbits of the inner planets that also includes the spacecraft Parker Solar Probe, BepiColombo, and Solar Orbiter. These fields are derived from outward projections of the Global Oscillation Network Group (GONG) solar surface fields updated several times each day using the CSSS (Zhao and Hoeksema, 1995, J.Geophys. Res., 100 (A1), 19-33) model, and then extrapolated outward from 15 Rs using IPS derived velocities. More imagery of these same real-time data that are Earth-based and at somewhat different resolution can be found from this same left page or at: [http://ips.ucsd.edu/IPS-ENLIL\\_predictions](http://ips.ucsd.edu/IPS-ENLIL_predictions) or [http://ips.ucsd.edu/ENLIL\\_predictions](http://ips.ucsd.edu/ENLIL_predictions).

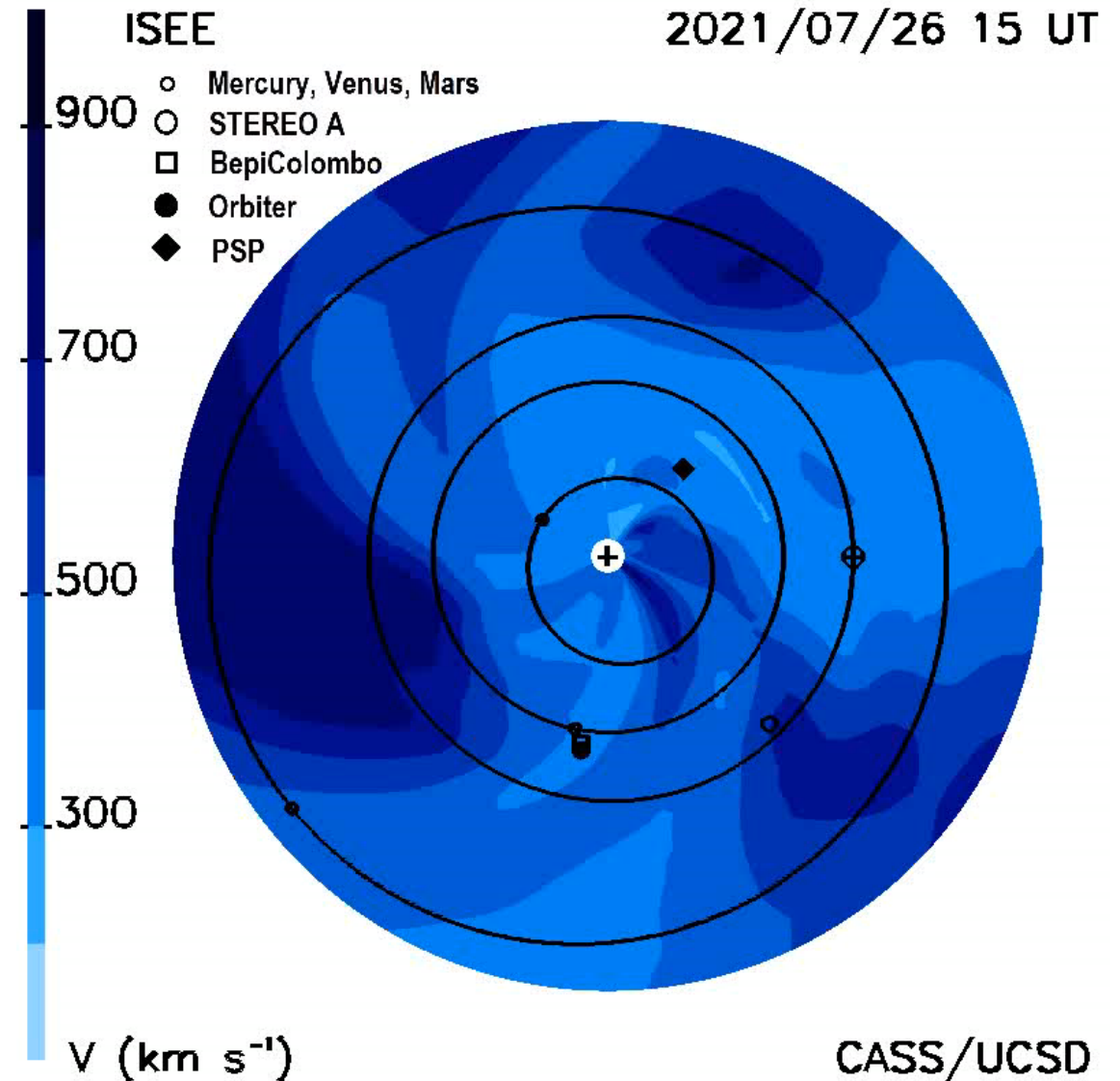
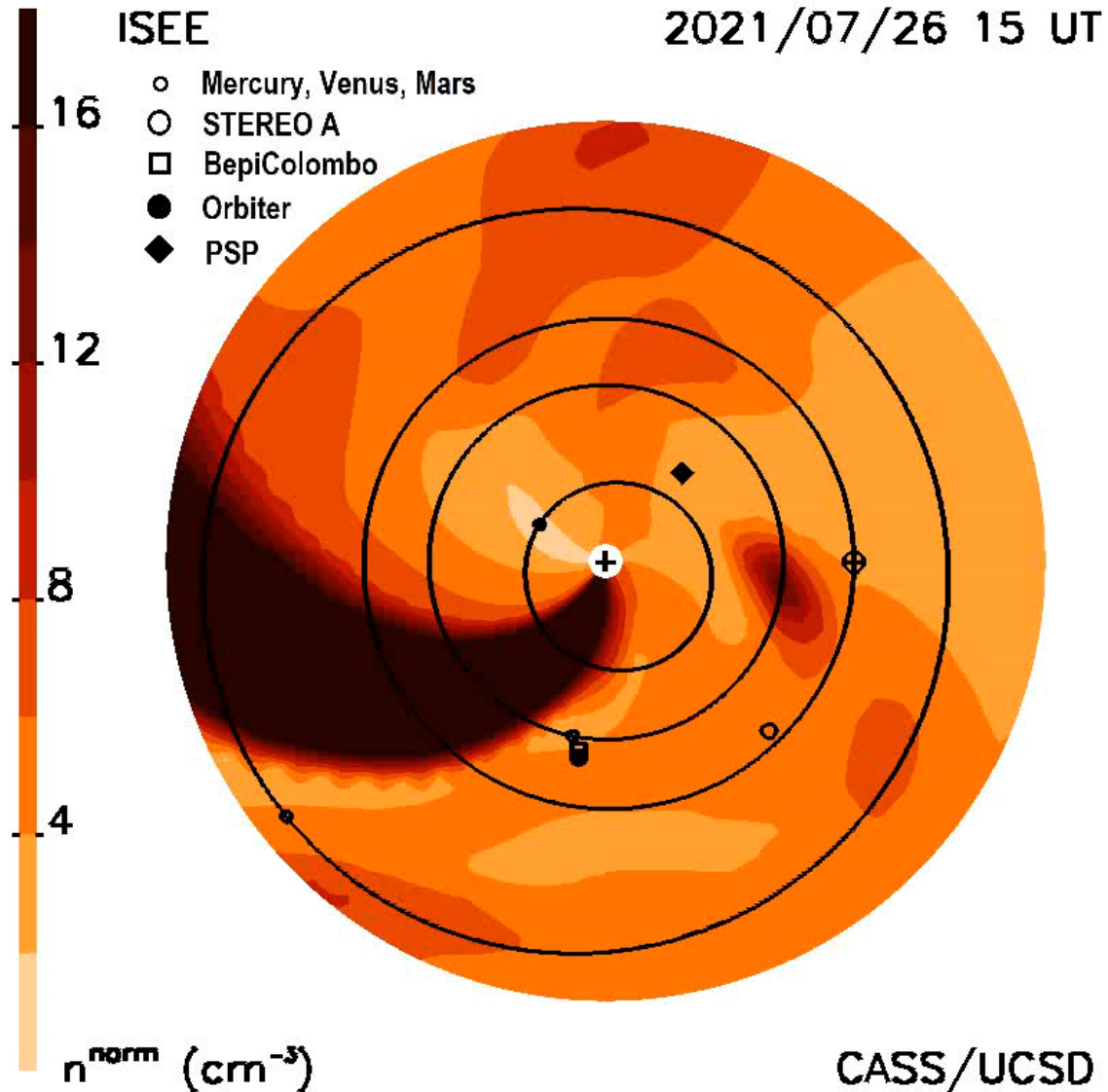
### Radial Magnetic Field



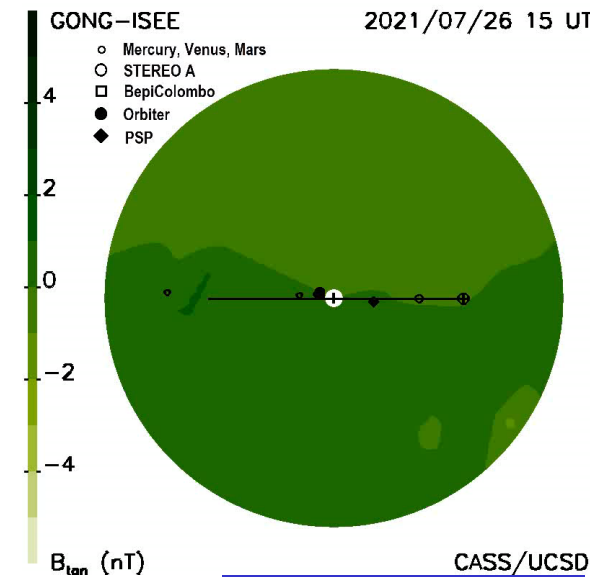
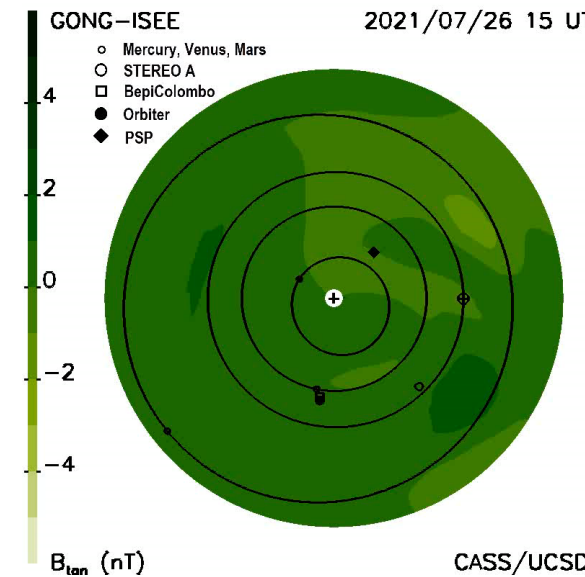
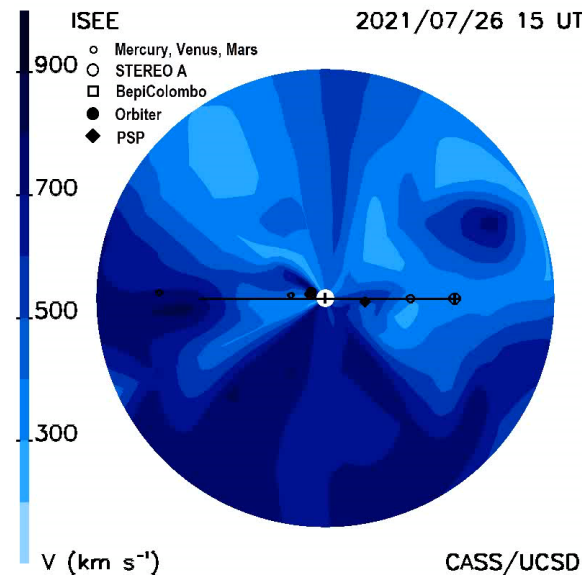
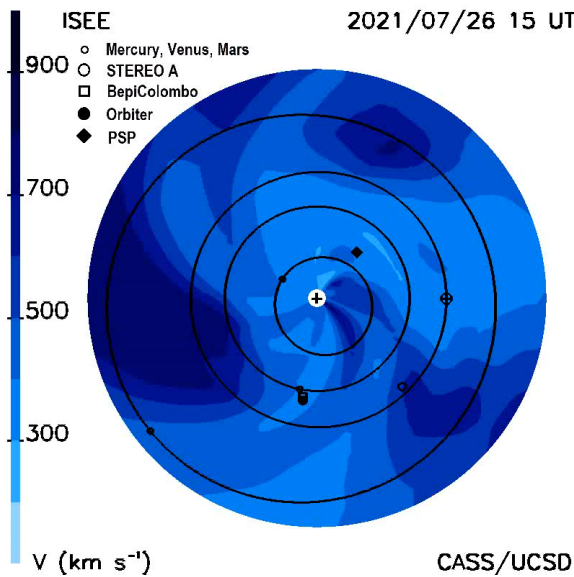
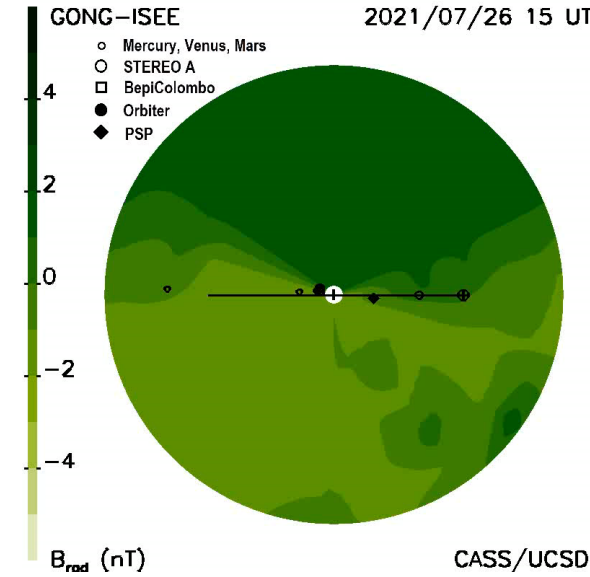
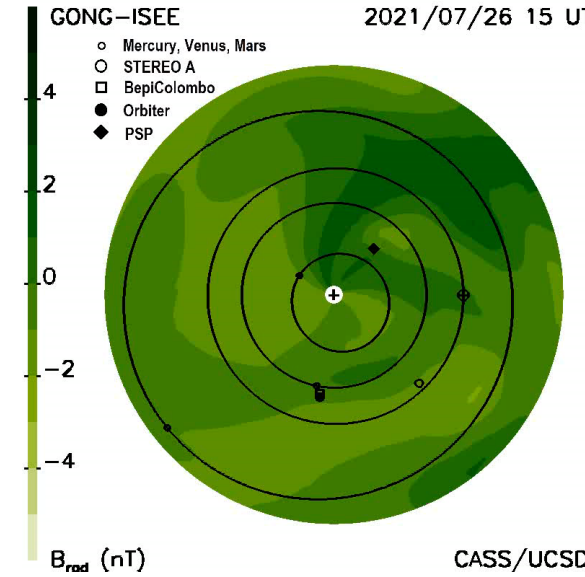
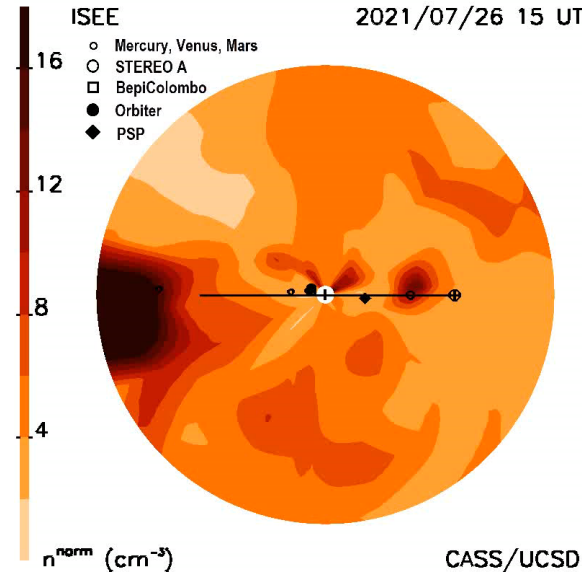
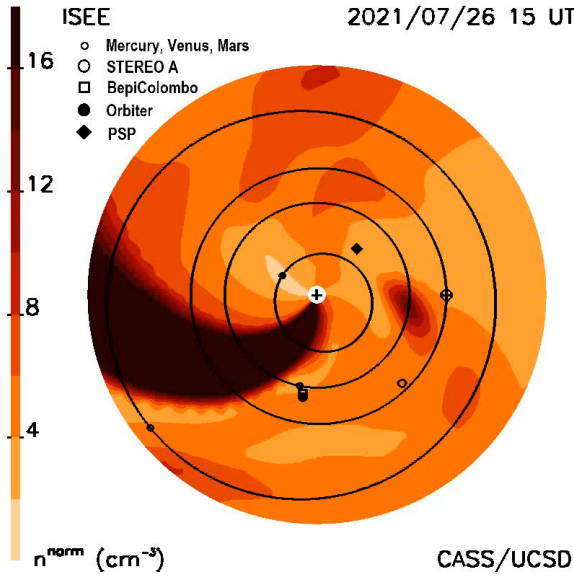
### Tangential Magnetic Field



# BepiColombo - Solar Orbiter Venus Pass of August 2021

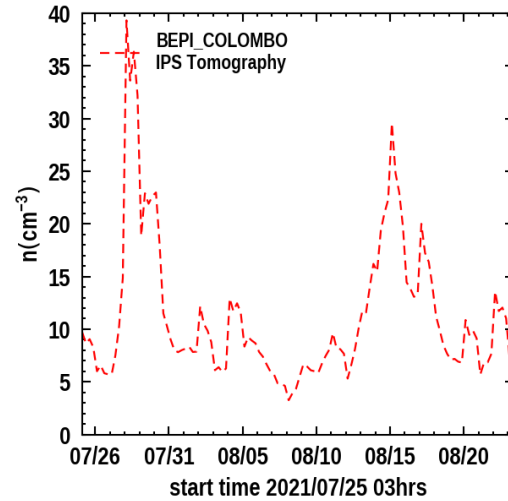
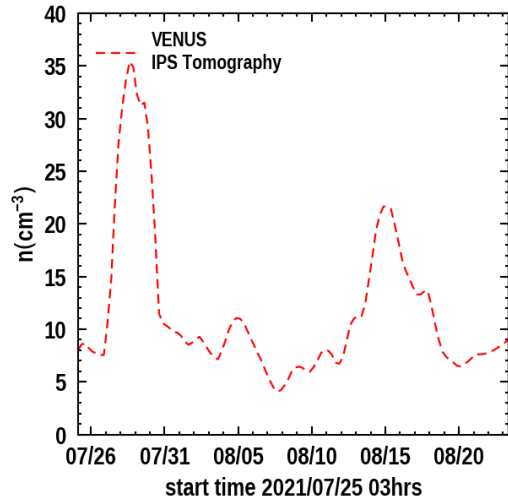


# BepiColombo - Solar Orbiter Venus Pass of August 2021

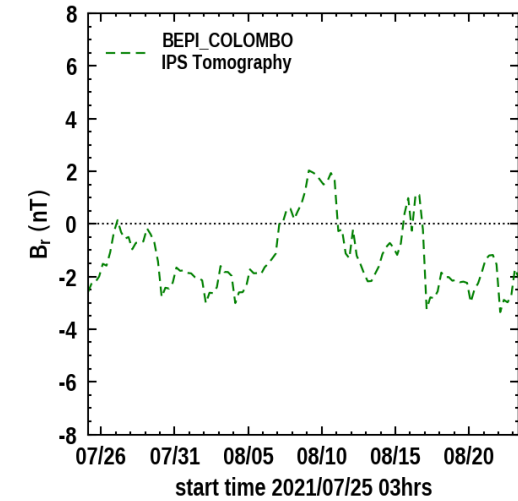
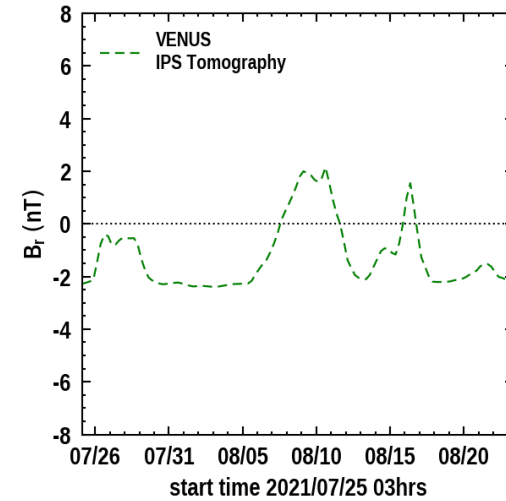


# BepiColombo - Solar Orbiter Venus Pass of August 2021

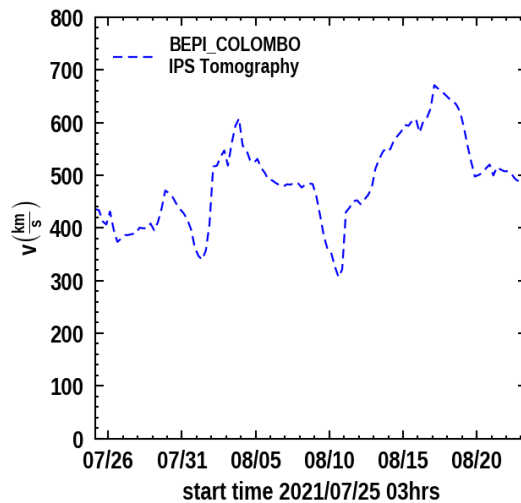
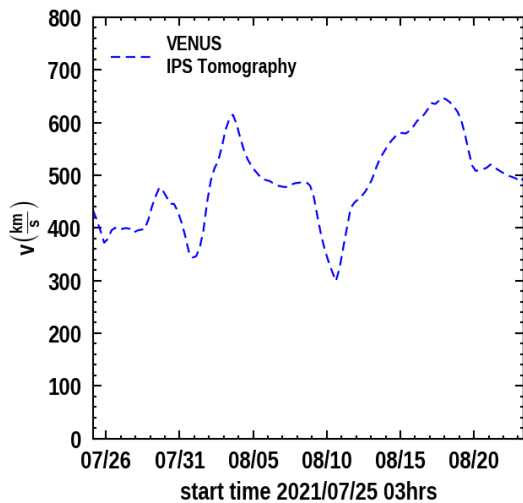
## Density



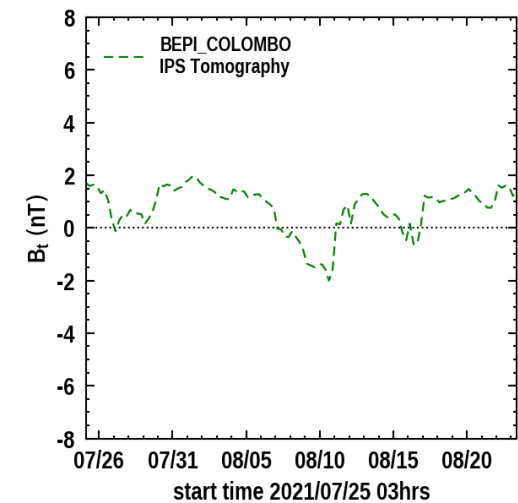
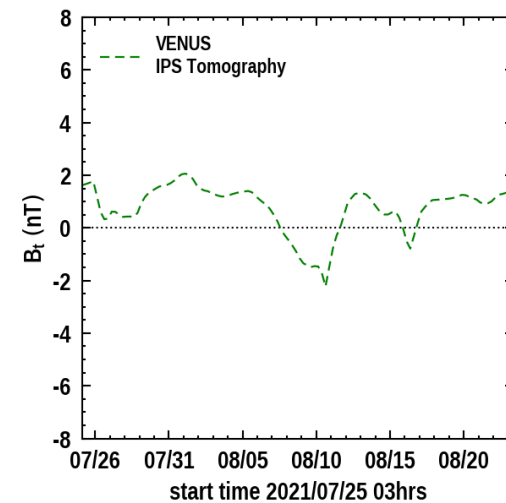
## Magnetic Br (RTN)



## Velocity



## Magnetic Bt (RTN)

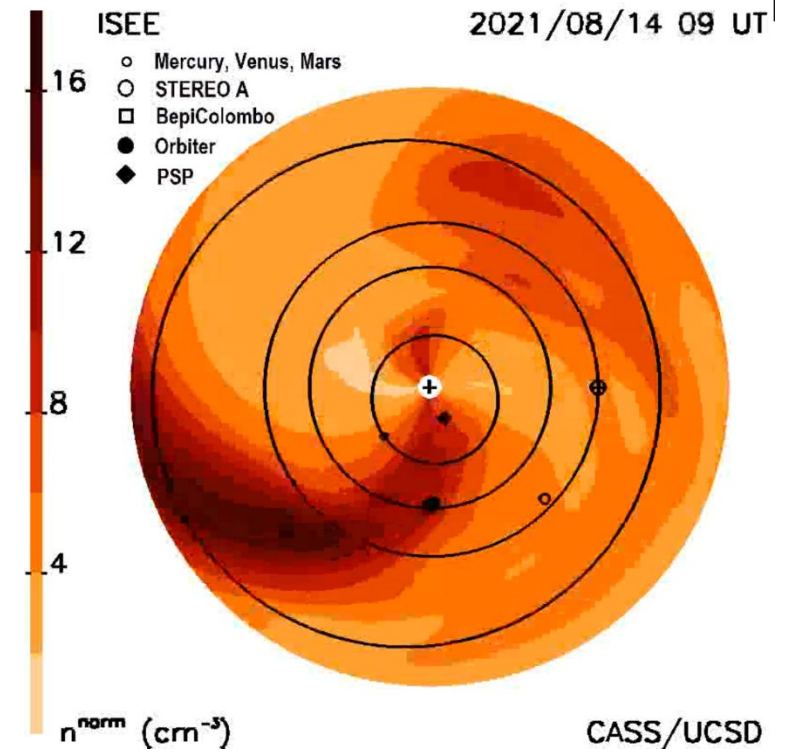
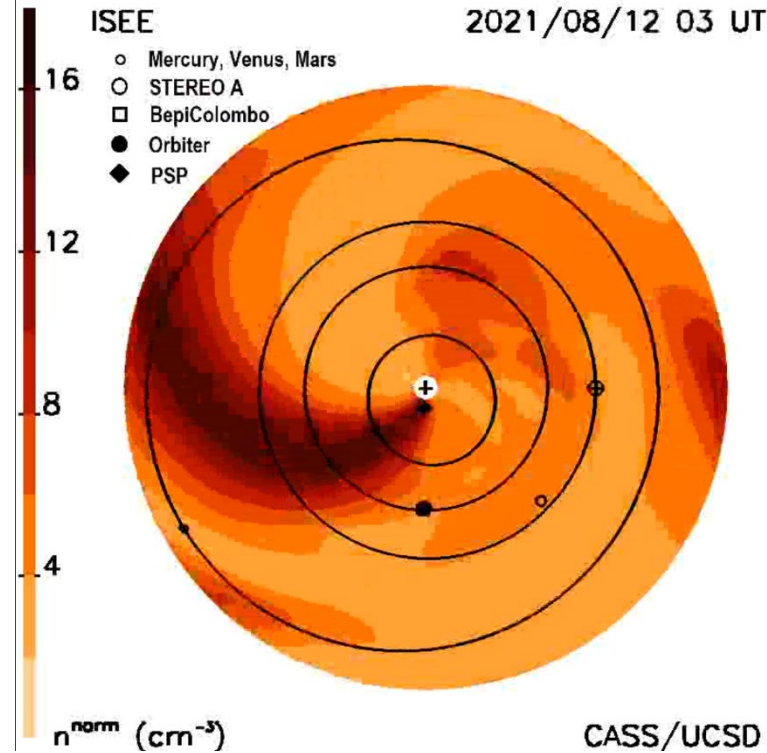
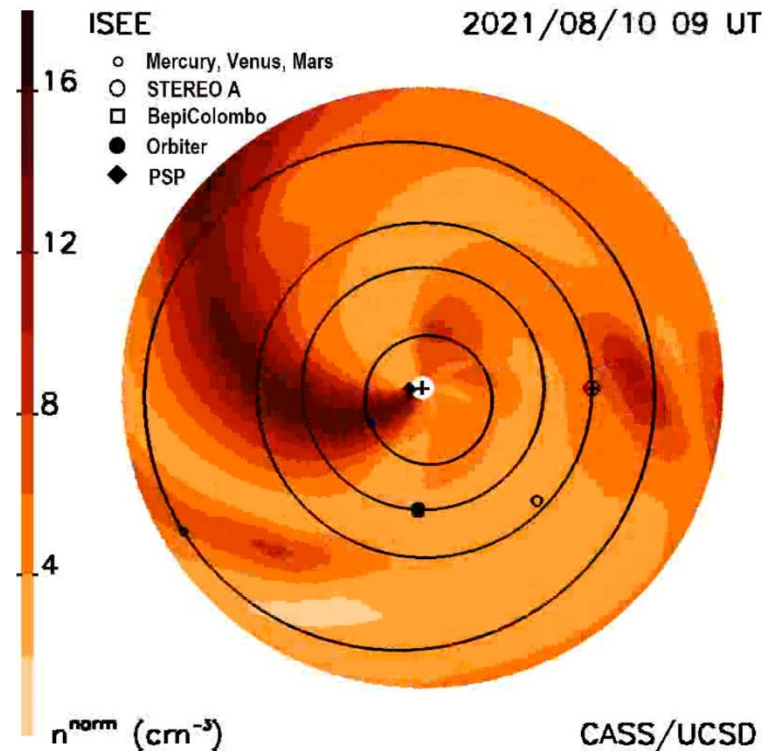


# BepiColombo - Solar Orbiter Venus Pass of August 2021

## BepiColombo Closest Approach

## PSP and Venus Radially Aligned

## Solar Wind at PSP Arrives at Venus



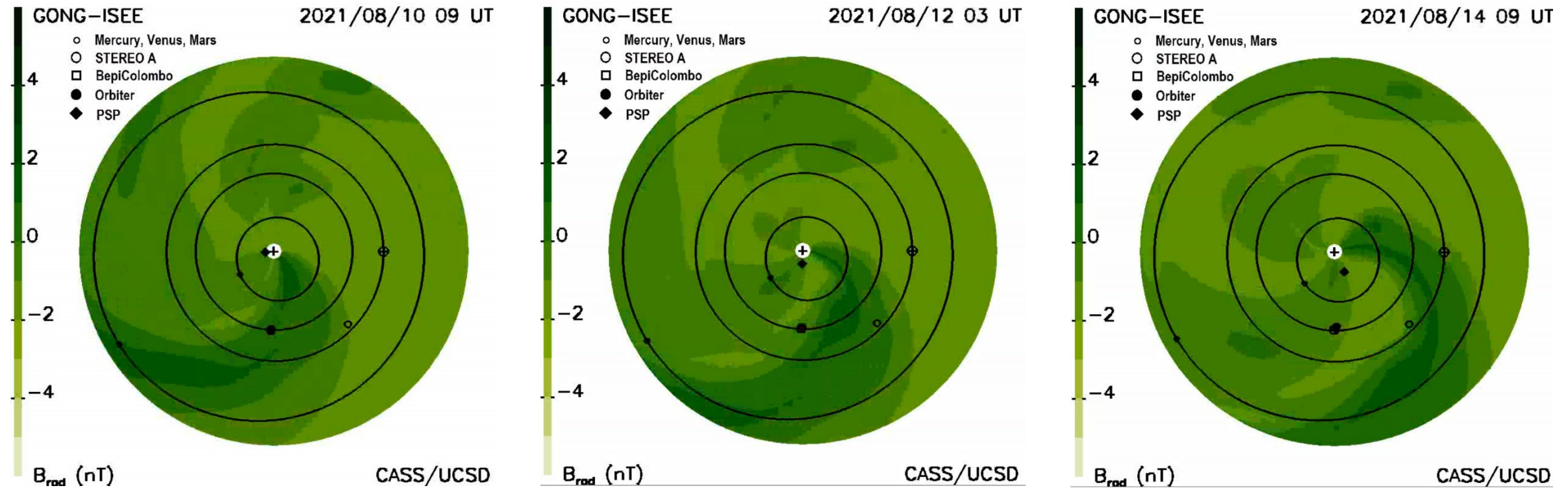
## Ecliptic Density

# BepiColombo - Solar Orbiter Venus Pass of August 2021

## BepiColombo Closest Approach

## PSP and Venus Radially Aligned

## Solar Wind at PSP Arrives at Venus



## Radial Magnetic Field

# **BepiColombo - Solar Orbiter Venus Pass of August 2021**

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## **Conclusion:**

**BepiColombo – Solar Orbiter – Akatsuka - Venus**

**Interplanetary Scintillation – IPS (Our Contribution)**

**Predictions and Forecasts - Current Progress in Providing In-situ Measurements at Different Locations**

**Potential Synergistic Measurements**