Mio cruise observation 2020

Last update: 27 May 2020

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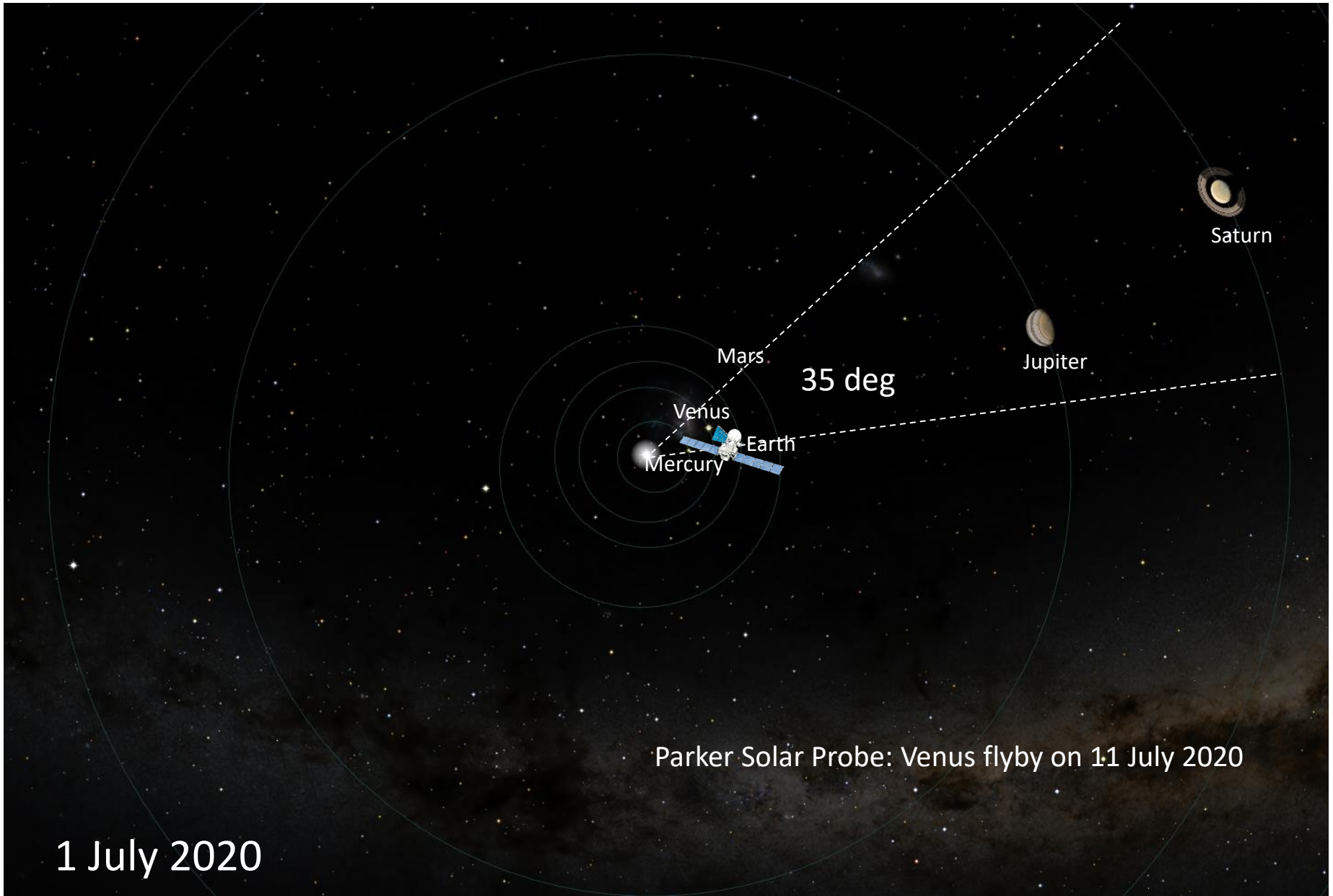
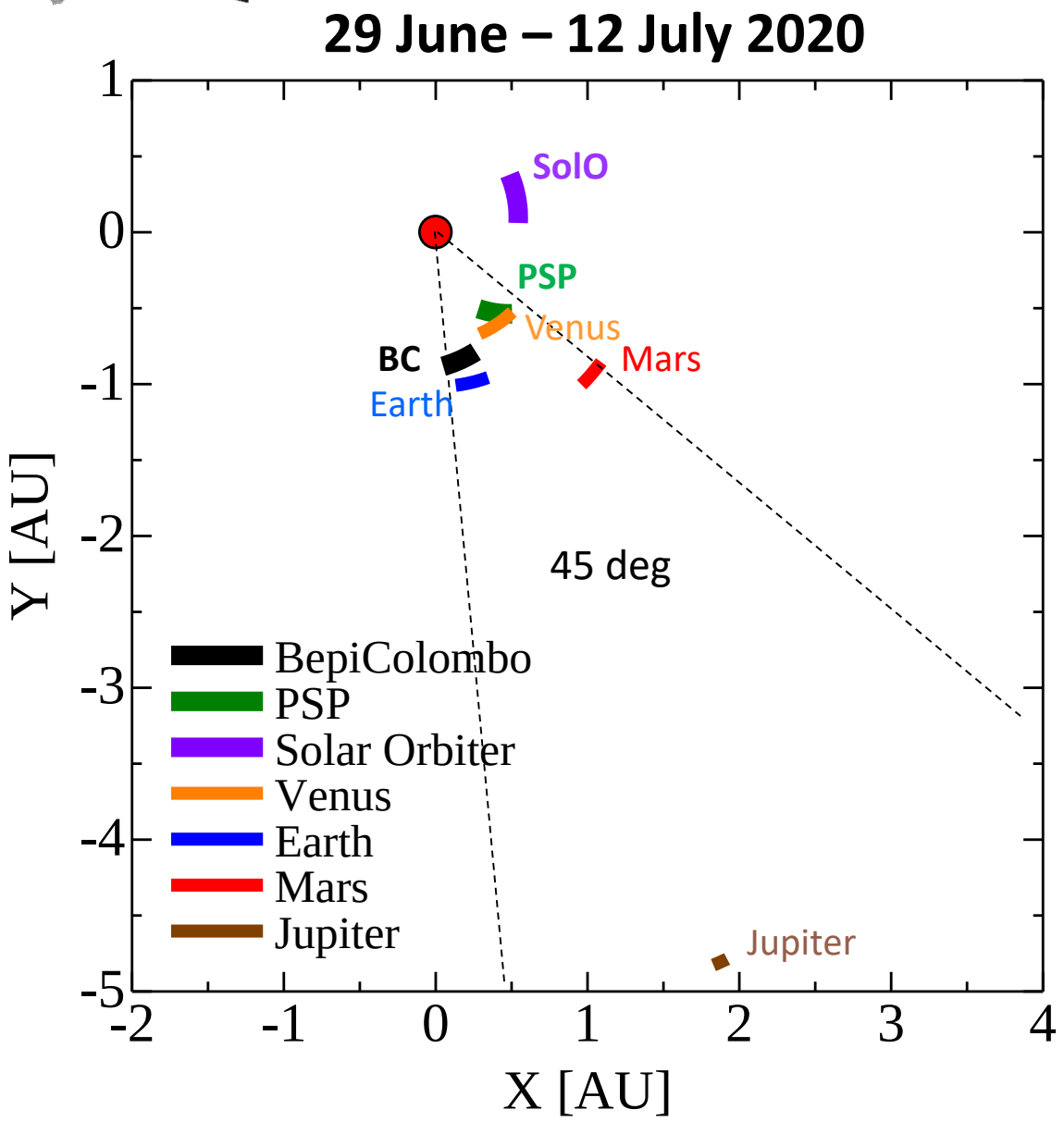
Cruise observations

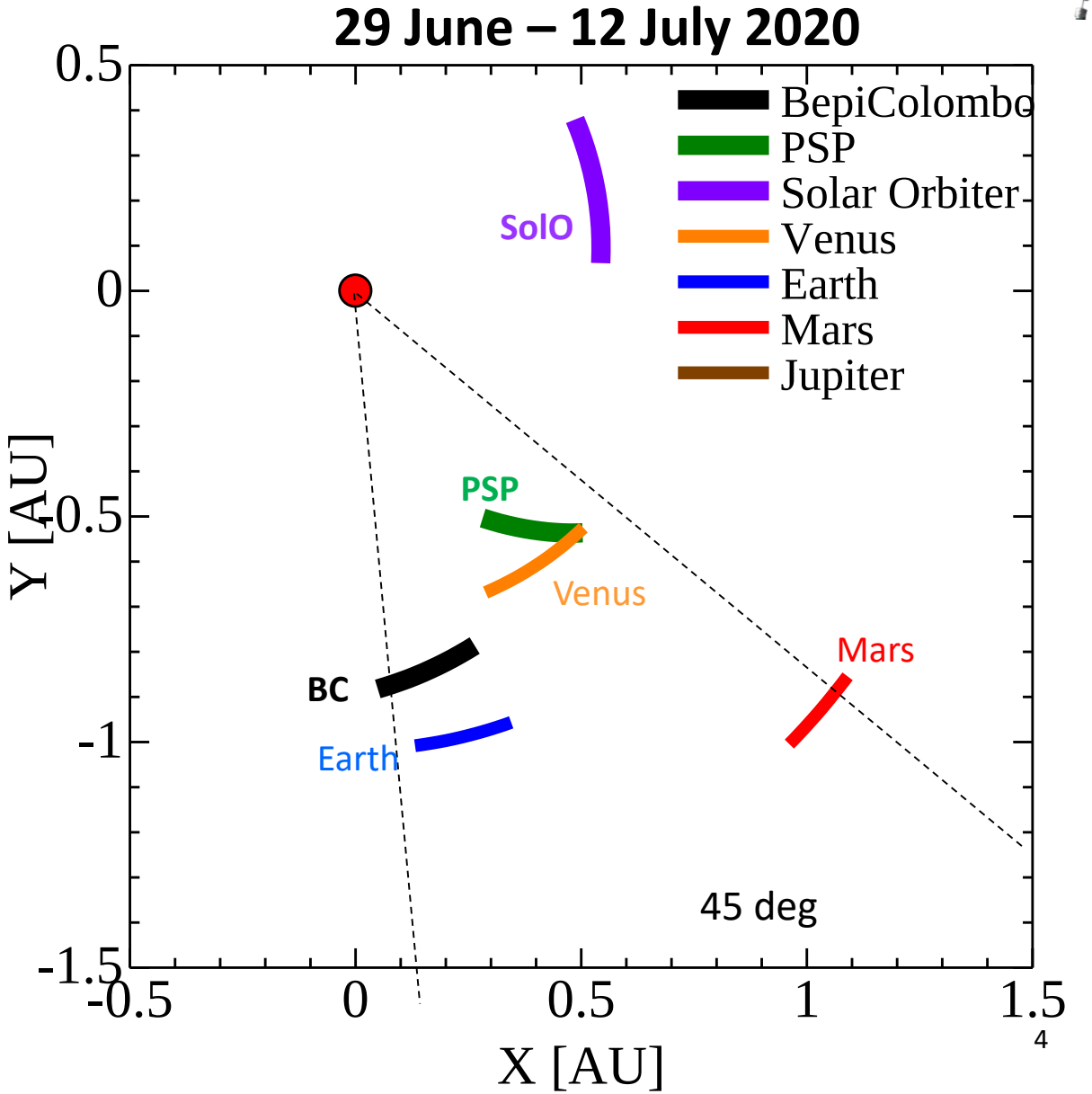
- PI team requests
  - **MPPE-MEA**: measuring solar wind electrons (only MEA1 is enough)
  - **MPPE-HEP-e**: potentially measuring solar energetic particles (SEPs)
  - **MPPE-ENA**: potentially measuring interstellar ENA
  - **MGF**: long-term monitoring (e.g., 2 weeks)
  - **PWI**: only B-fields (for cometary dust trail E-fields measurement is considered)
  - **MDM**: dust monitoring, especially for dust trail crossings
- Campaign requests
  - Inner heliosphere observations with multi-spacecraft (SO, PSP, etc.): under study by the sub-group
  - Planetary radial alignment: **29 June to 12 July 2020 (2 weeks)**
  - Dust trail crossing: **20-25 Aug 2020 (23 Aug 2020 ± 2 days)**

Planetary radial alignment



Planetary radial alignment





June-July 2020 campaign

- 29 June to 12 July 2020 (2 weeks)
- Instruments
  - **MPPE-MEA** (only MEA1)
  - **MPPE-HEP-e**
  - **MPPE-ENA**
  - **MGF**
  - **PWI** (only B-fields)
  - **MDM**
- All sequences will be executed by mission timeline (no interactive operations)
- Power cycling **once per two days** against the risk of MDP WDT error
- HV OFF -> ON for WOL **once per day**

Operations

- TL duration:
  - Start from 2020/06/29T11:28:02 (MDP ON)
  - End at 2020/07/13T10:23:42 (MDP OFF)
- No interactive operations
- No realtime monitoring is required for Pis
- Downlink pass assignments for the observation data
  - 02-07-20 (Thu) 16:24:00 22:32:00 UT
  - 09-07-20 (Thu) 11:41:00 19:24:00 UT
  - 15-07-20 (Wed) 12:18:00 21:43:00 UT

Timeline example (day 1)

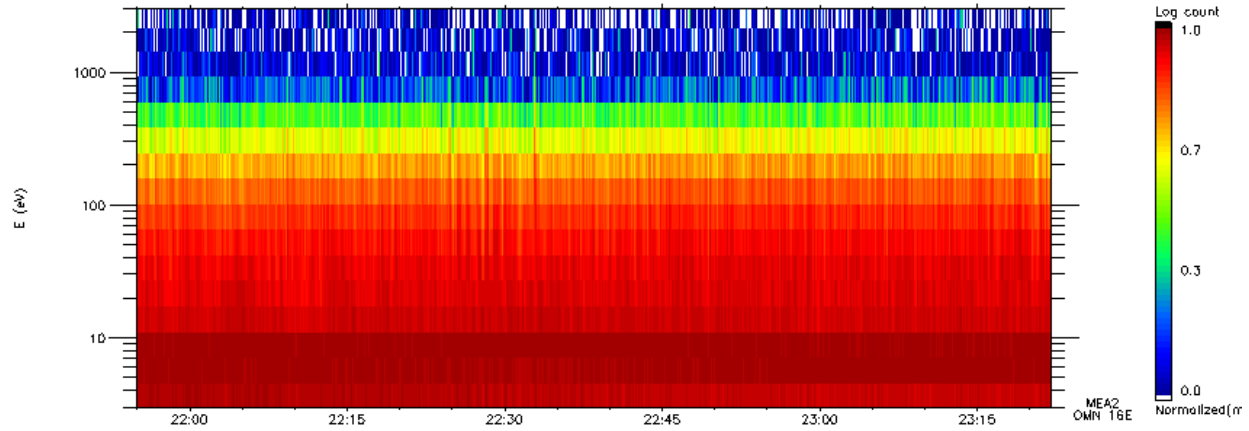
Start	End	Event	Activity	Procedure	Duration (sec)
2020/06/29T08:34:42	2020/06/29T11:06:02		MDP ERR DUMP	MDP_DUMP	9080
2020/06/29T11:06:02	2020/06/29T11:08:02		MDP OFF	MDP_OFF	120
2020/06/29T11:08:02	**2020/06/29T11:28:02**	**WOL DOY181**			1200
2020/06/29T11:28:02	2020/06/29T11:36:31		MDP ON	MDP_SETUP	509
2020/06/29T11:36:31	2020/06/29T11:37:13			MDP_CRUISE_SET	42
2020/06/29T11:37:13	2020/06/29T11:37:55		TLM mode change (MODE_10)	TLM_MODE_10	42
2020/06/29T11:37:55	2020/06/29T11:39:15		SI Power ON	PME_ON	80
2020/06/29T11:39:15	2020/06/29T11:53:43			PWI_ON_SETUP	868
2020/06/29T11:53:43	2020/06/29T11:53:57			MGF_ON_SETUP	14
2020/06/29T11:53:57	2020/06/29T11:58:49			MEA1_ON_SETUP_SW	292
2020/06/29T11:58:49	2020/06/29T12:08:13			ENA_ON_SETUP	564
2020/06/29T12:08:13	2020/06/29T12:28:43			HEP_ON_SETUP	1230
2020/06/29T12:28:43	2020/06/29T12:32:05			MDM_ON_SETUP	202
2020/06/29T12:32:05	2020/06/29T12:36:35		SI HV ON	HEP_HV_ON	270
2020/06/29T12:36:35	2020/06/29T12:42:19			ENA_HV_ON	344
2020/06/29T12:42:19	2020/06/29T13:10:41			MEA1_HV_ON	1702
2020/06/29T13:10:41	2020/06/29T13:11:23		TLM mode change (MODE_5)	TLM_MODE_5	42
2020/06/29T13:11:23	2020/06/30T10:35:41	Observation			**77058**
2020/06/30T10:35:41	2020/06/30T10:36:23		TLM mode change (MODE_10)	TLM_MODE_10	42
2020/06/30T10:36:23	2020/06/30T10:39:33		SI HV OFF	HEP_HV_OFF	190
2020/06/30T10:39:33	2020/06/30T10:42:51			ENA_HV_OFF	198
2020/06/30T10:42:51	**2020/06/30T10:45:57**			MEA1_HV_SCAN_OFF	186
2020/06/30T10:55:57	**2020/06/30T11:15:57**	**WOL DOY182**		2400	1200

Timeline example (day 2)

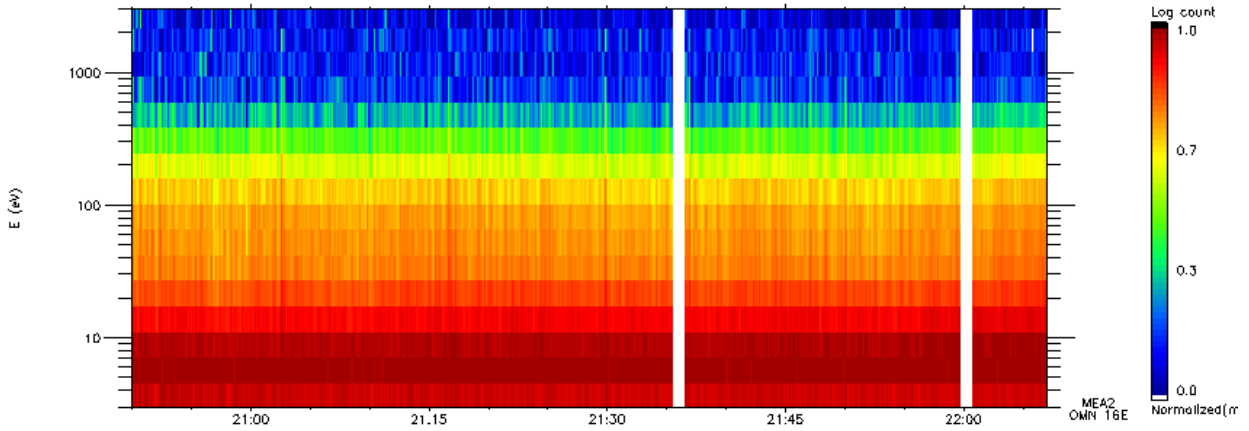
2020/06/30T10:55:57	**2020/06/30T11:15:57**	**WOL DOY182**		2400	1200
2020/06/30T11:25:57	2020/06/30T11:30:27		SI HV ON	HEP_HV_ON	270
2020/06/30T11:30:27	2020/06/30T11:36:11			ENA_HV_ON	344
2020/06/30T11:36:11	2020/06/30T12:04:33			MEA1_HV_ON	1702
2020/06/30T12:04:33	2020/06/30T12:05:15		TLM mode change (MODE_5)	TLM_MODE_5	42
2020/06/30T12:05:15	2020/07/01T08:54:57	Observation			**74982**
2020/07/01T08:54:57	2020/07/01T08:55:39		TLM mode change (MODE_10)	TLM_MODE_10	42
2020/07/01T08:55:39	2020/07/01T08:58:49		SI HV OFF	HEP_HV_OFF	190
2020/07/01T08:58:49	2020/07/01T09:02:07			ENA_HV_OFF	198
2020/07/01T09:02:07	2020/07/01T09:05:13			MEA1_HV_SCAN_OFF	186
2020/07/01T09:05:13	2020/07/01T09:07:53		SI Power OFF	MDM_OFF	160
2020/07/01T09:07:53	2020/07/01T09:09:03			HEP_OFF	70
2020/07/01T09:09:03	2020/07/01T09:10:31			ENA_OFF	88
2020/07/01T09:10:31	2020/07/01T09:13:11			MEA1_OFF	160
2020/07/01T09:13:11	2020/07/01T09:13:19			MGF_OFF	8
2020/07/01T09:13:19	2020/07/01T09:14:39			PWI_OFF	80
2020/07/01T09:14:39	2020/07/01T09:15:19			PME_OFF	40
2020/07/01T09:15:19	**2020/07/01T09:17:19**		MDP OFF	MDP_OFF	120
2020/07/01T09:17:19	**2020/07/01T09:37:19**	**WOL DOY182**			1200

MPPE-MEA: solar wind observations

- 09 April 2020

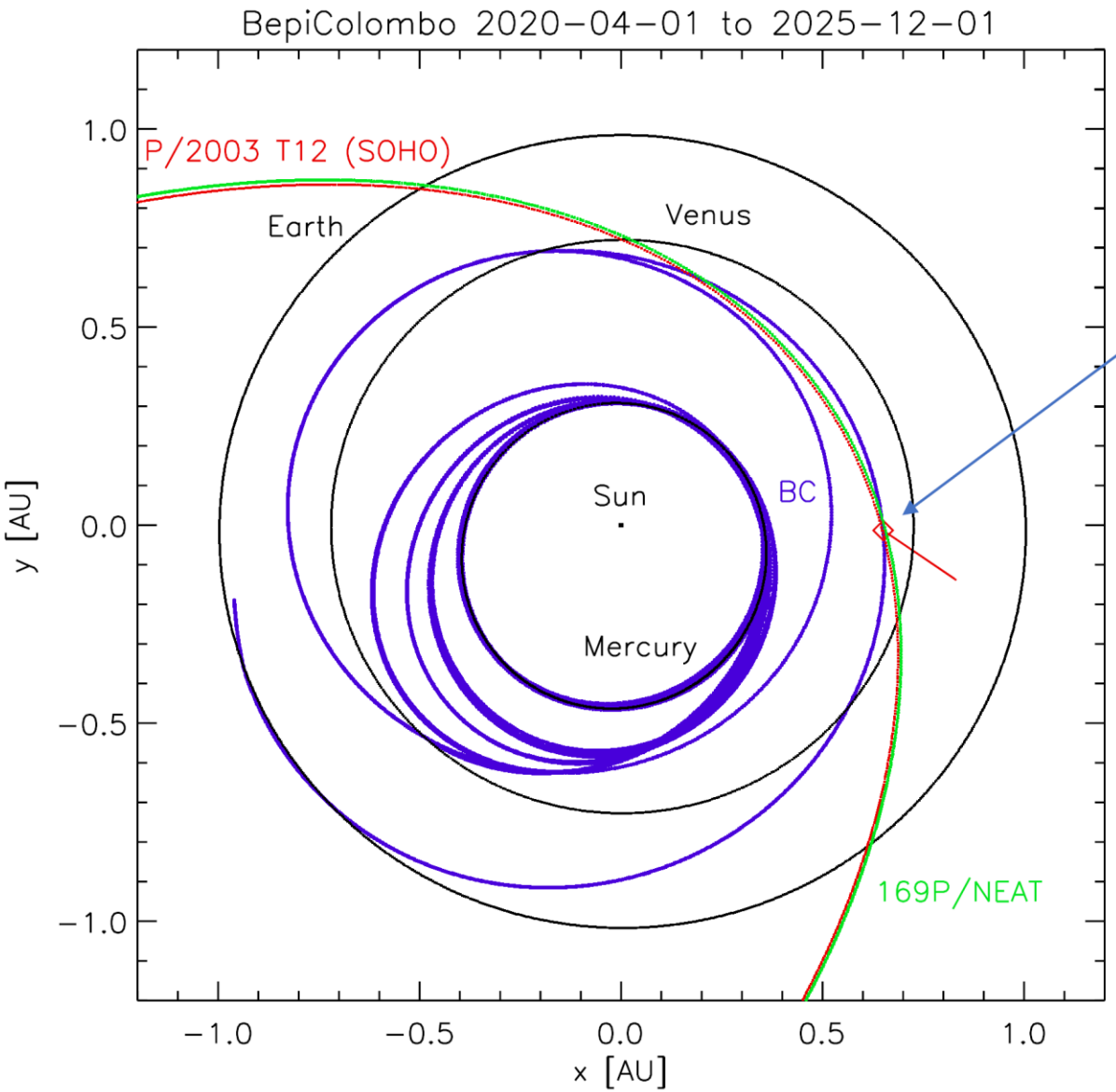


- 02 July 2019



Past observations have shown that MEA 1 & 2 **<u>can</u>** observe the solar wind

Orbits of relevant Comets and Impact Directions

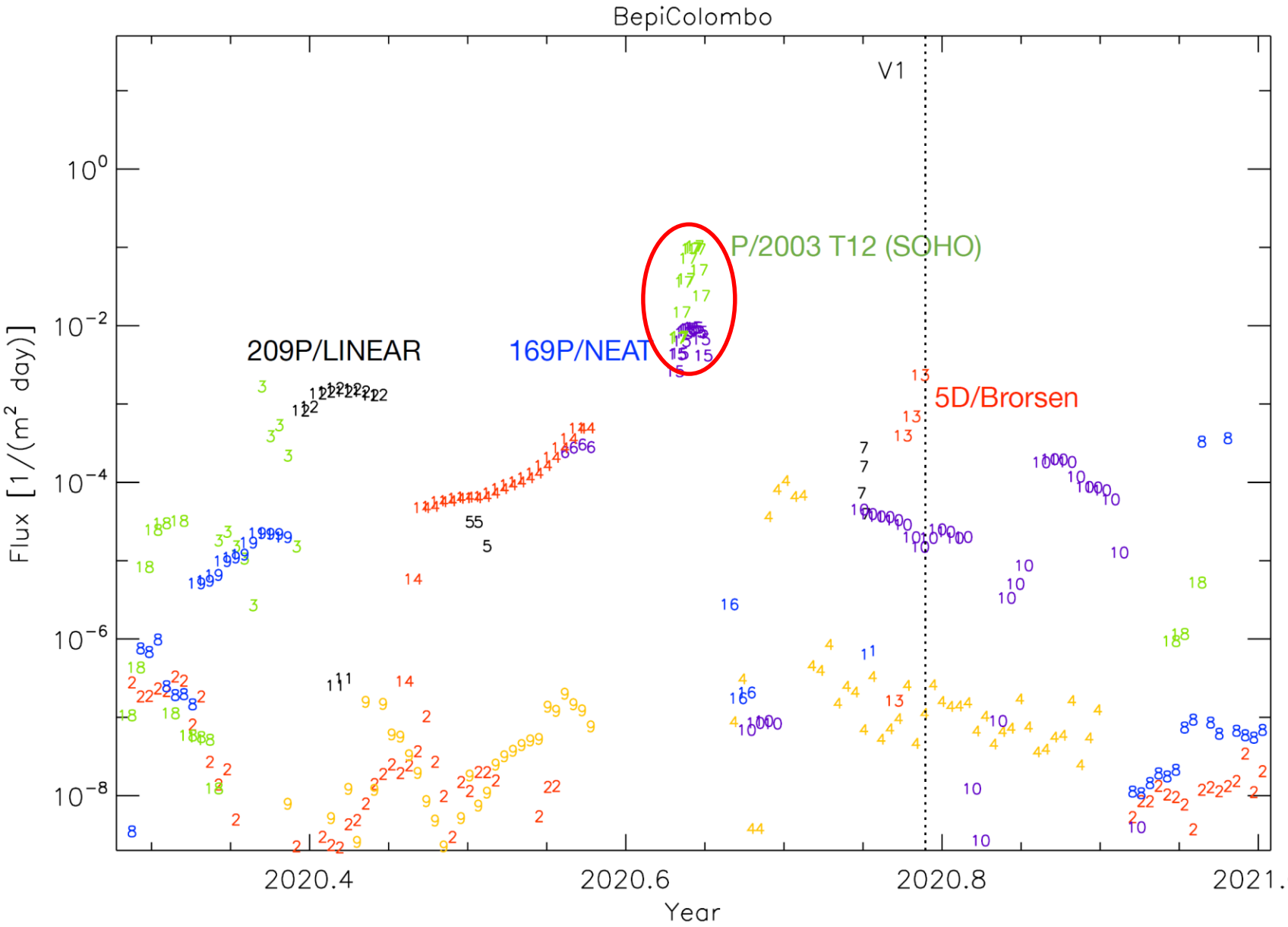


23 August 2020

Radiant of the dust trail as seen by an observer on board BepiColombo on 23 August 2020

	169P/NEAT	P/2003 T12 (SOHO)
Longitude [°]	325.3	325.5
Latitude [°]	42.6	44.3

ImexStreams Simulations for BepiColombo 2020



Separation of data points:

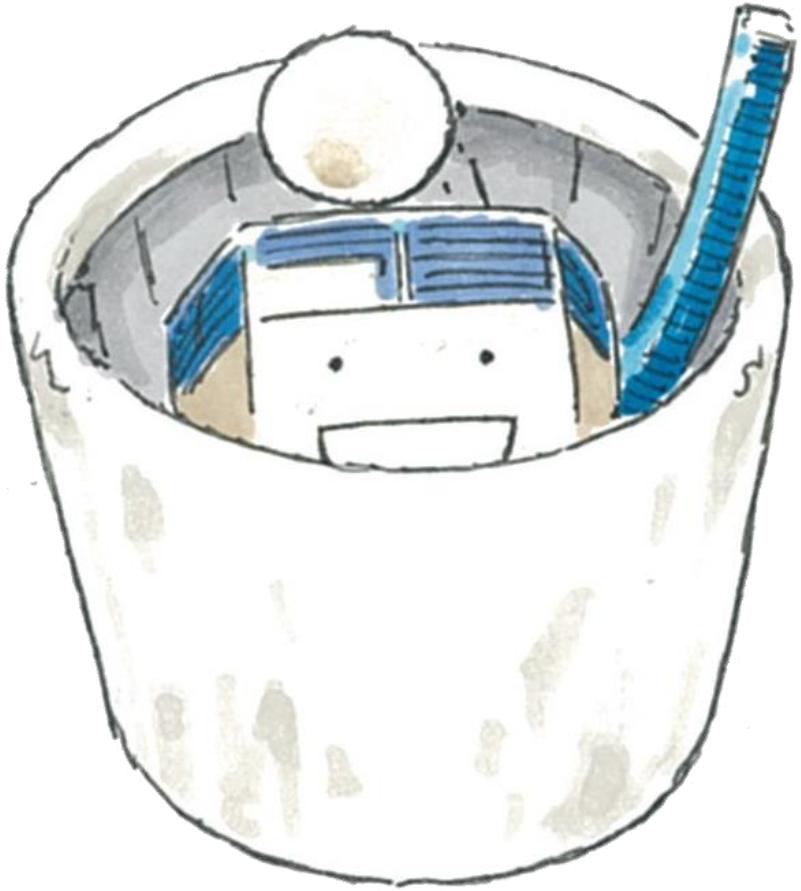
- 12 h for 169P and P2003 T12
- 2 d for all other comets

Each number refers to an individual comet

August 2020 campaign (TBC)

- 20 to 25 August 2020 (TBC)
- **Heliocentric distance < 0.7 AU: no wait time before safe mode thruster -> under discussion for HV instruments**
- Instruments
  - **MDM**
  - **MPPE-MEA (only MEA1) (TBD)**
  - **MPPE-HEP-e (TBD)**
  - **MPPE-ENA (TBD)**
  - **MGF**
  - **PWI** (only E-fields)
- **Pointing request: direct MCS –Z axis as close as possible to ecliptic lon & lat of (325°, 43°)**
- All sequences will be executed by mission timeline (no interactive operations)
- Power cycling once per day against the risk of MDP WDT error (TBC)

Thank you!



Stay safe!

Illustration by Masayuki Ishikawa