Juno Attitude and Orbit Geometry

May 31, 2017

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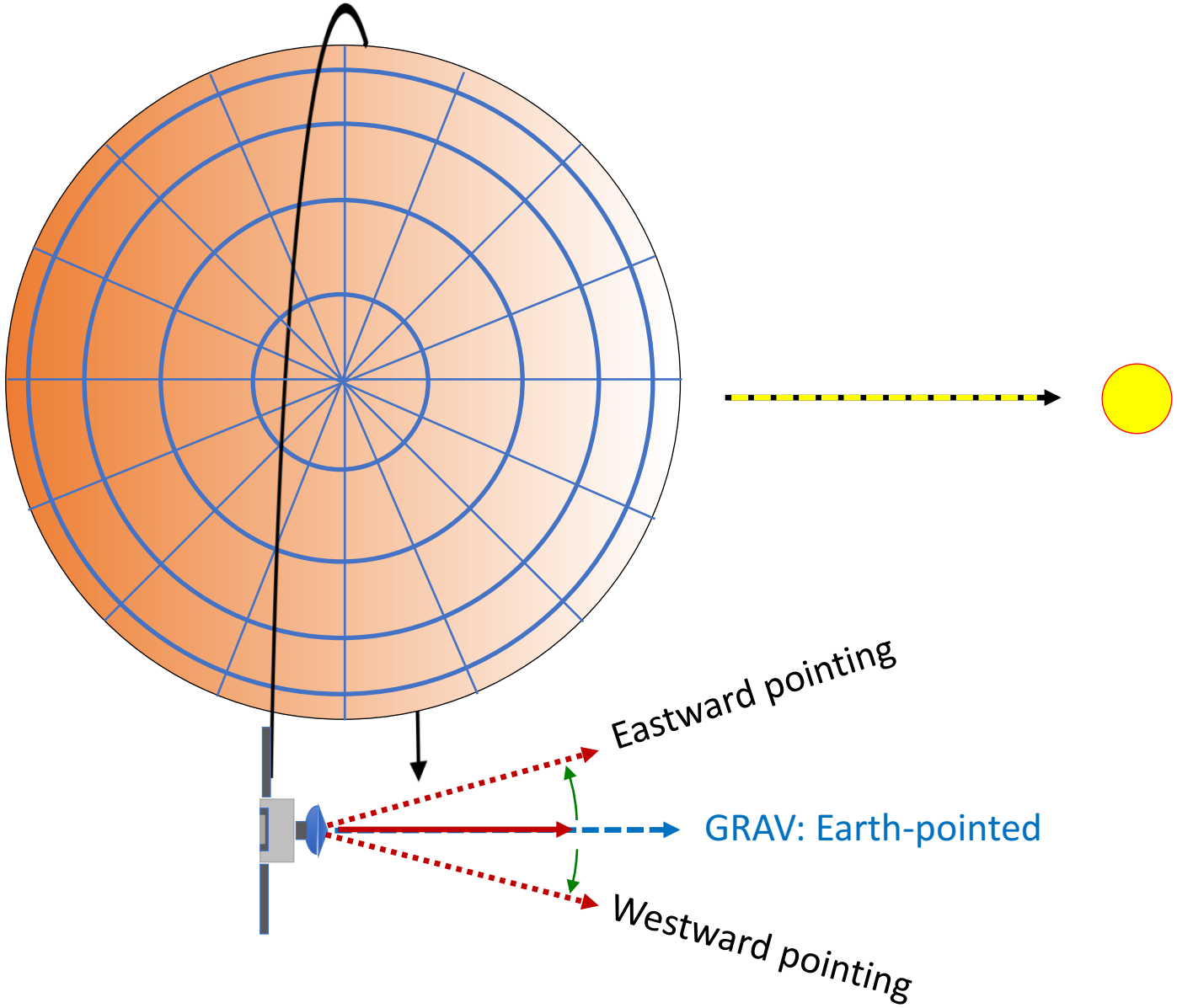
View from above Jupiter North Pole

Sun Direction

Earth Direction

Juno Spin Axis



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View from Jupiter Equator, Edge-on to Juno Orbit Plane

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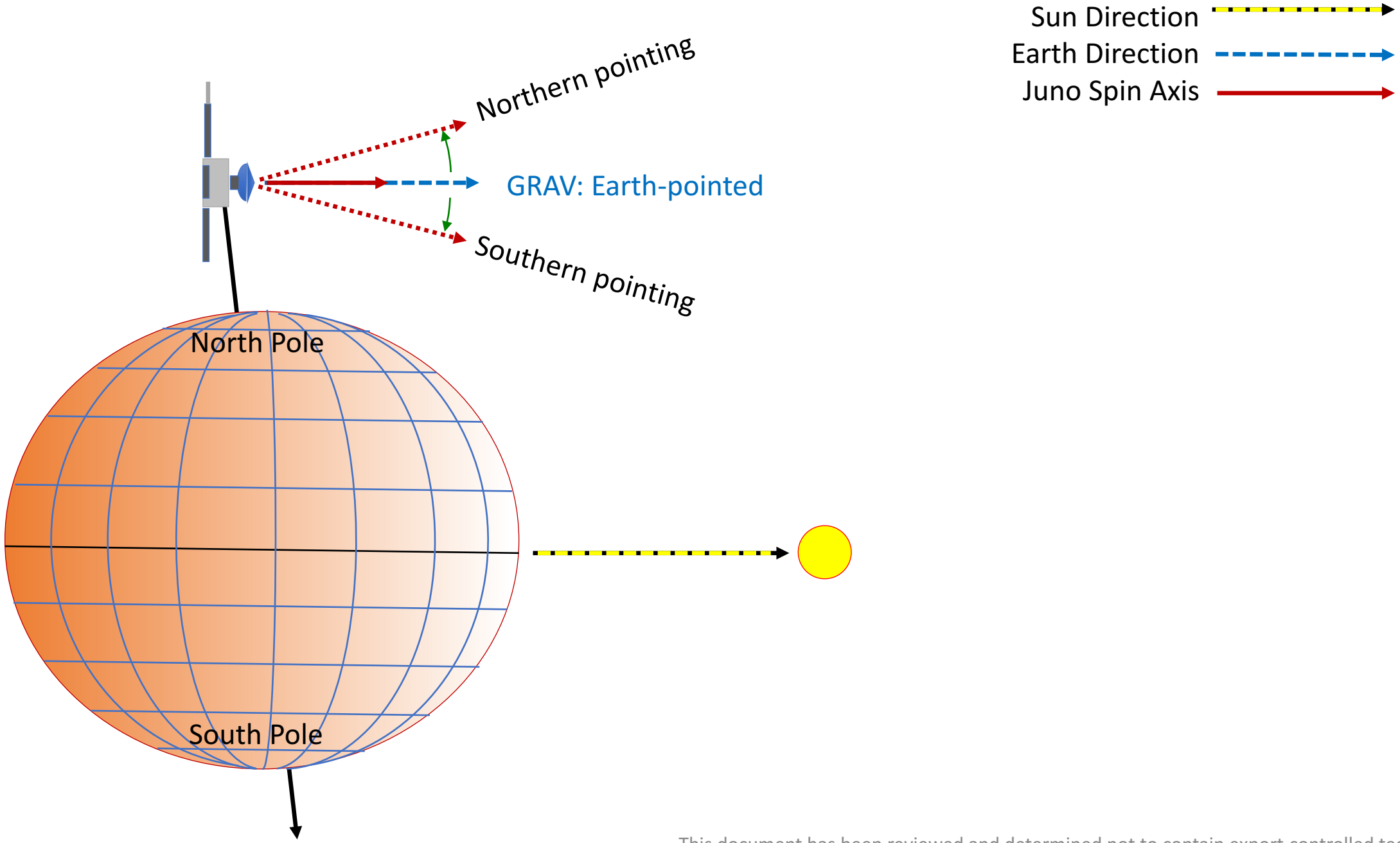

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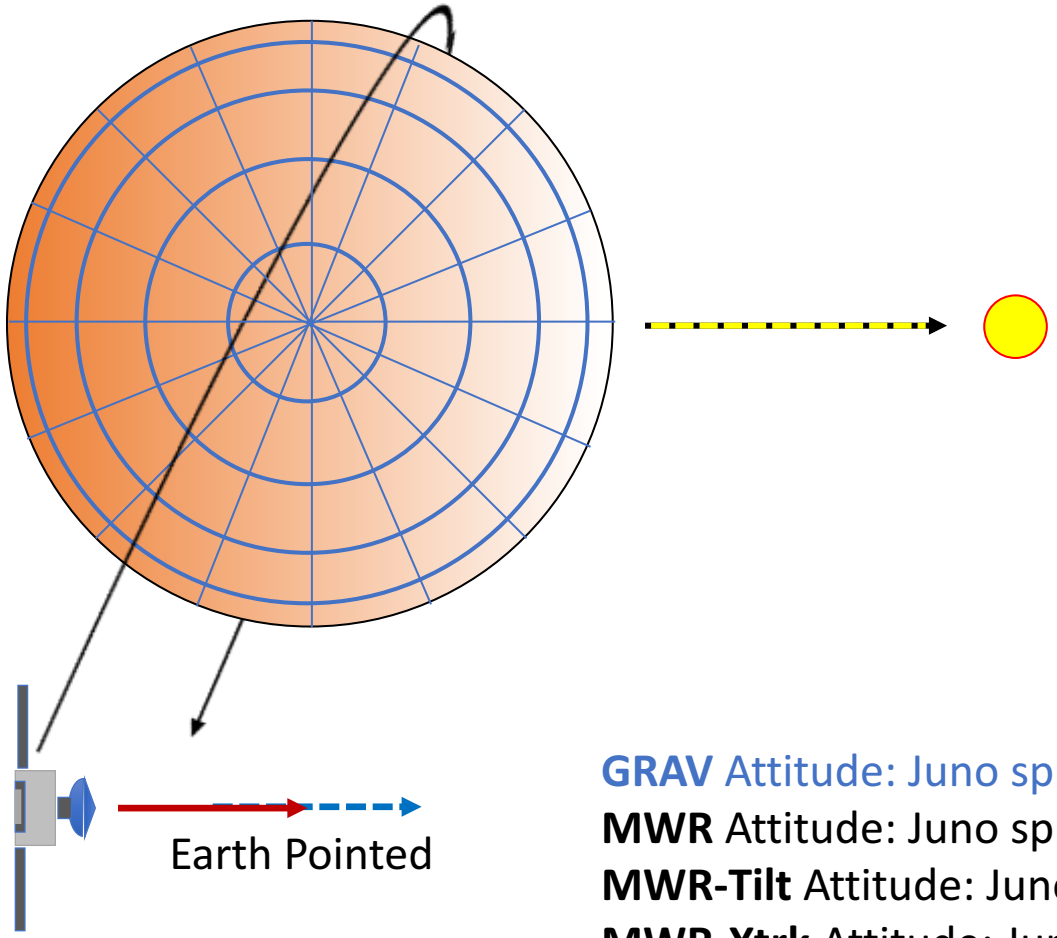
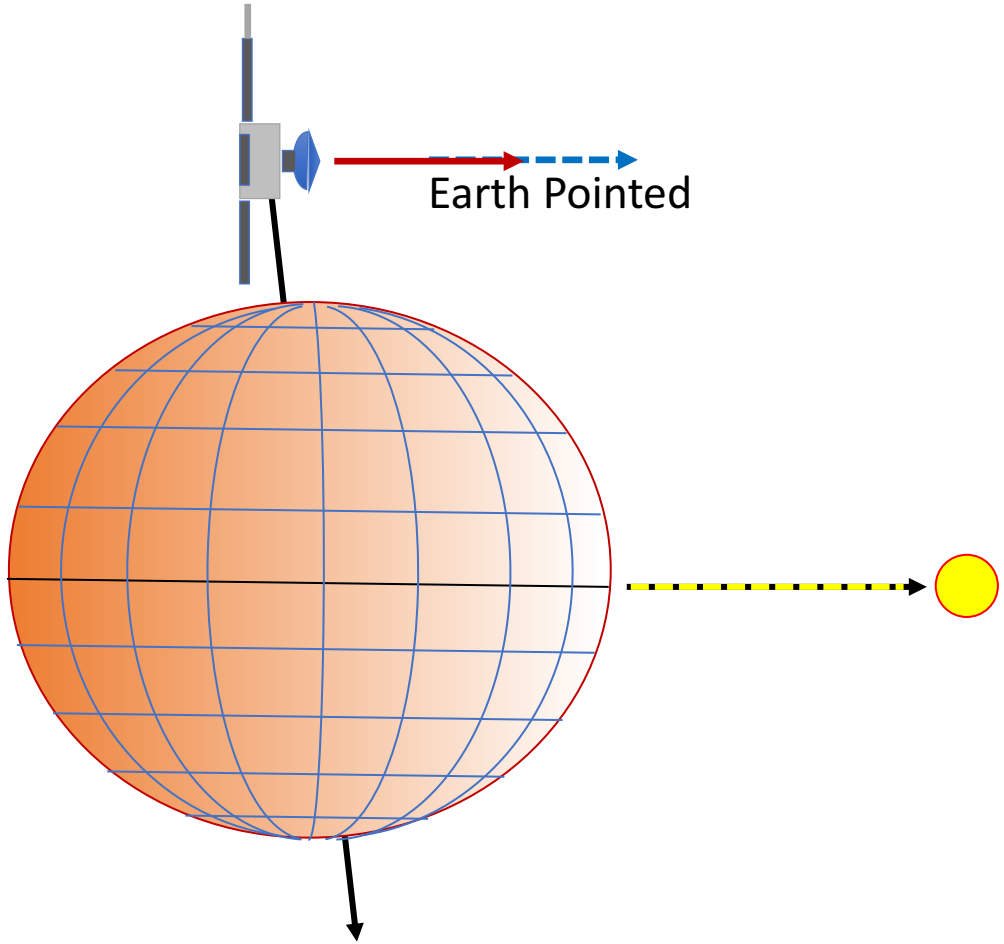
GRAV Attitude Example

North Pole View



Equatorial View
Edge-on to Orbit Plane



GRAV Attitude: Juno spin vector (HGA) to Earth
MWR Attitude: Juno spin vector aligned with orbit normal
MWR-Tilt Attitude: Juno spin vector aligned with orbit normal, then tilted ~14 deg North
MWR-Xtrk Attitude: Juno spin vector aligned with Jupiter pole axis

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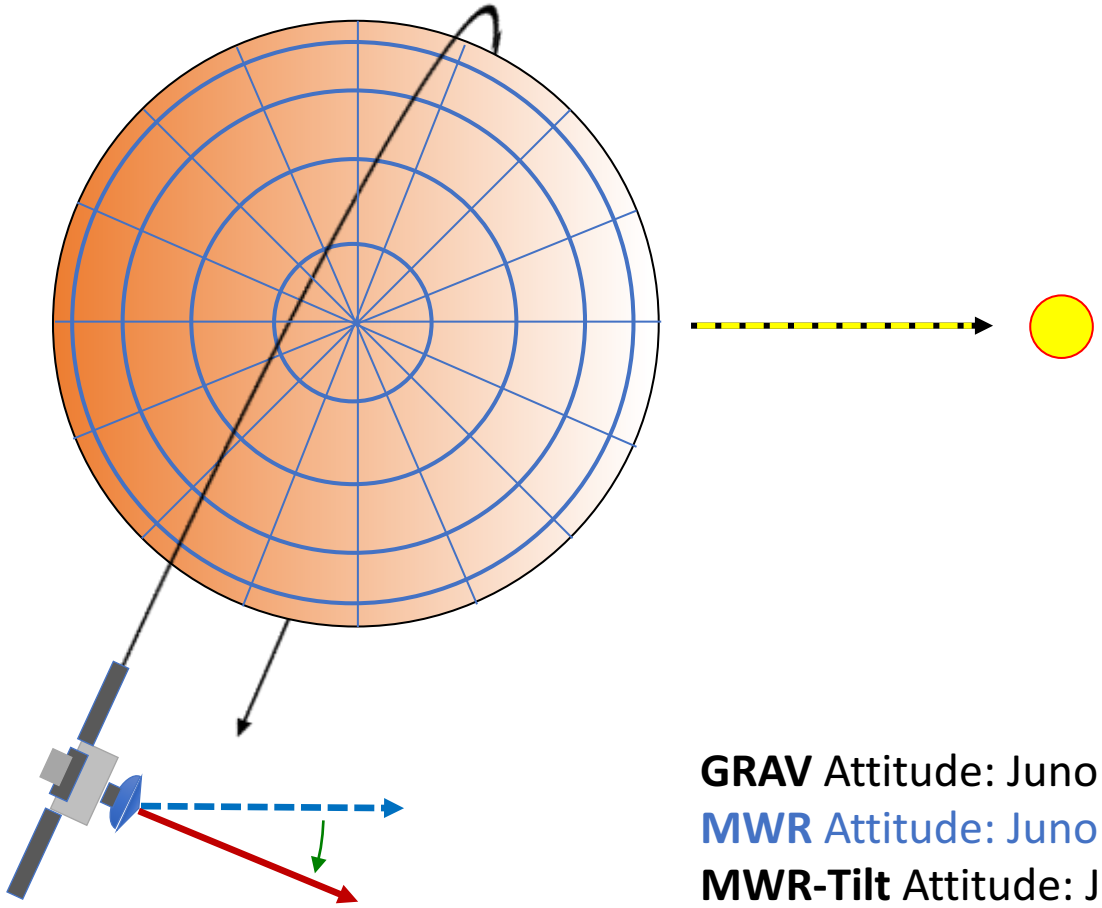
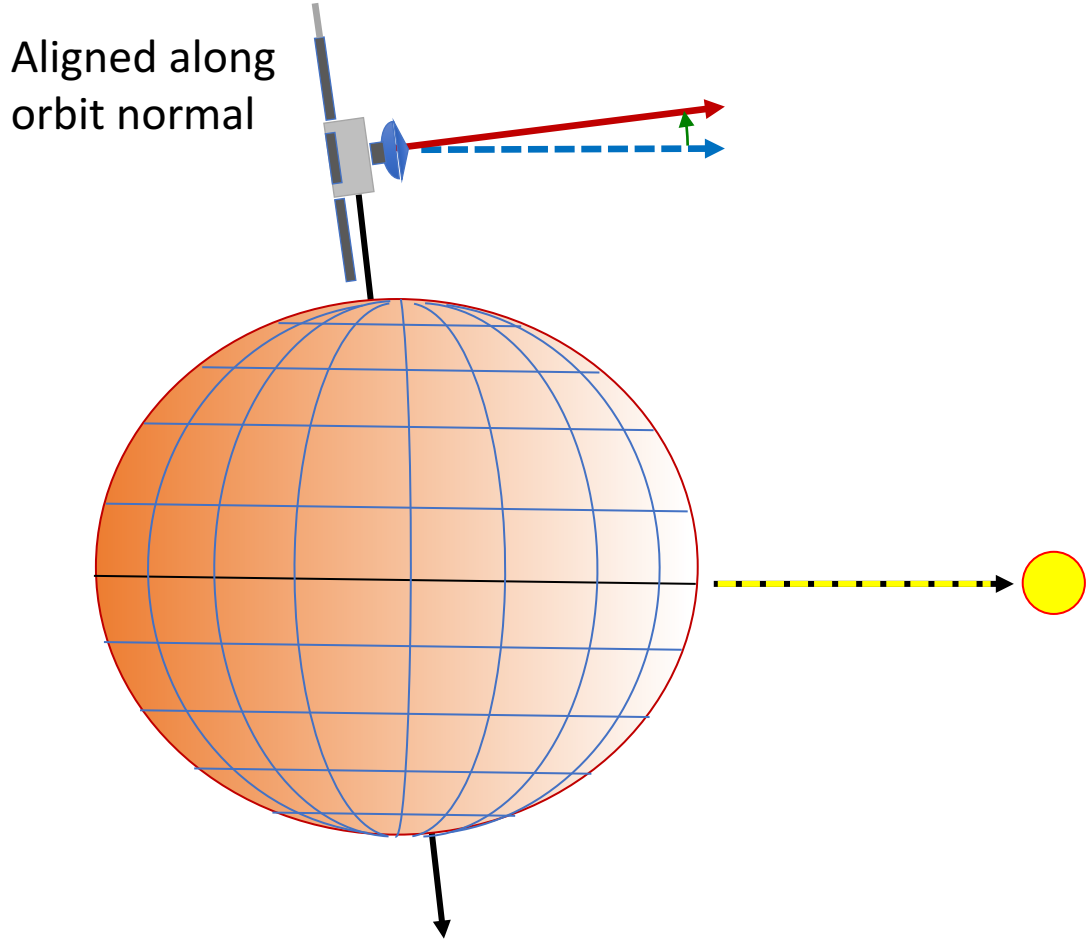
MWR Attitude Example

North Pole View



Aligned along orbit normal

Equatorial View
Edge-on to Orbit Plane



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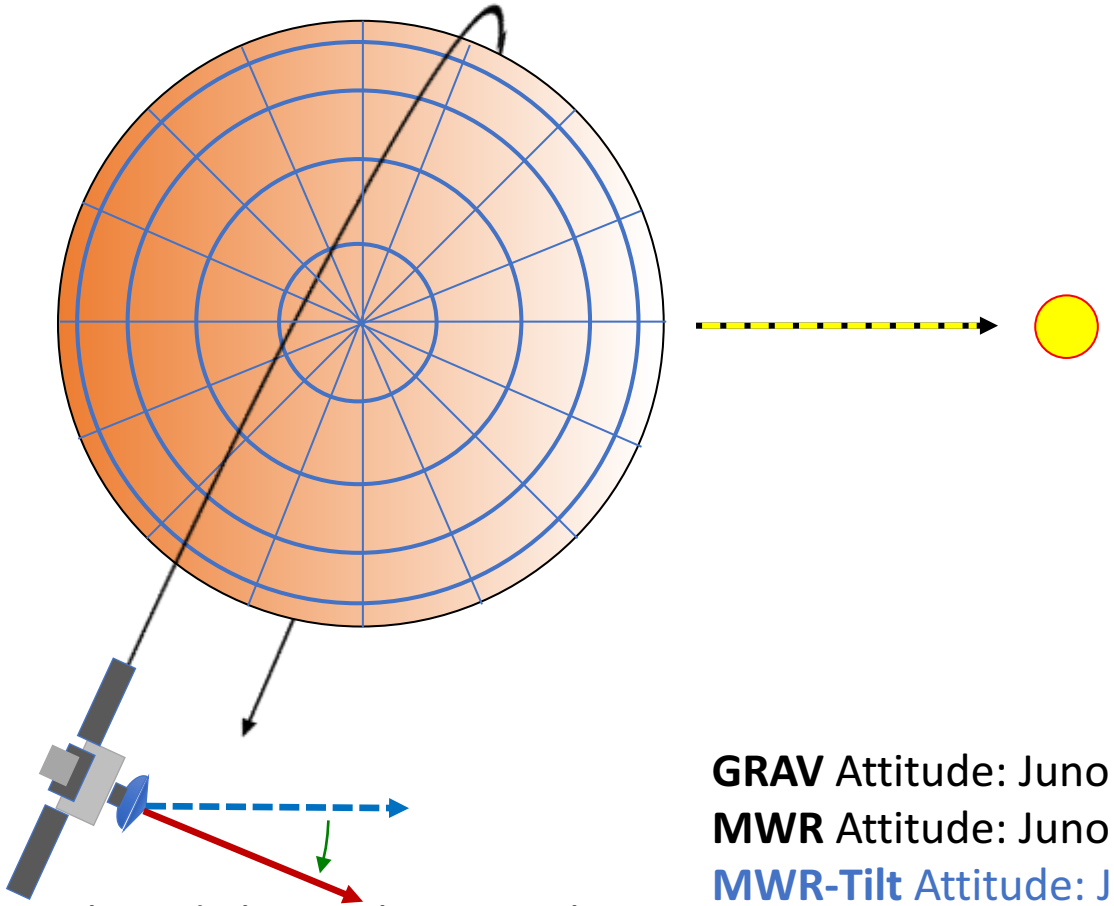
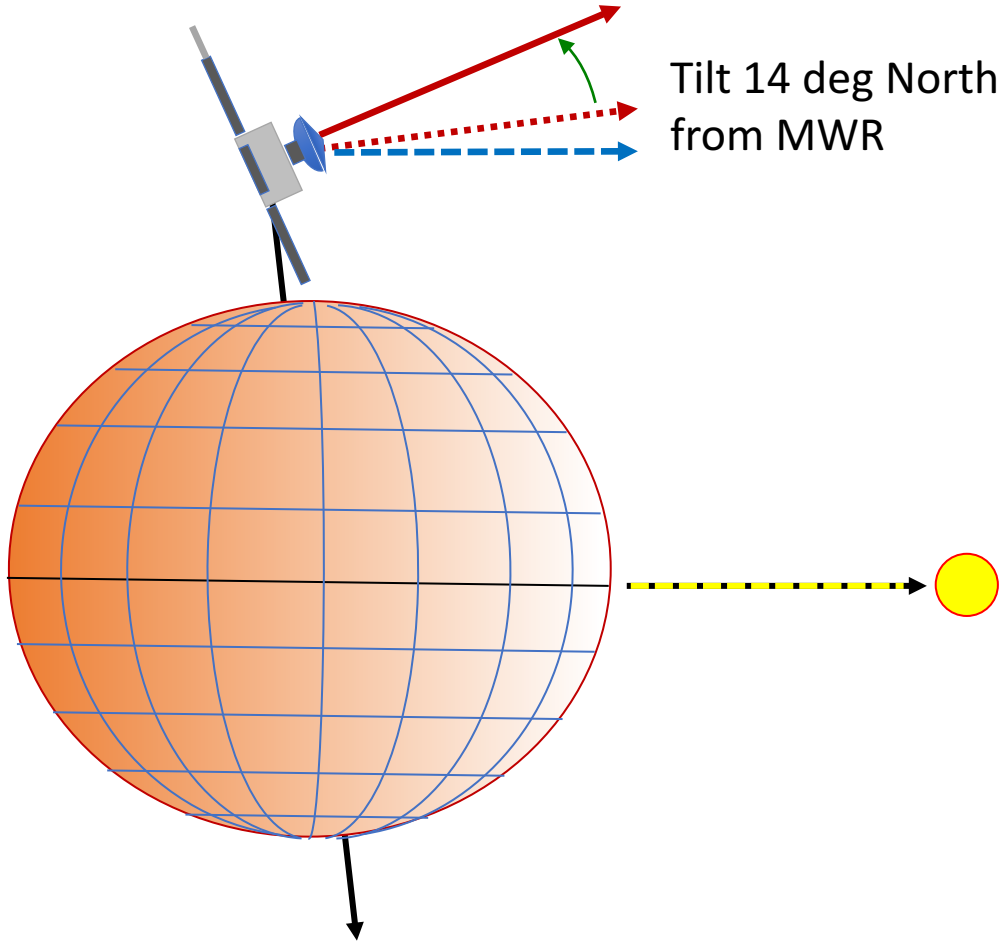
MWR-Tilt Attitude Example

North Pole View



Aligned along orbit normal
with 14 deg tilt

Equatorial View
Edge-on to Orbit Plane



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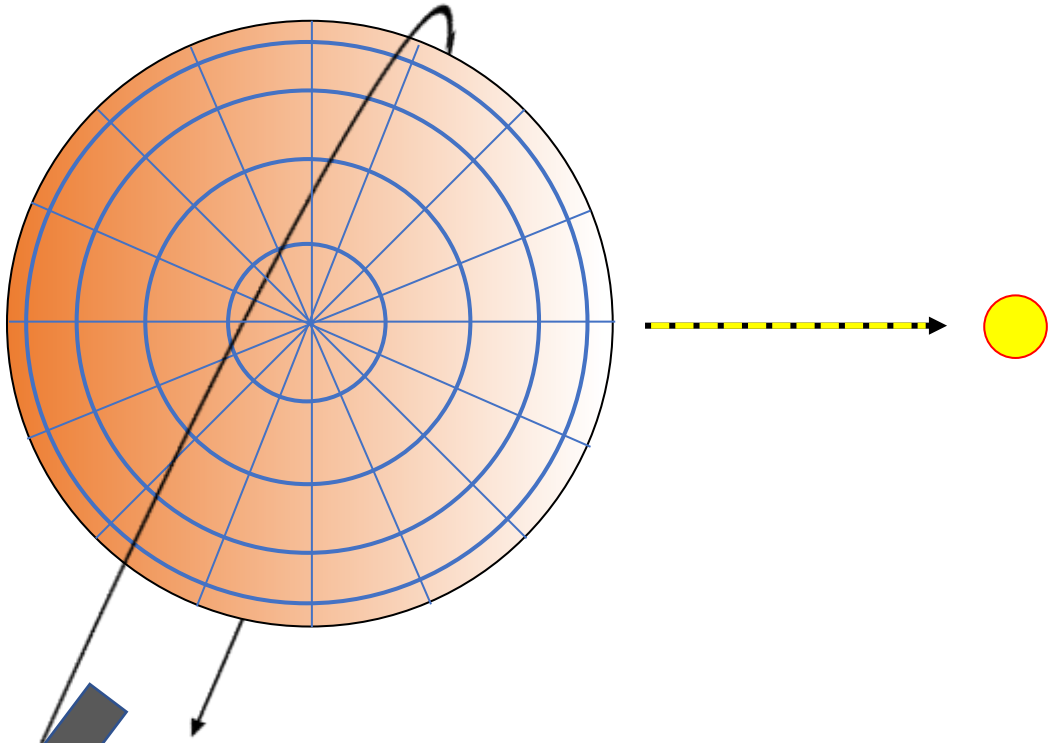
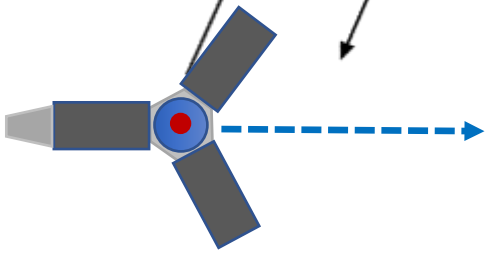
MWR-Crosstrack Attitude Example

North Pole View



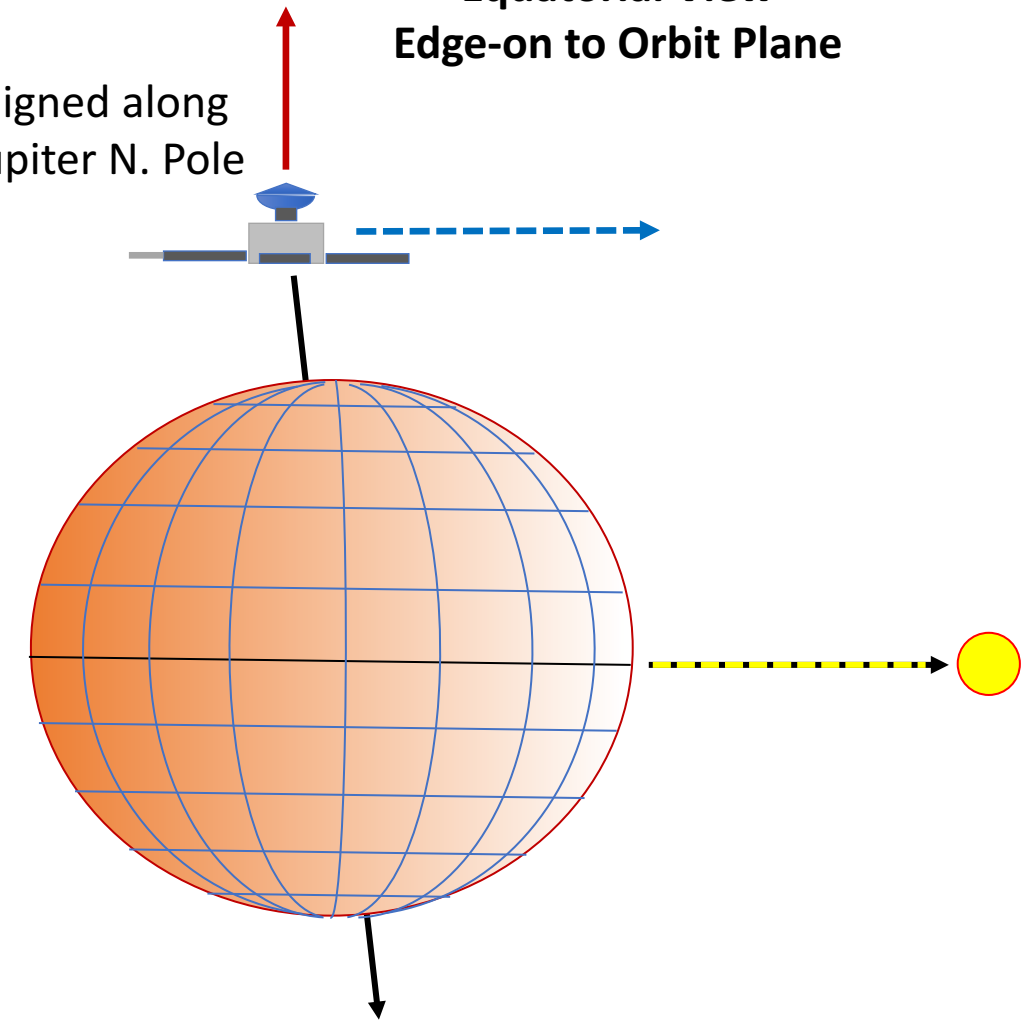


Aligned along Jupiter N. Pole

Equatorial View

Edge-on to Orbit Plane

Aligned along Jupiter N. Pole



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MWR-Xtrk Attitude: Juno spin vector aligned with Jupiter pole axis

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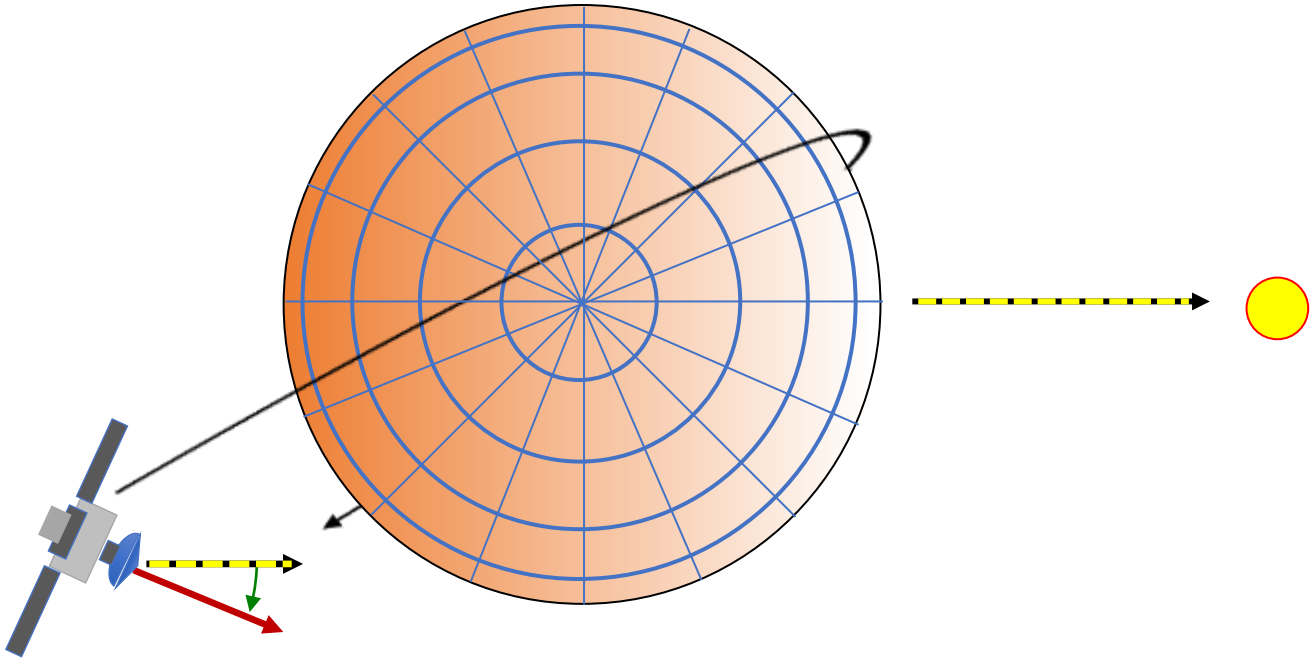
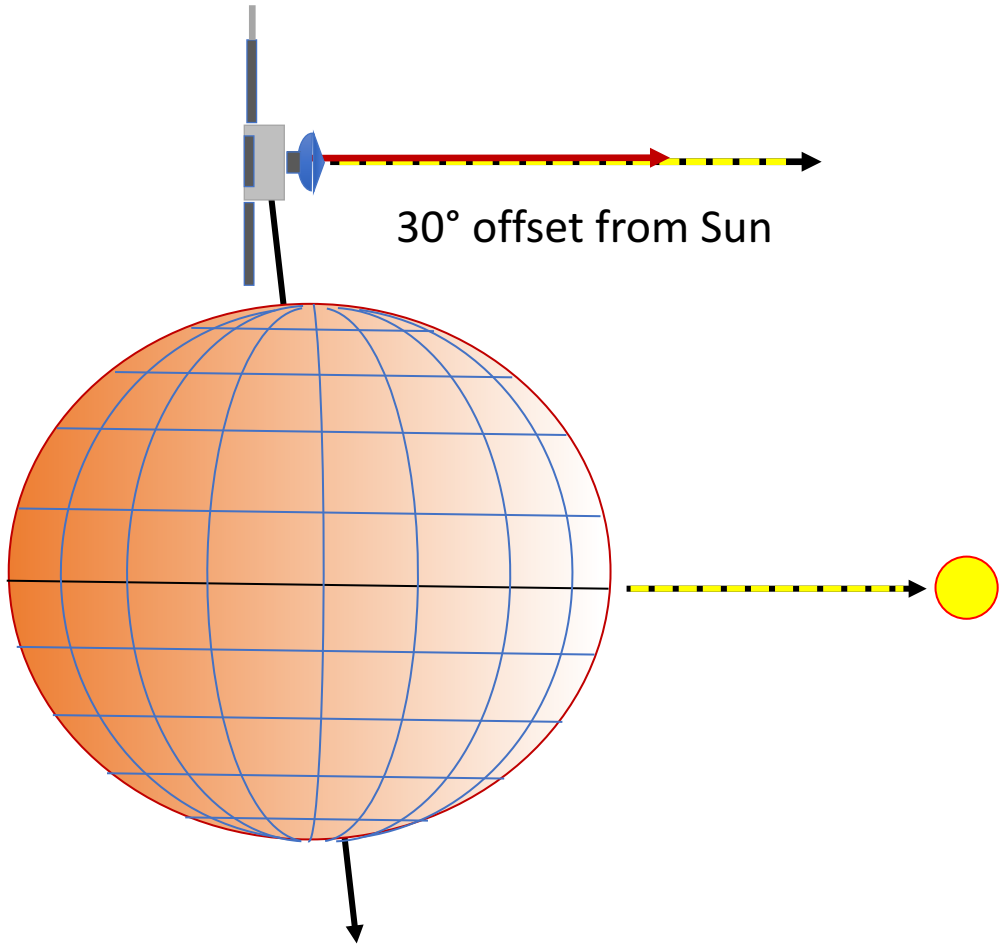
Proposed Attitude:
30° Offset from Sun towards MWR

North Pole View



30° offset from Sun

Equatorial View
Edge-on to Orbit Plane



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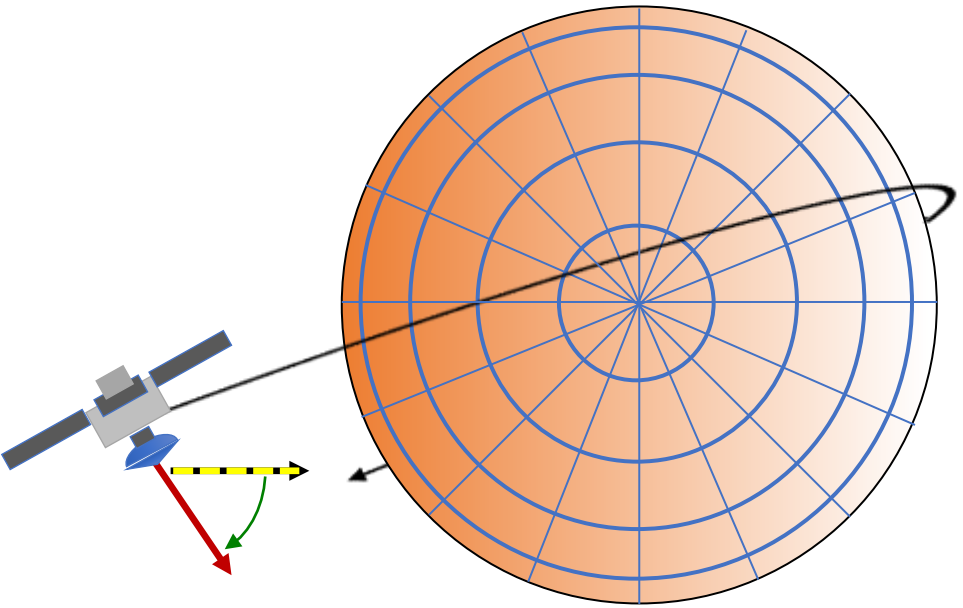
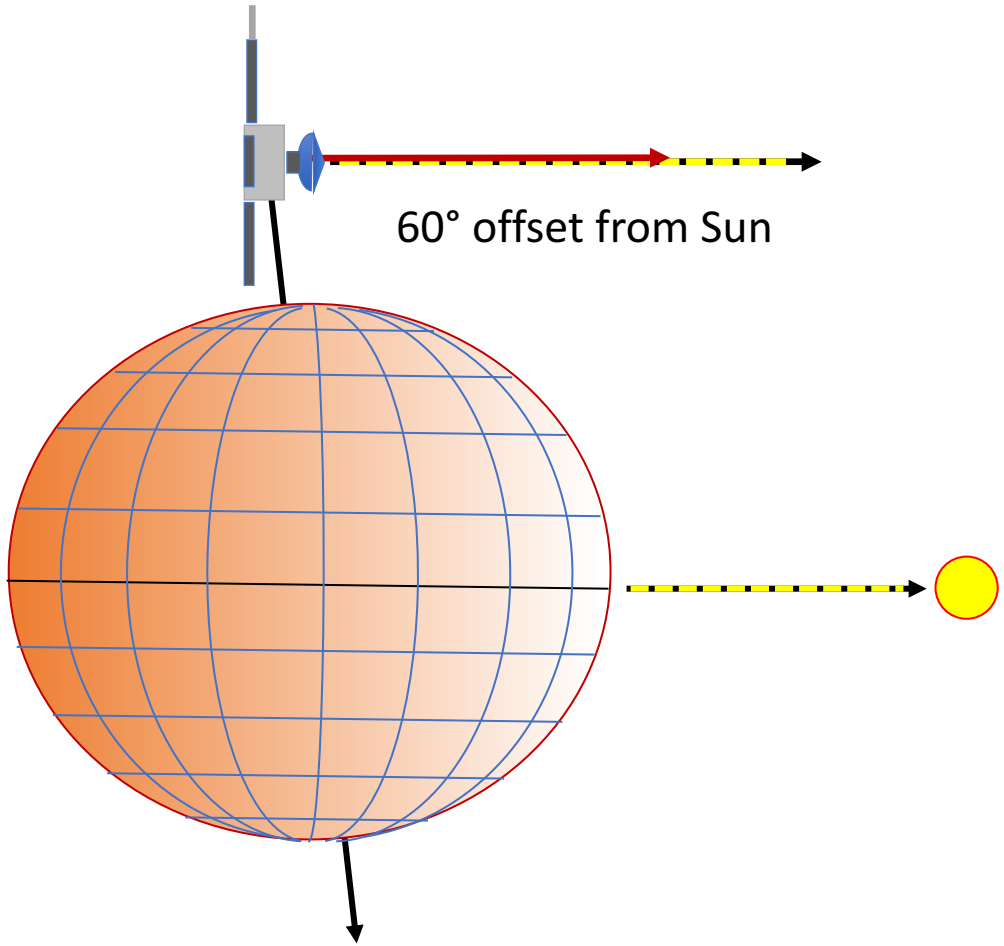
Proposed Attitude:
60° Offset from Sun towards MWR

North Pole View



Equatorial View
Edge-on to Orbit Plane



60° offset from Sun

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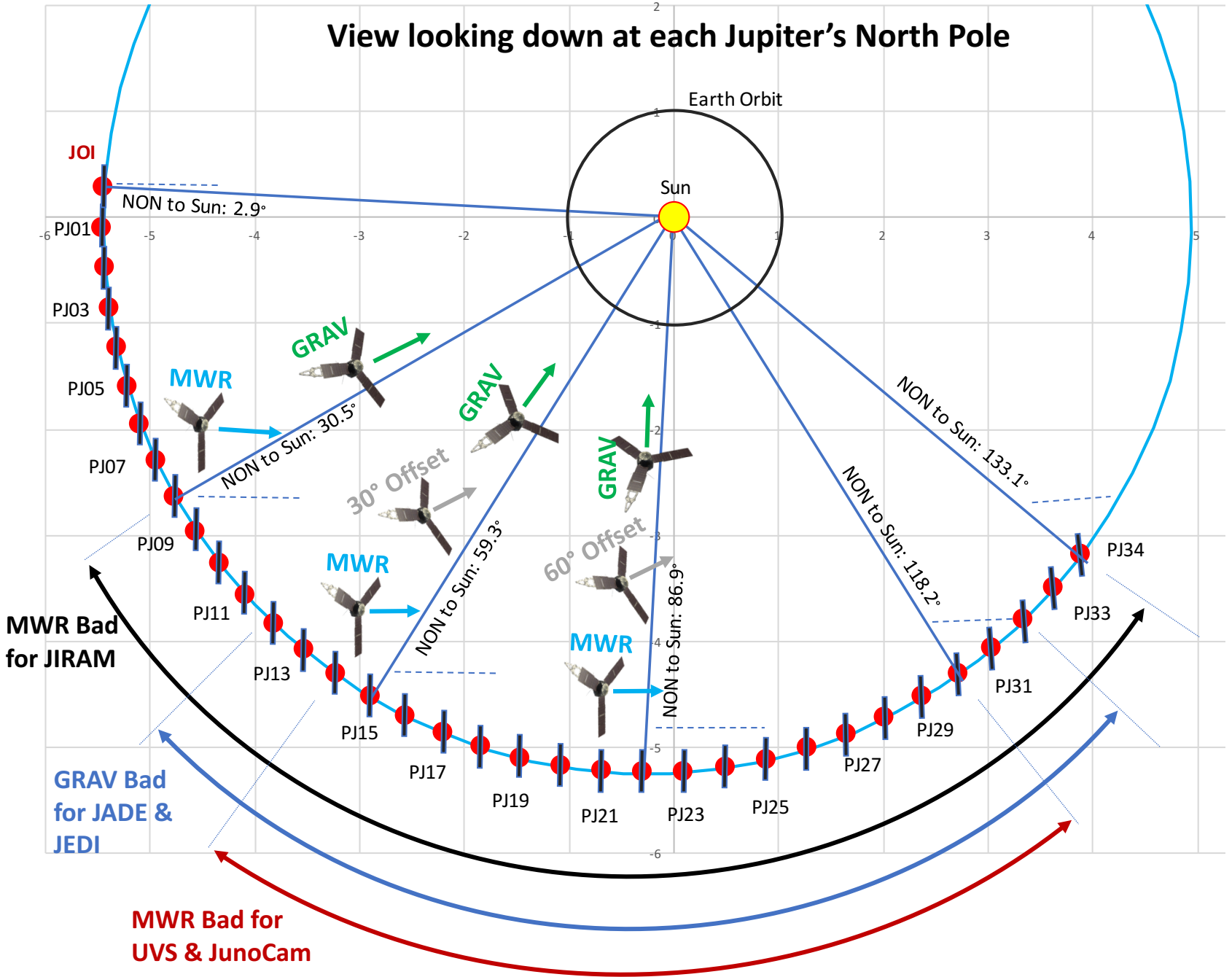
Diagram of Jupiter location around Sun and Juno orbit plane geometry at each Perijove (PJ)

PJ #	Type	Time (UTC/SCET)	NON to Sun (°)	NON to Earth (°)	+/- SPE (°)	SEP (°)
0	JOI	07/05/2016 02:47:32	2.9	12.0	9.7	64.1
1	PJ1	08/27/2016 12:50:44	2.7	2.8	4.1	22.6
2	Post-SM	10/19/2016 18:10:54	6.3	9.4	-3.3	18.2
3	GRAV	12/11/2016 17:03:41	10.2	19.2	-9.1	61.6
4	MWR	02/02/2017 12:57:09	14.2	23.9	-9.7	110.8
5	MWR Tilt	03/27/2017 08:51:52	18.3	20.6	-2.3	167.1
6	GRAV	05/19/2017 06:00:45	22.3	15.1	7.5	135.4
7	MWR	07/11/2017 01:54:51	26.4	16.0	10.7	85.7
8	GRAV	09/01/2017 21:48:57	30.5	23.4	7.2	42.5
9	MWR Tilt	10/24/2017 17:43:00	34.6	34.3	0.3	1.9
10	GRAV	12/16/2017 17:57:38	38.8	45.5	-6.8	40.8
11	GRAV	02/07/2018 13:51:49	42.9	53.2	-10.5	86.9
12	MWR XTk	04/01/2018 09:45:57	47.1	53.9	-6.9	139.2
13	GRAV	05/24/2018 05:40:07	51.2	48.2	3.1	163.4
14	GRAV	07/16/2018 05:17:38	55.3	45.3	10.2	109.7
15	GRAV	09/07/2018 01:11:55	59.3	49.8	9.7	63.6
16	GRAV	10/29/2018 21:06:15	63.3	59.5	3.9	21.5
17	GRAV	12/21/2018 17:00:25	67.3	70.9	-3.6	20.2
18	MWR XTk	02/12/2019 16:19:48	71.3	80.7	-9.6	64.0
19	GRAV	04/06/2019 12:13:58	75.3	85.1	-10.0	112.1
20	GRAV	05/29/2019 08:08:13	79.2	81.7	-2.5	166.7
21	GRAV	07/21/2019 04:02:44	83.1	75.7	7.5	137.1
22	GRAV	09/12/2019 03:40:47	86.9	76.2	11.0	86.9
23	GRAV	11/03/2019 23:32:56	92.8	85.7	7.4	42.7
24	GRAV	12/26/2019 16:58:59	96.4	96.3	0.2	0.8
25	GRAV	02/17/2020 17:51:36	100.1	107.0	-7.2	41.3
26	GRAV	04/10/2020 14:24:34	103.7	114.4	-11.1	85.7
27	GRAV	06/02/2020 10:19:55	107.3	114.9	-7.9	135.7
28	GRAV	07/25/2020 06:15:21	110.9	108.7	2.3	168.2
29	GRAV	09/16/2020 02:10:49	114.6	104.6	10.3	113.7
30	GRAV	11/08/2020 01:49:39	118.2	108.4	10.2	66.0
31	GRAV	12/30/2020 21:45:12	121.9	117.8	4.3	22.9
32	GRAV	02/21/2021 17:40:31	125.6	129.0	-3.5	18.4
33	GRAV	04/15/2021 13:36:26	129.3	138.8	-9.9	59.9
34	Extra	06/07/2021 09:32:03	133.1	143.8	-11.2	105.0
35	Deorbit	07/30/2021 04:33:28	136.9	141.1	-4.4	157.4

For spk_ref_161212_210731_170320.bsp (reference trajectory for 53-day orbits). Data are according to each PJ.
XTk = crosstrack. **NON** = negative orbit normal.
S, P, E, J = Sun, Probe, Earth, Jupiter in SPE, SEP, JPE, SJP.



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