

Galileo's TOES Observations

		Date (UT)	Time (UT)	Location	Latitude	Longitude	Seeing	Transparency	Telescope	Mag	Notes
I Eclipse #1	Ingress	2/17/2020	6:00:48	1600 Centretech, Aurora, CO	39.72N	104.8W	Good	Good	8" f/6 Newtonian	81x	Time is when Io completely disappeared
	Egress	6/8/2018	4:18:40 - 4:22	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	122x	
I Eclipse #2	Ingress	3/4/2020	4:15:50	1600 Centretech, Aurora, CO	39.72N	104.8W	Good	Good	8" f/6 Newtonian	81x	Time is when Io completely disappeared
	Egress	6/14/2018	6:13:19-6:15:10	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	
I Occultation #1	Ingress	6/14/2018	3:15:52	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	
	Egress	2/26/2020	5:35:30	1600 Centretech, Aurora, CO	39.72N	104.8W	Good	Good	8" f/6 Newtonian	122x	Time is when Io first noticable. It was 13° with light wind from SE making it feel cold.
	Egress	5/30/2020	1:27:20	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	A double egress. Io first then Europa about 33 minutes later.
I Occultation #2	Ingress	7/31/2018	3:16:23	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Very Good	Very Good	8" f/6 Newtonian	203x	
	Egress	4/5/2020	5:18:50	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Very Good	Very Good	8" f/6 Newtonian	203x	
I Shadow Transit #1	Ingress	6/14/2018	6:56:42	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	
	Egress	6/16/2018	3:34	Rocky Mountain National Park	40.37N	105.61W	OK	OK	8" f/6 Newtonian	122x	
I Shadow Transit #2	Ingress	6/22/2018	3:39:30	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	
	Egress	6/22/2018	5:28:00	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
I Transit #1	Ingress	6/14/2018	6:10	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	
	Egress	6/22/2018	4:33:40	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Poor	Poor	8" f/6 Newtonian	203x	
I Transit #2	Ingress	6/22/2018	2:23:29	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
	Egress	7/15/2018	4:28-4:29:30	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Very Good	Very Good	8" f/6 Newtonian	203x	
II Eclipse #1	Ingress	8/8/2018	4:36:10-4:39:15	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
	Egress	8/8/2018	4:59:00	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	Jupiter was low in SW. I setup my scope but just as it was to disappear, it went behind a top leaf of a tree to the west and blanked out. It was there at 4:58:10 and not there at 4:59:10.
II Eclipse #2	Ingress	3/2/2020	4:42:48	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	122x	Very low in eastern sky but was able to see it pop out from behind the disk of Jupiter.
	Egress	9/2/2019	9:40:27	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	
II Occultation #1	Ingress	6/11/2018	4:37:28	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	122x	
	Egress	8/8/2018	2:30:38-2:33	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	
II Occultation #2	Ingress	7/13/2018	3:21:00	Rocky Mountain National Park	40.37N	105.61W	Very Good	Very Good	8" f/6 Newtonian	122x	
	Egress	5/30/2020	2:10:40	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	A double egress. Io first then Europa about 33 minutes later.
II Shadow Transit #1	Ingress	8/24/2018	2:34	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
	Egress	7/16/2019	9:38	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
II Shadow Transit #2	Ingress	7/23/2019	9:45:20	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
	Egress	7/24/2019	0:16:22	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
II Transit #1	Ingress	7/30/2019	22:16:50	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
	Egress	8/24/2018	2:18 - 2:21	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
II Transit #2	Ingress	8/31/2019	9:31:9:38	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	
	Egress	7/23/2019	10:15:20-10:21	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
III Eclipse #1	Ingress	6/8/2018	3:13 - 3:17	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	122x	
	Egress	6/8/2018	4:45:30 - 4:53	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	122x	
III Eclipse #2	Ingress	8/8/2018	2:45:00	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Poor	Poor	8" f/6 Newtonian	203x	Thin cloud over Jupiter Europa there at 2:44:50, cloud thickened, then thinned and gone at 2:45:09

	Egress	6/29/2019	3:57:40-4:03	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Poor	Poor	8" f/6 Newtonian	203x	
III Occultation #1	Ingress	6/14/2018	3:59:10	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Very Good	Very Good	8" f/6 Newtonian	203x	
	Egress	6/14/2018	5:24:30	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	
III Occultation #2	Ingress	7/6/2019	9:04:40-9:09:50	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	203x	
	Egress	7/28/2018	3:43 - 3:47	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Very Good	Very Good	8" f/6 Newtonian	203x	
III Shadow Transit #1	Ingress	6/25/2018	2:42:10	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Very Good	Very Good	8" f/6 Newtonian	203x	
	Egress	8/8/2018	2:35:00	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
III Shadow Transit #2	Ingress	8/1/2019	1:24:00	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
	Egress	7/10/2020	3:49:50	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	122x	Time is when I couldn't detect the shadow at the edge of Jupiter's disk.
III Transit #1	Ingress	7/9/2018	4:13	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Very Good	Very Good	8" f/6 Newtonian	203x	
	Egress	7/10/2018	5:54 - 6:03	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
III Transit #2	Ingress	6/26/2019	4:00	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	122x	
	Egress	7/31/2019	23:32:30	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	203x	
IV Eclipse #1	Ingress	3/22/2020	5:25:50	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	122x	Eyepiece was fogging up making it hard to see when it winked out. 30 degrees. Heavy frost. The moon was far away from the planet when it entered eclipse, making the length of Jupiter's shadow obvious.
	Egress	6/14/2020	3:10:40	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	122x	
IV Eclipse #2	Ingress	7/21/2021	2:11:39	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Very Good	8" f/6 Newtonian	203x	Jupiter's bands were very obvious. Best view of them in years. GR just exiting off the edge of the disk. Noticable dimming of Callisto at 2:04:00. It winked out at the time I logged. It was very hard to tell the exact second because it got so faint at the very end.
	Egress	9/5/2020	22:52:02	1716 Lower Old Hwy 6 Rd, Oxford, IA	41.73N	91.76W	Good	Good	8" f/6 Newtonian	122x	First saw it reappear from the shadow.
IV Occultation #1	Ingress	8/3/2020	0:51:10	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Very Good	Very Good	8" f/6 Newtonian	122x	Nice view of bands. I thought I saw a tiny pinple of it just about 00:51:00 and I was sure I didn't see Callisto anymore after 00:51:10.
	Egress	10/8/2020	21:46:50	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	122x	It was very faint when I first noticed it, about 3 minutes after the predicted time. It surprised me how faint Callisto was, even when it had a bit of separations from the disk of Jupiter. I expected to see it <i>wart</i> off the disk of Jupiter as it reappeared, but beings it was so faint, I didn't see that like I had for the other moons.
IV Occultation #2	Ingress	8/19/2020	23:36:38	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	122x	Watched it slowly disappear at the recorded time. Smoke clouds parted in time for me to see it all.
	Egress	4/12/2021	5:03:30	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	122x	I am amazed how faint Callisto first is when I noticed it.
IV Shadow Transit #1	Ingress	7/9/2020	0:40:00	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Poor	Poor	8" f/6 Newtonian	122x	It was hard to see when the shadow actually started onto Jupiter's disk. This is the time I actually saw it. Had clouds hiding Jupiter at this time also making it harder to get the exact time.

	Egress	9/30/2020	23:27:00	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	122x	Contrast at the edge of Jupiter was not very good. By 23:27, I could not tell if the shadow was still on the disk or not. I don't think it was but it was hard to tell.
IV Shadow Transit #2	Ingress	8/27/2020	21:34:40	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	122x	First contact was at 21:30:40 and it completely disappeared onto Jupiter's disk at 21:34:40
	Egress	8/28/2020	1:40:10	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	122x	I started watching about 1:00 am and could see calisto on Jupiter's disk. An easy to see, darker dot where I expected it to be at that time. Low in SW sky. Time is when I first saw it reappear. Right after it started to be more obvious, it disappeared behind the neighbor's tree.
IV Transit #1	Ingress	7/9/2020	1:41:00	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	OK	OK	8" f/6 Newtonian	122x	1:36 was 3rd contact and 1:41 was when it was completely onto Jupiter's disk.
	Egress	3/31/2020	4:09:00	Broomfield Parking Lot	39.55N	105.1W	Very Poor	Very Poor	8" f/6 Newtonian	203x	Jupiter very low in SE. It was clear there until I noticed the moon reappear off Jupiter's disk. Then it clouded up.
IV Transit #2	Ingress	11/2/2020	18:45:10	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Good	Good	8" f/6 Newtonian	122x	I was using 203x and then the sky suddenly changes and dropped down to 122x. At 18:41:30 MST, I think Callisto quit standing alone and was a pimple on Jupiter's disk (1st Contact). At 18:45:10 MST was the last time I saw Callisto blinking at the edge of Jupiter. I watched for another couple of minutes and never saw it again. I am simply amazed how faint Callisto gets when this close to Jupiter's disk. Almost disappears.
	Egress	5/24/2021	3:08:50	1425 Snowberry Lane, Broomfield, CO	39.93N	105.09W	Fair	Fair	8" f/6 Newtonian	203x	Seeing was just good enough to see Callisto leave Jupiter's disk. I first noticed a pimple on Jupiter at 3:04:30. By 3:12:00, I could easily see it completely off Jupiter's disk. The time I logged for this event was when I thought it was first completely off the disk.

I = Io
II = Europa
III = Ganymede
IV = Callisto

17	of 16 Seen
16	of 16 Seen
16	of 16 Seen
16	of 16 Seen
64	of 64 Seen

Io Events
Europa Events
Ganymede Events
Callisto Events
100 Percent Complete
Eclipse - Moon Enters Jupiter's Shadow
Occultation - Moon Moves Behind Jupiter's Disk
Shadow Transit - Moon's Shadow Moves Across Jupiter's Disk
Transit - Moon Moves Across Jupiter's Disk