

Triple events of Galilean Satellites

During 21st century

As Jean Meeus points out in his new book, *Mathematical Astronomy Morsels*, the inner three moons (Io, Europa and Ganymede) have related periods, and only two can cast shadows at any given time. But you can get a three-shadow event: Callisto, plus two inner moons. I found 17 satellite transit and 17 shadow transit events, occurring during 21st century. Moments of begin/end are accurate within a couple of minutes and refer to the objects centers. On several occasions, there is no overlap, however objects are circles instead of points, so simultaneosity probably occurs for a very short time.

The next triple event will take place on March 31, 2010 when Io, Europa and Callisto will transit Jupiter simultaneously for more than an hour. Animation of the event you can find [here](#).

Below you can find data for all triple events I found. In the first two columns begin and end of triple transits can be found, followed by satellites being involved.

Triple Satellite Transits

Begin	End	Satellites		
2003 Jan 17 23:51.7	2003 Jan 18 01:10.8	Io	Europa	Callisto
2004 Aug 25 18:41.7	2004 Aug 25 19:58.2	Io	Ganymede	Callisto
2010 Mar 31 23:14.5	2010 Apr 01 00:20.4	Io	Europa	Callisto
2015 Jan 24 07:07.5	2015 Jan 24 07:11.9	Io	Europa	Callisto
2021 Aug 15 15:30.8	2021 Aug 15 15:48.2	Europa	Ganymede	Callisto
2026 Dec 11 22:33.2	2026 Dec 11 22:51.1	Io	Europa	Callisto
2032 Aug 17 22:25.9	2032 Aug 17 22:52.7	Io	Ganymede	Callisto
2037 Sep 05 04:26.7	2037 Sep 05 04:40.0	Io	Europa	Callisto
2038 Aug 05 17:59.2	2038 Aug 05 17:53.5	Io	Ganymede	Callisto
2038 Dec 18 05:10.6	2038 Dec 18 06:51.8	Io	Europa	Callisto
2045 Jan 05 15:17.0	2045 Jan 05 16:12.4	Io	Europa	Callisto
2045 Jul 09 14:11.0	2045 Jul 09 14:34.7	Europa	Ganymede	Callisto
2057 Jan 11 22:41.5	2057 Jan 11 23:42.2	Io	Europa	Callisto
2079 Oct 13 08:51.0	2079 Oct 13 10:35.9	Io	Europa	Callisto
2086 Jul 12 02:10.3	2086 Jul 12 02:33.9	Io	Ganymede	Callisto
2086 Nov 23 16:26.0	2086 Nov 23 17:54.9	Io	Europa	Callisto
2097 Feb 13 22:18.5	2097 Feb 13 23:39.5	Europa	Ganymede	Callisto
2097 Aug 17 20:57.0	2097 Aug 17 22:03.7	Io	Europa	Callisto

Triple Shadow Transits

Begin	End	Satellites		
2004 Mar 28 07:59.2	2004 Mar 28 08:19.0	Io	Ganymede	Callisto
2013 Oct 12 04:30.9	2013 Oct 12 05:36.5	Io	Europa	Callisto
2014 Jun 03 18:07.5	2014 Jun 03 19:43.7	Europa	Ganymede	Callisto
2015 Jan 24 06:27.1	2015 Jan 24 06:52.3	Io	Europa	Callisto
2032 Mar 20 10:51.3	2032 Mar 20 13:06.9	Io	Ganymede	Callisto
2032 Dec 30 09:44.9	2032 Dec 30 11:10.0	Io	Europa	Callisto
2038 Aug 05 17:38.1	2038 Aug 05 17:50.9	Io	Ganymede	Callisto
2043 Sep 24 15:24.2	2043 Sep 24 15:22.2	Io	Europa	Callisto
2045 Jan 05 16:47.4	2045 Jan 05 18:08.3	Io	Europa	Callisto
2045 Oct 17 14:57.4	2045 Oct 17 16:53.3	Io	Ganymede	Callisto
2061 Sep 17 15:35.8	2061 Sep 17 17:23.6	Io	Europa	Callisto
2062 May 10 05:19.4	2062 May 10 06:22.3	Europa	Ganymede	Callisto
2062 Dec 30 17:30.5	2062 Dec 30 17:50.7	Io	Europa	Callisto
2073 Sep 23 23:29.5	2073 Sep 23 23:56.5	Io	Europa	Callisto
2080 Feb 24 22:09.9	2080 Feb 25 00:13.4	Io	Ganymede	Callisto
2080 Dec 05 20:46.4	2080 Dec 05 22:47.0	Io	Europa	Callisto
2086 Jul 12 04:47.2	2086 Jul 12 04:45.1	Io	Ganymede	Callisto
2091 Aug 31 02:17.6	2091 Aug 31 02:34.5	Io	Europa	Callisto
2092 Dec 12 05:03.1	2092 Dec 12 05:10.2	Io	Europa	Callisto