PROFESSOR COMET REPORT

OCTOBER 2010

Current status of the predominant comets for 2010

Comets	Designation (IAU-MPC)	Orbital Status	Magnitude (Visual)	Trend	Observation (Lat.)	Visibility Period
Hartley 2	103P	**P**	5	Steady	85°N – 30°S	All Night
Tempel 2	10P	**P**	10	Fading	50°N - 65°S	Best Midnight
McNaught	2009 R1	C	~11.5	Fading	15°S - 65°S	Morning
McNaught	2009 K5	C	11.5	Fading	85°N - 15°S	Best Morning
Wolf Harrington	43P	**P**	~12.5	Fading	Poor Elongation	N/A
Gunn	65P	**P**	13	Varies	30°N – 65°S	Evening
Schwassman Wachmann	29P	**P**	~13	Varies	Poor Elongation	N/A
Encke	2P	P	13.5	Fading	10°N - 60°S	Evening
Garradd	2009 P1	C	13.5	Bright	20°N – 65°S	All Night
Christensen	2006 W3	C	13.5	Fading	Equator to 65°S	Evening
Wild 2	81P	P	14	Fading	20°N – 50°S	Early Evening
Tempel 1	9P	**P**	~14	Brightening	In Conjunction	N/A

*The **red designation** is assigned to all comets that are of 10th visual magnitude or brighter and are classified as the **major comets**. All remaining comets that are possibility at 12th visual magnitude or fainter are given the **blue designation** and are classified as the minor comets! The **green designation** is assigned to comets to far south to be seen in the continental United States. The **orange designation** is for comets that are lost in the daytime glare!*

Ephemeris data terminology:

Date: Month and Year using the standard Gregorian calendar.

TT: Terrestrial Time (Day of the Month) as a substitute for the astronomical Julian date.

RA(2000): Right Ascension based on the Epoch J2000 (longitudinal coordinate for the celestial sky) measured in hours and minutes.

Decl.: Declination as measured in degrees and arcminutes.

Delta: The distance from Earth measured in AUs (1 AU = 1 Astronomical Unit = 92 955 807 mi = 149 597 871 km as the mean distance between the Earth and Sun).

R: The solar distance as measured in AUs.

Elong: Solar elongation which is the angle of separation between the observed object and the Sun as measured across the night sky as measured in degrees.

Phase: Phase angle between the Sun, the celestial object, and the observer on the surface of the Earth. Also known as the Sun – Object – Observer angle.

m1: The visual magnitude of the celestial object as observed on the surface of the Earth at sea level.

m2: The nuclear magnitude which is the visual magnitude of the false nucleus within the coma as seen by an observer here on Earth at sea level.

Degree of Condensation (DC)

All observations of comets are broken down into three factors: estimating magnitudes for light curves to predict future brightness, coma observations, and observations that concern with a comet's tail(s). For the coma there two characteristic features that are important when studying the coma: Degree of condensation and coma size in arcminutes. The classification system for determining the DC is based on a positive integer system from 0 to 9 as shown below.

0 = Diffuse coma of uniform brightness
1 = Diffuse coma with slight brightening towards center
2 = Diffuse coma with definite brightening towards center
3 = Centre of coma much brighter than edges, though still diffuse
4 = Diffuse condensation at centre of coma
5 = Condensation appears as a diffuse spot at centre of coma – described as moderately condensed.
6 = Condensation appears as a bright diffuse spot at centre of coma
7 = Condensation appears like a star that cannot be focused – described as strongly condensed
8 = Coma virtually invisible
9 = Stellar or disk like in appearance.

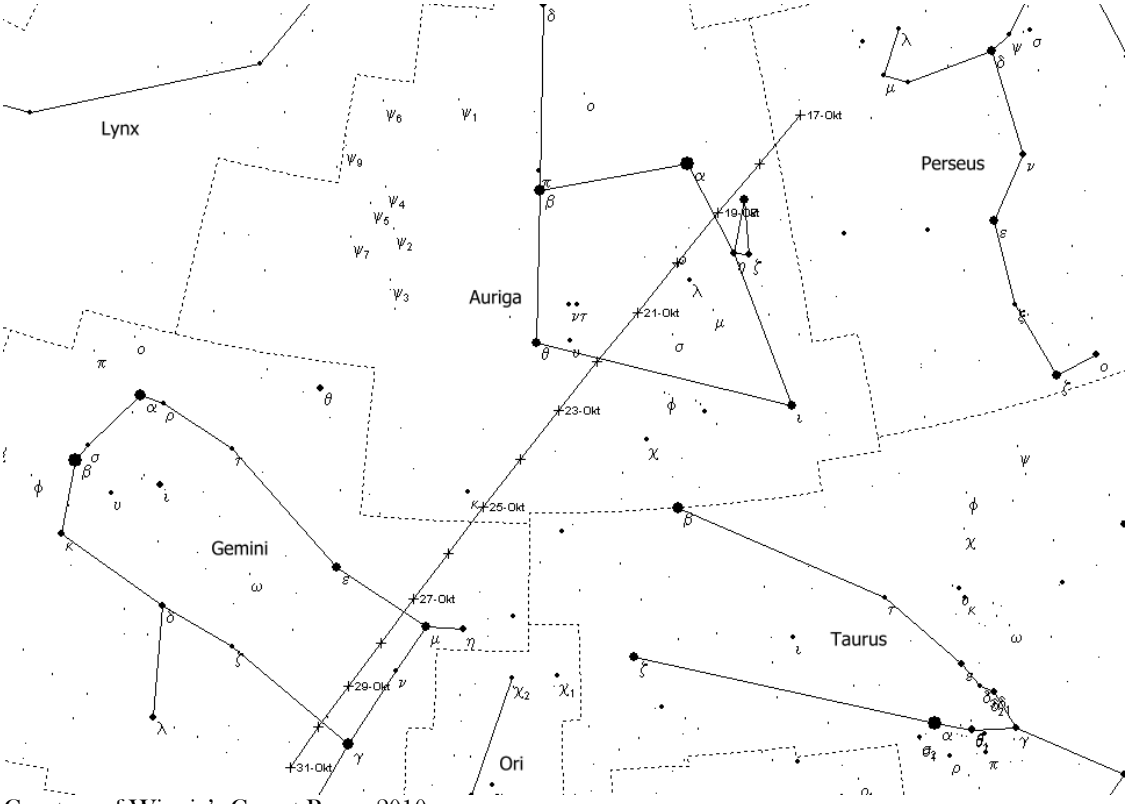
A Synopsis of Comets for the coming Autumn 2010!

Comet Hartley 2 is now the only bright comet to be seen by Astronomers on Earth via naked eye observations! However, most reports now indicate that the comet has only reach 5th magnitude and all predictions of the comet reaching a magnitude brighter than that have yet to materialize. The comet is now located in the constellation of Auriga and reports of its size now range from the equivalent of being full moon to about 41' in size! Maximum brightness is expected to be during the period of Oct 21 – 23 as the comet is now moving away from the Earth. After reaching perigee with the Earth it is now approaching perihelion with the Sun at a solar distance of just under 1.06 AU! The comet is now moving SW from Auriga into the Winter Hexagon and reside somewhere in Monoceros by the mid to late winter for what is left of 2010.

The only other comets of significance for visual observations in the northern hemisphere there are four which are in various states of fading as they either move further from the Earth or away from the Sun! 10P/Tempel 2 which will remain in Western Cetus undergoing retrograde motion until early December as it fades to a paltry 14th magnitude in visual brightness. The other three are 2009 K5 McNaught, 43P Wolf – Harrington, and 29P Schwassman – Wachmann with all three fading below 11th magnitude. 2009 K5 is up in the winter night skies as it passes its partial retrograde motion and moves across the constellation of Lynx towards the western region of Auriga. This will take place from early November thru the late December. Then there is 43P Wolf – Harrington which until recently was in bad apparition as it was lost in the morning glare, but the chances are improving with this comet. With the onslaught of winter the constellations of Crater and Corvus we become more visible in the earlier morning hours before sunrise as we approach December. On can look for this comet in a southeasterly direction across the NE region of both constellations heading south towards eastern Hydra! Finally 29P Schwassmann – Wachmann 1 is also appearing in the morning skies again before sunrise moving ESE between Leo and Sextans and it go under one of its annual retrograde loops during the late winter of 2011!

103P/Hartley 2

Figure 1 – Hartley 2 path across Auriga and Gemini



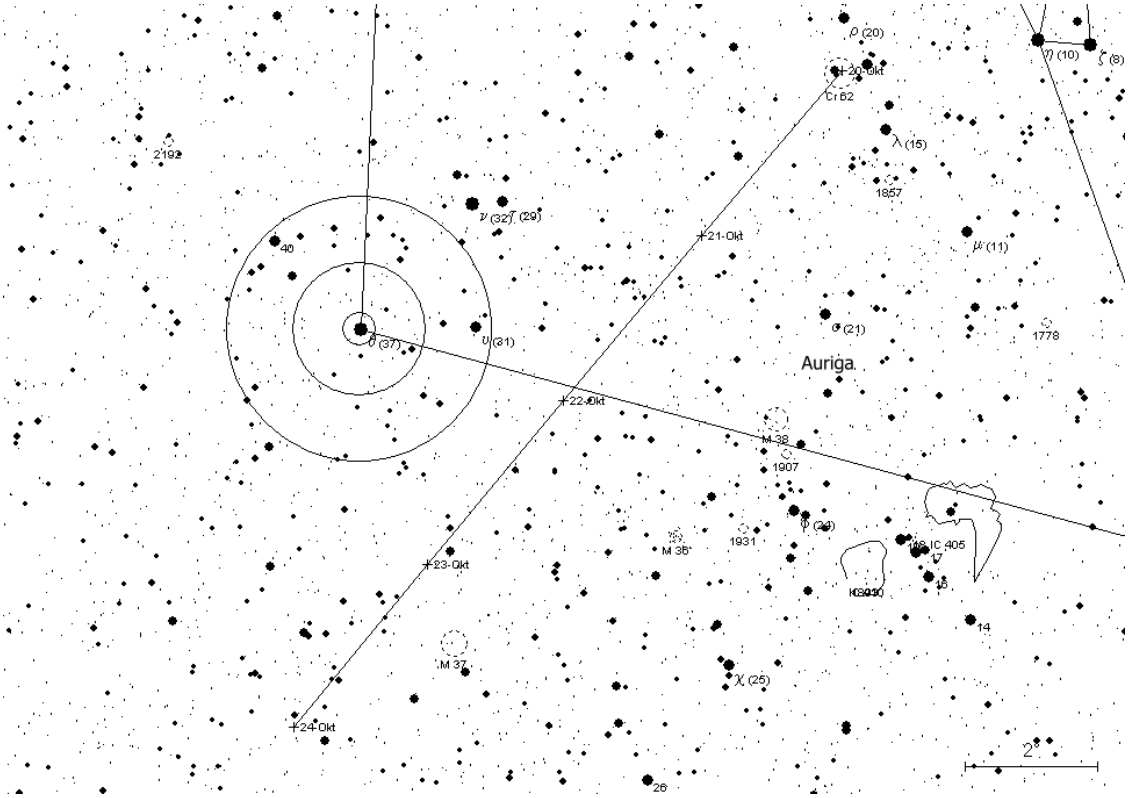
Courtesy of Winnie's Comet Pages, 2010.

Above is the current path of Hartley 2 as it moves in a northeasterly direction across the main region of Auriga towards the southern region of Gemini from 17 – 31 October.

Hartley 2 has now entered the period of expected maximum brightness during the period of 21 – 23 October as it in a SE direction through the main region of the constellation of Auriga. The comet is predicted to obtain a maximum brightness of 4.4 for visual magnitude through the evening of the fourth Saturday of October. ***The comet is now classified as a dwarf comet with a nucleus that is a mere 1.4 km or 4593.4 feet across!*** 103P Harley 2 belongs to the Jupiter family of comets with periodic orbits below 20 years and this comet has a period of 6.3 years, but in the past it has had longer periods in the past. During the early 20th century the comet had a period of 9.3 years, but successive flybys near the planet Jupiter have resulted in this comet reducing its orbital period to its present value! Expect the Deep Impact spacecraft to fly within 1000 km of the nucleus on 4 November 2010!

Figure 1 shows the comet graze fly past Auriga's famous trio of bright open clusters of M36, M37, and M38 to within a couple of degrees. As of October 23 the comet is continuing its SE journey to Southern Gemini as it will be moving past the last of this bright trio M37 while lying ~1.5° to the north of the 5.6 magnitude cluster! The comet has maintained a DC of 2 – 3 while in some reports a central brightening is occurring within the coma of the comet. This has lead some reports giving the comet now a DC of 4 and the coma has now been reported as being visible to the naked eye and having a size of up to 41 arcminutes across. Hartley 2 by this reported observation is now allegedly bigger than the **full moon**!

Figure 2 – Hartley 2 path near the Auriga Trio!

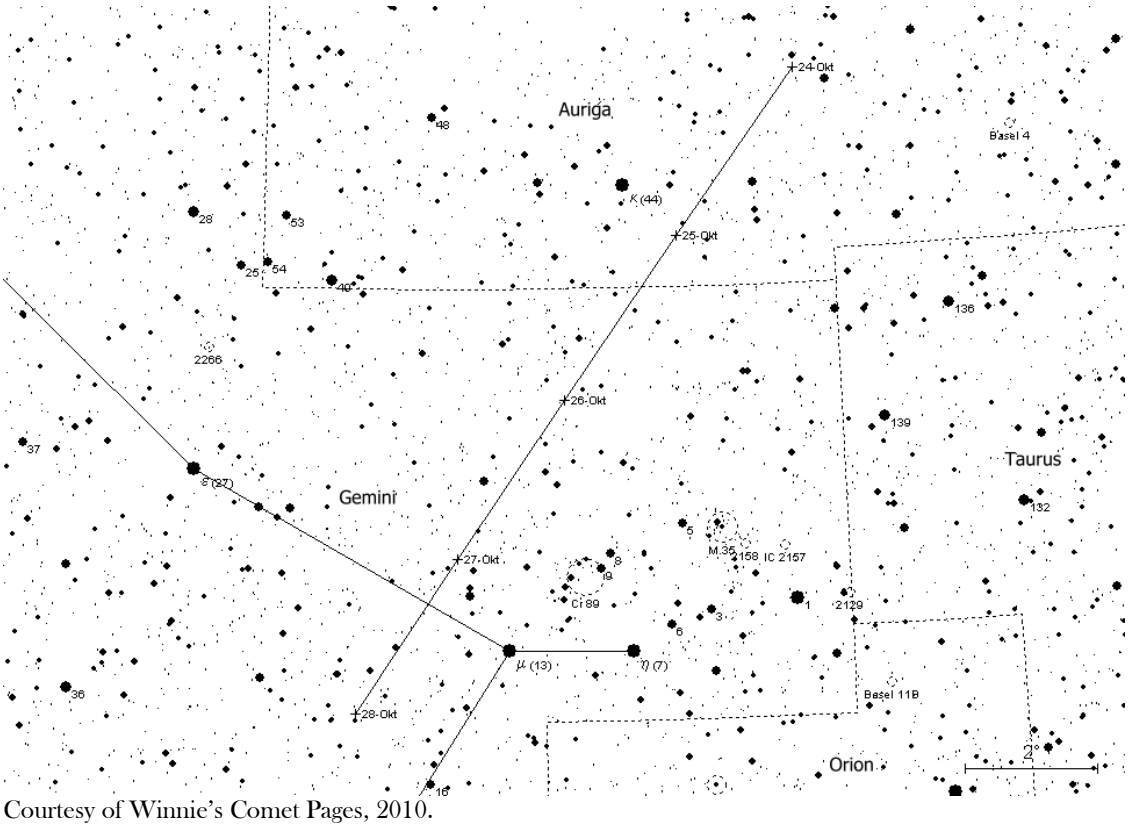


Courtesy of Winnie's Comet Pages, 2010.

The path of this comet can be seen in closer detail in figure 2 where the telrad target is focused on the star Theta Aurigae (θ Aur) also known as Manus 'the hand' in Latin. Manus is a stellar binary with the primary star θ Aug A is a white A-type main sequence star of visual magnitude 2.7 and θ Aug B is a Sun – like star of visual magnitude 7.2. The stars are called Bogardus and Mahasim respectfully; Mahasim is Arabic for 'the wrist' of the charioteer!

The comet is moving across the sky between 3° - 3.5° per night as it moves SE towards southern or lower Gemini! Hartley 2 is glowing as a nice bluish – green color for the coma although it will appear a fairly faint, grayish color unless seen in the very dark skies and the tail has been seen in some reports. The dust tail at first was hard to observe due to the orientation of the comet with respect to the Earth, but some observations and photographs now show the tail at least 2° long.

Figure 3 – Hartley 2 path towards lower Gemini

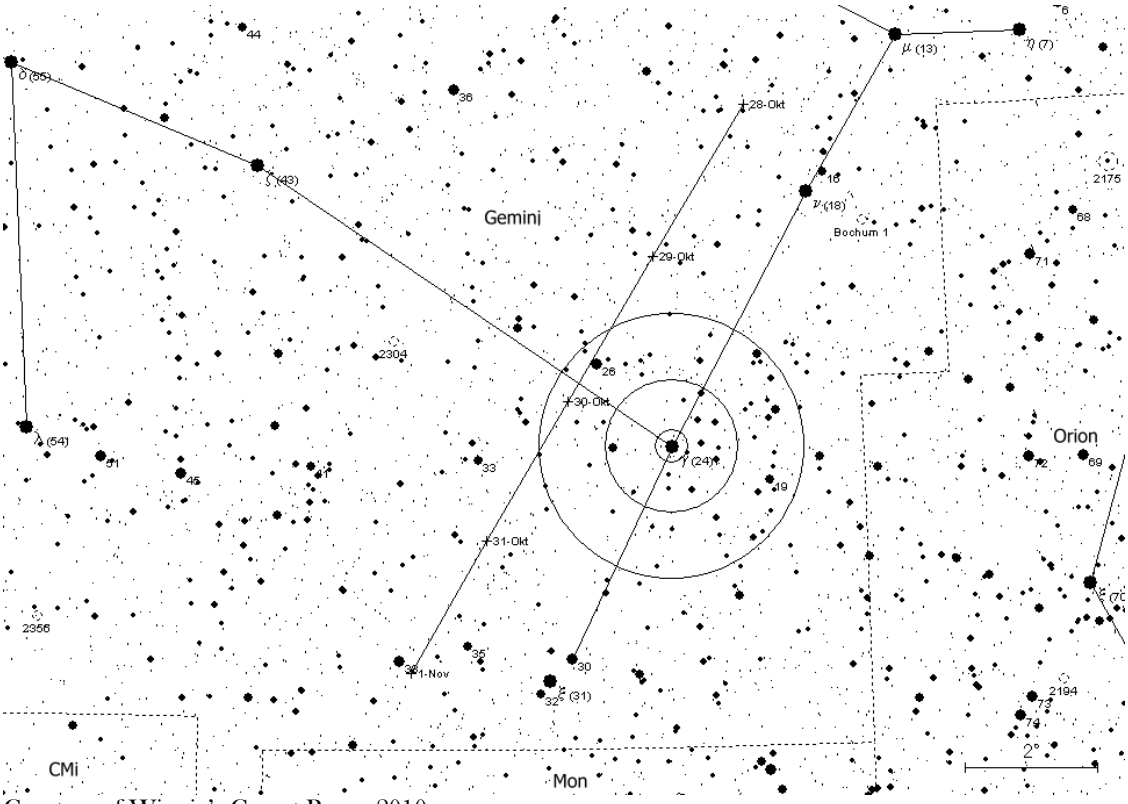


Courtesy of Winnie's Comet Pages, 2010.

During the period of 24 – 28 October is when the comet will move away from the Earth and head towards perihelion or minimum solar distance from the Sun! A perihelion of 1.0587 AU or 98,353,230 miles during the period of 28 – 29 October as the comet moves deeper into the winter hexagon! The comet will pass to within ~3.4° to the NE of open star cluster M35 and its distant companion cluster NGC 2158. M35 is a bright cluster of visual magnitude 5.1 with a size of 28 x 28 arcminutes making it almost full moon size! It can be used as a marker when using low magnification power to compare its size with the coma of Hartley 2. In the early evening of 26

October the comet as shown in figure 3 will be within ~2.4° of the more disperse open star cluster Collinder 89 which is half a magnitude fainter than M35, but has a larger size of 35 x 35 arcminutes! This open star cluster can be used as a size marker to indicate the scale of the coma when seen in moderate size binoculars. To find Cr 89 look for Tejat Posterior or Mu (μ)Geminorum which is located just to the left of bottom center; Cr 89 will be 1.7° to the NW of the 2.9 visual magnitude M class, red giant star.

Figure 4 – Hartley 2 on a parallel course with the feet of Gemini!

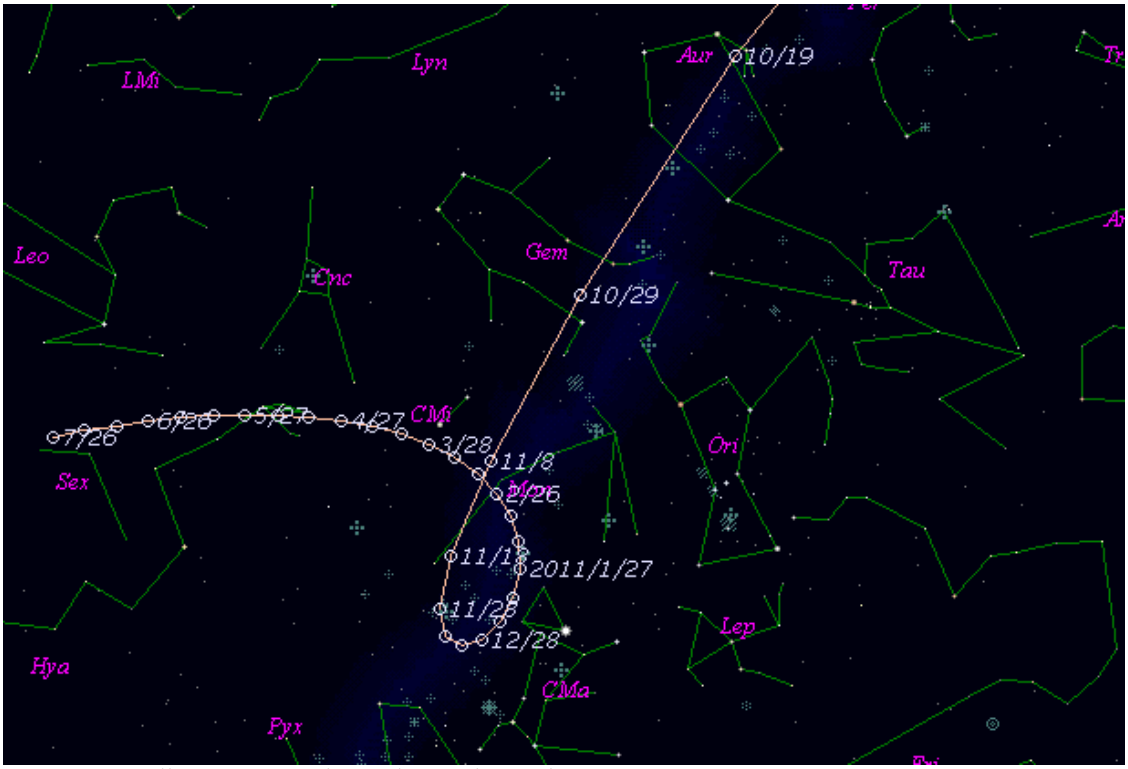


Courtesy of Winnie's Comet Pages, 2010.

The comet will continue moving SE on a parallel course between the feet of Gemini; first with Tejat Posterior 'back foot' of Castor and Alhena or Gamma Geminorum shown in the telrad target in figure 4 above. Alhena is 'the brand' in Arabic referring to the branding on a camel's neck or Almeisan which Arabic for 'the shining one'. *This path of the comet will take place during the evenings of 28 – 30 October and with the two stars separated by 7.14° of sky this means the comet could move across the sky about 3.57° per night!* During the entire period that the comet is moving out of Auriga and

thru lower Gemini from 23 October through 1 November, the comet should maintain a visual magnitude brighter than 5th magnitude!

Figure 5 – Hartley 2 in retrograde across Monoceros!



Courtesy: http://www.aerith.net/comet/catalog/0103P/2010.html

Even if the comet does not reach expectations in brightness it is still expected to maintain a visual magnitude of 5 well until 4 November before entering eastern region of the constellation of Monoceros! Monoceros as shown in figure 5 above is located to the east of Orion and to the north of Canis Major (CMa). The figure also shows that once Hartley 2 passes through Monoceros it undergoing retrograde motion in the area between eastern part of Monoceros and the eastern edges of Canis Major beginning 8 November right thru 13 March. After that the comet will take off again continuing on its easterly journey towards the constellation of Hydra thru what is known as **'THE LITTLE POLYGON' OF THE HEAD OF HYDRA** by mid – May 2011! However, the comet will likely have faded to 15th magnitude the end of its retrograde motion among the winter constellations!

IAU MPC Ephemeris data for 103P/Harley 2 (autumn 2010):

Date	TT	RA (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2010	10 15	04 10 51.8	+51 00 41	0.1271	1.0747	124.6	49.8	4.6	15.0
2010	10 16	04 26 44.9	+49 21 35	0.1251	1.0724	124.2	50.3	4.6	15.0
2010	10 17	04 41 52.2	+47 30 59	0.1235	1.0702	123.7	50.8	4.5	15.0
2010	10 18	04 56 08.4	+45 30 03	0.1223	1.0683	123.2	51.3	4.5	15.0
2010	10 19	05 09 30.8	+43 20 09	0.1214	1.0665	122.6	51.9	4.5	15.0
2010	10 20	05 21 58.4	+41 02 54	0.1209	1.0649	122.0	52.4	4.5	15.0
2010	10 21	05 33 31.9	+38 39 56	0.1208	1.0635	121.4	53.0	4.4	15.0
2010	10 22	05 44 12.9	+36 12 59	0.1211	1.0623	120.7	53.7	4.4	15.0
2010	10 23	05 54 04.1	+33 43 43	0.1218	1.0612	120.0	54.3	4.4	15.0
2010	10 24	06 03 08.3	+31 13 42	0.1228	1.0604	119.3	54.9	4.5	15.1
2010	10 25	06 11 28.7	+28 44 22	0.1242	1.0597	118.7	55.4	4.5	15.1
2010	10 26	06 19 08.7	+26 16 58	0.1259	1.0592	118.0	56.0	4.5	15.2
2010	10 27	06 26 11.4	+23 52 34	0.1280	1.0588	117.3	56.5	4.5	15.2
2010	10 28	06 32 39.8	+21 32 02	0.1304	1.0587	116.7	57.0	4.6	15.3
2010	10 29	06 38 36.8	+19 16 02	0.1330	1.0587	116.1	57.4	4.6	15.3
2010	10 30	06 44 05.1	+17 05 04	0.1359	1.0590	115.6	57.8	4.7	15.4
2010	10 31	06 49 07.0	+14 59 27	0.1391	1.0594	115.1	58.1	4.7	15.4
2010	11 01	06 53 44.8	+12 59 24	0.1424	1.0600	114.6	58.4	4.8	15.5
2010	11 02	06 58 00.6	+11 04 58	0.1460	1.0607	114.2	58.6	4.8	15.6
2010	11 03	07 01 56.0	+09 16 10	0.1498	1.0617	113.9	58.7	4.9	15.6
2010	11 04	07 05 32.9	+07 32 55	0.1537	1.0628	113.6	58.8	5.0	15.7
2010	11 05	07 08 52.5	+05 55 03	0.1578	1.0641	113.4	58.8	5.0	15.7
2010	11 06	07 11 56.4	+04 22 26	0.1620	1.0656	113.2	58.8	5.1	15.8
2010	11 07	07 14 45.7	+02 54 49	0.1663	1.0673	113.1	58.7	5.2	15.9
2010	11 08	07 17 21.5	+01 32 01	0.1708	1.0692	113.0	58.6	5.2	15.9
2010	11 09	07 19 44.8	+00 13 47	0.1753	1.0712	112.9	58.4	5.3	16.0
2010	11 10	07 21 56.5	-01 00 06	0.1799	1.0734	112.9	58.2	5.4	16.0
2010	11 11	07 23 57.4	-02 09 52	0.1846	1.0758	113.0	57.9	5.5	16.1
2010	11 12	07 25 48.2	-03 15 46	0.1894	1.0783	113.1	57.6	5.5	16.1
2010	11 13	07 27 29.6	-04 17 59	0.1942	1.0810	113.2	57.3	5.6	16.2
2010	11 14	07 29 02.2	-05 16 44	0.1991	1.0839	113.3	56.9	5.7	16.2
2010	11 15	07 30 26.5	-06 12 13	0.2040	1.0870	113.5	56.6	5.8	16.3
2010	11 16	07 31 43.0	-07 04 36	0.2090	1.0902	113.8	56.1	5.9	16.3
2010	11 17	07 32 52.1	-07 54 05	0.2140	1.0935	114.0	55.7	5.9	16.4
2010	11 18	07 33 54.3	-08 40 49	0.2191	1.0971	114.3	55.2	6.0	16.4
2010	11 19	07 34 53.5	-09 24 38	0.2242	1.1008	114.6	54.7	6.1	16.5
2010	11 20	07 35 42.7	-10 06 17	0.2293	1.1046	114.9	54.2	6.2	16.5
2010	11 21	07 36 25.8	-10 45 36	0.2344	1.1086	115.3	53.7	6.2	16.5
2010	11 22	07 37 03.3	-11 22 42	0.2396	1.1127	115.7	53.1	6.3	16.6
2010	11 23	07 37 35.2	-11 57 41	0.2447	1.1170	116.1	52.6	6.4	16.6
2010	11 24	07 38 01.9	-12 30 40	0.2498	1.1214	116.5	52.0	6.5	16.7
2010	11 25	07 38 23.6	-13 01 44	0.2550	1.1260	117.0	51.4	6.6	16.7
2010	11 26	07 38 40.4	-13 30 58	0.2602	1.1307	117.4	50.8	6.6	16.7
2010	11 27	07 38 52.5	-13 58 26	0.2654	1.1356	117.9	50.2	6.7	16.8
2010	11 28	07 39 00.2	-14 24 13	0.2706	1.1405	118.4	49.5	6.8	16.8
2010	11 29	07 39 03.5	-14 48 22	0.2758	1.1457	118.9	48.9	6.9	16.8
2010	11 30	07 39 02.7	-15 10 57	0.2810	1.1509	119.5	48.3	7.0	16.9

Note: The green designation shows the stellar magnitudes for the comet that indicates future visual magnitude values greater than 5.0! Also during the period of 15 – 23 October when the comet is approaching maximum brightness the nuclear magnitude for the false nucleus will be 15.0. This is possible to observe with direct vision during dark skies with little humidity using moderate – size (10" – 18") telescopes during the cool autumn months. The pink designation shows when the comet is expected to reach a maximum brightness of 4.4! The dark blue designation show the period when the comet will be at peribelion (closet distance) to the Sun during the period of 28 – 29 October!

Caution: Magnitude estimations are predictions made by the IAU Minor planet center and are only predictions. Actual magnitude estimations by current observational reports might show changes in the brightness of comets that differ from MPC preditctions!