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BAKER-NUNN OBSERVATIONS OF UV CETI
 SEPTEMBER-OCTOBER 1967

During the interval 27 September - 10 October 1967, the working group of flare stars of IAU Commission 27 scheduled an observing program of wide scope on the star UV Ceti. To join in this program, the Smithsonian Astrophysical Observatory (SAO) expanded its normal program of observation of the star, denoted period PXXXI, pursued in conjunction with radio telescope observations, in an attempt to provide full 24-hour coverage of the star from a uniform observing system. As expected, clouds, equipment difficulties, and other demands on the cameras limited the returns somewhat. A chart showing precise coverage by the SAO cameras is given in Figure 1. Total time covered was 87^h06^m, or just over 25 % of the time we had hoped to observe.

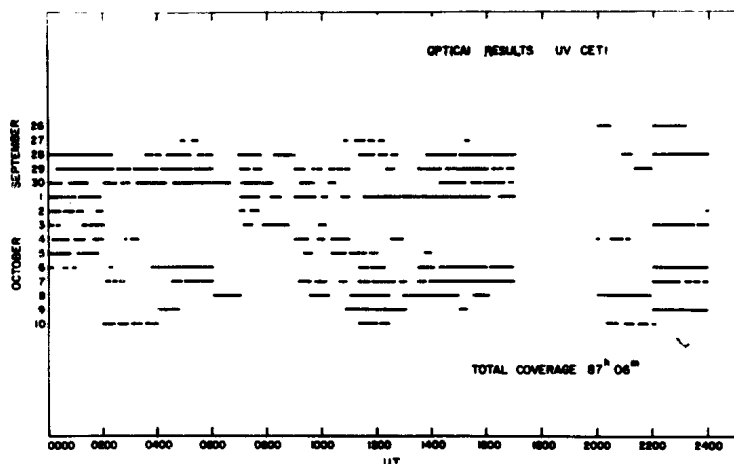


Figure 1. Coverage by SAO cameras using Baker-Nunn film from 26 September - 10 October 1967.

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During this observing period, all photographs were obtained as multiple exposures, several to each frame of film exposed in the cameras. While this procedure increased the time resolution to approximately 30 sec, the reduction method described previously by Solomon (1966) can no longer be used. We use instead a scheme of detecting the departure of a single image from "normal light" of the star, as defined by the set of images on each frame. Once an event is detected (or suspected), any variation in nearby comparison stars can be quickly checked. If the variation is shown not to be due to sky or seeing variations, an attempt is made to compare the flare stars to the comparison sequence. Our estimate of the precision of magnitude estimation by this sequence of steps is approximately 0.15 mag for an individual point, compared to just under 0.1 mag by use of the previous reduction scheme on single exposure plates. The minimum flare considered real is thus about 0.4 mag, rather than the 0.25 mag previously noted. Many flares previously detected in unambiguous fashion are now marginal, or even unnoticed. Table 1 gives a list of events, noted as definite (large events with $\Delta m \geq 0.7$ mag), probable ($0.5 \leq \Delta m < 0.7$ or confirmed by a second film), and possible (marginal cases that require other confirmation, $0.3 \leq \Delta m < 0.5$). We consider only the first two classes in our attempts to determine flare periodicity.

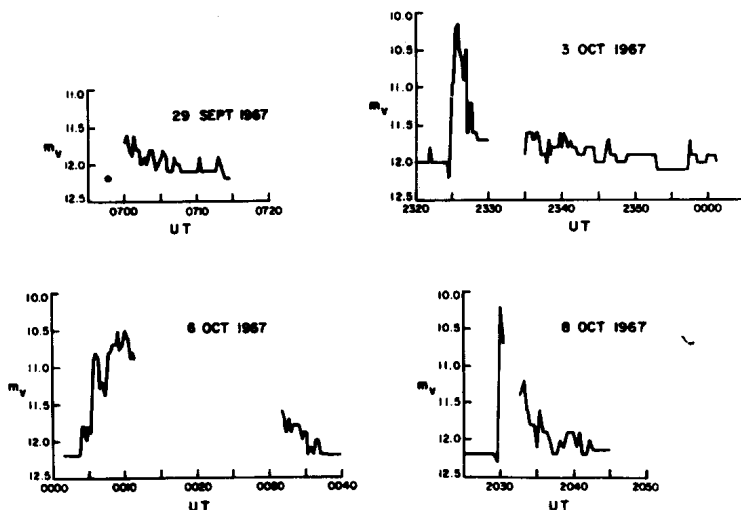


Figure 2. Light curves of four large events.

Table 1.

Date	Time (UT) of max	Δm	Time from max to normal light (min)	Notes
Sept. 26				No activity.
27	1131	0.4	1	Possible rapid event.
28				No significant activity.
29	0700	0.4	5	Probable event. Apparently end of larger event, decline of images readily apparent.
30	0607.5	0.4	1	Possible rapid event.
Oct. 1	1605.5	0.4	1.5	Possible event; film quality poor.
	0025.0	0.6	1.5	Probable rapid event.
	0038.5	0.5	1	Probable event. There appears to be a good deal of minor activity about this time.
	0733.5	0.4	1	Possible small event.
	1012.5	0.5	?	Possible event. Last image on film shows increase in light.
	1403.5	0.4	1	Possible event.
	1502	0.4	2	Possible event.
2	0143.5	0.4	2	Possible event; film quality good.
3	0143	0.4	1	Possible event.
	2307	0.5	3.5	Probable event; preflare of following.
	2325.5	1.9	28	Definite event. Complex activity during decline.
	2357.5	0.4	1	Possible event related to previous flare.
4	0013	0.4	3	Possible activity as above.
	0059.5	0.5	1.5	Probable event.
	1023.0	0.5	1	Probable event.
5				No significant activity.
6	0006.0	1.4	35	Definite event showing double maximum. Breaks in film de- grade light curve, but evidence of very complex activity during event.
	1612.5	0.4	25	Possible small but complex event of long duration.
	to	to		
	1622.5	0.5		
	2208	0.4	2	Possible event.
7	1435	0.4	1	Possible event.
8	2030	2.0	13	Definite flare; rapid decay.
9				No significant activity.
10				No significant activity.

There were three definite large events, five probable events unrelated to the large flares, one probable that is related to a large flare, and 14 possible events requiring further confirmation. Figure 2 shows light curves of four of the large events. SAO has therefore detected about one flare of 0.5 mag or greater during each 11 hours of monitoring.

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