

The Observatory Report

H alpha Telescope in Hiraiso and Future plan

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1,Intro.

Hiraiso Solar Terrestrial Research Center started the project named " Space Whether Forecast" at 1988. The purpose of this project is the comprehensive understanding of solar active phenomena and related interplanetary and geomagnetic disturbances . Its final goal is the understanding of influence of space environment for human activity in future and predict its dangerous conditions.

The current most important topic of this project is the study of elementary process of active phenomena such as flares and the development the optical telescopes for study and prediction of solar active phenomena. The H alpha telescope for observation of surface structure and velocity field of chromosphere and filter type vector magnetograph by measuring polarization of photospheric absorption line are now under construction. The two dimensional spectrograph for multiwavelength observation of active phenomena and HeI 10830 heliograph will be constructed in near future. Small patrol telescopes will be also operated. These telescopes will be dedicated to study of solar flare, its prediction and patrol in collaboration with other facilities in different wavelength.

In this report, the status of H alpha telescope and observational examples obtained during its test observation is reviewed.

2. General Specifications of telescopes

This system are developed by ourselves based on the 15cm telescope made by Zeiss. Operations for changing field of view , inserting additional optics, and adjusting focus etc. can be done via Personal Computer and/or Unix Workstation. General specification of H alpha telescope are followings.

Telescope : Coude refractor of D=150mm f=2250mm (By Zeiss)
Filter : Lyot Filter with passband of 0.25 (By Zeiss)
Camera : 1/2 inch EIA camera
Pixel Size : 0.8"/pix for active region (1.2"/pix until end of June '93)
4" /pix for full disk
Guider : Photoelectric guider

The digital images are obtained by Unix workstation. Communications between Personal computer for telescope control and imaging workstation is established by RS232 serial line. The telescope control command are issued by workstation to PC1, and PC1 send back status to workstation. Wavelength of filter are controlled by PC 2. With PC2, the rotation angle of optical elements of Lyot filter is monitored and the motor for rotation of filter optics are controlled. PC 2 are controlled by PC 1 through serial line (Figure 1).

The software for imaging and telescope control have some useful functions. To

reduce the data quantity, important part in the field of view are extracted as saving data . The seeing selection system are developed and operated to capture image with better seeing quality. The observing sequence table can be easily programmed by using the observation supporting softwears.

3. Observation

The telescope are operated on every fine day. Usually, the target region is the same as PFI of Yohkoh/SXT. In usual case, the following data are obtained automatically.

(1) Narrow field of view mode (every or every two minutes)

The field of view is about 5 arcmin * 5 arcmin and its pixel size is 0.8"/pix. The images in H alpha center, H alpha+0.7 A, and H alpha-0.7 A are obtained every minutes or every two minutes. The continium images are also obtained.

(2)Wide field of view mode (every 30 minutes)

The field of view is about 10 arc min. and 7 arc min. Other conditions are same as narrow field of view mode.

(3)Full disk

The fulldisk in H alpha center with 4"/pix are obtained for monitoring flare and filament activities outside of primary target region.

4. Observational examples

Some observational examplless are shown in Figure 2 - 4.

The M4/2B flare with associated surge are observed from 01UT on 23 Oct. 1993 (Figure 2) . The intermittent subflares and surge activities are observed after this event. The KPNO magnetogram shows that the isolated magnetic island of opposite polarity are located very near sunspot.

Figure 3 is the evolution of active region of NOAA 7260 and Figure 4, the evolution of NOAA 7321.

5. The future plans

(1) Filter type vector magnetograph

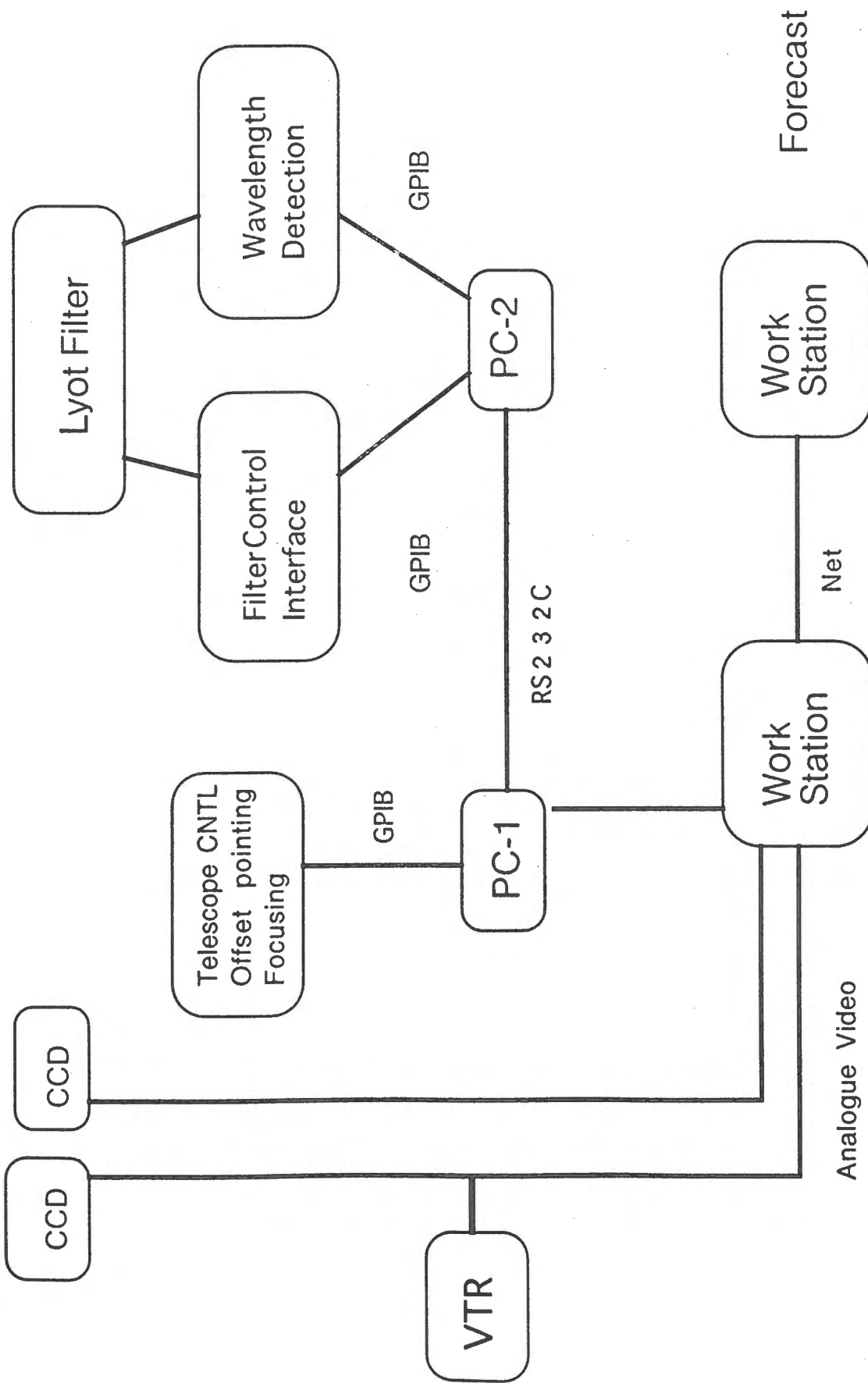
For the observation of magnetic field of active region, the filter type vector magnetograph is under construction. Lyot filter (FeI 6337A) and KDP elements are developed under collaboration with Dr. Li Ting at Nanjing Astronomical Research Center. The start of test observation is planned to start at around summer in 1994.

(2) Two Dimensional Spectrograph

The telescope for two dimensional spectral observation with grating or Fabry-perot filter are now planned. The purposes are detail spectral observation of initial phase of flare and filament eruption and daily monitor of coronal hole with He10830 spectroheliogram.

<Acknowledgements>

The author gratefully thanks to Drs. Y.Nakai, Y.Funakoshi at Kwasan and Hida Observatories for their various helpful comments and discussion, and Mr. J.Maekawa and M.Kamata at Carl Zeiss Co. for their kind support in maintenance work. The figures are prepared by Mrs. Okano, the secretary of Solar division of Hiraiso solar terrestrial research center.



Other Institute

FIGURE 1

FIGURE 2

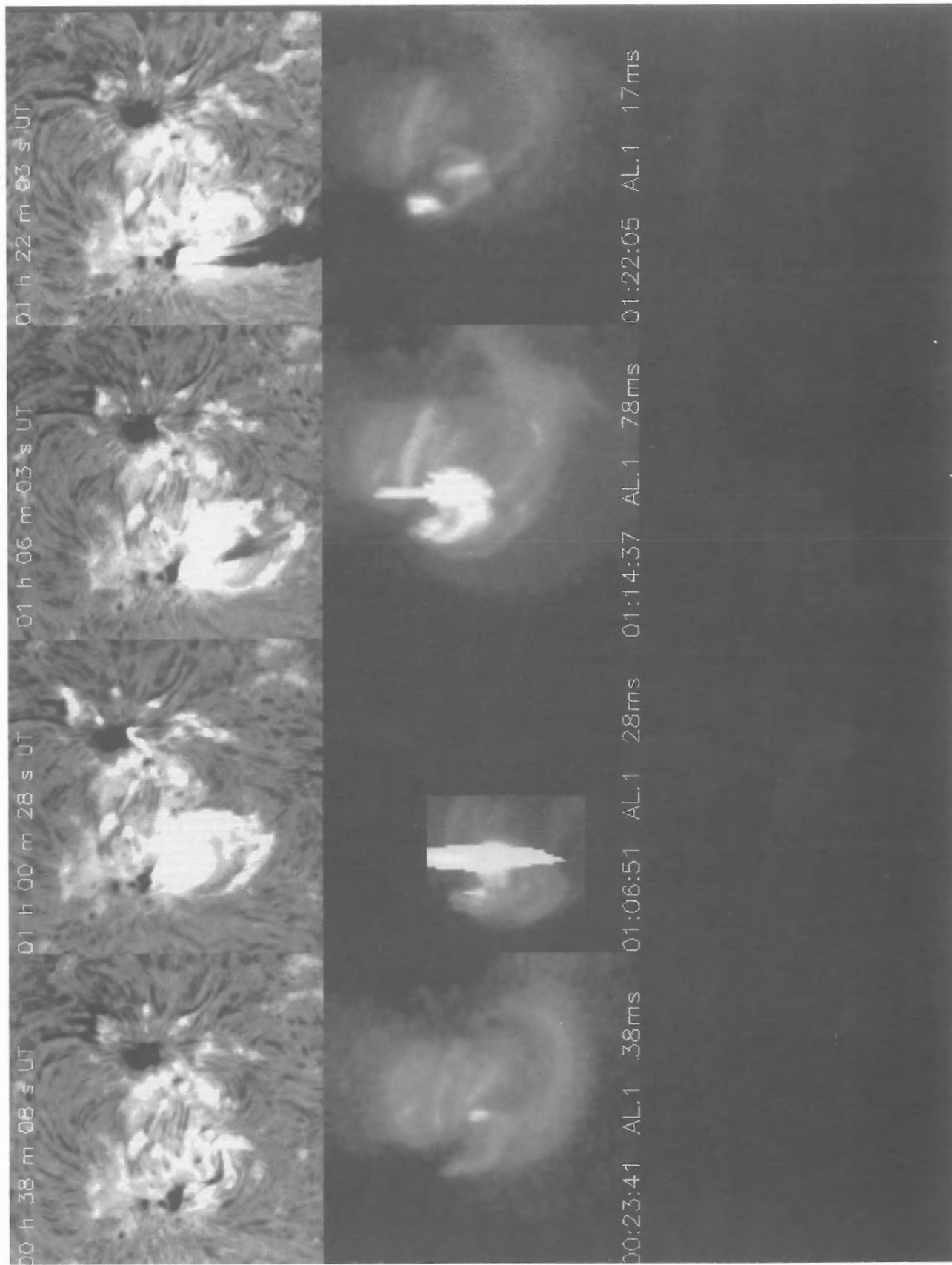


FIGURE 3

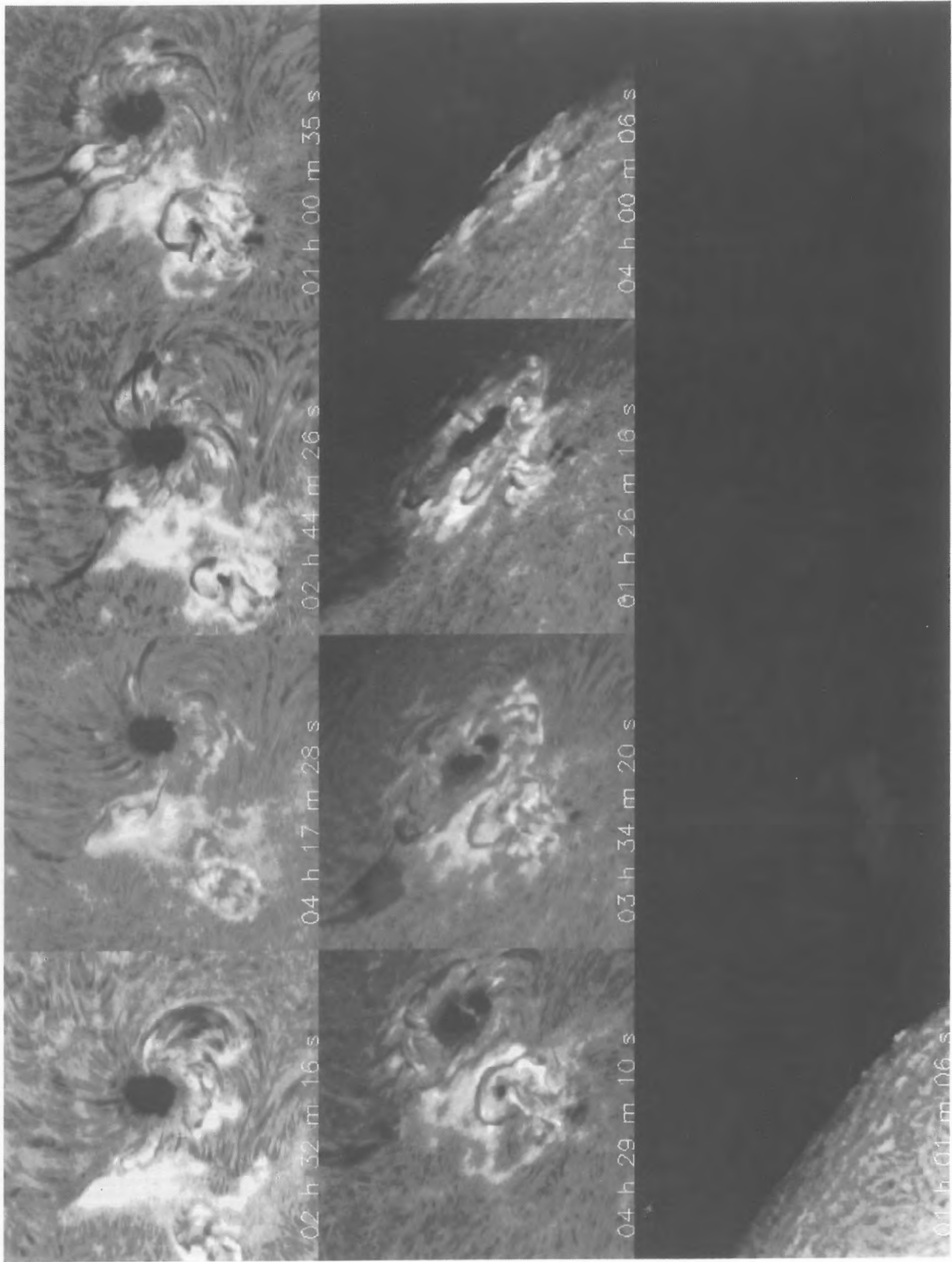


FIGURE 4

