transform imaging and utilizes scanning modulation grid collimator optics to provide full-Sun imaging with 1.9-arcsecond resolution over the energy range from 20 to 700 keV at time resolutions from 0.1 to 2 s. GRID will employ 55 subcollimators, each composed of a matched pair of high-Z collimator grids separated by 5.2 meters and a photoelectric scintillation spectrometer detector having no spatial resolution. The subcollimators and integrally-mounted fine aspect system are contained within a telescope canister which will be pointed to 0.1 degree accuracy to produce source modulation. The 55 subcollimators provide a uniform distribution of grid slit orientations and a logarithmic distribution of slit spacings corresponding to angular dimensions of 1.9 arcseconds to several arcminutes. The instrument is several orders of magnitude more sensitive than the HXIS instrument on SMM and nearly 10 times more sensitive than any similar instrument scheduled to fly during the next solar maximum. The payload, designed for long-duration high-altitude balloon capacity, is scheduled for a test flight in the spring of 1991, and the first science flight (8 to 14 days duration) from the Antarctic in January or February of 1992.

21.07
The Soft X-Ray Telescope for SOLAR-A
W.A. Brown, L.W. Acton, M.E. Brunner, J.R. Lemen, K.T. Strong (Lockheed Palo Alto Research Lab.)

The Solar-A satellite being prepared by the Institute for Space and Astronomical Sciences (ISAS) in Japan is dedicated to high energy observations of solar flares. In collaboration with investigators at the National Astronomical Observatory of Japan (NAOJ) and the Institute for Astronomy of the U. of Tokyo, we are preparing the Soft X-Ray Telescope (SXT) to provide filtered images in the 2 to 60A interval. Prof. T. Hirayama of NAOJ is the SXT principal investigator.

The flight model is now undergoing tests in the 1000 foot tunnel at MSFC. Launch will be in Sept. 1991. Earlier resolution and efficiency tests on the grazing incidence mirror have established its performance in soft x-rays. The unique one-piece, two mirror grazing incidence telescope is supported in a strain free mount separated from the focal plane assembly by a carbon-epoxy metering tube whose windings and filler are chosen to minimize thermal and hygroscopic effects. The CCD detector images both the x-ray and the concentric visible light aspect telescope. Optical filters provide images at 4500/whm30A and 4700/whm200A.

The SXT will be capable of producing over 8000 of the smallest partial frame images per day (6x6x4 pixels or 2.5x2.5 arcmin), or fewer but larger images, up to 1024x1024 pixel images. Image sequences with two or more of the five x-ray analysis filters, with automatic exposure compensation to optimize the charge collection by the CCD detector, will be used to provide plasma diagnostics. Calculations using a differential emission measure code were used to optimize filter selection over the range of emission measure variations and to avoid redundancy, but the filters were chosen primarily to give ratios that are monotonic in plasma temperature. Practical exposure times and counting statistics were included in the selection process.

Science planning in collaboration with NAOJ, U. Tokyo, ISAS, and US co-investigators from UC Berkeley, Stanford, and U of Hawaii has been underway for two years, and detailed plans for organization of data acquisition and archival archiving are being developed. The LPARL work is supported by NASA under contract NAS8-37334.

Session 22: Magnetograph Group
Group Leader: Harrison Jones
Oral Session
8:30 am - 9:00 pm

22.01
Magnetograph Observations during the International Solar Month
H. P. Jones (NASA/GSFC)

The working group on energy storage at the Kansas City workshop suggested that cooperative magnetograph campaigns during and after the Max 91 effort would be valuable for instrumental intercalibration, studies of time evolution of the magnetic energy content of active regions, and for long-term, uninterrupted studies of surface field dynamics. In response, I hastily attempted to arrange for roughly simultaneous and coplanar observing and to collect data from as many different magnetographs as possible during the International Solar Month (Sep. 1988). Eleven groups (three foreign) responded to the preliminary mail announcement. Subsequent communications were primarily by electronic mail, both coordinated through the SMG Data Analysis Center and individually. The principle aim of this effort was to find out who was interested and to gain some experience in both campaign coordination and in treating diverse data sets.

Six facilities, in addition to the NSO/KP magnetograph, obtained data during the period of interest, and, to date, three sites have actually shipped data to NSO/Tucson for processing. One data set was in FITS format and has been easily copied into IRAF images for internal display and analysis. The other two were in less transportable formats, and the translation programs are being developed. Intercomparison of flux values will be attempted by the time of the workshop, and follow-up communications with the remaining sites will be initiated.

More efficient and complete campaigns will require careful advanced planning and will demand more reliable rapid communications facilities, particularly with international participants. A major purpose of ensuing workshop discussions should be to develop specific, well-defined objectives of future observing programs, to identify the resources required of both participants and coordinators, and to develop reasonable timelines.

22.02
Magnetograph Intercomparision Campaign of 1972
J. Harvey (NSO/NOAO)

In 1970, a working group of IAU Commission 10 was proposed by D. Rust and formed under the leadership of L. Beckers. This "Working Group on Standardization of Solar Magnetic Field Observations" aimed at comparing simultaneous observations of the same active region by different observatories in order to resolve calibration discrepancies. More than 20 observatories were initially involved. The project serves as a prototype for a recent, similar campaign. A pilot study was run in October, 1970 followed by two full campaigns in October, 1971 and June, 1972. The October 1971 campaign was the most successful with 7 observatories contributing data. The major result was a factor of two variation in derived field strength depending on observatory and spectrum line. Under standardized observing conditions the agreement was better. As a result of the working group activity, some observatories changed their calibration procedure and a general realization of the importance of spectrum line variations and non-linear instrumental response was gained by the participants.

22.03
Magnetic Field Strengths from a Digital Magnetogram compared with those from Video Spectra-Spectroheliograms (VSSHG)
G.A. Chapman, A.D. Herzog, S.R. Walton(SFO/CSUN)

As part of the international collaboration on intercomparisons of magnetograms, two large active regions, NOAA Nos. 5105/5106, were observed on 11 Aug 1988 using the dual Reticon system in a Zeeman mode. Within two hours, a set of spectra were obtained, mapping the active region using the Video Spectra-Spectroheliograph (VSSHG) analyzing for circular and linear polarization. The calibration of the Reticon magnetogram was obtained from spectral scans of the 6102.7A Ca I line. The noise level of the Reticon magnetograms is approximately 5 gauss, which with a pixel size of about 3.8" corresponds to a minimum detectable signal of 7.3 x 10^-17 Mx. The Reticons were operated at room