STANDARD ASTRONOMICAL SOURCES FOR THE SPACE TELESCOPE

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ABSTRACT. The Space Telescope (ST) will require many types of standard sources for a diverse range of calibrations to be performed after launch. The scientific instruments are sensitive to a wide range of wavelengths from 1050 to 11,000Å and encompass a broad range of measurement capabilities including astrometry, photometry, imaging, polarimetry, and spectroscopy. To verify proper operations of each instrument and to provide quantitative calibrations, a diverse range of standard sources and fields are required. In order to select targets that satisfy the requirements of the Instrument Definition Teams and the long term responsibilities of the Science Institute, six groups containing a total of 25 astronomers are defining the calibration targets to be observed after launch. The six categories of ST standard sources are:

1) Ultraviolet Spectrophotometric
2) Ground Based Spectrophotometric and Photometric
3) Wavelength
4) Astrometric
5) Polarimetric
6) Spatially Flat Field

The data in these categories will be collected from the literature or through new observing programs as appropriate. These six reports of the working groups outline the calibrations and proposed targets for all of the scientific instruments on ST. The collected data on each set of standard sources should be published in the refereed literature.

1. CALIBRATION TARGETS

The background material for the choice of calibration targets comes from the individual instrument teams, which have the responsibility for calibrating their scientific instrument during the first six months after launch. At the end of the six-month period, calibration becomes the responsibility of the ST ScI. Therefore, cooperation and joint

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planning of calibration efforts is imperative for all concerned parties. Through an intercomparison of all of the team plans, the centralization of the calibration planning at the ST ScI leads to the identification of omissions and the elimination of redundant targets that appear in the calibration plans developed by each team acting alone.

Table I contains the list of calibration target categories and the scientists who are contributing. The first name listed is the scientist at the ST ScI who is leading the efforts to obtain a consensus on the requirements for each instrument and to identify a minimal set of targets that satisfy the complete matrix of requirements. Presently, the preparation of the combined target lists is about 50% complete. After distribution of these proposed target lists, some changes are expected as new ideas come into the ST ScI from the astronomers in the ST project and from the general community of potential ST users.

2. RESULTS

Currently, data has been collected only for the category of UV spectrophotometry. Using the IUE observatory, the spectra shown in Figure 1 were obtained in December of 1983. The goal of the IUE program is to obtain spectrophotometry of hot stars in low dispersion from the bright limit of third mag to the faint limit of ~15 mag with a spacing of about one mag. This ST standard star program has additional observing time scheduled for 1984 at the ESA and the NASA stations.

Notes to Table I.

FGS - Fine Guidance Sensor. This instrument is being developed by the Perkin Elmer Corporation for the primary purpose of fine pointing the Space Telescope. The FGS can also be used for astrometry, and these scientific uses are being directed by an astrometry team led by W. Jefferys at the University of Texas.

FOC - The Faint Object Camera has been developed by the European Space Agency. P. Jakobsen is the Project Scientist, replacing F. Macchetto, who is now the science team leader.

FOS - Faint Object Spectrograph. The principal investigator is R. Harms from the University of California at San Diego and the Applied Research Corporation.

HRS - High Resolution Spectrograph. The principal investigator is J. Brandt of the Goddard Space Flight Center.

HSP - High Speed Photometer. The principal investigator is R. Bless of the University of Wisconsin.

WFPC - Wide Field and Planetary Camera. The principal investigator is J. Westphal of the California Institute of Technology.

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TABLE I

ST CALIBRATIONS REQUIRING ASTRONOMICAL TARGETS

Category of Standard Source	Affected Instrument	Study Team Members
1. UV Spectrophotometric	FOC, FOS, HRS, HSP, WFPC	R.C. Bohlin, J.C. Blades, A.V. Holm, B.D. Savage, C.C. Wu
2. Ground Based Spectrophotometric and Photometric	FGS, FOC, FOS, HSP, WFPC	J. Koornneef, W.A. Baum, R.C. Bohlin, J.F. Dolan, J.B. Oke, D.A. Turnshek
3. Wavelength	FOC, FOS, HRS, WFPC	H.C. Ford, L.M. Hobbs, D.G. York
4. Astrometric	All	A. Fresneau, P.D. Hemenway, B.G. Marsden, P.K. Seidelmann, W.F. van Altena
5. Polarimetric	FOC, FOS, HSP, WFPC	H.S. Stockman, J.R. Angel, A.D. Code, J.F. Dolan, O.L. Lupie, R.L. White
6. Spatially Flat Fields	FOC, FOS, HRS, HSP, WFPC	R.E. Griffiths, P.D. Feldman, J.E. Gunn

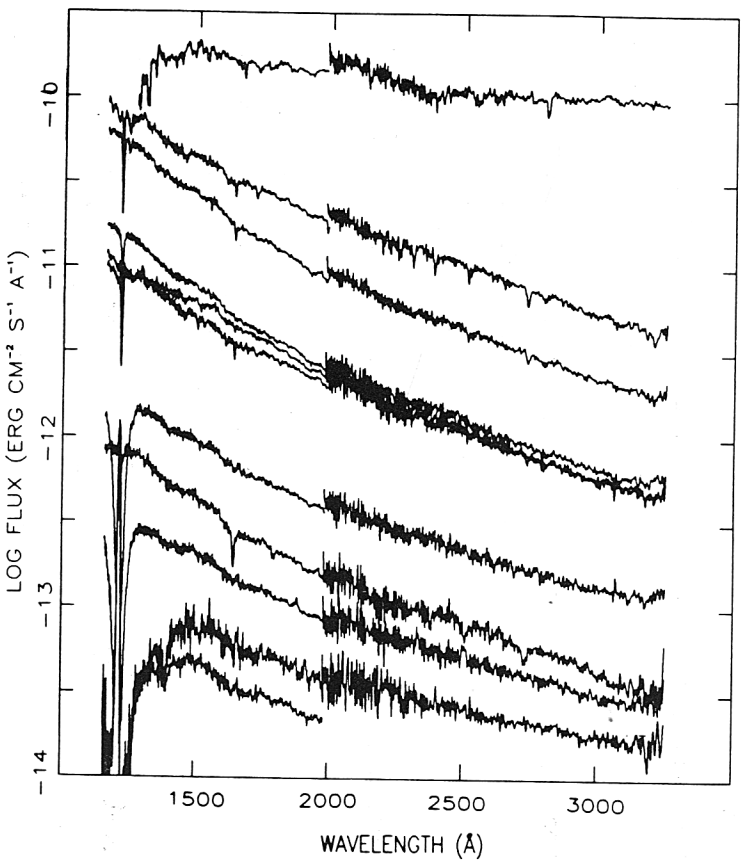

Fig. 1. Preliminary UV spectrophotometry of ST standard stars from the IUE spacecraft. The fainter stars were obtained at the Vilspa site using ESA time, while the brighter targets were observed at GSFC on NASA time.

DISCUSSION

JASCHEK: What are the wavelengths you are concerned with? Do you have the list of wavelengths or the identification of the wavelengths in the stellar spectra?

BOHLIN: We are seeking stars with well determined wavelengths. The accuracy we need is about 1 km/sec. The HRS observes at wavelengths below 3200 Å so we need a hot star, such as a B-star. Alternatively, we may do better with interstellar lines.

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