CURRENT STATUS OF THE INTERNATIONAL HALLEY WATCH INFRARED NET ARCHIVE

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The primary purposes of the Halley Watch have been to promote Halley observations, coordinate and standardize the observing where useful, and to archive the results in a database readily accessible to cometary scientists. The intention of the IHW is to store the observations themselves, along with any information necessary to allow users to understand and use the data, but to exclude interpretations of these data. It is important to note that submission of observations to the IHW does not preclude the publication of these observations in journals. In fact, observers are urged to publish their data promptly in the open literature. Data submitted to the Infrared net of the IHW will not be released until the IHW archives are released.

Each of the archives produced by the IHW will appear in two versions: a printed archive and a digital archive on CD-ROMs. The CD-ROMs will contain everything submitted in digital form to JPL. Due to cost constraints, the printed archives will contain some, but not all, of the information in the digital archives for each of the observations. The printed versions will allow astronomers to quickly look up information and will give them an idea of what type of information is available on what dates. Each entry will contain the ID number of the corresponding file in the digital version, so the printed archives will be useful as indices to the CD-ROMs. The digital archives will allow the data to be easily accessed by computers for data reduction and analysis. CD readers for IBM PCs and other microcomputers are available to read the CD-ROMs. Thus, access to the digital archives will not be excessively expensive.

The archive is expected to have a very long lifetime. Experience indicates that magnetic tapes deteriorate to uselessness after only ten years or so. As CD-ROMs were developed relatively recently, their useful lifetimes are unknown, but they are expected to last at least 30 or 40 years. When they start to wear out, they can be copied onto newer CD-ROMs or other media. The archive is expected to be used at least up through the next apparition of Halley.

The IHW has already produced an archive for P/Crommelin. This consists of one printed volume and two 1600 bpi tapes. The CD-ROM version is contained in the Planetary Data System's (PDS) Interactive Data Interchange (IDI) disk. The Crommelin archive was created as a test of the Halley Watch. It enabled the IHW to determine what problems would be likely to appear during data collection for the creation of the other two archives. The proposed format for the printed versions of the G-Z and Halley archives has changed considerably based on experience gained from the Crommelin archive. Furthermore, the indexing scheme used for the G-Z and Halley digital archives will differ substantially from that used for Crommelin. Nonetheless, the Crommelin archive is a useful source of data, although its distribution in CD form has been far more limited than is planned for the Halley and G-Z disks.

The Halley archive will contain at least twenty gigabytes of information – possibly twice that. Recent estimates are that the printed version will consist of seven 500-page volumes and the digital version will consist of perhaps twenty CD-ROMs, depending on the data-compression techniques employed. This is obviously a large collection of cometary data.

The printed version of the Giacobini-Zinner archive will be published in November 1988, followed by the digital version in mid-1989. The printed Halley archive will be

published about October 1, 1989, and the digital version in mid-1990.

The IHW is subdivided into nine nets: Astrometry, Infrared Studies, Large-Scale Phenomena, Near-Nucleus Studies, Photometry and Polarimetry, Radio Studies, Spectroscopy and Spectrophotometry, Amateur Astronomers, and Meteor Studies. Each of these nets is headed by one or more Discipline Specialists, who decide what types of information to include in the archives and collect observations from the observers in their nets. Discipline Specialists for the Infrared net are R. Knacke and T. Encrenaz. The Discipline Specialists give the data they collect to their Software Specialists, who convert it to FITS [1,2] format and write it onto magnetic tapes. The tapes are then sent to the Lead Center at JPL in Pasadena, California, where the final editing and publication are done.

The IHW infrared center at Stony Brook has the task of deciding what types of infrared data to include in the archive, soliciting this information from the observers, determining the format for both the printed and digital versions of the archive, collecting and organizing the data, verifying that the data were received correctly, and converting the data to FITS format for submission to the Lead Center. From time to time the Discipline Specialists and the Software Specialist for the IR net meet with their counterparts from the other nets and personnel from the Lead Center to discuss the formats for the archives in order to achieve consistency across the nets. They also work on designing an indexing system to allow data on the CD-ROMs to be quickly and easily located.

Information submitted to the IR net is stored on a hard disk on an IBM PC/XT with a commercial database program. When complete, a printed copy is sent to the observer to be checked for errors and returned with corrections. It is then exported to ASCII text files and converted into FITS format. Once the FITS files have been checked for errors, they are uploaded at 9600 baud over a direct line to a DEC MicroVAX. From there they are written to tape and then mailed to the Lead Center.

Figures 1 and 2 show the general status of the IR net in April and August 1987. The proportion of the total data that has been received so far has increased, for two reasons. First, the IR net has received a large amount of information since April. Secondly, the estimated total amount of information expected has decreased as observers have reported that certain observations were not made due to bad weather or other problems. As information has been processed and submitted to JPL, more information has arrived, so the total amount of information in preparation has stayed fairly constant.

Figures 3 and 4 give a breakdown of the information by type. Infrared observations of Halley are dominated by photometry. The IR net has been processing Halley photometry and polarimetry data and has begun work on spectroscopy. There are still a few details about the digital format for images that need to be worked out before the images can be processed and submitted. Due to this and to the small amount of Giacobini-Zinner photometry and spectroscopy data received so far the G-Z data have not yet been fully processed. Processing of the G-Z photometry and spectroscopy data should be completed by the end of January 1988.

Figures 5 and 6 show the number of nights of observations made each month during the recent apparitions of Giacobini-Zinner and Halley.

The IHW infrared net needs the continued support of the observers. For the G-Z and Halley archives to be as useful as possible, observers must submit all available data so that the archives can be complete collections of the observations. It is also necessary for the IR center to be made aware of observations that were planned but not made in order for its calendar of observations to be updated. The Lead Center must operate with a continuous inflow of observational data. Each individual who contributes data will be given a free copy of the archives, both in the printed and digital forms.

The archive publication dates mentioned above set deadlines for data submission. The IR net needs time to organize and reformat the data. Extra time is required for dealing with unexpected problems such as hardware breakdown or difficulty in reading tapes. In

addition, the Lead Center needs time to organize the data received from the nine IHW nets. The Giacobini-Zinner data should have been delivered by December, 1987. Please contact us if you have data but could not meet the deadline. Halley observations should be submitted by June 1988.

Data may be submitted to the IHW infrared net in the form of tables, notes, computer printouts, or magnetic tapes mailed to either Dr. Roger Knacke or Brian McGuinness at the following address:

Department of Earth and Space Sciences
State University of New York at Stony Brook
Stony Brook, NY 11794

or to:

Dr. Therese Encrenaz
Observatoire de Paris
Section d'Astrophysique
92190 Meudon, France

We prefer that magnetic tapes be written in unlabelled form. Files on the tape should be written as ASCII text files or as FITS files. The tape density should be 1600 or 6250 bpi. When sending tapes, please indicate what format the tape is written in (plain unlabelled form, ANSI-D, or whatever) and what type of computer it was written on. Some computers, such as the Prime, have idiosyncrasies that affect tapes written by them. It would also be appreciated if the tape was accompanied by a list of what files it contains. This aids in the detection of errors during the process of reading the tape.

An alternative is to send the observations in the form of electronic mail on BITNET to BMCGUINESS@SBCCMAIL. This will cause them to be sent to the Stony Brook Computing Center's VAX 8600 computer system. From there they can be downloaded to the IBM PC/XT for processing.

REFERENCES

[1] Griesen and Harten, 1981, *Astron. Astrophys. Suppl. Ser.*, **44**, 371-374.

[2] Wells, Greisen, and Harten, 1981, *Astron. Astrophys. Suppl. Ser.*, **44**, 363-370.

IHW Infrared Network
Data Reporting as of April 1987

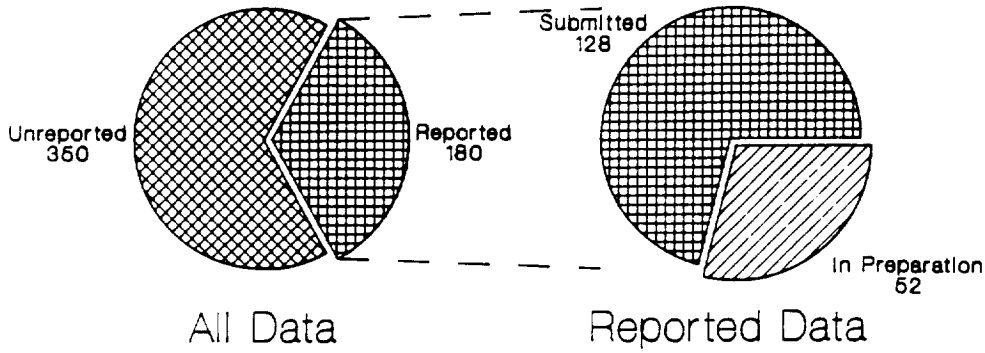


Figure 1.

IHW Infrared Network
Data Reporting as of August 1987

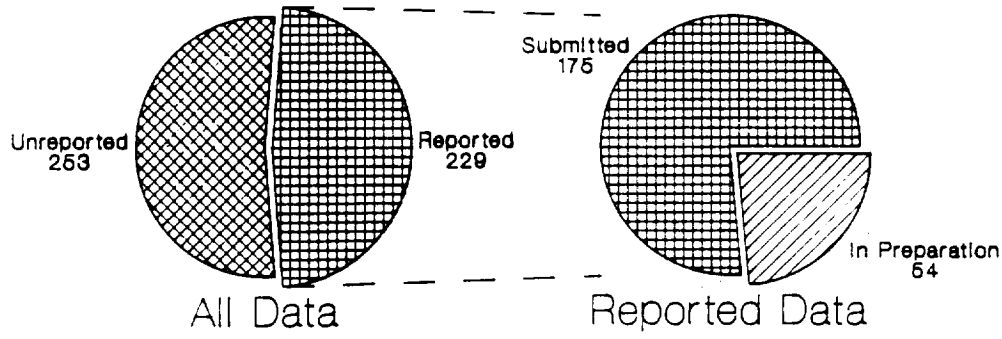
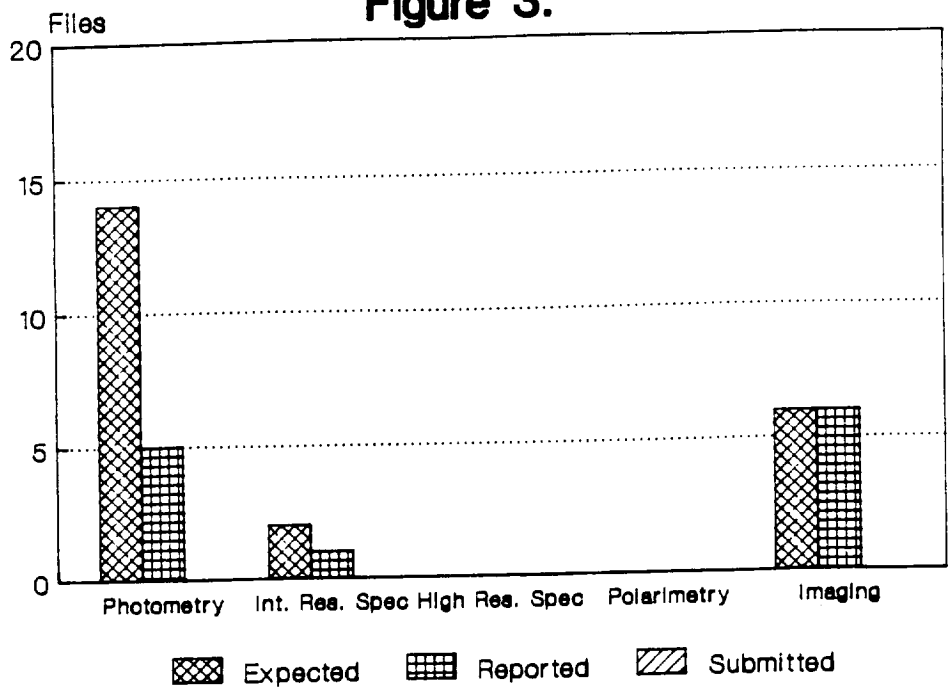


Figure 2.

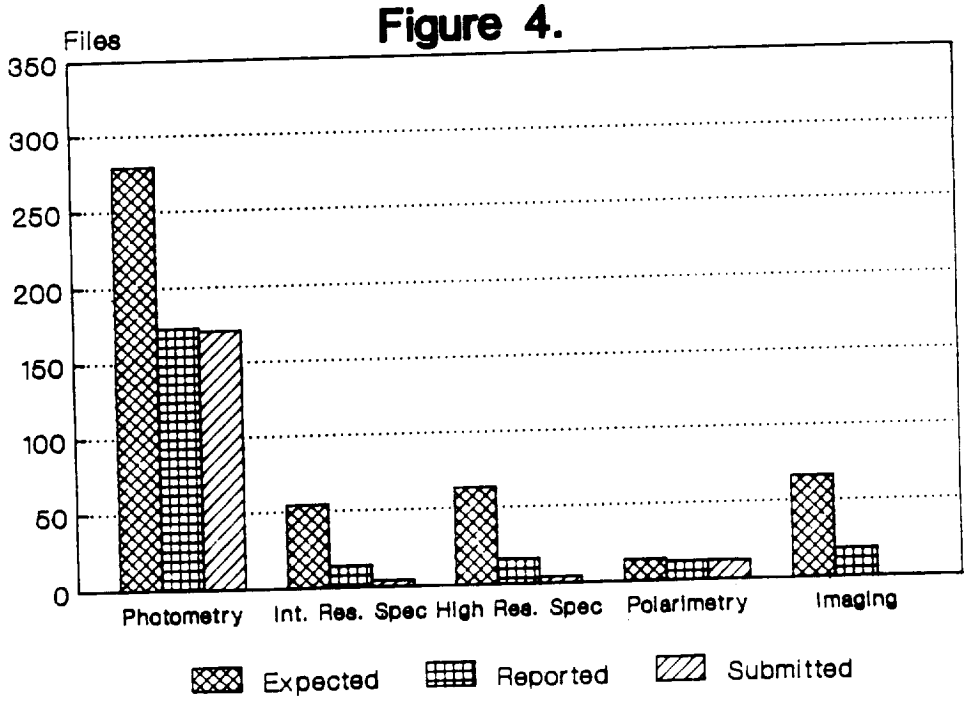
Infrared Data Status (G-Z)

Figure 3.



Infrared Data Status (Halley)

Figure 4.



Giacobini-Zinner Infrared Science
Monthly Log of Observations

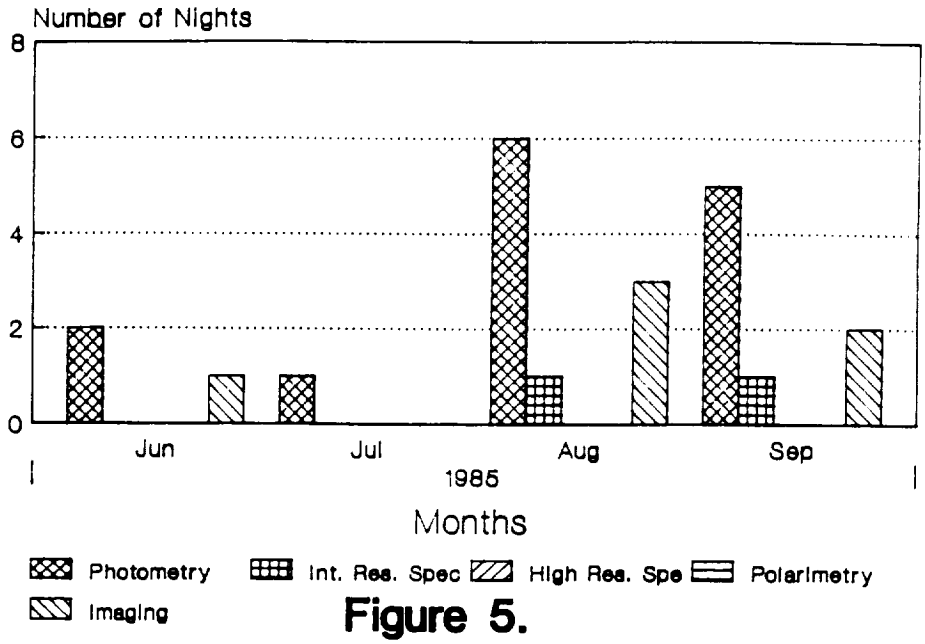


Figure 5.

Halley Infrared Science
Monthly Log of Observations

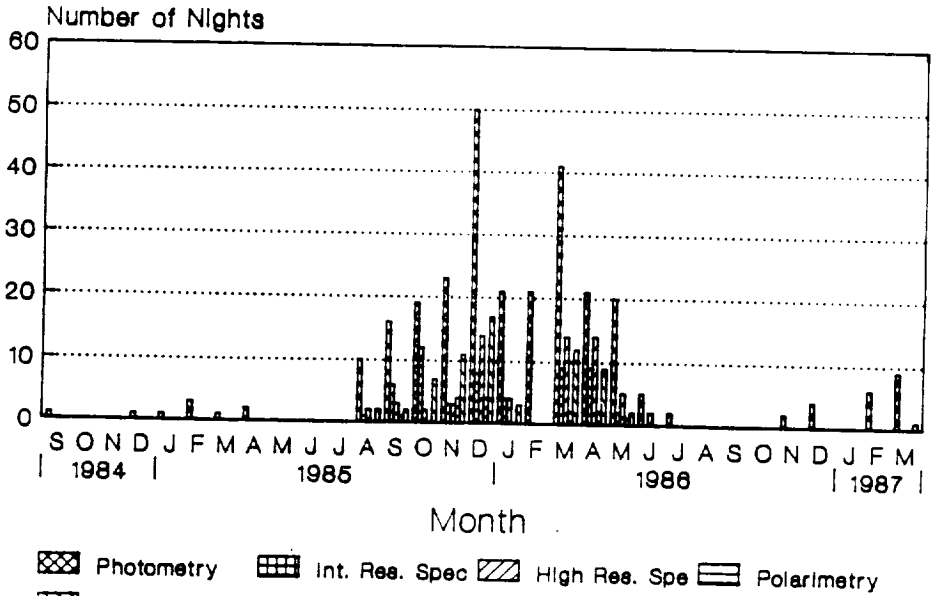


Figure 6.