

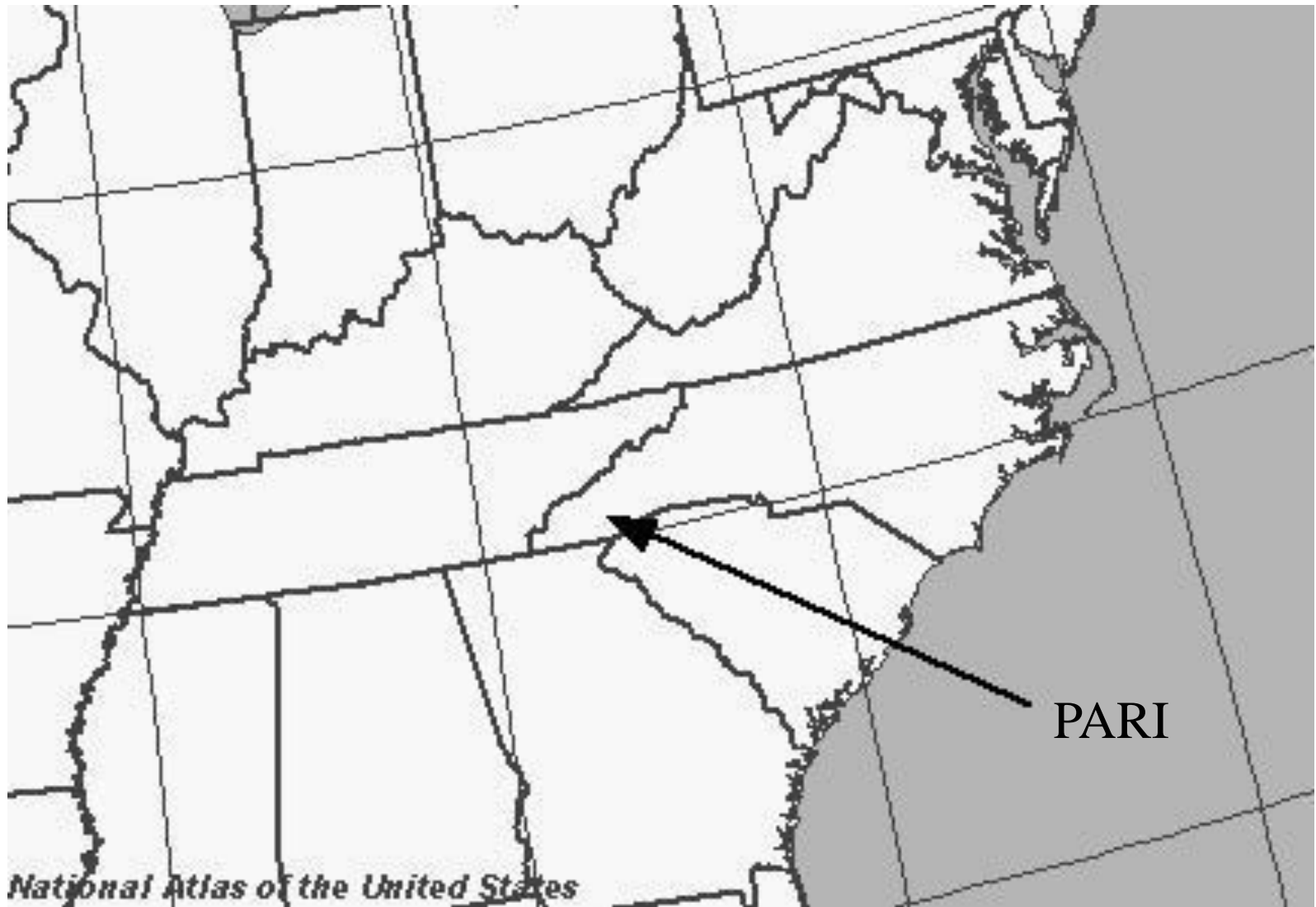
PISGAH ASTRONOMICAL RESEARCH INSTITUTE

AND

ASTRONOMICAL PHOTOGRAPHIC DATA ARCHIVE

www.pari.edu



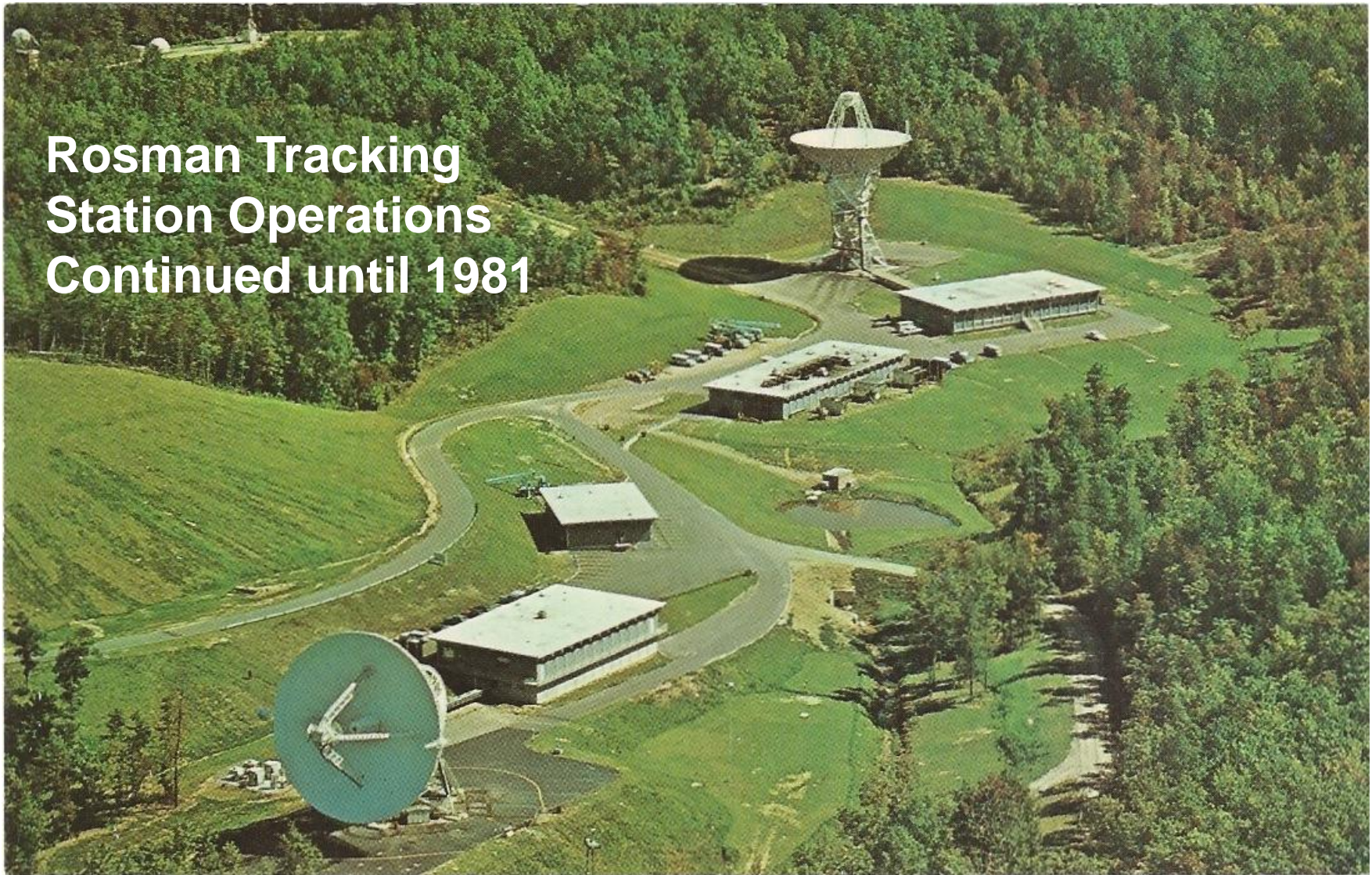


200ac (80ha) campus
6.2mi (10km) of roads
12 buildings 100,000 ft² (9290 m²)

Extensive Internet Infrastructure
Redundant Electrical power, water and fuel



Rosman Tracking Station Operations Continued until 1981



Rosman Research Station 1981-1995

Satellite Communication

Operated by the Department of Defense



Pisgah Astronomical Research Institute

Created in January, 1999



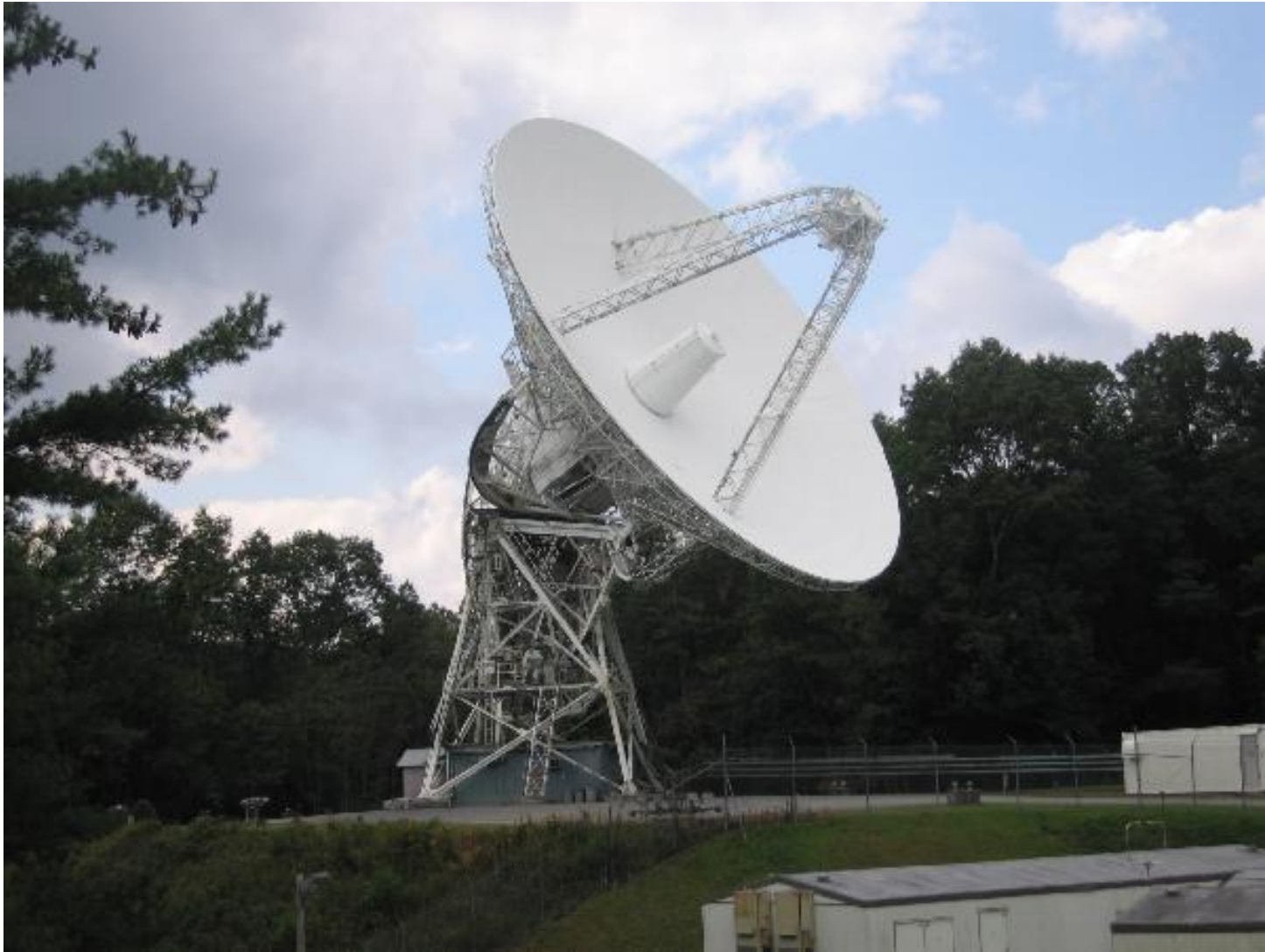
PARI Staff and Volunteers



26-East Radio Telescope



26-West Radio Telescopes



SMILEY - 4.6m Radio Telescope



12m Radio Telescope



12m radio antenna
with a precision 0.4
mm antenna surface
supports operations
to 60 GHz.

May be used to
survey the Milky
Way galaxy for
regions of star
formation.





Optical Telescopes



Earth Sciences Instrumentation

- ✂ Seismometer
- ✂ GeoMagnetometer
- ✂ Plate Boundary Monitor
- ✂ Satellite Weather
- ✂ Fireball Network
- ✂ Cosmic Ray Monitor

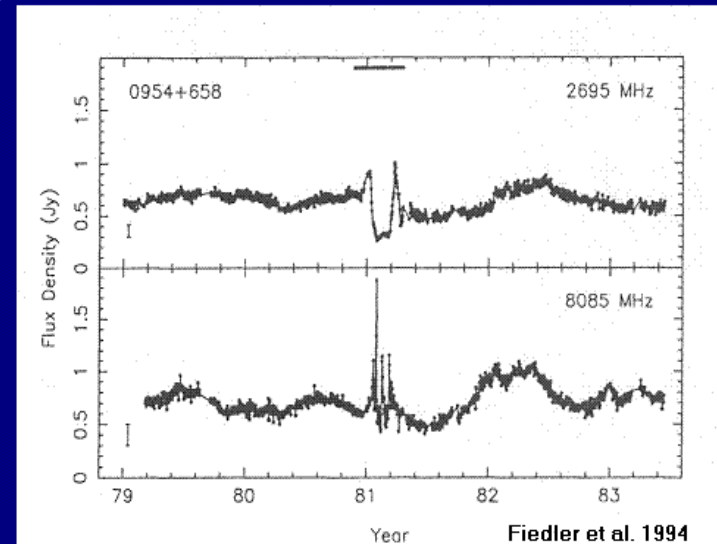


200 Tbyte Storage System – Cline Admin Bldg



ESE or DIRV Project

Extreme Scattering Event (ESE)



Fiedler, Dennison, Johnston & Hewish 1987,
Nature 326, 675.

Drs. Meriwether and Castalez

Aeronomy Installation



IRDC - INFRARED DARK CLOUD PROJECT

Spitzer Science Center and Jet Propulsion Lab



PARI's Portable Planetarium - StarLab



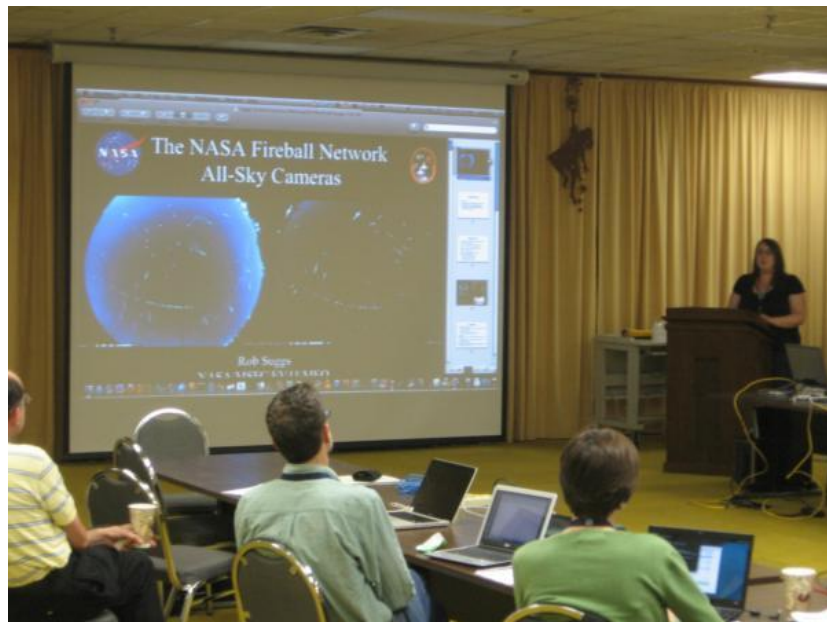
Brevard Middle School Students



Duke Tip Students – Summer Program 2013



Multi-Media Room



DIRV Control Center

**Dedicated Interferometer for Rapid Variability
ESE - Extreme Scattering Event
26m Radio Telescope Interferometer**



Exhibit Room

NASA Shuttle Artifacts

Meteorite & Geological Displays

Satellite Weather, Radio Jove & Video Programs



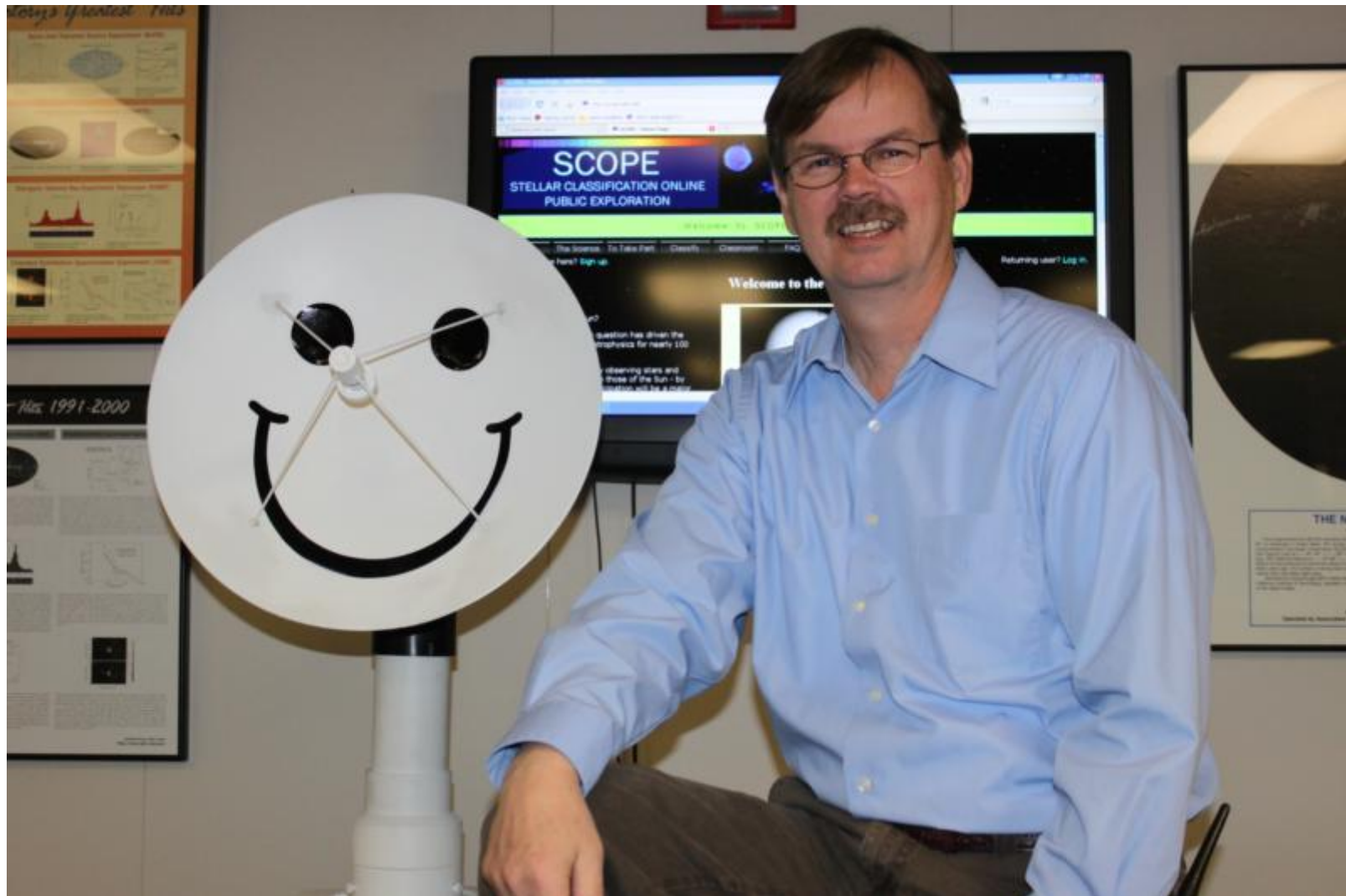
PARI Library

**Astronomical Journals
Astronomy and Physics Texts**

**Astronomical Photographic Data Archive
Hands-On Display**



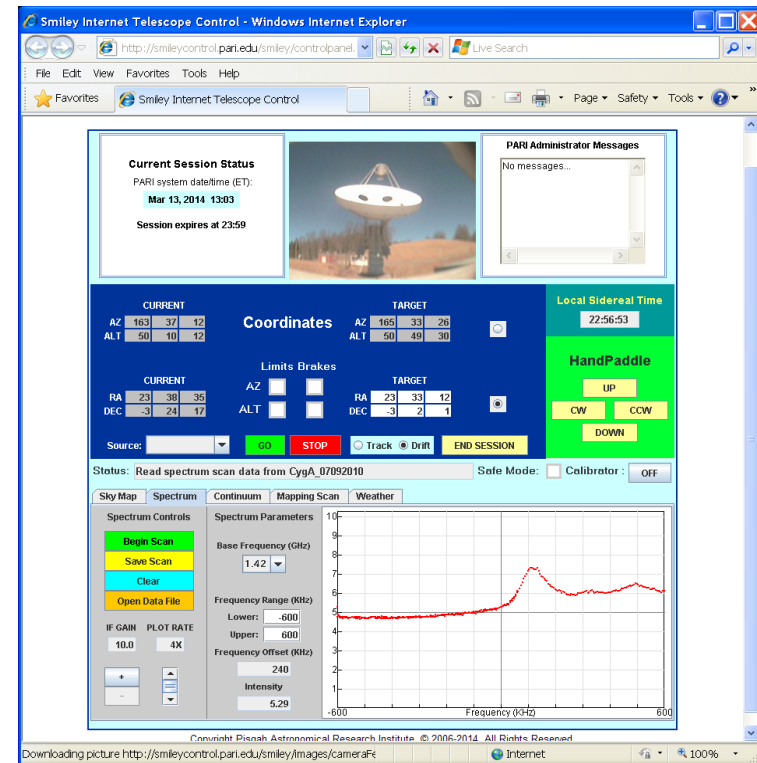
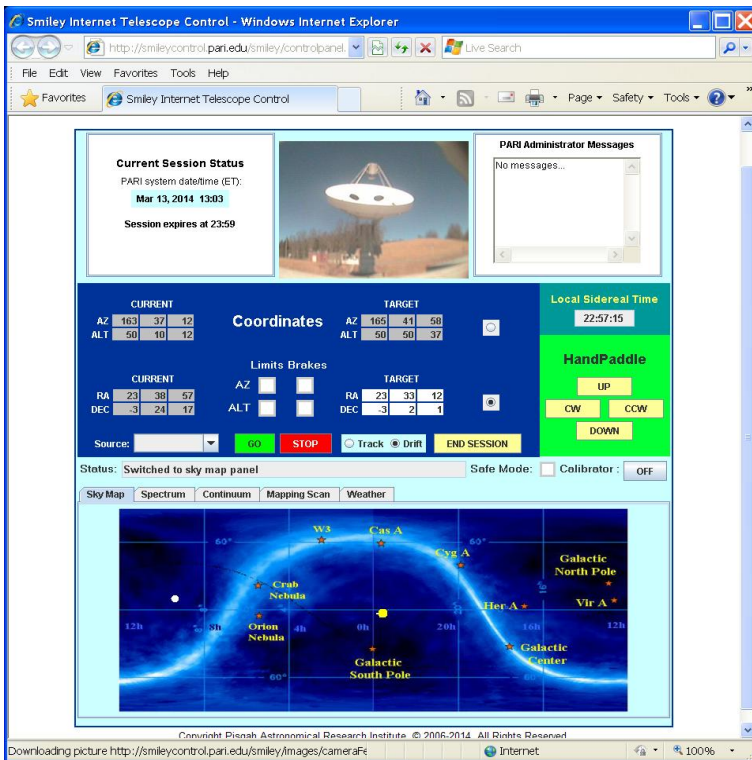
Dr. Castalez – SCOPE & SGRA Programs



SGRA

School of Galactic Radio Astronomy

Interactive Online Operation Using SMILEY (4.2m Radio Telescope)



SCOPE

Spectral Classification

Online Public

Exploration

SCOPE - Home Page - Mozilla Firefox

File Edit View History Bookmarks Tools Help

SCOPE - Home Page

scope.pari.edu

ngc m60

Edit Mail f m t Aol. f Search the Web

SCOPE

STELLAR CLASSIFICATION ONLINE

PUBLIC EXPLORATION

Welcome to SCOPE 2.1! (What's New)

Home The Science To Take Part Classify Classroom FAQ Contact Us

Welcome! New here? Sign up. Returning user? Log in.

Welcome to the Stars

Are all stars like the Sun?

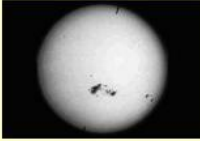
The answer to this basic question has driven the field of astronomy and astrophysics for nearly 100 years.

Explore the answer here by observing stars and comparing their features to those of the Sun - by classifying stars. Your participation will be a major contribution, observing stars never before classified. You can be the very first person to measure the temperature of a star never before measured! This is discovery in the purest sense of the word.

- To explore with us, click on [To Take Part](#).
- Learn more about stars, spectroscopy, and the data in this project by clicking on [The Science](#).
- If you have any questions, please do not hesitate to contact us. We are very interested in your comments.

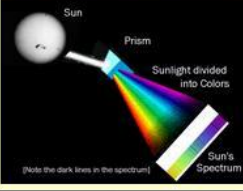
We hope you enjoy your visit and decide to work with the astronomers at the Astronomical Photographic Data Archive (APDA) at the Pápagh Astronomical Research Institute (PARI).

APDA is a collection of astronomical photographic plates taken over a period of nearly 100 years and safely archived at PARI. Roughly 33,000 of the plates contain information on the spectra of more than 1,000,000 stars (estimated). The plates were taken by generations of astronomers at many of the major observatories in the world. You can join this group of astronomers and explore the stars!



The Sun

- Surface Temperature: 6,000 C
- Composition: 73% Hydrogen and 25% Helium and 1.6% other by mass
- Diameter (photosphere): 1,391,980 km
- Mass: 1.99×10^{33} g
- Average Density: 1.41 g/cm³
- Luminosity: 3.83×10^{33} erg/sec
- Rotation Period: 25 days (equator)



Note the dark lines in the spectrum!

"Beyond the stars of the sixth magnitude you will behold through the telescope a host of other stars, which escape the unassisted sight, so numerous as to be almost beyond belief, for you may see there more than six other differences of magnitude, and the largest of these, which I may call stars of the seventh magnitude, or of the first magnitude of invisible stars, appear with the aid of the telescope larger and brighter than stars of the second magnitude seen with the unassisted sight."

-Galileo Galilei, in Sidereus Nuncius, March 1610.

This program is partially supported with funding from the National Science Foundation, grant DUE 0937824.

Select Plate and Spectrum Selection Display

SCOPE - Choose a Plate - Mozilla Firefox

SCOPE - Choose a Plate

scope.pari.edu/panelchooser.php

ngc.m60

CTIO-12307 * NEW STARS *

CTIO-8197 * NEW STARS *

Date Taken: 1971-03-03

[Get Additional Information About This Plate](#)

Plate	RA	Dec
CTIO-8197_BC NEW!	12:46:43.25	+06:10:21.51

- CTIO-131
- CTIO-1383
- CTIO-16495
- CTIO-16533
- CTIO-21731-19780531
- CTIO-21731
- CTIO-23065
- CTIO-2322
- CTIO-2329
- CTIO-2550
- CTIO-3364
- CTIO-3366
- CTIO-3484
- CTIO-3569
- CTIO-4991
- CTIO-6096
- CTIO-6099
- ctio-6115
- CTIO-6138
- CTIO-9656
- CTIO-T109

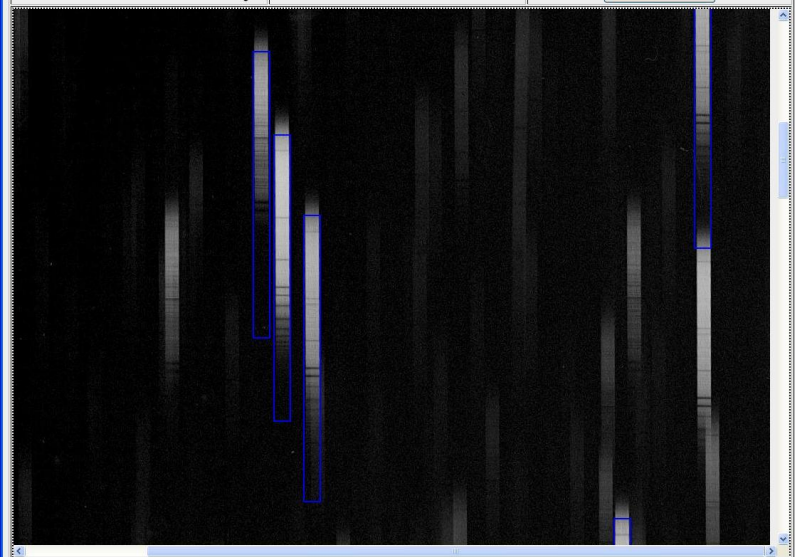
SCOPE - Star Chooser Applet - Mozilla Firefox

scope.pari.edu/starchooser.php?view=1140&w=870

Select a Star to Classify

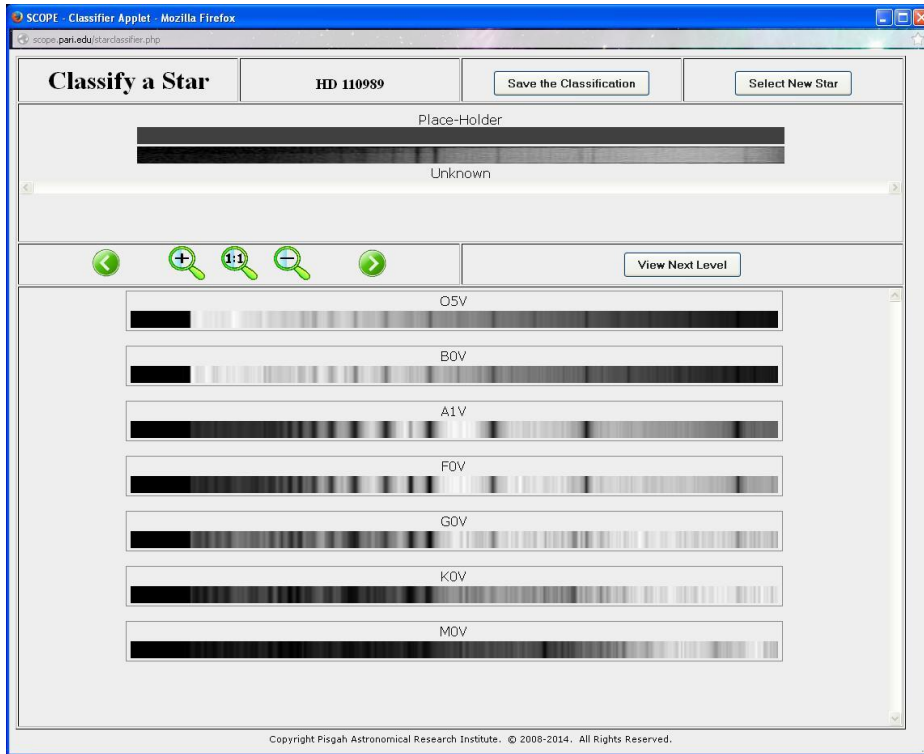
CTIO-8197_BC

Select New Panel



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Determine Spectral Classification Using Standard Star Spectra



PARI Plate Preservation Workshop 2007

32 Participants from USA, Canada and Europe



PARI Plate Preservation Workshop 2007

Workshop in Progress



Workshop Participants Examining Historic Plates

Simcoe, Skiff and MacConnell



ASTRONOMICAL PHOTOGRAPHIC DATA ARCHIVE

APDA

220,000 Plates and Films

Research Building



Research Building 2012-2013 Upgrades: Roofing, HVAC and ½ MegaWatt Backup Power



Heating, Air Conditioning and Humidity Systems



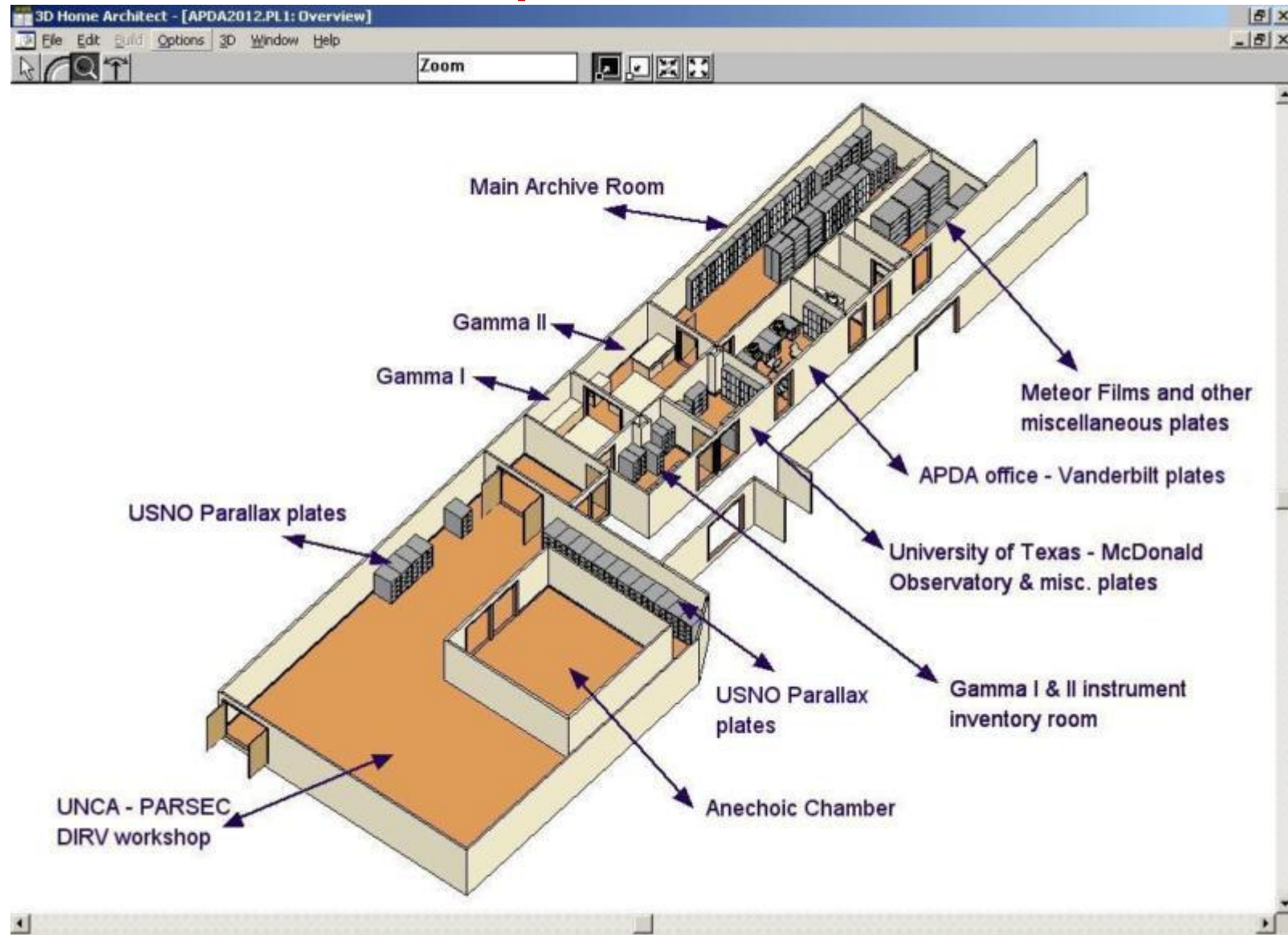
500KW Diesel Generator and Battery Backup System



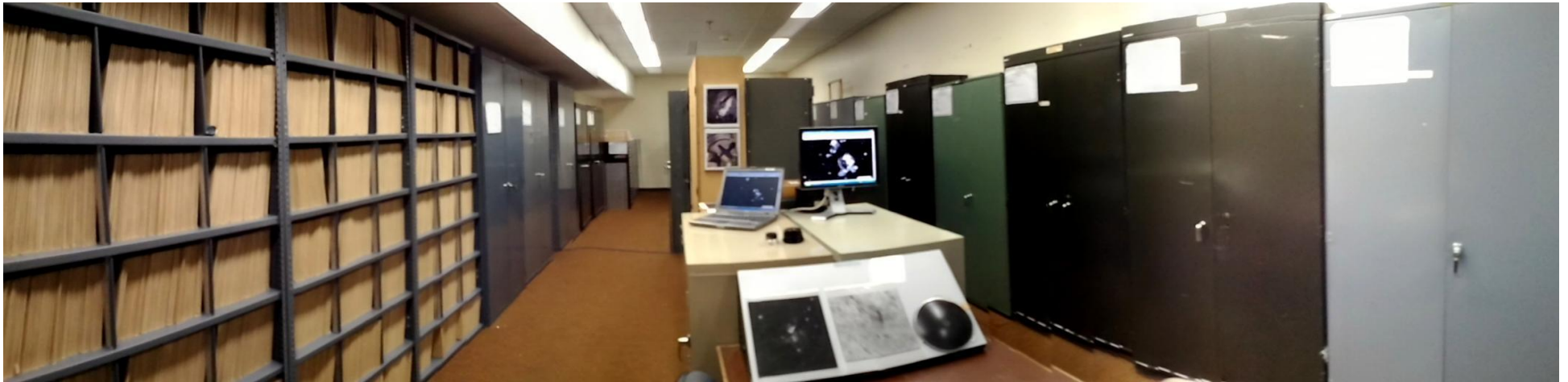
200 TByte Computer Systems – Research Bldg.



First Floor Space Allocation for APDA



Main Archive Room CWRU, U of Michigan and USNO



USNO Parallax Plates



McDonald Observatory Minor Planet Survey Plates



USNO Double Star Collection



Collections with over 1000 Images

U of Michigan (0.95m Reflector – slit spectra)

CWRU (Burrell-Schmidt 61/91cm)

U.S. Naval Observatory (D.C.)

CTIO (Curtis-Schmidt 61/91cm),

McDonald Observatory (2.1m)

Maria Mitchell Observatory

Harvard/Smithsonian Meteor Photographic Survey
(Baker Super-Schmidt 32cm 55° FoV)

Meteorite Recovery Program (Baker-Nunn Cameras)

Mauna Loa Solar Observatory - disk and limb images

Spectral Surveys 1 of 2

HK Survey 4-deg prism

A-Stars Survey 1.8-deg prism

He Survey UV filters

High Luminosity Survey

IR Survey 4-deg prism

Red Survey 4-deg prism

OB Survey 4-deg prism

QSO Survey 1.8-deg prism

SGP Survey 1.8-deg prism

NGP Survey 1.8-deg prism

All-Sky Survey 4-deg prism

Blue Survey 10-deg prism

Spectral Surveys 2 of 2

AntiCenter Survey 4-deg prism

Weak Metalicity Survey 4-deg prism

6-Degree Survey 6-deg prism

Low-Z Survey 4-deg prism

LS1-VI Luminous Stars Survey 1.8-degree prism

Parallax Survey (non-USNO) Direct images

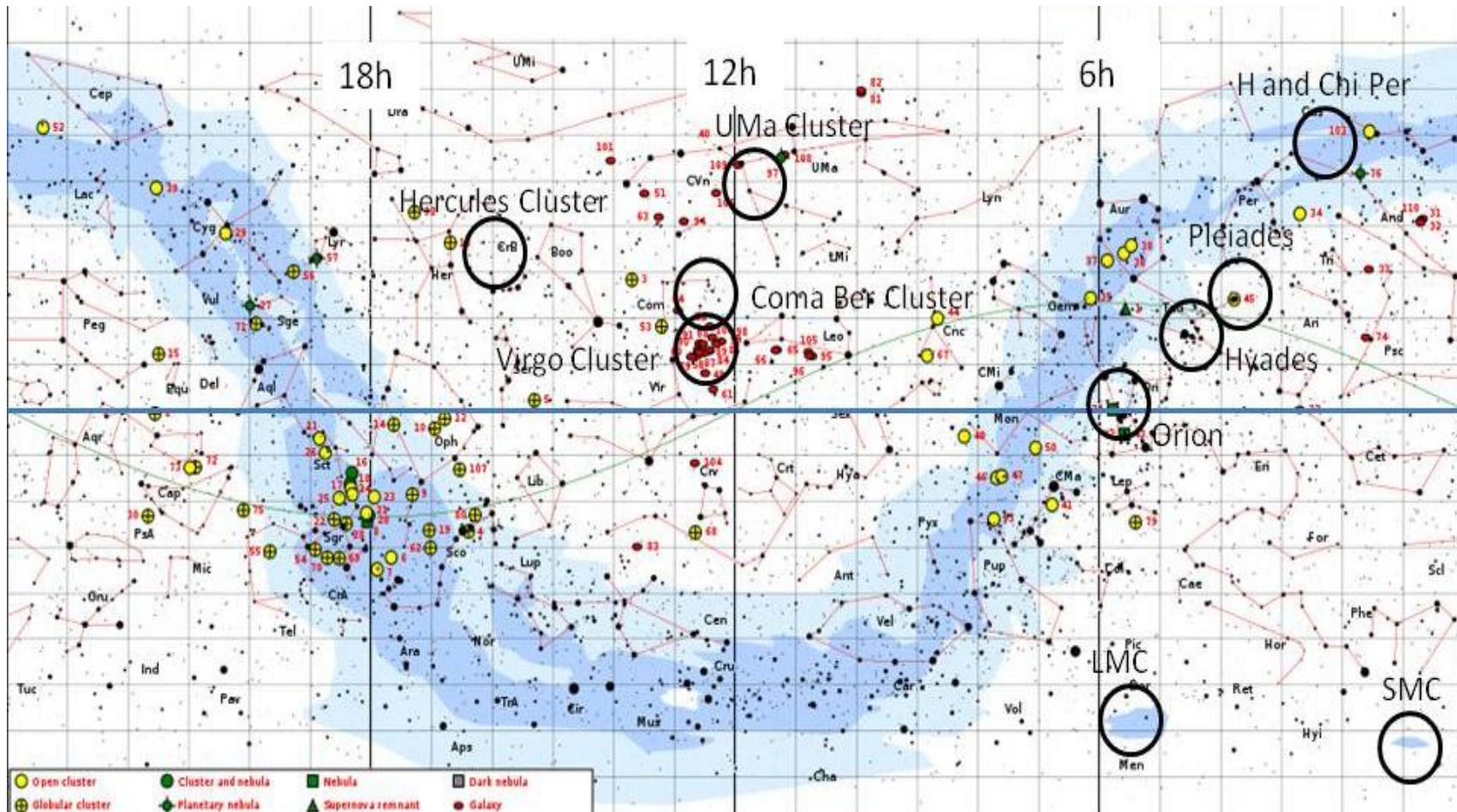
SGH Survey 2 or 6 degree prisms

Henize H-alpha Southern Survey 4-degree prism

Taurus 6-degree Survey 6-degree prism

UV-Survey 1.8-degree prism

Fields - Messier Objects, Clusters etc.



N11 in LMC - 1.9m Pretoria S.A.



CTIO 4m Blanco Telescope Image 500nm Filter - 50nm Bandpass

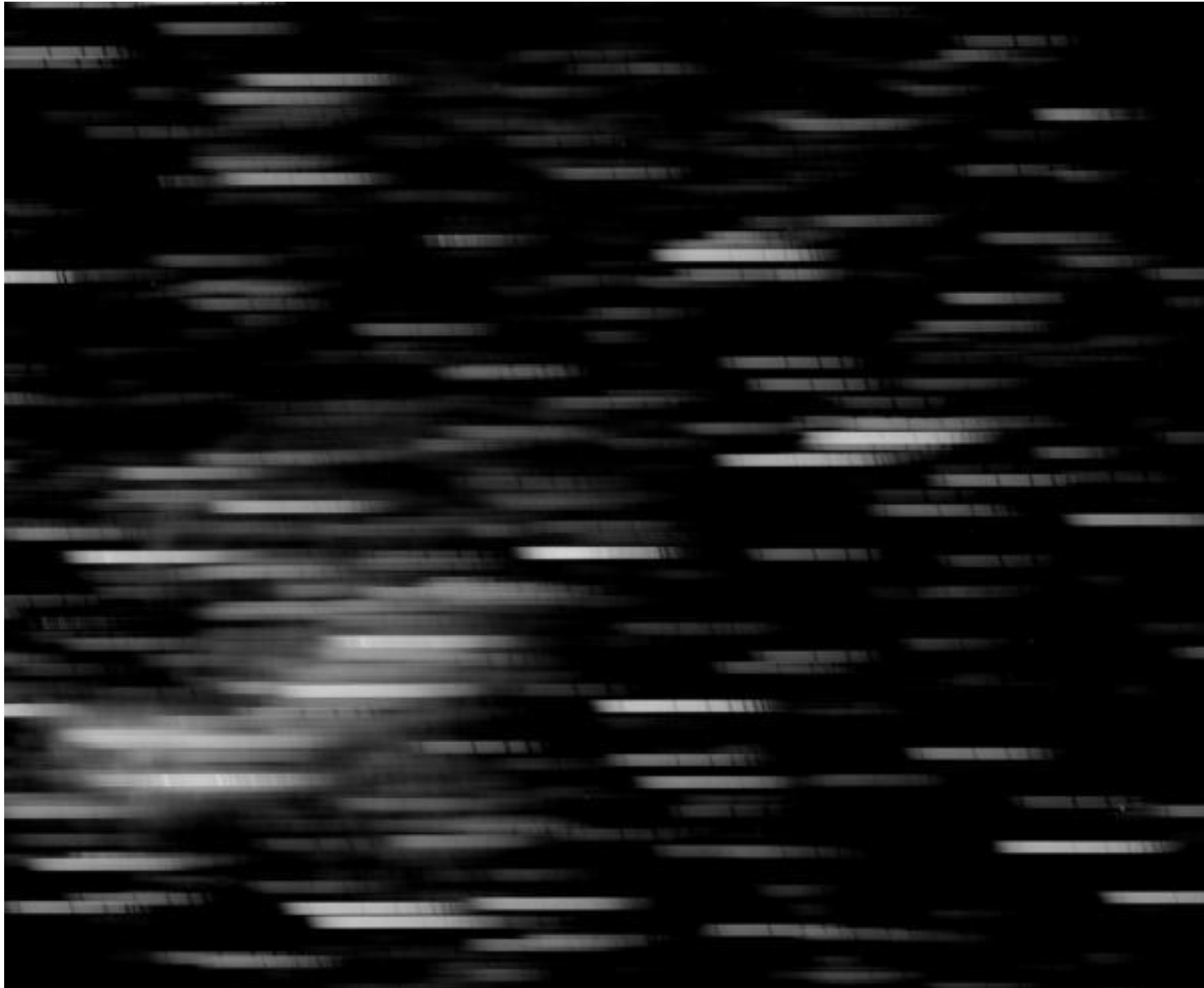


CTIO 4m Blanco Telescope Image



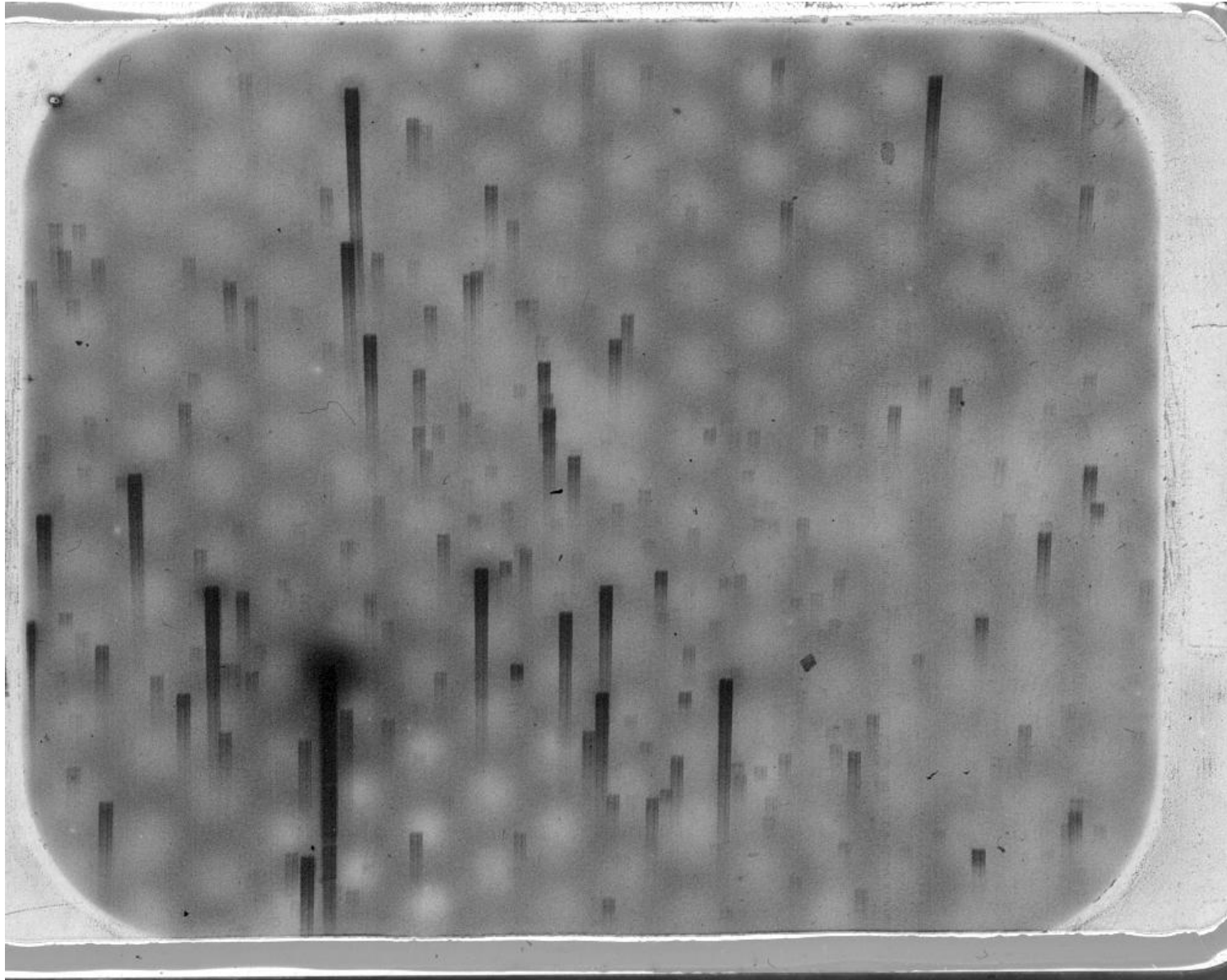
Curtis Schmidt (61/91cm) – CTIO

10⁰ Objective Prism Blue Survey Image (Houk)



SKYLAB 1973-1974

Experiment S019 - UV line spectra



Lost City Meteorite Image – January, 1970

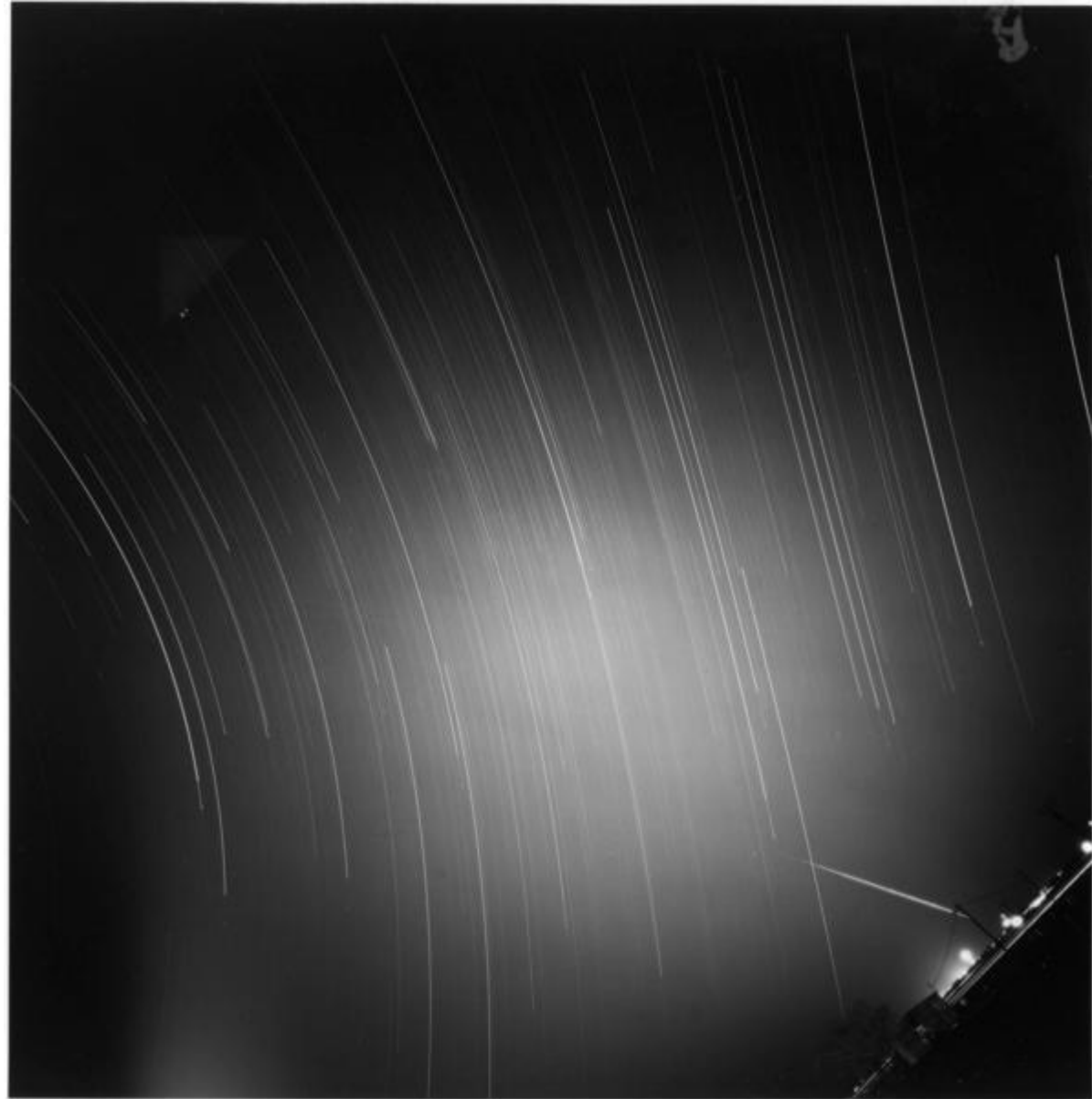
**Harvard
Smithsonian
Meteorite
Recovery
Program**

1963-1974

8,000 Images

**Baker/Nunn
Cameras**

**Central USA
11 State
Coverage**



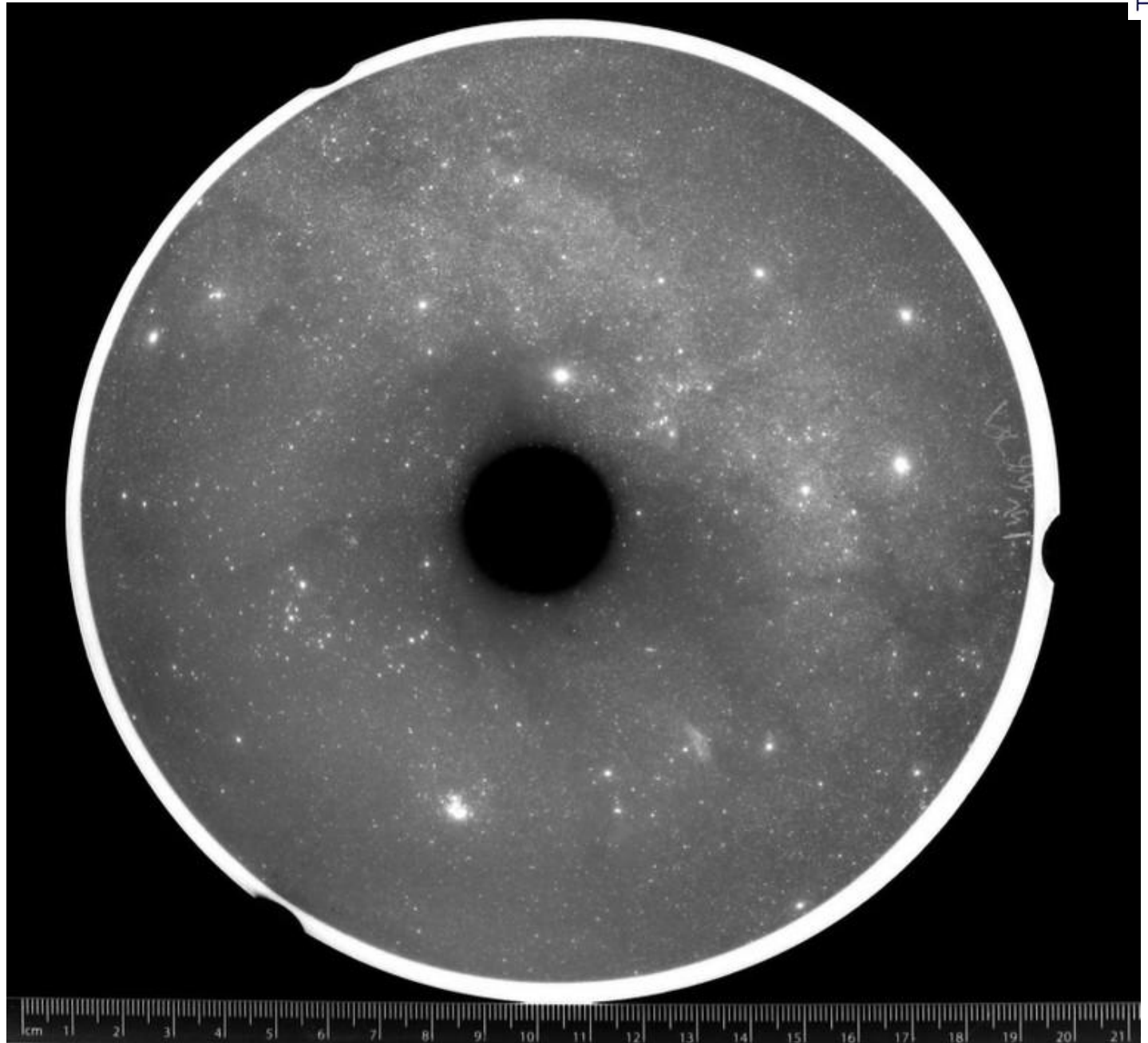
**Harvard
Smithsonian
Photographic
Meteor Survey
Program**

1952-1957

35,000 Films

**Two Baker
Super-Schmidt
Cameras**

32cm f0.8 55° FoV



Solar Limb Image from MLSO



Dr. Castelaz Tour of APDA – Duke TIP Students



PARI Visitors - Weekly Tour of APDA

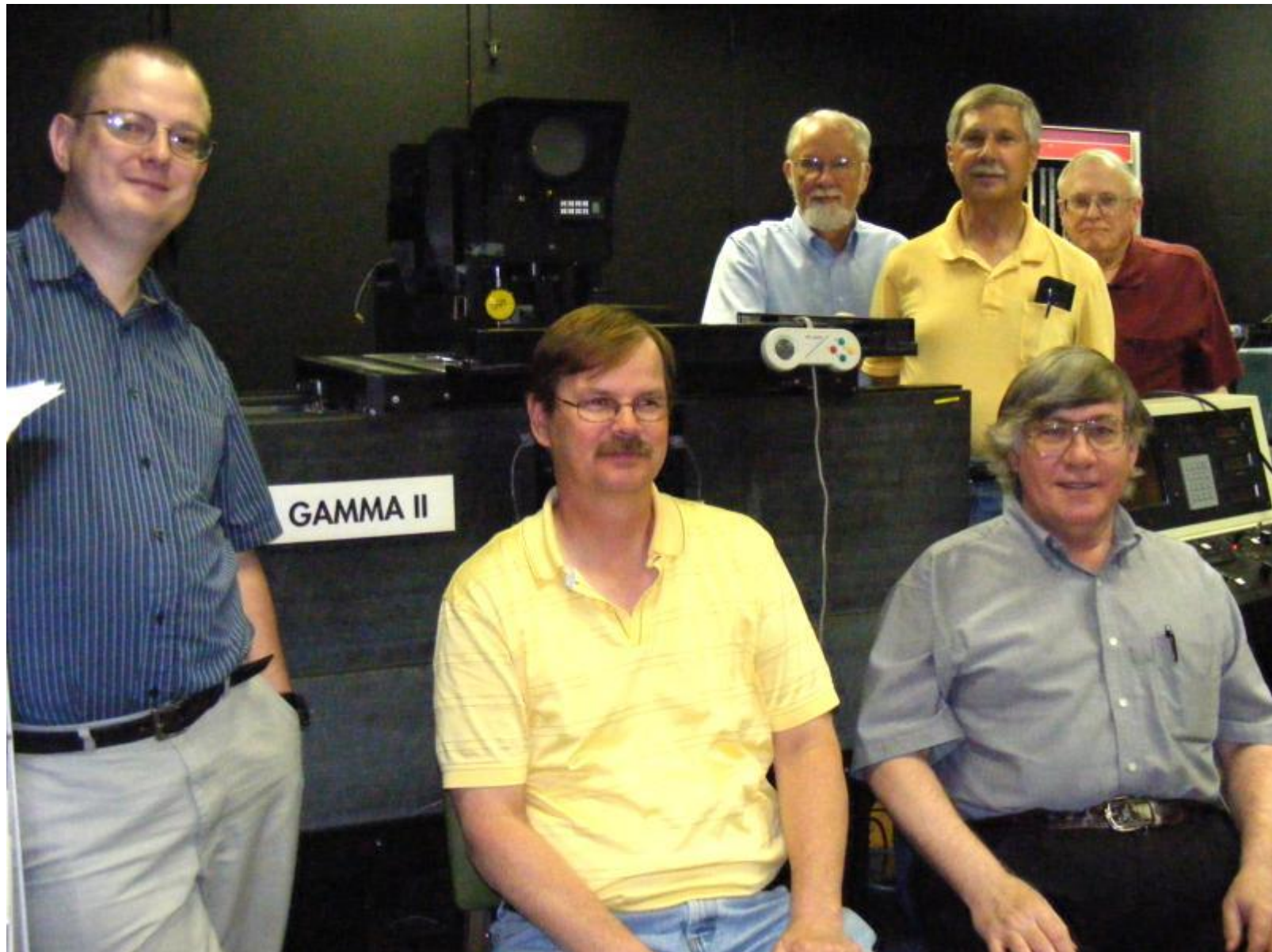


GAMMA II – Perkin Elmer 2020G PDS Base



GAMMA II Restoration Personnel

GAMMA II Renamed - AME

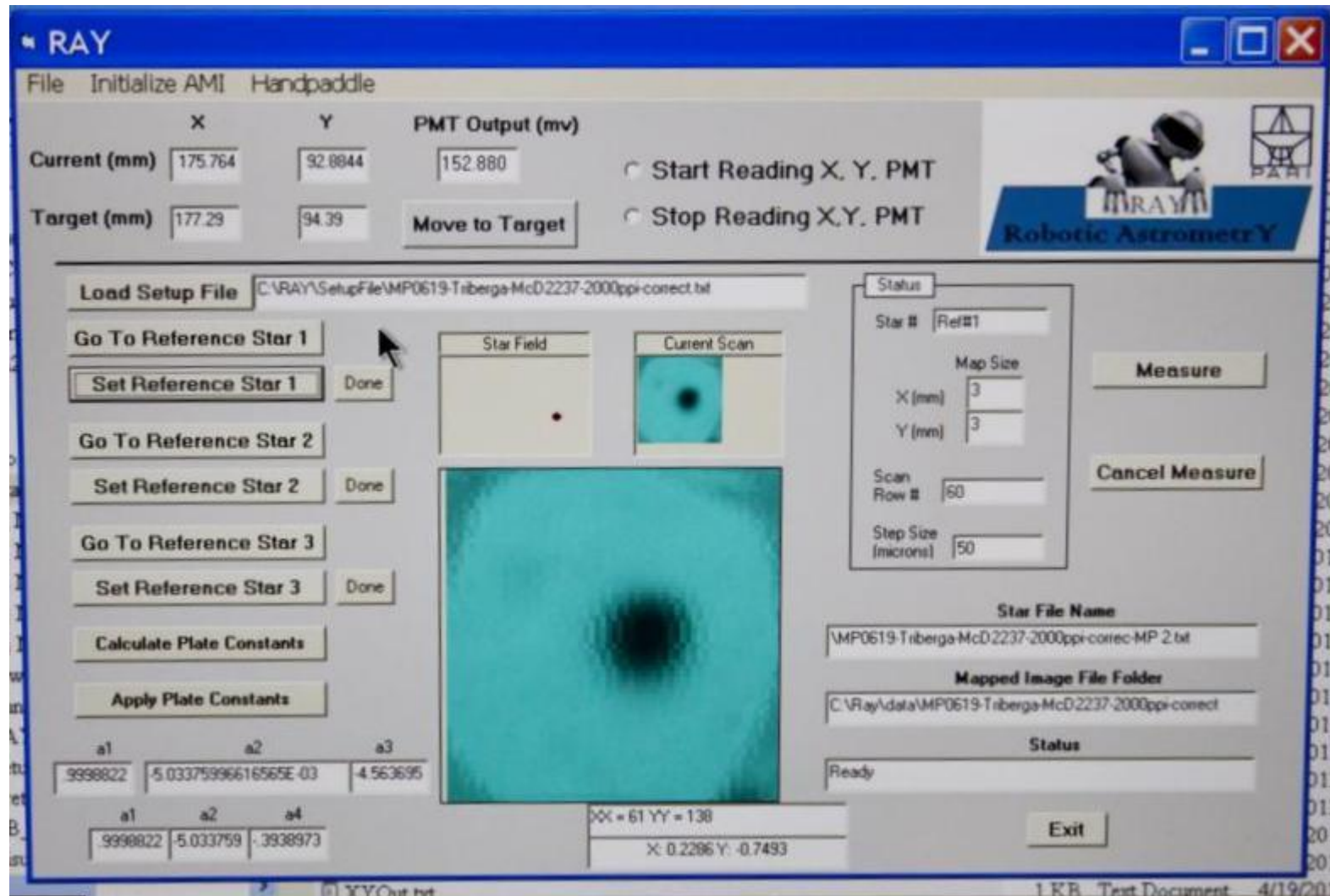


Drs. Castelaz & Hemenway – Minor Planet Project

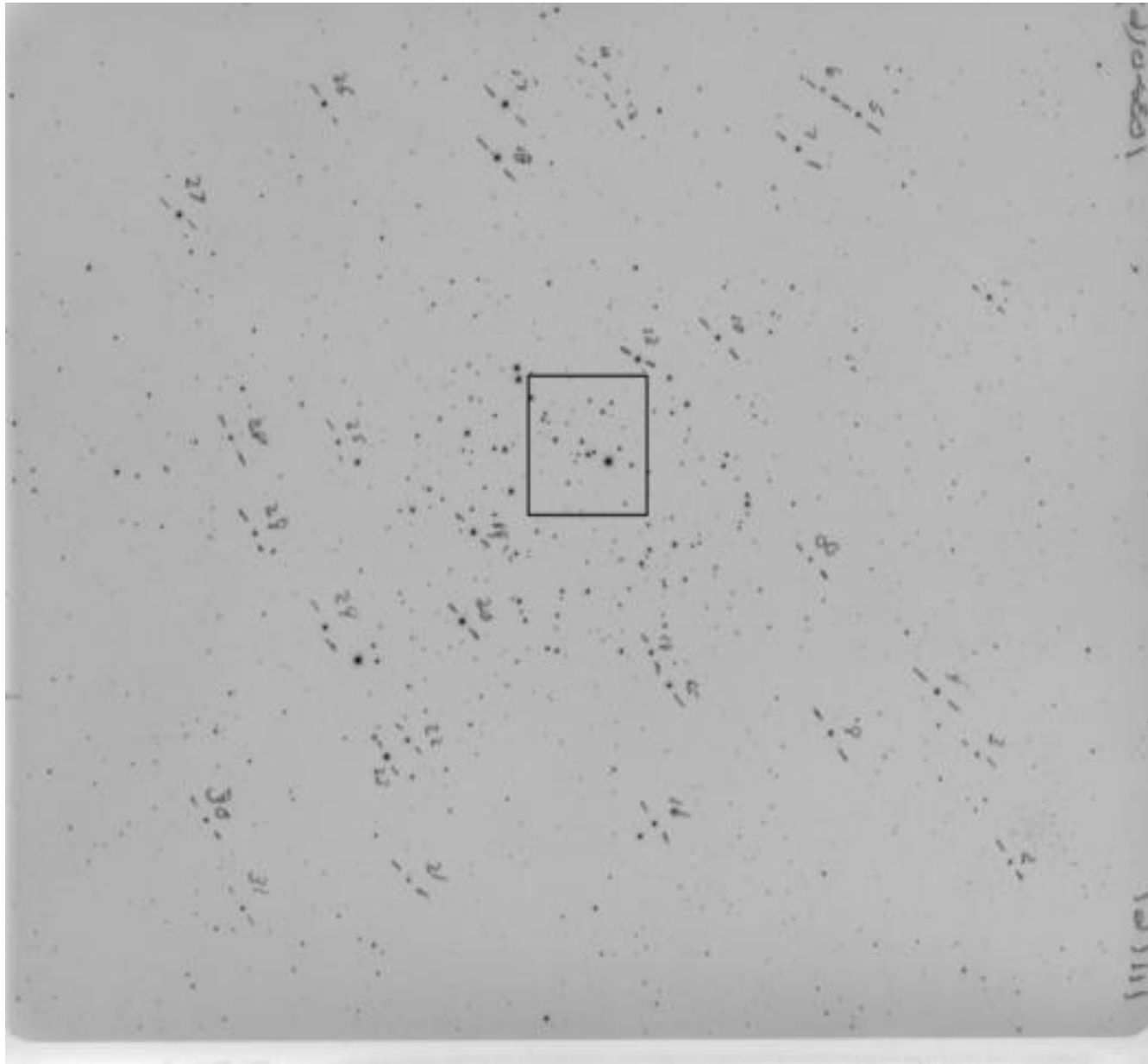


AME Control Software Programmed at PARI

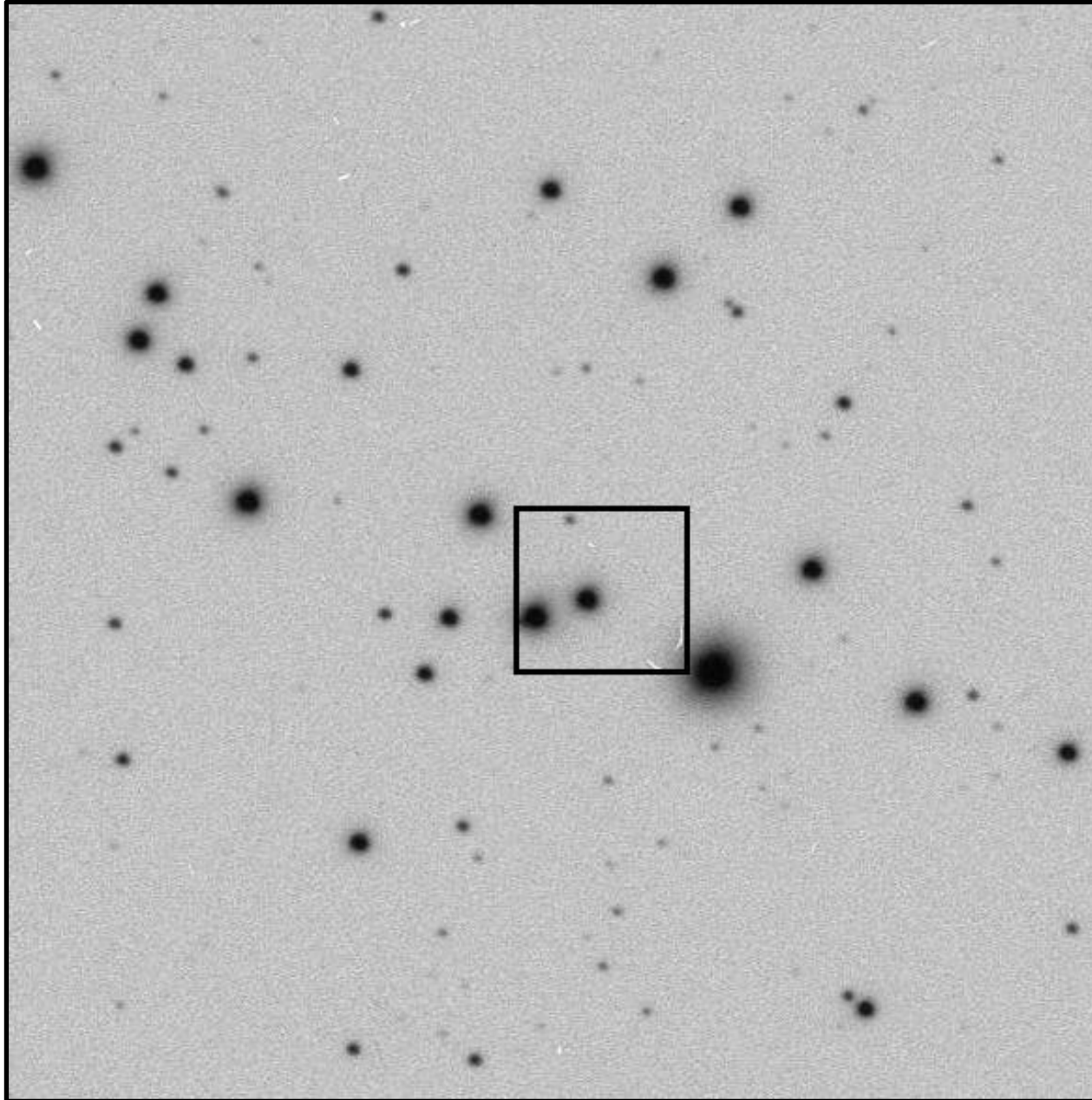
Minor Planet Project



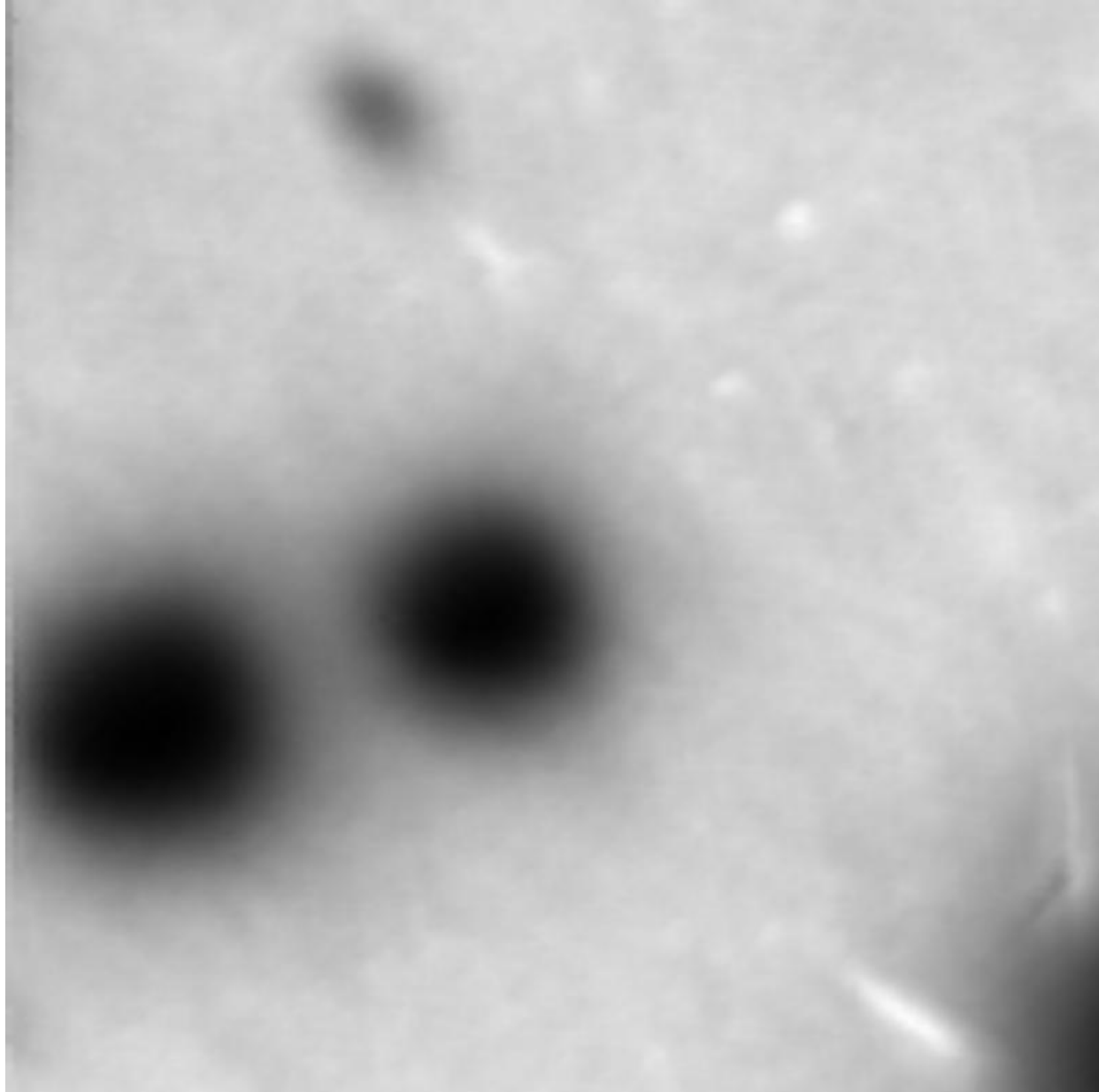
Allegheny Observatory – M35 Plate 111161



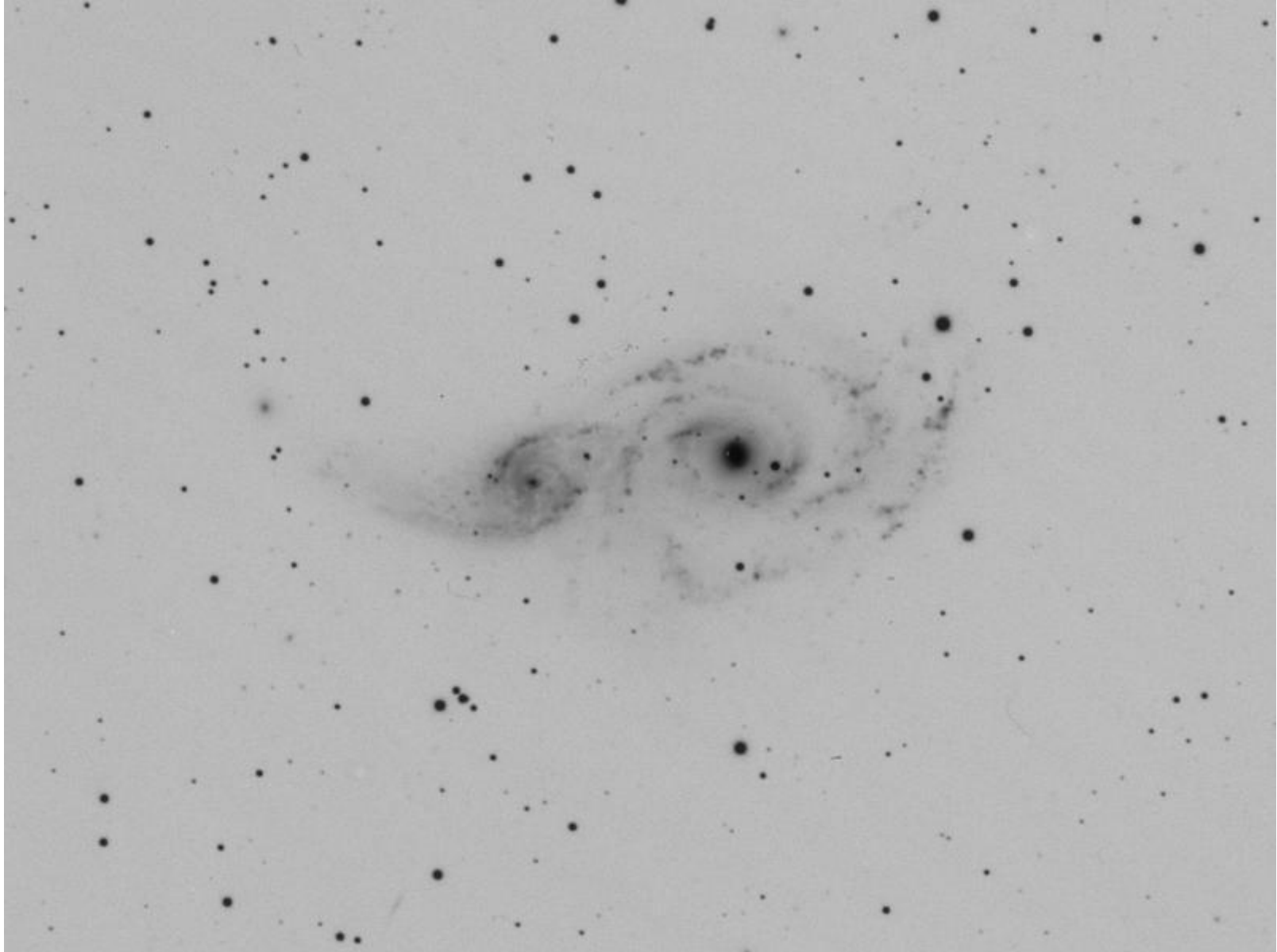
AME - Test Section



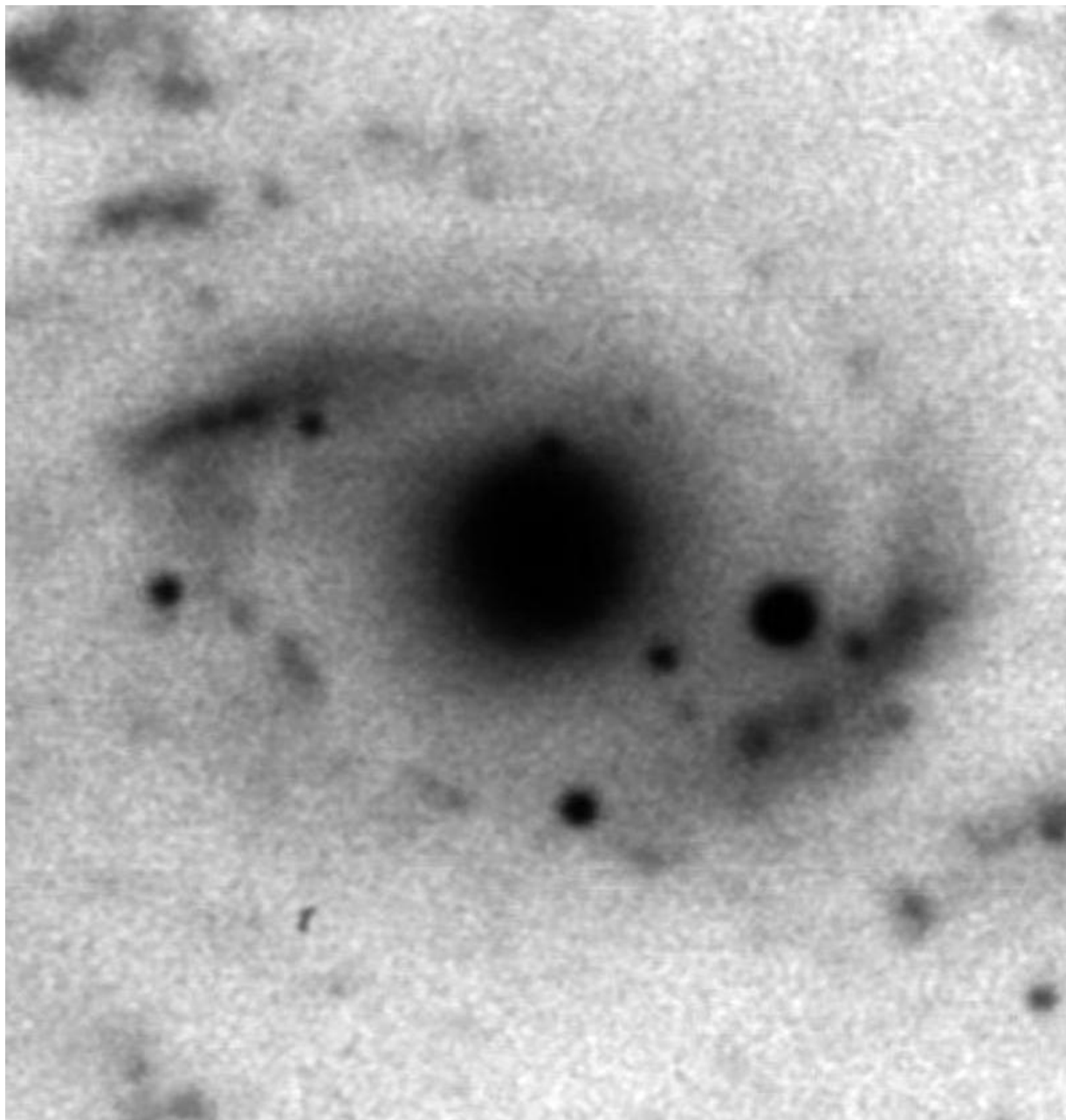
AME Scan - 4mm x 4mm area - 20 μ m pixels



KPNO 4m Telescope Image of IC2163 & NGC2207



AME Scan - 4mm x 4mm 12 μ m Pixels



PISGAH ASTRONOMICAL RESEARCH INSTITUTE

AND

ASTRONOMICAL PHOTOGRAPHIC DATA ARCHIVE

www.pari.edu

Cosmic Front – NHK-TV, EMC-TV, Exploring NC, KQED-Quest