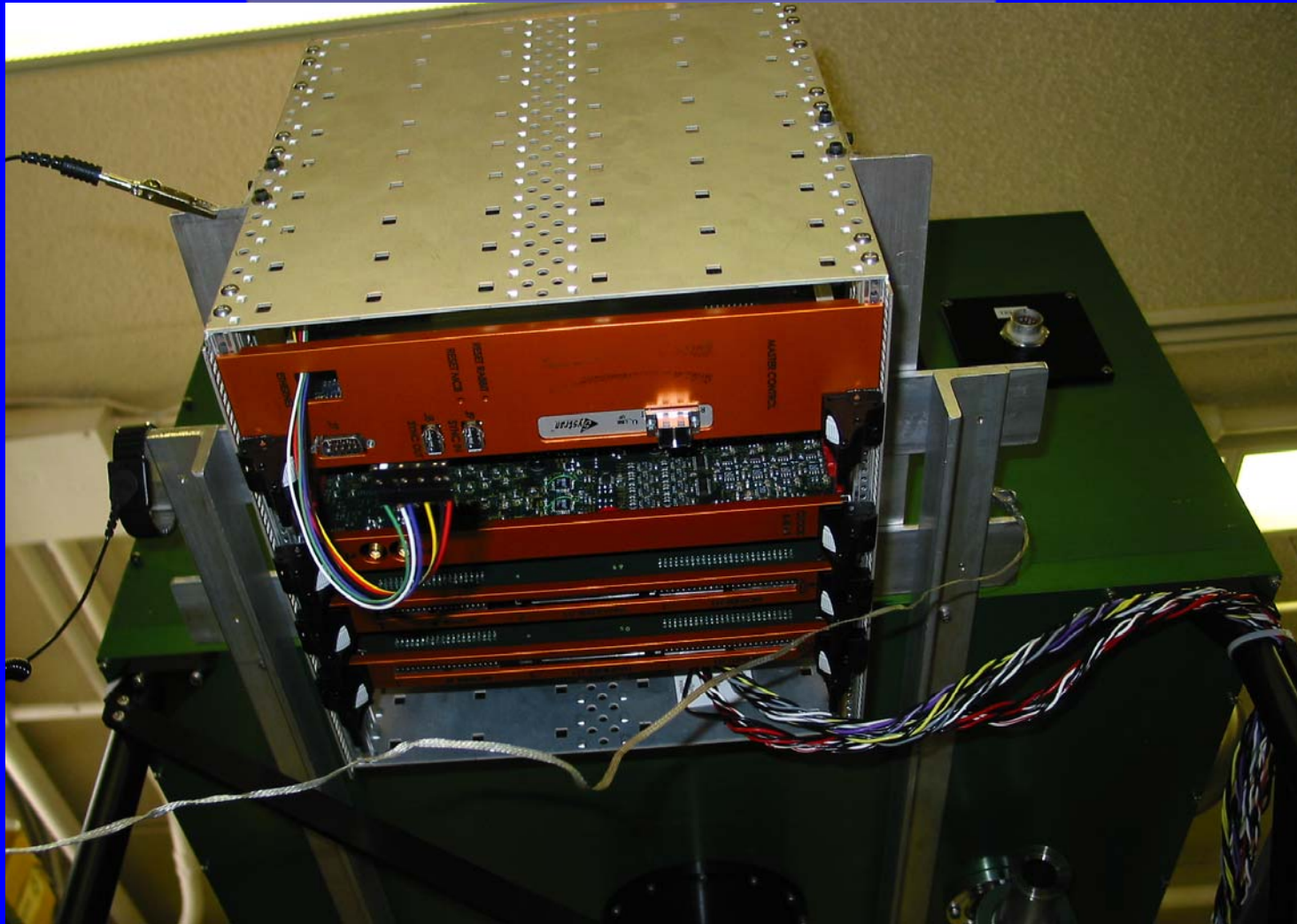# MONSOON

Mark Hunten   NOAO MI Program

MONSOON

- Detector-limited image acquisition for the next generation of astronomical instruments

- Scalable, multichannel, high-speed image acquisition system

- Designed for large pixel count detectors & Mosaics

Why is MONSOON needed?

- We need new technology for reading out
  - New mosaics of 2k x 2k IR arrays
    - 64 outputs x 4 arrays => 256 parallel channels
    - File sizes of 80MB (sub) to 160MB (sep) *per frame*
  - New mosaics of CCDs
    - OTAs with 8x8 OT cells on each chip
    - Large focal plane arrays of OTAs - ODI
    - Large focal plane arrays of CCDs

What is MONSOON?

NOAO present implementation in hardware:

- High speed parallel data acquisition for focal plane mosaics
- IR and Visible flavors
- Compact form factor with low power dissipation
- Focused on detector control vs. instrument control

Why would I want one?

- Good for controlling new high pixel count mosaics
  - NEWFIRM (4 OrionII devices) requires a system with 256 IR channels
  - ODI requires controlling 64 OTA CCDs, each with 8 channels (256 CCD inputs)
- Cost effective
  - PAN is based on PC technology with Linux
  - Present custom boards moderate in cost

Where is MONSOON now?

- IR version
  - Lab system deployed and taking data for the Orion IR array project
- CCD version
  - 8 channel version in firmware development

Picture taken with a warm Orion II MUX 5/17/04

Where is MONSOON now?

- First revision of most hardware completed
- Systems in progress:
  - NEWFIRM system – 4 2kx2k IR arrays
  - WIYN OTA CCD test system
  - KPNO CCD evaluation system
  - Lab systems for North & South development
  - 2 CCD Test Station systems for U of IL
  - FHiRE CCD system for Indiana University

Where is MONSOON going?

- In the future:
  - WIYN QUOTA CCD system – 4 OTA mosaic
- Potential Instruments
  - WIYN ODI CCD system – 64 OTA mosaic
  - WIYN WHIRC IR system – 1 IR array
  - Gemini HRNIRS – 4 2kx2k IR arrays
  - DECAM 30 – 4kx4k CCDs
  - LSST

MONSOON

- Staff spread across NOAO North and South
  - 4.5 FTE North + 20% WIYN Engineer
  - 1.5 FTE South
- Major challenges – Testing, firmware and software
  - Recruited help at NOAO South for testing of NEWFIRM IR Acquisition boards
  - Engineers at both sites write firmware

MONSOON - Future plans

- High speed analog front end for CCDs
  - Needed for megapixel rate cameras
  - Allows oversampling for noise reduction
- Miniaturization/denser packaging
  - Needed for LSST type applications
  - Nice for smaller dewars and retrofits
- Encourage collaboration with other groups
  - Development of digital front ends
  - Development of a compact CCD system