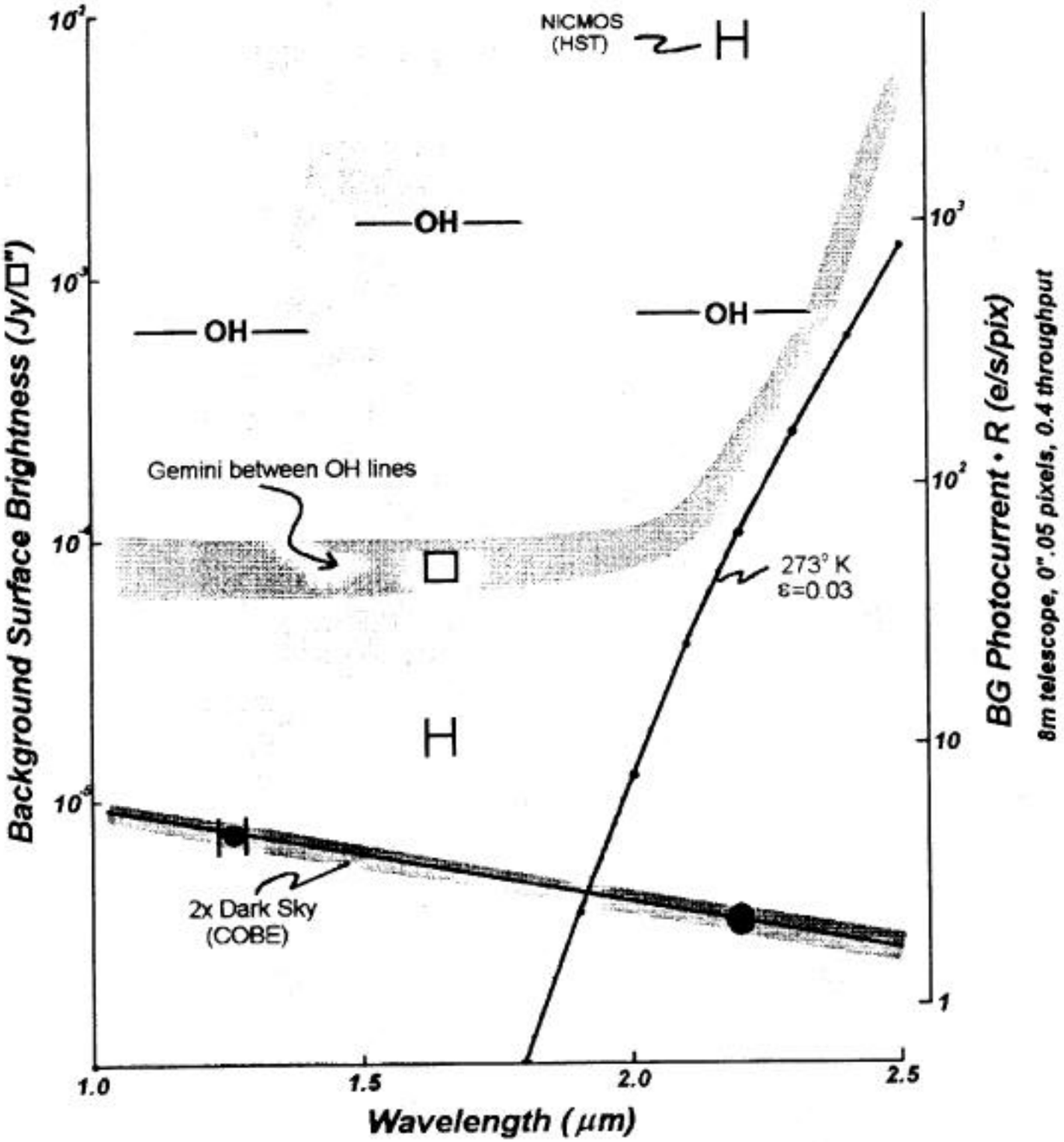
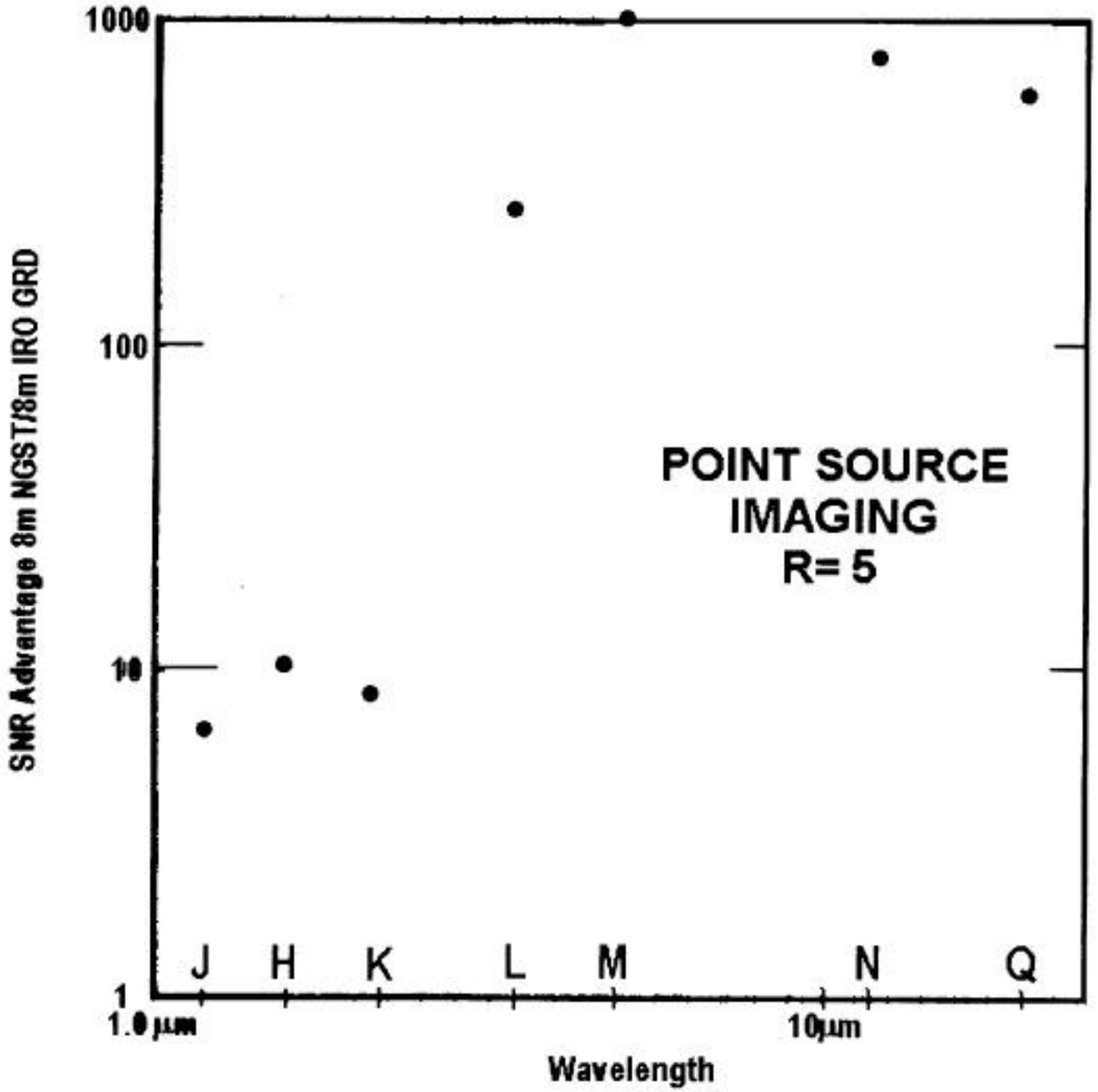
SNR Comparison
8m NGST and 8m IRO on GRD

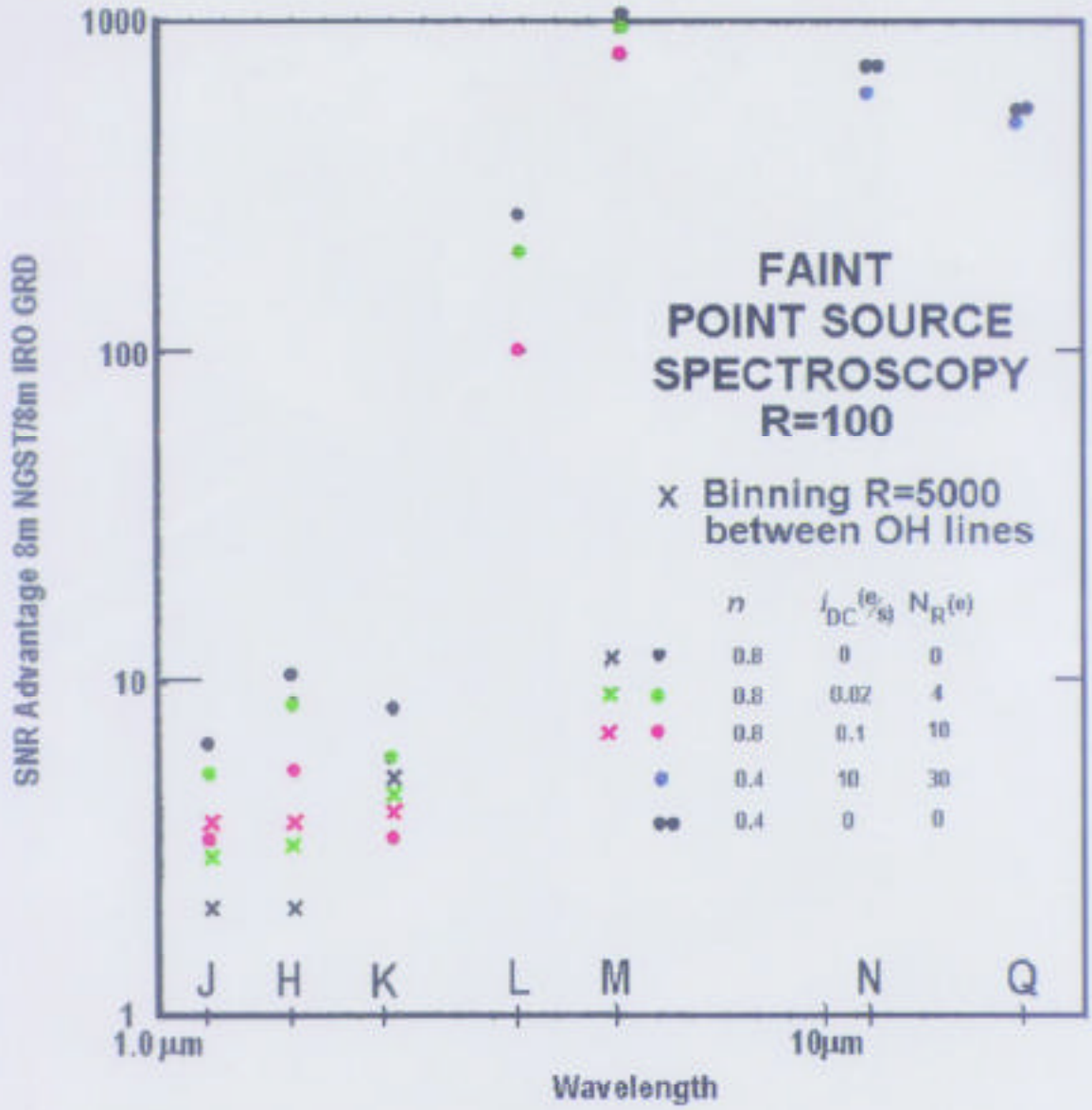
- **In Atmospheric Windows**
- **Telescope Temp/Emissivity**
  - IRO: 273°K/0.02
  - NGST: 30 °K/0.05
- **Sky Background**
  - NGST: 2x COBE Minimum
  - IRO: 273 °K, 1mm H_2O, Mauna Kea
- **Image Size/Slit Width**:
  - $\lambda < 3.5\mu m$ $\Omega = 0.01\square''$
  - $\lambda > 3.5\mu m$ $\Omega = 0.01\square'' \times (\lambda / 3.5)^2$
    - » NGST: 50% of Point Source within Ω
    - » 8m IRO: 70% of Point Source within Ω for $\lambda \leq 2.2\mu m$, 50% for $\lambda \geq 3.5\mu m$
- **Pixel Size:** 4 pixels/Ω
- **Photon Throughput to Detector:** 0.54
- **Maximum Exposure Time**
  - IRO: 4000 sec
  - NGST: 1000 sec

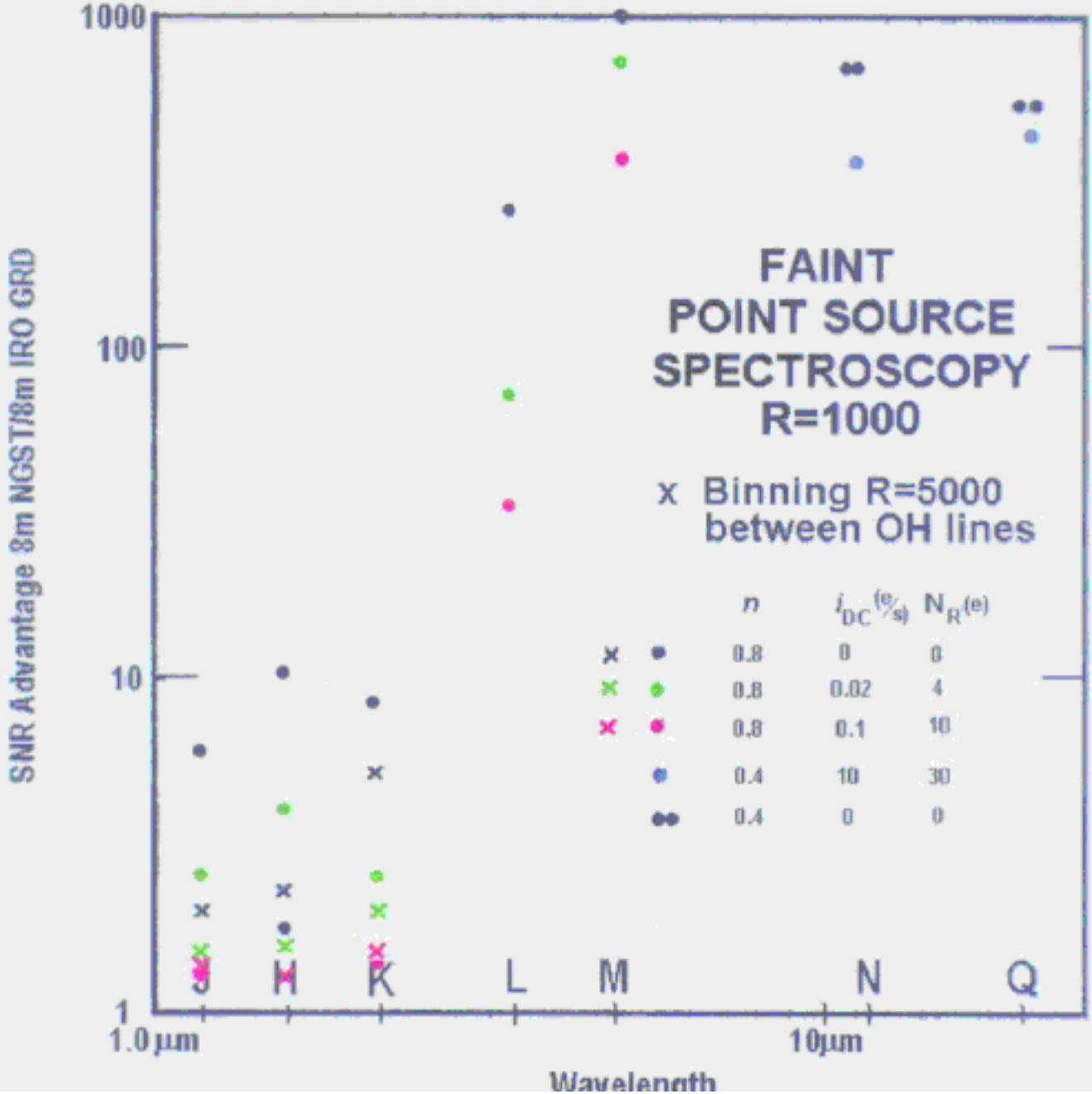
Near IR Sky Backgrounds




1000
100
10
1
SNR Advantage 8m NGST/8m IRO GRD
POINT SOURCE
IMAGING
R= 5
J
H
K
L
M
N
Q
1.0 µm
10µm
Wavelength

GEMINI


FAINT
POINT SOURCE
SPECTROSCOPY
R=100
x Binning R=5000
between OH lines
n
j_{DC} (e⁻/s)
N_R (e)
0.8 0 0
0.8 0.02 4
0.8 0.1 10
0.4 10 30
0.4 0 0
SNR Advantage 8m NGST/8m IRO GRD
1000
100
10
1
J
H
K
L
M
N
Q
1.0 µm
10µm
Wavelength


1000
100
10
1
SNR Advantage 8m NGST/8m IRO GRD
FAINT
POINT SOURCE
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R=1000
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between OH lines
n
i_{DC} (e/s)
N_R (e)
0.8 0 0
0.8 0.02 4
0.8 0.1 10
0.4 10 30
0.4 0 0
J
H
K
L
M
N
Q
1.0 µm
10µm
Wavelength

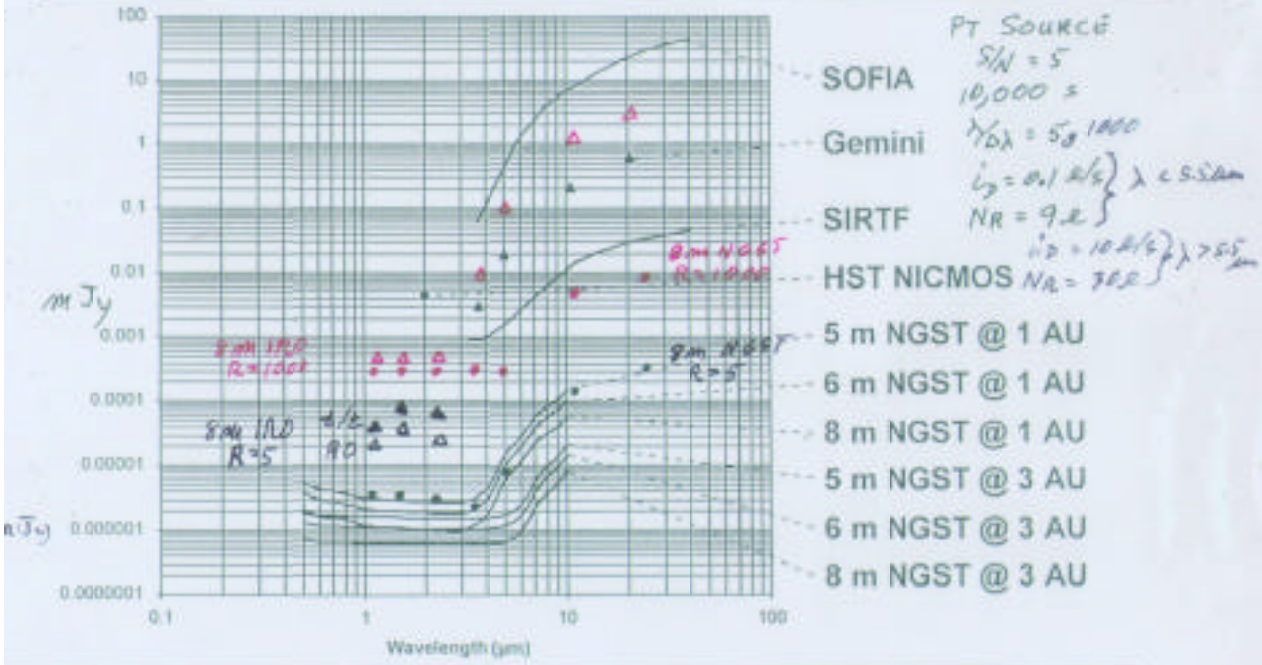
NGST

CAN Study

Comparative Imaging Sensitivities

LOCKHEED MARTIN

Civil Space Programs



Team Members:
Eastman Kodak, Harris Corp., L'Garde Inc., Thermotrex, Composite Optics Inc., Garman Systems Inc., Allied Signal Aerospace, CIT/JPL, University of Arizona, Princeton University, MIT, STScI, MSFC.

Chart 1
LMMS MM