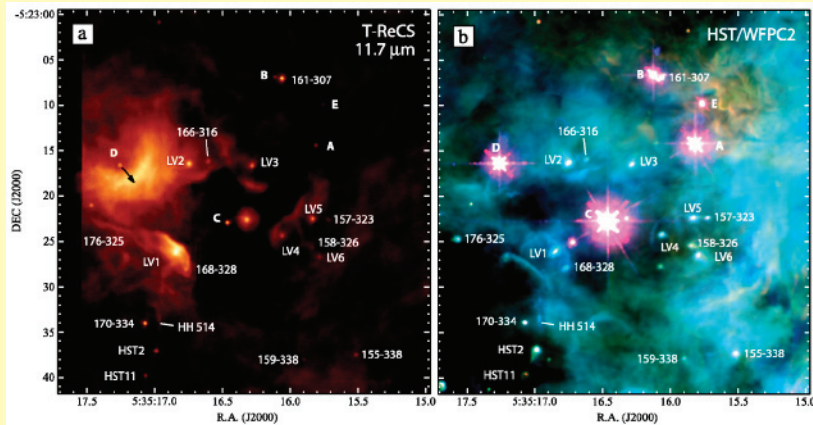
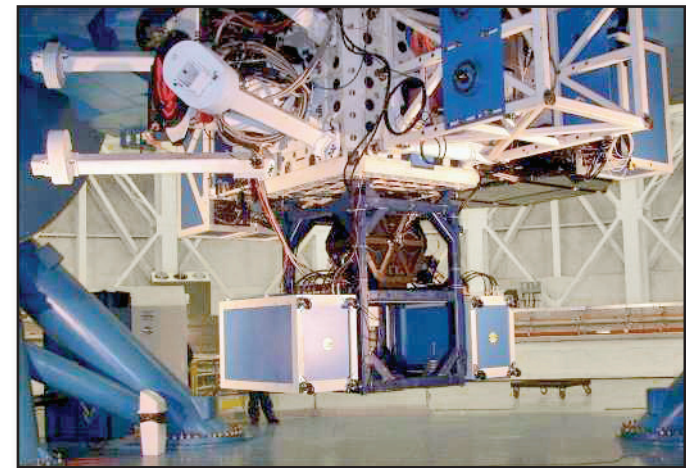


# T - ReCS

## Mid-IR Imager and Spectrograph



Close-up of the Trapezium region (a) at 11.7  $\mu\text{m}$  with T-ReCS and (b) with *HST* WFPC2. The 11.7  $\mu\text{m}$  image is in false color, while the *HST* WFPC2 image has [O III] in blue,  $\text{H}\alpha$  in green, and [N II] in red. The 0.35 arcsec diffraction-limited resolution facilitates direct comparison of the structures seen in the mid-IR (stars, proplyds and dusty arcs marked in the images) with those in the *HST* image. Courtesy of Nathan Smith [from Smith et al., 2005, AJ, 130, 1763]



*T-ReCS mounted on the uplooking port of Gemini South.*

Offered at **Gemini South**

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Queries for Gemini-specific issues should be directed to the Gemini HelpDesk at:  
<http://www.gemini.edu/sciops/helpdesk/helpdeskIndex.html>



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**T-ReCS (Thermal-Region Camera Spectrograph)** is a mid-infrared imager and long-slit spectrograph available at Gemini South. The instrument design is relatively simple and is optimized for low thermal background, high throughput, and excellent image quality. The Gemini South telescope is the first 8- to 10-m class telescope with a silver coating. This reduces the thermal emissivity of the telescope, thus increasing the sensitivity and performance of T-ReCS. T-ReCS yields nearly diffraction-limited 10  $\mu\text{m}$  images under most seeing conditions.

## Overview of T-ReCS Capabilities

### Science Modes

Broad-band (N, Q) and narrow-band filter imaging

Low-resolution long-slit spectroscopy:

R ~ 100 near 10  $\mu\text{m}$ , R ~ 80 near 20  $\mu\text{m}$

Medium-resolution long-slit spectroscopy:

R ~ 1000 near 10  $\mu\text{m}$

### Wavelength Coverage

Optimized for 8-26  $\mu\text{m}$  (imaging and R ~ 100 spectroscopy)

R ~ 1000 spectroscopy 8-13  $\mu\text{m}$

### Detector

Raytheon 320x240 pixel Si:As IBC array

Switchable-capacitance: deep-well mode for broad-band imaging, medium-well mode for spectroscopy

### Imaging

Diffraction-limited image quality: FWHM <0.4" near 10.0  $\mu\text{m}$ , 0.75" at 24  $\mu\text{m}$

Pixel size = 0.09" (fixed)

Field of view = 28.8"x 21.6"

Filters: Standard broad-band filters and various narrow-band filters, covering the 10 and 18  $\mu\text{m}$  silicate features and a variety of nebular lines, are available.

### Long-slit Spectroscopy

Slit length = 21.6"

Slit widths = 0.21" to 1.3"

Pixel size in spatial direction = 0.09" (fixed)

Low resolution spectroscopy modes encompass the entire N and Q band atmospheric windows.

Grating	dispersion ( $\mu\text{m}/\text{pxl}$ )	wavelength coverage $\Delta\lambda$ $\mu\text{m}$
low res (10 $\mu\text{m}$ )	0.22	7.1
low res (20 $\mu\text{m}$ )	0.033	10.6
hi res (10 $\mu\text{m}$ )	0.0019	0.6

### Wavefront Sensing

No on-board infrared sensors, uses telescope peripheral wavefront sensors.

### Imaging Sensitivity (S/N = 5, 30 min on source):

Filter Name	Wavelength (microns)	Point Source Sensitivity (mJy)	Magnitude Equivalent
Si-1	7.77	6.7	9.9
Si-2	8.73	1.4	11.4
Si-3	9.68	3.4	10.2
Si-4	10.37	2.2	10.5
Si-5	11.63	1.6	10.5
Si-6	12.29	2.7	9.9
N	9.83	1.4	11.1
Qa	18.06	21	6.8

Information herein adapted from Gemini Web pages.

For complete information, please see:

<http://www.gemini.edu/sciops/instruments/t-recs>