

AN *HST* SURVEY OF THE INNER ORION NEBULA

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RESUMEN

Se usó la nueva cámara de gran campo del *Telescopio Espacial Hubble* para obtener imágenes de 12 regiones contiguas en la parte interna de la Nebulosa de Orión, con filtros que aislan las emisiones de [O III], [N II] y $H\alpha$ y un filtro de banda ancha similar a V . Las 12 imágenes se han combinado formando un mosaico de la región de Huygens de la nebulosa. Esta imagen revela muchos más detalles que lo conocido previamente.

ABSTRACT

The new *HST* wide field camera has been used to image 12 contiguous regions in the inner part of the Orion Nebula in filters isolating the strongest emissions of [O III] and [N II], $H\alpha$ and a wide bandpass approximating V . The 12 image sets are being combined into a mosaic image of the Huygens region of the nebula. This image reveals vastly more detail than any previous investigation.

Key words: H II REGIONS — ISM: INDIVIDUAL OBJECTS: THE ORION NEBULA

1. INTRODUCTION

No other H II region commands the interest of the Orion Nebula, NGC 1976. It represents a uniquely close H II region with an associated, very dense cluster of young stars (Herbig 1982) and has been the subject of numerous studies with many observing techniques, each new investigation revealing new characteristics. It was, therefore, only appropriate that it should be the subject of a major investigation by the *Hubble Space Telescope* (*HST*).

2. OBSERVATIONS

Twelve fields of view have been imaged with the *HST*. The first field was imaged as the first set of scientific observations made after the refurbishment mission in December 1993 and the other eleven were imaged over the interval December 1994 through March 1995. In each case the filters employed (and the emission lines they isolate) were F502N ([O III] $\lambda 5007$), F656N (H I $\lambda 6563$), F658N ([N II] $\lambda 6583$) and F547M (which approximates the stellar V bandpass but is narrower, thus avoiding the strongest nebular emission lines). The pointings and orientations of the images were selected to provide complete coverage of a region nearly centered on the Trapezium stars and extending slightly further on the north side. The border of the region covered is shown in Figure 1.

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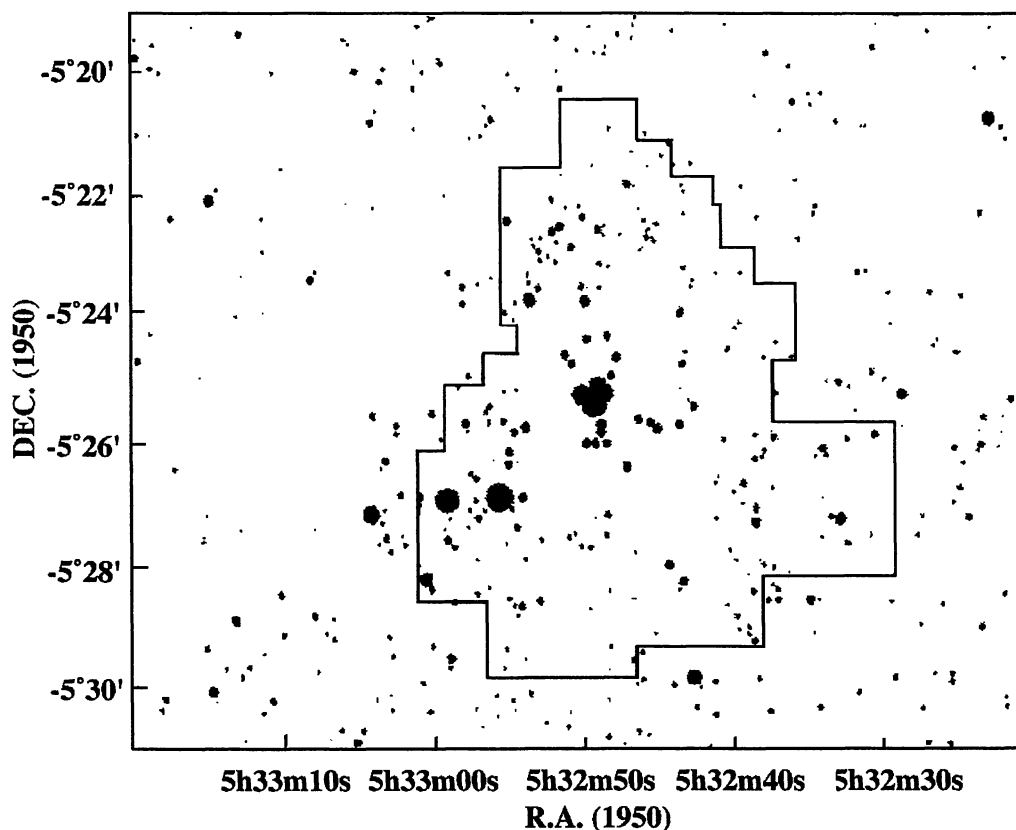


Fig. 1. An outline of the twelve contiguous fields of view imaged with the *HST*.

3. RESULTS AND DISCUSSION

Since the last of the observations were made only a few weeks before this conference, little discussion of the resulting images is possible. We can report that many of the properties of this region from the first image made (O'Dell & Wen 1994) have been extended. We see many more of the PROPLYD objects (circumstellar material around young stars rendered visible by being in or near an H II region), most of which show interaction with either the stellar wind or radiation pressure of θ^1 C Ori. A total of four dark disk objects are now seen, these being PROPLYDS lying in regions shielded from photoionizing radiation, thus appearing only in silhouette against nebular background). The parent star in one of these dark disk PROPLYDS is not visible. We see optical counterparts of almost all of the IR fingers originating from IRc2 (Allen & Burton 1993), which argues that these are Herbig-Haro shock fronts arising very close to the surface of the molecular cloud OMC-1. There are numerous shock features throughout the inner region of Orion, indicating frequent interaction of outflows from newly formed stars with the ambient gas of the nebula.

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REFERENCES

- Allen, D. A., & Burton, M. G. 1993, *Nature*, 363, 54
 Herbig, G. H. 1982, *Ann. NY Acad. Sci.*, 395, 64
 O'Dell, C.R., & Wen, Zheng. 1995, *ApJ*, 436, 194