

exploiting space knowledge in commercial enterprises and thereby help preserve US leadership in space and industrial systems. The Advanced Technology Advisory Committee will continue to follow automation and robotics needs and report to Congress semi-annually.

The Advisory Committee is made up of personnel from NASA Headquarters and the NASA Centers. Chairman is Aaron Cohen, Director of Research and Engineering at the Johnson Space Center, Houston. The Automation and Robotics Panel is chaired by James R. Arnold of California Space Institute (Cal Space), University of California, and its membership includes both NASA and non-NASA people. The NASA automation study was directed by Daniel H. Herman, Director of the Engineering Division, Office of Space Station, NASA Headquarters, Washington, D.C., and Victor J. Anselmo, Herman's deputy for automation.

3.13. GAS CLOUD SURROUNDS POSSIBLE PROTOPLANETARY SYSTEM⁽⁷⁾

Observations with the International Ultraviolet Explorer (IUE) satellite have revealed what appears to be a variable cloud of gas surrounding the star Beta Pictoris, a star that many astronomers think is a leading candidate for a planetary system resembling our own. Beta Pictoris is located in the constellation Pictor in the southern hemisphere.

Large particles of dust have been reported previously from observations using the Infrared Astronomy Satellite (IRAS) and ground-based telescopes. The IUE findings of co-existing dust and gas clouds are consistent with scientific theories of planetary system formation, according to Dr. Yoji Kondo, IUE project scientist at the Goddard Space Flight Center in Greenbelt, Md, and Dr. F. C. Bruhweiler of Catholic University, Washington, D.C., who jointly made the observations last month. "Many stars like Beta Pictoris show evidence of being surrounded by clouds of gas at ultraviolet wavelengths," said Kondo. "If such data imply that these stars are also surrounded by a protoplanetary gaseous cloud with a disc of dust particles, then many nearby stars may have evolving planetary systems. That's exciting because these stars would offer a unique opportunity to see the way a solar system might appear in formation."

In general, theories predict that planets evolve from large stellar clouds of dust and gas which gradually condense into orbiting planetary bodies. This theoretical argument for planet formation was strengthened two years ago by observations with the IRAS, an international infrared satellite in Earth orbit, which suggested that a number of nearby stars are surrounded by planetary

⁽⁷⁾NASA News Release No. 85-52 of 10 April 1985.

discs. Additionally, astrometric measurements of the movement of several stars have indicated the possible presence about each star of a planetary body several times more massive than Jupiter.

IRAS detected evidence of the presence of particles larger than 1 millimetre surrounding a star similar to Beta Pictoris. In October 1984 ground observations of Beta Pictoris indicated the presence of dust particles of sizes larger than a fraction of a millimetre which could engulf possible planetary bodies. The ground observations were made from the Andes Mountains by Drs Bradford Smith, University of Arizona, and Richard Terrile, of NASA's Jet Propulsion Laboratory, Pasadena, Calif., using an image-enhanced near-infrared telescope. Kondo and Bruhweiler used the IUE telescope to obtain the ultraviolet spectra of Beta Pictoris to determine the manner in which ultraviolet light was absorbed by the gas cloud and the extinction of the light by the dust cloud. The ultraviolet spectra showed an absence of selective extinction of the light at shorter wavelengths, evidence that the star's light was being blocked evenly at all wavelengths by dust particles greater than 1 micron (millionth of a metre), as reported from infrared data. "The IUE observations," said Kondo, "indicate that the gas is either clumpy or is varying under the pressure of the stellar wind and radiation. If so, this would tend to complement IRAS and ground telescope observations that a substantial dust cloud of protoplanetary material exists around Beta Pictoris." Kondo and Bruhweiler caution that there is an alternate possibility that the lack of observed extinction could be due to viewing the star just a little off-plane, so that the telescope's line-of-sight was not aligned directly through the disc of orbiting dusty matter. However, Bruhweiler notes, "that would be unlikely. All evidence seems to point to a belt too thick around Beta Pictoris for the line-of-sight to miss it". The existence of such a thick dust belt is supported by the work of Smith and Terrile, indicating that the star's radiation is dimmed by half a magnitude due to dust obscuration.

3.14. NASA SELECTS TWO INDUSTRY TEAMS FOR JSC SPACE STATION WORK⁽⁸⁾

The National Aeronautics and Space Administration has selected McDonnell Douglas Astronautics Co., a California division of McDonnell Douglas Corp., St. Louis, and Rockwell International, Space Station Systems Division, Downey, Calif., for fixed-price awards for definition and preliminary design (Phase B) of the structural framework and other elements of a permanently manned Space Station. The contracts will be managed by NASA's Johnson Space Center, Houston. Work on the contracts will extend

⁽⁸⁾NASA News Release No. 85-56 of 15 April 1985.