



## Light Source

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research on light sources for promoting food growth in a closed environment, such as a space station or a long duration manned spacecraft. The kind of lighting used in plant research facilities on Earth has many drawbacks for space use, notably short lifespan, poor energy efficiency and too much heat output. WCSAR and Ignatius began exper-

imenting with LEDs, which offer high energy efficiency and give off virtually no heat; research had shown that red LED wavelengths are very effective in promoting plant growth and photosynthesis (*at right* is a WCSAR experiment in controlled growth of wheat using a double array of LEDs). QDI was successful in developing a line of LED products specifically designed as red radiation sources for plant growth. Ignatius founded QDI in 1990 to market the LED technology, which has commercial applicability for growing plants indoors and for commercial plant growing operations such as greenhouses, and to produce a line of wavelength-specific LEDs tailored to a customer's requirements. QDI, in conjunction with another Wisconsin company, has advanced the technology and expanded the range of applications to include medical devices; an initial LED-based cancer treatment device is targeted for human clinical trials in 1993. •

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- RESEARCH ON FOOD
- GROWTH FOR LONG
- DURATION SPACECRAFT
- YIELDS A LIGHT
- SOURCE FOR GROWING
- PLANTS INDOORS

In the *top photo* is a QBeam™ solid state light source consisting of a control unit and a lamp. The hand covering the lamp evidences that the box-like red light source is putting out very little heat although it is generating high intensity radiation. Used as a light source for plant growth and photosynthesis research, the QBeam is marketed by Quantum Devices, Inc. (QDI), Barneveld, Wisconsin, a company formed to pursue the commercial application of light emitting diodes (LEDs) as a plant lighting source.

QDI, headed by president Ronald W. Ignatius, evolved out of cooperative efforts with the Wisconsin Center for Space Automation and Robotics (WCSAR) at the University of Wisconsin in Madison. WCSAR is one of NASA's Centers for the Commercial Development of Space; Ignatius represented a company that was one of WCSAR's industrial partners.

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