MILWAUKEE SENTINEL **Business**

Saturday, September 7, 1985 Page 7, Part 2

Laser project links MU, UWM

By Peg Masterson

Science, like politics, makes strange bedfellows.

So the unlikely pairing of a former rock musician from New York City and a Jesuit priest on sabbatical leave from Marquette University is quite reasonable when you consider the project upon which they collaborated.

John Gilbert, 37, associate professor of engineering at the University of Wisconsin — Milwaukee, and Donald Matthys, 49, an associate professor of physics from Marquette University, recently completed a 15-month project to create a new technique which combines lasers and holographic images to do stress analysis of structural components.

In simpler terms, it is the use of both technologies to determine a crack, bend or strain in anything from a nuclear reactor's holding tank to the wing of a commercial passenger plane.

Gilbert, an engineer who completed his doctorate at 25 at the Illinois Institute of Technology, joined UWM's engineering department in 1975 and began working in the area of fiber optic techniques in 1980.

The work was funded through a Department of Defense contract administered by the Army Research Office.

Matthys, a Jesuit priest at Marquette, obtained his doctorate in physics at Washington University in St. Louis in 1975. He joined Marquette in 1974 as an assistant professor.

The two came together in 1984 when Matthys was looking for a research project during his sabbatical.

A survey of several universities across the country brought him to his own backyard — to UWM and Gilbert's project.

"I wanted to take a look at laser applications," Matthys said. "John's work in using the laser holigraphic images . . . was very interesting."

Matthys' knowledge of the basic functions of the laser combined with a command of computer programing complimented Gilbert's talent of applying the technology in a practical engineering setting.

"It has demonstrated that two people working together can produce much more than working apart," Gilbert said. "Each of us has a little different background and can contribute something."

A group of undergraduate and graduate students from UWM were involved in the project. Recently, Marquette students have also participated. "I am convinced at this point that interaction is the most important thing we can instill in the students," Gilbert said.

Imagine a laser light beam that can determine movement within a millionth-of-a-meter in a superstructure or seveal hundred feet into the Earth. That's what the research team has developed.

"The images are used to reflect minute changes in the surface of an object," Gilbert said. "The laser serves as a light and produces interference patterns."

Holigraphic, three-dimensional images essentially take a picture of a structure without cameras or lenses using photographic film and laser light.

Matthys said among the applications of the technology was a project for the Army that proposes to monitor structural integrity of components in outer space. Gilbert said the project generated additional research which was used in the medical field.

Private industry has had its share of benefits from the research as well. Gilbert said the Allen Bradley Co. has been funding his work since 1975 and will soon become involved in application of the technology to test the stress limitations on relay components.

Other companies that have worked with Gilbert and Matthys are SMD Technologies, a Milwaukee-based North American Phillips Co. and AT&T Bell Laboratories in Murray Hill, N.J. The companies work in tandem with the researchers to discover applications for the new technology.

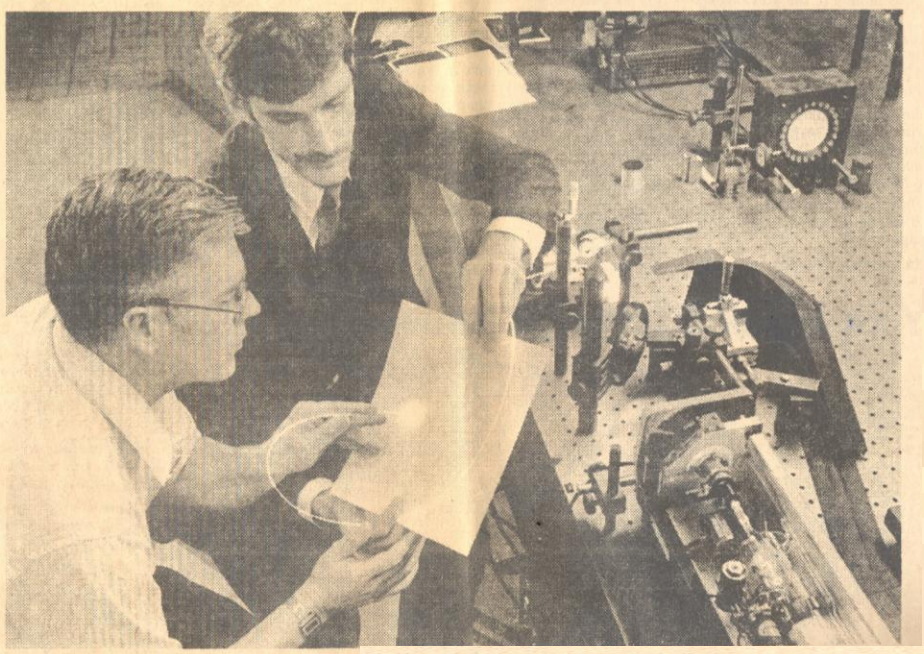
Gilbert said the merger of private sector funding, military grants, foundation donations and university dollars has made the work possible. He estimated that the funding has topped $600,000.

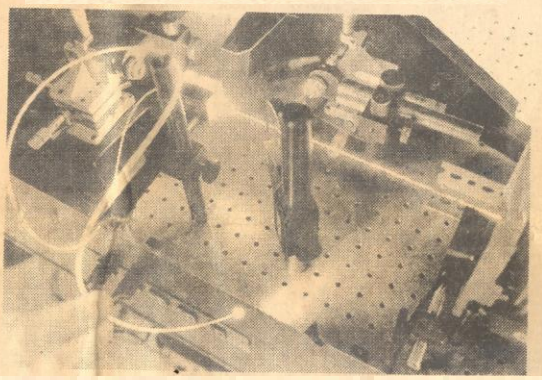
Additional funding comes from the National Science Foundation and American Cystoscope Makers Inc., of Stamford, Conn. which provided the diagnostic equipment.

Matthys is back at Marquette this semester and has started putting together his own lab to continue the work he has done with Gilbert.

He emphasized, however that the joint effort is far from over. "We got off to a good running start, but the collaboration will continue," he said. "It has been a very productive and fruitful period."

Gilbert said he also enjoyed working with Matthys on the project. "Initially, I was somewhat skeptical because I didn't know what to expect, but it worked beautifully," he said.





Donald Matthys, associate professor of physics at Marquette University (left, above) and John Gilbert, associate professor of engineering at the University of Wisconsin — Milwaukee, demonstrate the effects of a bent laser beam as part of a joint project. A close up view of the laser (below) shows how the beam can be funneled through a fiber optic cable for easy access underneath the ground or into a structure to determine strains, bends or breaks within a millionth of a meter. Matthys and Gilbert worked more than 15 months on the project while Matthys was on sabbatical from Marquette.

— Sentinel photos