

The Village Courier

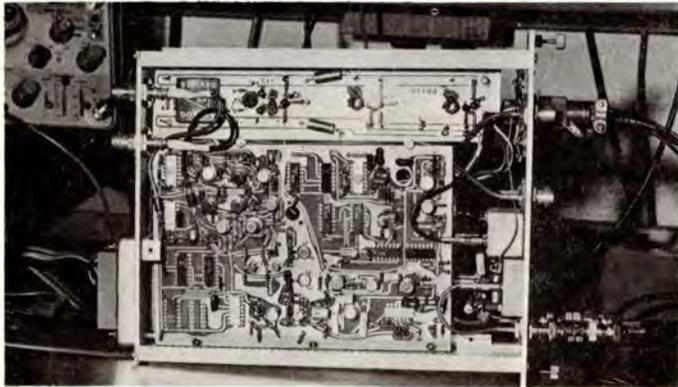
 national accelerator laboratory

Operated by Universities Research Association Inc.
Under Contract with the United States Atomic Energy Commission

Vol. 5 No. 11

March 22, 1973

THE MAIN RING ORBIT MEASURING SYSTEM -- ANOTHER MILESTONE



...Beam position detector box (front view), connected to testing equipment...



...Louise Latreille wires detector box in Cross Gallery workshop...



...Quentin Kerns (R), K.C. Cahill check position detector box at Research Services workshop in the Village...

"A major step forward providing the necessary instrumentation to allow better beam measurements. These measurements are already helping us to quickly diagnose problems and bring the accelerator toward the goal of the design performance." The words are those of Don Young, of the Accelerator Section, and he is referring to NAL's newest diagnostic tool, the main ring orbit measuring system, which was installed in February.

No longer is it necessary to ride around the tunnel on a bicycle, carrying an inductance bridge, in search of a misbehaving magnet. Nor is it necessary to measure the position of the beam within its vacuum chamber with a hand-held box. This new system enables the accelerator operators to determine precisely the position of the horizontal and vertical orbit of the protons around the main ring at any given moment, from the Main Control Room. They can tell by glancing at their computer display screen when something is disturbing the orbit, and where the problem lies within the four-mile circumference of the tunnel.

The orbit measuring system is actually a very complicated arrangement of electronic devices. It starts in the tunnel. Sets of position detector plates -- electrodes -- are located inside the vacuum chamber at specific intervals around the main ring. Ten sets of these electrodes are connected by cables to a solid-state multiplexer unit in each of the twenty-four service buildings (one set of electrodes next to each quadrupole magnet). Thus, the position of the beam within the chamber can be measured from any of 240 locations. The multiplexer unit is similar to a channel selector on a television set. Under computer command, it selects one of its ten position detector pairs to measure. The measurement it chooses is transmitted to yet another box -- the so-called beam position detector box. In this box the signal is transposed into a voltage measurement proportional to the position of the beam. This measurement is then transmitted via the MAC 16 computers in the service buildings to the Sigma computers in the control room. There a print-out display is available to

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THE MAIN RING ORBIT (Continued)



...Bob Pighetti (L) and Ryuji Yamada installing position detector plates inside the vacuum chamber in the main ring tunnel...



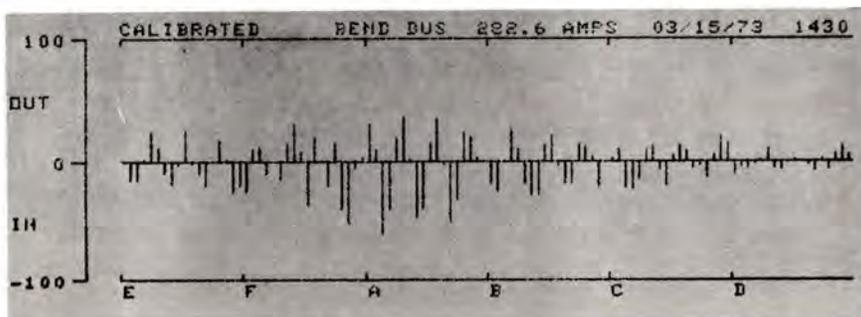
...Sue Tingley wires a multiplexer unit in the Cross Gallery workshop...

Ticku, Gerry Christenson, Louise Latreille, James Pachnik, and Gerald Ortlieb.

The printed circuit-card design and assembly, and final checking of the position detector boxes was directed by Gerald Tool, of Research Services. He was assisted by Charles Anderson, K.C. Cahill, Rupert Crouch, Allan Fogle, and James Ziober. Draftsmen August Rehbein and Thomas Schmitz also contributed.

To transmit the position measurements to the Control Room in a useful form, a considerable amount of computer programming was necessary. Alan Maier and John Michelsen handled the programming for the MAC 16 computers, and Janelle Zamie did the same for the Sigma computers.

Tuning the main accelerator is no longer the mystery it once was. As Operations Chief Robert Flora commented the night the orbit position measuring system was first tested, "Once we were blind, and now we can see!" That this is so is due, in true NAL fashion, to the hard work, determination, and cooperation of many people, even more than could be listed here.



...A computer print-out showing the horizontal orbit of the proton beam in the main ring. The lengths of the lines (one measurement from each of the position detector plates in the tunnel) indicate that the orbit is distorted from its optimal path...

to anyone needing it.

"It is really a very complex system, and many people in the Accelerator and Research Services sections worked very hard to design, make, and install the components," says project leader Rae Stiening.

Both the multiplexer unit and the beam detector box were created by Quentin Kerns, who commented, "We're fortunate that the developers of the transistor didn't stop there, but went on to other solid state devices such as PIN diodes, the very useful current-controlled resistors. NAL may be high energy physics' largest user of these -- there are over 1300 of them performing microsecond acrobatics in the position detector system."

Ryuji Yamada designed the position detector electrodes, based on a suggestion from Frank Shoemaker, now at Princeton University. Yamada supervised their installation in the tunnel, with assistance from Walter Pelczarski, Robert Pighetti, and Howard Fulton. Shigeki Mori did the final testing of this part of the system.

The Accelerator Operators assembled the multiplexer units during the times when they were on call, but not needed in the Control Room. Robert Hiveley, Douglas Howard, Michael Froehle, Ewald Macheel, Bill Lee, Mark Koenig, and John Nelson assisted. Technical direction was provided by other Accelerator Section personnel, including Robert Kocanda, Jawahar

PLANT MANAGEMENT EMPLOYEES HONORED



...Arthur Streccius (dark suit) congratulates William Byrd following award of certificate of commendation for completion of training courses. Also present at the ceremony were (L-R) Charles Marofske (NAL Personnel Manager); Kenneth Schultz and Paul Linden of Plant Services; Robert E. Roberts and Fred Moore of Plant Maintenance and Operations...

Four employees who have completed specialized training were honored by their colleagues in the Plant Maintenance and Operations and Plant Services sections at a luncheon in the Village Barn on Friday, March 9.

William Byrd and Robert Roberts have completed a self-paced, self-taught course in electrical and mechanical maintenance, which consisted of 100 lessons, and required about 200 hours of study. Although this course usually requires two years of study, they finished it in only eighteen months, maintaining grade averages of 95. Paul Linden and Fred Moore have completed one-year courses of evening instruction at Waubensee Community College, Linden in water sewage treatment, and Moore in water treatment. Both men are now certified by the State of Illinois to test and treat water.

The four were presented certificates of commendation by Arthur Streccius, who supervises orientation and training for the section. Others who attended the luncheon included Carolyn Hines, Grace Hinze, and Dottie Alderton (who have all completed correspondence courses in business), William Riches, George Doyle, and Charles Marofske.

Continuing education is very important in the Plant Services and Maintenance and Operations sections. "We have about 35 other employees studying to improve their skills and learn new ones," commented Streccius. "We try to acquaint each new person with the entire NAL operation, through a special orientation program, and then we encourage him to learn as much as he can about his particular job."

As Streccius explains, "Because of the nature of NAL, we consider it practical to become as self-sufficient as we can. Two of our men are now taking locksmith training. Also, we have begun programs for managerial staff development and safety management. We're planning for the future, trying to have the most capable force available."

Section members are enthusiastic about the possibilities. As William Byrd commented at the luncheon, "I'm pleased to have had the opportunity to take these courses. Not many employers will give so much help and encouragement. I'm going on to do more."

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ARCHERY ANYONE?....Anyone interested in having a Archery Club and Range at NAL, please notify Tony Frello at Ext. 3349.

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NALREC NOTES ON COMING EVENTS AT NAL

COME ONE, COME ALL... Rumunsko Kolo, Yugoslavian circle dance and circle dances from Greece, Israel, and the British Isles are planned for the first meeting of the International Folk Dance group, on March 30 at 8 p.m., in the Village Barn. Neither a partner nor experience is necessary. Jim and Marilyn Griffin will lead, and at least two of their daughters will be on hand also. Bring your family and join in the fun. Marilyn Paul, Ext. 3453, will answer questions in the meantime.

NAME YOUR CHOICE... To determine interest among employees in forming music groups -- classics, rock, folk, choral, instrumental, electronic -- NALREC is sending every employee a questionnaire. Watch for yours in the mail on Monday, March 26, and return it to Eric Jarzab, Personnel Office, 21 Sauk, by March 30.

SAVE THAT DATE... Saturday evening, May 12, to be precise. That's the date NALREC, by dint of a crystal ball and a ouija board, has determined as the best time to hold a really big happening, perhaps the most entertaining event of the year. Watch the Crier for more information as the time draws near.

PING PONG... Anyone interested in participating in a ping pong tournament, April 9 through 13, should contact Sherry Nila, Ext. 3587. NALREC will furnish the ping pong balls, but you must provide your own paddle.

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1973 NAL EMPLOYEES DIRECTORY NOW AVAILABLE

A revised version of the NAL Home Address and Phone Book has recently been prepared by the Visitor's Center. Although these booklets are intended primarily for visitors, anyone in the employ of the Laboratory may have one just for the asking.

Explains Janice Roberts, "The fact that NAL employees live in so many different communities means that not all of them are listed in the same telephone directory and this makes it difficult for newcomers at NAL to contact people at home. This book is our solution to the problem. I find it helpful myself."

Hereafter, the list will be revised annually. If you'd like a copy, contact the Visitor's Center, Ext. 3560.

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!!! REMEMBER, CREDIT COSTS LESS AT YOUR CREDIT UNION!!!

CLASSIFIED ADS

FOR SALE - 1964 Chevy II Station Wagon - \$350. Call David Williams, at DUSAF-879-2755 or at home, 259-2392.

FOR SALE - 1966 Chevy Caprice with comfertron air conditioner, power steering, power brakes. Blue with black vinyl roof. Good tires; just tuned up - \$900. Call Randy Hoffman, Ext. 3575, 898-9232 or 896-1944 after 5:30 p.m.

FOR SALE - Craig 8 track FM Stereo for auto. Call Joe Jackson, Ext. 3205.

WANTED - Kitchen chairs, toaster, sofa-bed, arm chairs, four-speed record player. Call John Clarke, Ext. 3479.

FOR SALE - Appaloosa type mare, 10 years old, perfect condition, good trail horse, spirited, has been shown. Call H.L. Satter, Ext. 3786 or 393-1801.

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V O'CLOCK BREAK - Village Barn - 5:15 p.m. - Friday, March 23, 1973.

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