

February 3, 1986

N. C. State University

## CHARTER

Title: Precision Engineering Center

Objectives and Goals:

The Center carries out a comprehensive graduate research program to provide educational and research opportunities to engineering students at the M.S. and Ph.D. levels in the areas of metrology, feedback control and precision manufacture. The students getting degrees with these specialties and the research results produced are relevant to the needs of the machine tool and related industries requiring high precision in measurement or production. The Center emphasizes a multidisciplinary approach to research and provides a mechanism to attract high quality faculty members and students to increase the quality and quantity of engineers trained in this important field. Although precision engineering has been established as an emphasis area in some European countries and in Japan for many years, this is the first organized graduate research center dedicated to precision engineering in the United States.

Relationships:

The Center provides a mechanism to strengthen the cooperation between Mechanical Engineering, Materials Engineering, Electrical and Computer Engineering, and the Department of Physics in providing new opportunities for students to be trained in precision engineering. Each of these departments have faculty expertise that can contribute to the goals and objectives of the Center. Initially, the research program will involve faculty in the Departments of Mechanical and Materials Engineering, and it will be expanded to engage faculty from the other departments as funding opportunities increase. As an organized research unit, the Center will have a beneficial effect on recruiting outstanding graduate students. The Center will not have a direct impact on academic departments or units (other than those noted) at North Carolina State University or within The University of North Carolina.

The Director and Advisory Units:

Center Director - The principal officer will be the Center Director, Dr. Thomas A. Dow, a professor in the Mechanical and Aerospace Engineering Department at North Carolina State University. The head of the department is Dr. J. A. Bailey. Mechanical and Aerospace Engineering is one of eight departments in the School of Engineering under Dean L. K. Monteith. Dr. Dow is recognized nationally as an authority in research and graduate education in Precision Engineering. The responsibilities of the Center Director are to oversee the operation of the Center and to implement the research plan determined jointly by himself, the research faculty, the Industrial Research Board, and the Dean of the School of Engineering.

Industrial Research Board - An Industrial Research Board, consisting of one representative of each sponsoring company, has the responsibility to evaluate and recommend:

- \* the research directions of the Center
- \* the apportionment of effort and funds for projects and capital equipment

The Board will fulfill its obligations by reviewing the annual research plan formulated by the Director in cooperation with participating faculty members and by providing recommendations on modifications deemed appropriate. The final plan will be sent to the Dean of Engineering who will have final authority on the research program, allocation of resources, and Center bylaws.

The Board will have the power to recommend changes in the Center bylaws. It can also recommend whether or not donations of planned equipment acquisitions can be used in lieu of money for Center membership.

The Industrial Research Board will meet semi-annually or at other intervals as required.

The Board will be headed by a chairperson to be appointed on an annual basis by alphabetical name among the board members. During voting, each membership company is entitled to one vote. Membership companies who are not present at the meeting will forfeit their vote on the Board for that particular meeting.

Academic Policy Committee - The Academic Policy Committee consists of the Associate Dean of Research of the School of Engineering and the department heads of Mechanical and Aerospace Engineering and Materials Engineering. The functions of this committee are (a) to help the Center director insure that the research proposed to the Industrial Research Board is consistent with university goals; (b) to coordinate manpower, space and equipment requirements with the Center; and (c) to provide direct information to the departments regarding the activities of faculty members contributing to the Center. Other department heads will be added to the committee when faculty from those departments begin to participate in Center programs.

Industry Program Monitors - Industry Program Monitors are experts in the field with responsibilities assigned by Board members and have vested long-term interest in Center research. Their function is to provide a mechanism for technical interchange between company, technical personnel and center personnel. Program monitors are to facilitate the transfer of research results to the sponsors as well as to provide the faculty with access to persons in industry who are aware of the research needs of their companies. Program monitors attend research reviews, provide feedback to the Board member and the Center director, receive Center reports, and have informal contacts with faculty principal investigators. The industrial monitors will be appointed by the Industrial Research Board members.

Faculty Principal Investigators and Research Associates - Each research project will be managed by a principal investigator who is either a faculty member or a full-time researcher within the Center. The principal investigator works with other faculty and graduate students to accomplish the research outlined in the research projects selected for the Center.

Budget Estimates:

The precision engineering program has been developed under support from the Office of Naval Research (ONR) through its Selected Research Opportunities initiative. ONR has agreed to provide continued support as the effort in precision engineering is formally established as an organized graduate research center. Additional support will be

provided by industry under an industrial affiliates arrangement whereby companies agree to provide multi-year support for a generic research program to be carried out by the Center. In addition, university resources will be made available to support the Center as feasible. During the first year, six companies will support the Center, each contributing \$25,000: Eastman Kodak, General Motors, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Moore Specialty Tools, and Texas Instruments. Based on estimates of grant support and industry contributions, the following budget projections have been made:

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
Research Grants	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000
Industry Support	150,000	210,000	250,000	300,000	350,000
NCSU Support	40,000	40,000	50,000	50,000	50,000
Total	<u>\$390,000</u>	<u>\$450,000</u>	<u>\$500,000</u>	<u>\$550,000</u>	<u>\$600,000</u>

Space Needs:

The immediate space needs of the Center are to accommodate the office requirements of the Director, the supporting clerical staff, and graduate students and special research laboratories. These immediate needs can be met by existing program allocations and the precision engineering laboratory (developed over the past three years) and amounts to about 2,000 ft.<sup>2</sup>

It is anticipated that an additional 6,000 ft.<sup>2</sup> of space will be needed over five years as the Center program expands through additional industrial sponsorship. The laboratory and office space requirements of the Center are included in the space and facilities planning and implementation schedule of the School of Engineering.

Other Needs:

The research and educational programs to be carried out by the Center will not require unusual or extraordinary capital equipment or library resources beyond the facilities and resources already available. Usual and ordinary research and instructional equipment purchases are included in budget plans for the Center.

Effects on Instructional Programs:

The Center will provide a mechanism and forum for faculty in two departments to work together in carrying out a graduate program of instruction in the area of precision engineering. Accordingly, the Center is expected to have a positive and beneficial effect on instruction at the graduate level.

Administrative Structure:

The Center will operate as an organized research unit within the Mechanical and Aerospace Engineering Department of the School of Engineering. The Center Director reports to the Department Head, Dr. John A. Bailey. Figures 1 and 2 illustrate the organizational structure of the Center and the placement of the Center in the organizational structure of the School of Engineering.

Additional Information:

University/Industry Cooperative Research Programs, as represented by the proposed Center, are consistent with the long-standing mission and tradition of North Carolina State University as a land-grant institution.