

Proposition: 01-08/09

Sponsor: Harry Hardee (Engineering)

Proposed Committee

Assignment: Scholastic Affairs

Assigned Committee: Scholastic Affairs 9/16/08

Title: MS & PhD Programs in Aerospace Engineering

Proposal: To Create MS and PhD Programs in Aerospace Engineering in the Mechanical and Aerospace Engineering Department.

Rationale:

Purpose of Program. An MS/PhD program will: (1) provide opportunities not currently available to NM students in an area of high academic interest and relevance; (2) develop aerospace research programs, (3) enhance the academic reputation of NMSU engineering; (4) support economic development in aerospace and related endeavors in the local area, as well as state, regional, and national; and (5) contribute to the replacement of aging professionals in academia and the aerospace industry.

Evidence of Need is solidly documented for economic and educational impact in the full version of program proposal. In short:

Economic: New Mexico's traditional interaction with aerospace industry (White Sands Missile Range and Test Facility, Holloman Air Force Base, Sandia and Los Alamos National Laboratories are a partial list) is experiencing a dramatic expansion in private aerospace development. Fueled by commitment to a spaceport in Upham, the state is offering financial incentives to attract further growth in aerospace business.

On the national level, the aerospace industry is economically strong with a high trade surplus (\$52 billion in 2006), increasing sales and manufacturing growth. Locally, and statewide, aviation companies have more than doubled their employment and increased revenue by 50% in the last three years.

Educational: The level of established, developing, and potentially new aerospace related ventures in New Mexico is impressive, yet there is no graduate aerospace engineering program in the state. Aerospace engineers are essential to this industrial strength. To date, companies have had to recruit AE trained employees from graduates of non-New Mexico universities, and conversely, New Mexico students wishing to pursue a career in aerospace engineering have taken their skill and education dollars out of New Mexico.

While entry level engineering requires only a bachelor's degree, advancement hinges on higher levels of education and training. Master's degree requirement is increasing as the engineering industry has begun to outsource basic (bachelor's level) engineering tasks. Doctoral degrees continue to be essential for high level research, as well as for academic teaching and research positions.

Demographic: Perhaps the single factor most influencing the potential employment of AE graduates is the anticipated rapid decline in workforce skill as baby boomer engineers reach retirement age. Various studies

place this attrition rate at 26-27% (Aerospace Commission). This situation has drawn the attention of NASA, the National Science Board, AIAA and the Aerospace Industries Association (AIA).

Institutional Commitment to the Program The following are cited as evidence of institutional commitment to aerospace engineering:

The NMSU Board of Regents approved the creation of Aerospace Engineering degree program in 2003.

NMSU has sought state funding for its aerospace engineering program since FY 2005, placing AE as official legislative priority for FY 2007, 2008 and 2009.

NMSU has allocated two new tenure track faculty positions to AE.

The university has established aerospace as one of five research clusters in the university. These research clusters are identified priority areas for both research opportunity and relevance to NMSU's land grant mission.

NMSU's Physical Sciences Lab (PSL) has a long involvement in aerospace and related activities, traditionally oriented toward engineering services, rather than research. However, in accordance with a university initiative, PSL is developing closer ties with the College of Engineering and increasing its activities in scholarly enterprises which encompasses its aerospace orientation.

The proposal has been reviewed by, and received approval from:

The College of Engineering and all engineering departments

NMSU deans: Library, Student Success, Graduate School, and the Exec. Vice President and Provost.

Graduate Deans Council.

Associate Deans Council

Academic Deans Council (Final version presented and now under consideration.)

Other New Mexico educational institutions, 2 review distributions, (New Mexico Tech, University of New Mexico, Western New Mexico State University, Eastern New Mexico State University and New Mexico Highlands University)

Curriculum Integration: The most critical aspect of program implementation is competent faculty. Two AE professors have been hired to start in Fall 2008; three more will be added in Fall 2009; the recommended level of six will be achieved by the end of the first five years of the program

The admission requirements, degree program options, thesis requirements, written and oral examinations and defenses, and number of hours of required graduate course work will be the same for the AE program as for the existing graduate program in Mechanical Engineering (ME). The admission standards, degree requirements and curricula of twenty-six MAE/AE graduate programs were analyzed. Our proposed program is in line with the general trend represented. A table comparing a selection of these is included in the formal proposal.

Full version of proposal has been forwarded to Faculty Senate Chair Joseph Pfeiffer