10:45 10. CONTEXT-DIRECTED HIGH LEVEL INTERPRETATION OF REMOTELY SENSED URBAN IMAGES. Lin Lin*, Ashok Samal, and Sharad Seth, Department of Computer Science and Engineering, University of Nebraska–Lincoln.

11:00 11. SEDIMENTARY STRUCTURES OF MARS IN COMPARISON WITH THOSE ON EARTH. Ryan Morgan, Department of Geosciences, Chadron State College, Chadron.

11:15 12. DIFFERENCES IN THE SPATIO TEMPORAL INTERPOLATION BETWEEN PLAIN AND MOUNTAINOUS REGIONS. Jun Gao* and Peter Revesz, Department of Computer Science and Engineering, University of Nebraska–Lincoln.

11:30 13. WAVES IN THE AFRICAN EASTERLY JET IN SUMMER 2002. Jon Schrage, Department of Atmospheric Sciences, Creighton University, Omaha.

11:45 14. GENERAL AVIATION AND TRANSPORTATION SECURITY: ECONOMIC CONSEQUENCES OF REGULATORY POLICY ACTIONS AND PERCEPTIONS OF ACTION. Kimberly Senda and Brent Bowen*, Aviation Institute, University of Nebraska at Omaha.

AERONAUTICS AND SPACE SCIENCE

SESSION B

Chairperson: Mary M. Fink, University of Nebraska at Omaha
Olin Hall Planetarium

8:00 a.m. 1. APPLICATION OF COMPONENT IDENTIFICATION SYSTEMS IN TRACKING METALLIC COMPONENTS. Fasineh Samura* and E. Terence Foster, College of Engineering and Technology, University of Nebraska–Lincoln.

8:15 2. RFID TECHNOLOGY FOR TRACKING INVENTORY IN A SPACE SHUTTLE. Erick Jones* and Jayakumar Narasimhan, Department of Industrial Engineering, University of Nebraska–Lincoln

8:30 3. MODELS FOR THE USE OF SPACE IMAGERY IN TECHNOLOGY SUPPORTED LEARNING ENVIRONMENTS. Neal Grandgenett, Bill Schnase*, and Paul Clark, Department of Teacher Education, University of Nebraska at Omaha.

8:45 4. ANALYSIS OF IVA TASKS AND DEVELOPMENT OF A SOFTWARE TOOL FOR MISSION PLANNING. Shuvra Ghosh, Rajesh Shanmugam*, and Ram Bishu, Department of Industrial and Management Systems Engineering, University of Nebraska–Lincoln.

9:00 5. GRAVITATIONAL FORCES INFLUENCE THE LOCAL DYNAMIC STABILITY OF HUMAN GAIT PATTERNS. Max Kurz*, Nicholas Stergiou, HPER Biomechanics Laboratory, University of Nebraska at Omaha; and Jacob Bloomberg, Neuroscience Laboratory, NASA Johnson Space Center, Houston, TX 77058-3696.

9:15 BREAK/POSTER PRESENTATIONS

9:45 6. A COMPARISON OF PILOT PERFORMANCE USING TRUE FLIGHT TRACK VERSUS MAGNETIC HEADING NAVIGATION PARADIGMS. Mike Larson* and Parker Lucas, Aviation Institute, University of Nebraska at Omaha.

10:00 7. UTILIZING BALLOON SATELLITE DATA TO ENGAGE K-12 TEACHERS IN SCIENCE INQUIRY. Carol Mitchell*, College of Education, and Mike Larson*, Aviation Institute, University of Nebraska at Omaha.

10:15 8. THE FORMATION OF ERROR INTOLERANCE IN PUBLIC ORGANIZATIONS. Patrick O'Neil, Aviation Institute, University of Nebraska at Omaha.

10:30 9. THE ROLE OF HISTORICAL TRANSPORTATION PARTNERSHIPS IN THE DEVELOPMENT OF AMERICAN SPACE TRANSPORTATION. Patrick O'Neil*, Aviation Institute, and Carol Ebdon, School of Public Administration, University of Nebraska at Omaha.

10:45 10. A STUDY OF SIZE EFFECTS ON FERROELECTRIC SUPERLATTICES. Jiangyu Li and Quangen Du*, Department of Engineering Mechanics, University of Nebraska–Lincoln.

11:00 11. VARIATION IN EXPRESSION OF PAIN AND CLOCK GENES. Natalie Rasmussen* and Lynne Farr, College of Nursing, University of Nebraska Medical Center, Omaha; and Eufemia Jacob, Department of Hematology/Oncology, Baylor College of Medicine, Houston, TX.

11:15 12. PLANETARY EXPLORATION WITH THE CLIFF-BOT SYSTEM. Gale Paulsen, Nathan Wood*, and Shane Farritor, Department of Mechanical Engineering, University of Nebraska–Lincoln, NE.

11:30 13. *IN VIVO* ROBOTICS. Mark Rentschler*, Department of Biomedical Engineering, University of Nebraska–Lincoln; Jason Dumpert, Stephen Platt and Shane Farritor, Department of Mechanical Engineering, University of Nebraska–Lincoln; and Dmitry Oleynikov, Department of Surgery, University of Nebraska Medical Center, Omaha.

11:45 14. PUBLIC SPACE TRAVEL: FAIR FARES OF TOMORROW. Steven Ryberg* and Brent Bowen, Aviation Institute, University of Nebraska at Omaha.

AERONAUTICS AND SPACE SCIENCE

Poster Session 9:15 - 9:45 a.m.
Olin 249

AIRBORNE REMOTE SENSING APPLICATION FOR AGRICULTURAL AND THE ENVIRONMENTAL STUDIES. Brian Bronson, Aviation Institute, University of Nebraska at Omaha.

UTILIZING GEOSPATIAL TECHNOLOGIES FOR EDUCATION AND OUTREACH ON THE WINNEBAGO AND SANTEE SIOUX INDIAN RESERVATIONS. Karisa Vlasek and Cindy Webb, Aviation Institute, University of Nebraska at Omaha.

USING HYPERSPECTRAL IMAGERY TO ADDRESS GRASSLAND CONSERVATION ISSUES IN LANDSCAPES OF THE CENTRAL MISSOURI RIVER VALLEY. Mary Ann Vinton, Biology Department, Creighton University, Omaha; and Joan Ramage, Department of Earth and Environmental Science, Lehigh University, Bethlehem, PA.

AERONAUTICS AND SPACE SCIENCE
SESSION B

APPLICATION OF COMPONENT IDENTIFICATION SYSTEMS IN TRACKING METALLIC COMPONENTS

Fasineh Samura and E. Terence Foster, College of Engineering and Technology, University of Nebraska–Lincoln, NE 68588

Structural metal production and construction organizations, especially those working with steel and aluminum in the aerospace environment, look for ways to improve the supply chain and maintenance of components. Current methods of extracting data about metal components have serious limitations related to timelines, accuracy, and durability. Radio Frequency Identification (RFID) technology uses radio waves to acquire information without physical line of sight or contact. This intelligent technology has the automatic ability to identify and track the production, storage, transportation, delivery, operation, and maintenance of metal products. This paper discusses development and experimental testing of metallic components using the component identification system (CIS). This project's goal is to develop systems for exchanging information among all parties involved in the component life cycle process. Initial investigation indicates that, even though metals exhibit some interference with RFID signals, CIS has great potential in increasing efficiency of handling and access to accurate information.

RFID TECHNOLOGY FOR TRACKING INVENTORY IN THE SPACE SHUTTLE

Erick Jones and Jayakumar Narasimhan, Department of Industrial Engineering, University of Nebraska–Lincoln, NE 68588

The space ship carries many inventories, such as clothing, food and other essentials for crew members. These items are stored in a bag and transported into the shuttle cargo. The problems the crew members face during the flight are non-traceable inventory, lost inventory and insufficient replenishment. As a consequence there is a critical need to develop a new identification technology. Radio Frequency Identification (RFID) is a technology similar to the newly developed bar code system for identification. With RFID, the electromagnetic or electrostatic coupling in the RF portion of the electromagnetic spectrum is used to transmit signals. An RFID system consists of an antenna and a transceiver, which reads the radio frequency and transfers the information to a processing device, and a transponder, or tag, which is an integrated circuit containing the RF circuitry and information to be transmitted. The objective of this paper is to develop a system that can track the inner pack quantities. A method to write passive tag information to an active tag is also included.

MODELS FOR THE USE OF SPACE IMAGERY IN TECHNOLOGY SUPPORTED LEARNING ENVIRONMENTS

Neal Grandgenett, Bill Schnase, and Paul Clark, Department of Teacher Education, University of Nebraska at Omaha, NE 68182

This presentation describes several educational models for the effective use of space imagery in the grade 7-12 classroom. Current innovations of the DataSlate software, designed collaboratively by the NASA Jet Propulsion Laboratory and the University of Nebraska (Lincoln and Omaha), are integrated into the various educational models focusing on standards-based mathematics and science instruction. NASA Headquarters has recently announced that they will expand the distribution of DataSlate in 2005. Educational impacts of the various integration models are being monitored in several ways, including mapping to district benchmarks, detailing teacher and student perceptions, following the enrollment of students in upper level courses, and by

using various mechanisms for tracking student paths through the interactive learning process. In addition to examples of the various educational models underway, the expected future evolution of these learning environments, such as the incorporation of digital video, will also be discussed.

ANALYSIS OF IVA TASKS AND DEVELOPMENT OF A SOFTWARE TOOL FOR MISSION PLANNING

Shuvra Ghosh, Rajesh Shanmugam, and Ram Bishu, Department of Industrial and Management Systems Engineering, University of Nebraska–Lincoln, NE 68588

The human operator is considered to be the most valuable asset in the space work environment as the space program moves to extended duration of flight. The various Intra Vehicular Activities (IVA) tasks specific to a mission are presently scheduled after rigorous training, and are highly structured. However, tasks performed inside the International Space Station (ISS) have to be unstructured and need a different mission planning approach. This study used three distinct stages to obtain a more efficient mission planning approach. The first step towards this mission planning approach was to identify various tasks performed inside the ISS from available past mission videotapes. Tasks which were clearly identifiable and separable from each other were analyzed further using a video analysis technique. Physical and Cognitive Task Analysis was also performed to measure physical and mental workload on the identified tasks. Tasks were then classified according to their stress level and task time standards were calculated. The second stage of the study was to create an informatics database with the analyzed tasks, their motion descriptors, time, elemental subtasks, their respective time elements, and time variance. Using Microsoft Access, the database was set up. The third and final stage of the study was to develop a software interface for easy access and modifications of the database, as well as the capability of performing various calculations for critical mission planning. The software has been developed and needs to be validated.

GRAVITATIONAL FORCES INFLUENCE THE LOCAL DYNAMIC STABILITY OF HUMAN GAIT PATTERNS

Max Kurz and Nicholas Stergiou, HPER Biomechanics Laboratory, University of Nebraska at Omaha, NE 68182; and Jacob Bloomberg, Neuroscience Laboratory, NASA Johnson Space Center, Houston, TX 77058-3696

A custom built body weight suspension (BWS) system was used to explore the influence of gravity on the local dynamic stability of human gait. The BWS system supplied a constant upward force on the subject's center of gravity via a cable-spring-winch system that was monitored with a force transducer. Subjects walked on a treadmill for the following micro-gravities: 1.0, 0.9, 0.8, and 0.7 Gs. The largest Lyapunov exponent was calculated for the respective lower extremity joint angles to determine the local dynamic stability. Our results indicated that there was a linear relationship between the influence of gravity and local dynamic stability. The gait pattern became more random as gravity was reduced. Our future investigations are directed towards understanding how alterations in other Newtonian forces influence the local dynamic stability of human gait. This scientific information will serve as the foundation for the development of better counter-measures for long-term space flight.