

Appendix

Jack A. Norqual

Mr. Zach I. Lamppa
President
TALENT Inspection Group
615 9th St. North
Virginia, MN 55792-3761

Mr. Lamppa,

I am writing a letter of interest regarding your intentions to implement Unmanned Aircraft Systems (UAS) in the State of North Dakota. I have been briefed on the technology and interested in applications such as pipeline inspection and the ROW monitoring capabilities UAS will bring to the industry and the public conscience. I am very interested in the progression of this technology and how it will be of value to the current and long term oil/gas industry in the state of North Dakota. I am a businessman that has invested in many transactions and companies like TIG and can say that I am interested in technology implemented into the private sector.

Mr. Lamppa, you have given me information about you and your team's intentions to implement Unmanned Aircraft Systems technology in the state of North Dakota. Provided the technology and business aspects are met that make this a viable investment I have genuine interest and the financial wherewithal to be involved with the capital required in this very worthwhile venture.

Sincerely,

Jack A. Norqual
Chief Manager
12 West Partners,LLC.



HESS CORPORATION
3015 16th Street SW, Suite 20
Minot, ND, 58701


November 1st, 2011

Zack Lamma
TALENT Inspection Group (TIG)
1088 W Lake Drive
Detroit Lakes, MN 56501

Mr. Lamma,

In light of our conversation held the week of October 24th, I have reviewed your proposal for Unmanned Aerial Survey capabilities for the private sector. The concept is of interest to the Hess Operations in North Dakota to aid in managing the multiple activities we have underway in the state. Anything that can lead to increased surveillance and monitoring of our facilities (both below and above ground) and the activities around those facilities is of interest to our organization.

We look forward to hearing more about your work as it progresses and will certainly consider any future opportunities in the challenge to plan, protect and monitor our infrastructure in North Dakota. Please keep up informed of progress on your research and development.



Regards,
Stacey Nachbaur
Team Lead Facilities and Maintenance
Hess ND Operations
Office: 701-420-6989
Cell: 701-580-1658

CC: Jeff Wirth



Alliance Pipeline Inc.
6385 Old Shady Oak Road
Suite 150
Eden Prairie, MN
55344

Telephone (952) 944-3183
Toll-free 1-877-733-3183
Fax (952) 944-9166

November 1, 2011

Mr. Zach Lamppa
President
Talent Inspection Group
615 9th Street N.
Virginia, MN 55792-3761

Dear Mr. Lamppa,

I am writing to express Alliance Pipeline's general interest in the development and testing of Unmanned Aerial Systems (UAS) to monitor and identify potential threats to safety of the oil and gas infrastructure. Further development and implementation of this type of technology may provide cost effective alternatives for monitoring of encroachments, unauthorized excavation, geotechnical concerns, leaks, etc.

Alliance consistently supports research that may improve the safety and integrity of the pipeline infrastructure including funding and participation with Pipeline Research Council International (PRCI). We look forward to seeing the results of your work in this area.

Sincerely

A handwritten signature in black ink that reads "Michael J. McGrath". The signature is written in a cursive style with a long horizontal line extending from the end of the name.

Michael J. McGrath
Team Leader Pipeline Safety Performance

BRIDGER PIPELINE LLC

455 NORTH POPLAR CASPER, WY 82602

P.O. BOX 2360
CASPER, WY 82602
307-237-9301
307-237-3146 FAX

November 1, 2011

Zach I Lamppa
TALENT Inspection Group (TIG)
1088 W Lake Drive
Detroit Lakes, MN 56501

Zac,

I have reviewed your proposal for Unmanned Aerial Survey of pipelines. I think that the concept has merit and potential. Anything the pipeline industry can do to more accurately and more frequently monitor pipeline ROWs is of importance.

Bridger Pipeline and its affiliates operate hundreds miles of liquids pipeline in North Dakota. As an operator we are keenly aware of the need to protect and monitor pipeline infrastructure in an active area such as Western North Dakota. Please keep up informed of progress on your research and development.

Regards,

Robert Stamp, P.E.
Commercial/Engr Supervisor
Bridger Pipeline LLC
Office: 307-266-0345
Cell: 307-262-9160

Cc:

Ken Dockweiler, Bridger
Tad True, Bridger

Mr. Zach Lamppa
Talent Inspection Group
615 9th St. North
Virginia, MN 55792-3761

Re: Letter of Reference for Unmanned Aircraft Systems Research

Dear Mr. Lamppa;

Thank you for discussing and allowing me the opportunity to review your proposed Unmanned Aircraft Systems (UAS) research project. The proposed research could result in a means to significantly improve pipeline safety through improved aerial patrolling while reducing the cost of biweekly aerial patrols.

Once the technology is accepted as a commercial alternative to aerial patrolling by PHMSA and is proven to be as effective or more effective than aerial patrols, Arrow Pipeline, LLC would be interested in using this technology to improve the safety of its facilities.

Please keep me informed of your progress.

Sincerely,

A handwritten signature in black ink that reads "Douglas M. Lee". The signature is written in a cursive style with a large, sweeping initial "D".

Douglas M. Lee, P.E.
Sr. VP-Operations
Arrow Pipeline, LLC
10702 Highway 73
Keene, ND 58847

Kadrm
as
Lee &
Jackson

Engineers Surveyors
Planners

October 20, 2011

Mr. Zach I. Lamppa, President
TALENT Inspection Group
615 9th St. North
Virginia, MN 55792-3761

Mr. Lamppa,

Kadrm, Lee & Jackson (KL&J) provides comprehensive engineer services for midstream companies that build and operate pipelines throughout the upper Midwest and mountain region. We work with major companies like Oneok Rockies Midstream and smaller companies like Banner Pipelines Company. In North Dakota alone, more than 1500 miles of new pipelines will be added in 2011. Inspection and compliance monitoring are two of the major components in Pipeline Integrity. Your utilization of UAV's and new imaging technologies has good potential to solve issues that are developing today. Increased regulation will also drive the need for lower cost inspection procedures.

I believe that your technologies have great potential. KL&J is a pipeline integrity provider and as your company develops we would enjoy the chance to partner.

Sincerely,



Niles Hushka PE
CEO
Kadrm, Lee & Jackson, Inc.
Bismarck, North Dakota

701 355 8400

128 Six) Line Drive

PO Box 1157

Bismarck, ND 58502-1157

Fax 701 355 8781

kljeng.com

Kadrm, Lee & Jackson, Inc.



21 West Superior Street, Suite 500
Duluth, Minnesota 55802
218 727-8446
Fax 218 727-8456
www.LHBcorp.com

August 12, 2011

VIA EMAIL: zach@talentinspectiongroup.com

Zach Lamppa
Talent Inspection Group
8419 Congdon Blvd
Duluth MN 55804

**UNMANNED AIRCRAFT SYSTEMS (UAS) FOR MONITORING OF
OIL AND GAS TRANSMISSION PIPELINES**

Thanks for taking time to update us on your continued work on application of UAS technology to oil and gas transmission pipelines. We appreciated your work with us last year in preliminary development of this concept.

LHB is a multi-discipline Engineering firm with offices in Duluth and Minneapolis. I lead a specialty group within LHB that is focused on providing engineering, mapping and survey services to major gas and oil pipeline clients including Enbridge and TransCanada.

Based on over 20 years in the Pipeline Industry, I believe there is a tremendous opportunity for application of UAS technology for monitoring of pipelines, pump stations, terminals and related facilities. UAS technology could increase frequency of monitoring operations and reduce operating costs. Benefits might also include automated leak detection and third party damage prevention.

Our background in pipeline construction design, construction and maintenance make us an ideal partner as you pursue development of UAS technology for pipeline monitoring. Please contact me if we can be of assistance.

Thank you again. Please call if you have any questions.

LHB Inc.

A handwritten signature in black ink, appearing to read 'Dan A. Heldt'.

Dan A. Heldt, PE
PIPELINE/UTILITIES GROUP MANAGER

Duluth, MN

Minneapolis, MN

MCKENZIE COUNTY, NORTH DAKOTA
Board of County Commissioners

Box 543
Watford City, ND 58854-0543
Telephone (701) 444-3616 Ext. 132 or Fax (701) 444-4113
Email: lsvihovec@co.mckenzie.nd.us

Roger Chinn, Chairman
581 Highway 85 S
Grassy Butte, ND 58834-9376
701-863-6604

Ronald A Anderson
30891 33rd ST NW
Keene, ND 58847-9443
701-675-2267

Richard Cayto
3691 158th Ave NW
Fairview, MT 59221-9340
701-744-5139

Rick Lawler
3102 127th AVE NW
Watford City ND 58854-9697
701-842-3719

Dale R. Patten
PO Box 812
Watford City ND 58854-0812
701-842-2715 H

Zach Lamppa
TALENT Inspection Group, LLC

August 12, 2011

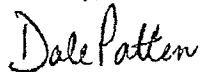
Dear Mr. Lamppa,

The McKenzie County Commission recognizes the immediate need for monitoring the massive expansion of pipeline infrastructure in western North Dakota resulting from the rapid growth of the oil and gas industry. A monitoring system would help ensure that the pipeline systems in western North Dakota would provide for safe transport of oil and gas by-products, minimizing damage to the environment caused by spills and leakage, while increasing the volume of product that is transported through the pipeline systems.

Therefore, we enthusiastically support your efforts to develop a pipeline monitoring project utilizing Unmanned Aerial Systems. The proposed project would be conducted in a safe and efficient manner, providing valuable data and information, assuring maximum throughput of oil and gas by-products.

Feel free to contact us if there is anything we can do to help this project move forward.

Sincerely,



Dale Patten
McKenzie County Commissioner

----- Original Message -----

Subject: Pipeline inspection project

Date: Thu, 11 Aug 2011 15:03:07 -0500

From: "Brent Sanford" <brent@sandsmotorsinc.com>

To: <zach@talentinspectiongroup.com>

Zach - It was nice to hear from you today regarding your project idea for Talent Inspection Group. Monitoring of pipelines from the air would represent a huge improvement in pipeline public safety. Our county has had 100's of miles of pipelines transporting gas and oil since the 1950's.

With

the number of wells currently being drilled, the miles of pipe in the ground

will only increase exponentially. Stories we hear of saltwater leaks in the

Alexander, ND area and crude oil leaks in Montana make public officials cringe thinking of that happening in your own jurisdiction. Due to the sheer

volume of pipelining taking place and yet to take place in this Bakken oil play, this technology may be just what the state and the oil industry need going forward to stay ahead of the curve on pipeline safety.

Brent Sanford

Mayor

Watford City



Zach Lamppa
TALENT Inspection Group, LLC

August 11, 2011

Mr. Lamppa (Zach),

I am pleased to provide this letter of support regarding your efforts to develop a pipeline monitoring project utilizing Unmanned Aerial Systems. This effort touches on two significant events that are emerging here in the state of North Dakota and the Red River Valley region. With the explosive growth in oil and natural gas development in the state, and the subsequent need for expanded infrastructure (pipelines) there is a growing need to monitor these to ensure safe transport – minimizing any potential damage to our environment due to accidental spills or leakage and helping to maximize the throughput of this valuable national asset (energy related by-products such as oil).

The other element is the utilization of UAS to conduct this work. As you know the use of this type of asset to conduct dirty, dangerous or dull work is a game changer as it relates to overall efficiencies and cost, and provides a more cohesive and comprehensive picture – in real time – of the pipeline.

I feel that this project, and others like it, will provide the foundation for a more safe and productive use and utilization of oil transportation and will impact the region and state in the development of knowledge based jobs that will be able to capitalize on the talents and resources that are in the state now. Please keep me informed as to the status of this effort, and if there is anything we can do to help move it forward please don't hesitate to call.

Regards,

A handwritten signature in black ink that reads "Douglas McDonald". The signature is written in a cursive, flowing style.

Douglas McDonald, Senior Fellow
Red River Valley Research Corridor



August 11, 2011

Zach I. Lamppa, President
Talent Inspection Group
8419 Congdon Blvd
Duluth MN 55805

Dear Mr. Lamppa:

As we have discussed, I spend a good bit of my time working on federal policy issues that impact the future use of Unmanned Aerial Vehicles (UAVs) in the National Airspace System (NAS). I believe that experiences on the battlefield and along North Dakota's northern border have proven that UAV systems will eventually evolve into a relatively low-risk, as well as a lower cost alternative to manned aircraft surveillance in the oil and gas industry.

Additionally, advances in control and command systems are expected to give rise to UAV use in multiple domestic applications within the next three to five years. The reason for this exponential growth is the simple fact that the Federal Aeronautics Administration (FAA) is expected to select six test sites for flying UAVs in the NAS by early next year. At this moment, the state of North Dakota is one of the nation's leading candidates, if not *the* leading candidate.

As Moore's Law applies to advances in iPad technology, it too applies to UAV optics. Optic and sensor technologies are advancing so rapidly that federal pipeline safety officials have suggested that UAVs could compliment or even replace manned/piloted surveillance flights within the next decade.

Today, law enforcement agencies nationwide are launching UAVs to pursue criminals. North Dakota and Minnesota farmers are testing UAVs for use in precision crop management. And, the Federal Emergency Management Agency (FEMA) is using the Custom and Border Patrol's (CBP) aerial platform to monitor North Dakota's flooding. Following the FAA's approval of regular use of UAV flights in North Dakota, there is no reason why they should not be widely flown by the oil and gas industry.

Many of North Dakota's key civil aviation and economic development stakeholders, as well as local, state and federal policy makers, have been preparing for the day when UAVs fly within the same airspace as a Piper Cub or F-16.

North Dakotan's hard work and determination has placed the state squarely in the center of the national UAV debate. In closing, I am so confident that you are on the correct path, that I would not hesitate working with you to ensure that Talent Inspection Group is the first to market.

Again, thank you for your insight on what I, too, believe is an exciting emerging technology. You are pursuing an amazing opportunity.

Sincerely,

A handwritten signature in black ink, appearing to read "Shawn", with a long, sweeping underline that extends to the right.

Shawn Bullard
President
Duetto Group, LLC

TALENT Inspection Group, LLC.
August 08, 2011



Subject: UAS Applications for Oil & Gas

Dear Mr. Lamppa,

I was very excited to hear about the potential applications for Unmanned Aircraft Systems (UAS) in the oil and gas industry. As the co-founder and CEO of Field of View, I fully support your initiatives to integrate UAS into the oil and gas industry for more efficient and precise monitoring of right-of-ways.

Field of View is a startup company based out of Grand Forks, ND founded by myself and another University of North Dakota (UND) engineer that uses unmanned aircraft to provide farmers and growers with data regarding the health of their crops. My experience gained through starting a company revolved around UAS operations, and an additional 4 years of UAS operations as the Pilot in Command of the Unmanned Aircraft systems Engineering Laboratory (UASE) at UND, has provided me with a strong glimpse of a promising future for the UAS industry. I have had exposure to UAS with commercial potential abroad as well, as I led the UASE team of engineering researchers to the Australian Outback Challenge where we competed amongst teams from across the globe and ultimately took first place.

To accomplish the task of quick-turnaround, cost-effective, and precise data capture, TIG will need to develop and operate a UAS with robust sensor hauling capabilities, and long duration flights. Field of View's background in sensor integration and UAS operations is a perfect fit for accomplishing this task, and we are eager to aid in producing a solution to the current costly and inefficient pipeline monitoring operations.

I look forward to working with you and your company in the future to develop unmanned aircraft systems and sensors capable of monitoring and capturing data relevant to the oil and gas industry.

Regards,

A handwritten signature in cursive script that reads "David Dvorak".

David Dvorak
Chief Executive Officer
Field of View, LLC
715 42nd St N, Suite 302B
Grand Forks, ND 58203



Center for UAS Research, Education and Training

University of North Dakota / John D. Odegard School of Aerospace Sciences
Clifford Hall 260
3980 Campus Road Stop 9007
Grand Forks, ND 58202-9007

May 20, 2011

Alan W. Palmer, Director, Center for UAS Research, Education and Training
Clifford Hall 260
3980 Campus Road Stop 9007
Grand Forks, ND 58202-9007

Dear Prospective Client or Investor:

The University of North Dakota serves as headquarters for the Center of Excellence for Unmanned Aircraft Systems (UAS). The John D. Odegard School of Aerospace Sciences leads the nation in Research, Education, and Training. I would like to take this opportunity to recommend Zach I. Lamppa, Talent Inspections Group as a company with sound ideas in the practical application of Unmanned Aircraft Systems. He has approached the University of North Dakota, UAS Center for Excellence in Research, Education, and Training with innovative ideas. I have had the opportunity to meet Zach and listen to his proposals finding them credible and worthy of future development. We have agreed that future developments on potential applications are viable as well as credible.

I would like to express my most sincere recommendation that we move forward with opportunities with Talent Inspection Group and Zach Lamppa.


Sincerely,

Alan W. Palmer, Director
UND, UAS Center for Research Education and Training

UNDAEROSPACE

Minnkota Power

MPC COOPERATIVE, INC.

Your Touchstone Energy® Partner 

1822 Hill Road • P.O. Box 13200 • Grand Forks, ND 58208-3200 • Phone (701) 795-4000

May 24, 2011

Mr. Zach Lampa
Talent Inspection Group
2806 Belknap Street
Duluth, MN 54880-2341

Ref: Line Patrol Using Unmanned Aircraft

Dear Mr. Lampa:

Once the technology has been developed to use unmanned aircraft for line patrol Minnkota Power Cooperative, inc. would be interested in getting more information from your company, including pricing to do our line patrol. Minnkota Power Cooperative currently uses small aircraft to do line patrol which consists of approximately 1,000 miles which they patrol 3-6 times per year. Minnkota Power also has plans to construct a new 345 kV transmission line which will be approximately 240 miles in length from Center, North Dakota to Grand Forks, North Dakota which is scheduled to be completed sometime in mid-2013. This new transmission line will also need line patrol.

Please keep us informed of your progress. I can be reached at (701) 795-4235 or email me at rbridewell@minnkota.com.

Sincerely,

MINNKOTA POWER COOPERATIVE, INC.



Renae Bridewell
Buyer

----- Original Message -----

Subject: Re: zach lamppa information

Date: Tue, 7 Jun 2011 08:19:50 -0400

From: Dean.Fulmer@faa.gov

To: "Zach I. Lamppa" <zach@talentinspectiongroup.com>

Zach,

Good to meet you as well. Wish you the best in your business plan. As I said out in GFK we are working hard towards improving UAS integration into the NAS and endeavors like yours prove the need to do just that.

Regards,

Dean Fulmer

Acting Manager, ATO UAS Group AJV-13

763-229-0734 cell



Grand Forks Region
Economic Development Corporation

Zach Lamma

TALENT Inspection Group, LLC

Dear Mr. Lamma

I am pleased to provide this letter of support for your efforts in developing pipeline monitoring utilizing Unmanned Aircraft Systems (UAS). North Dakota has been blessed with significant growth in oil extraction in the western area of the State. The numbers are astounding when looking at the revenue generation and economic activity. Here in the Grand Forks Region, we have seen a cluster of activity related to the development of UAS. Since the realignment of the Grand Forks Air Force Base from a tanker mission to a UAS mission, the region has added significant jobs and seventeen companies working in the growing UAS industry.

I am delighted to see an entrepreneur like you bridging the activity on both sides of the North Dakota utilizing this state-of-the-art technology. The savings companies can realize when switching from traditional monitoring equipment to UAS will be significant in both manpower and resources. This method of monitoring should prove to be much more effective and environmentally sound.

I believe this project can provide a foundation for safer transportation of oil while capitalizing and building on the UAS knowledge base in the Grand Forks Region. I am looking forward to seeing this project mature. Please keep me informed of the future development as you move forward.

Best regards,

Eric Icard

Senior Business Development Officer

Zach I. Lamppa

95330 Grove Island Tower MN 55790

zach@talentinspectiongroup.com

(612) 220-1092

Professional Experience:

TALENT Inspection Group (TIG), LLC

North Dakota/Montana Sales Manager

January 2010-Present

- Manage field and internal relationships with XTO, Whiting, Continental Resources, HESS, EOG, ONEOK, Westcon Industries, Enbridge Energy, Trans Canada, Marathon Oil/Gas, Quanta, Michels, TIC, Westconn Industries, Kadmas Lee & Jackson and Lo-n-Bro.
- Sell field services to energy companies, pipeline contractors and oil producers.
- Schedule and coordinate subcontractors and direct field crews.
- Oversee all invoicing and fiscal responsibilities of business.
- Responsible for safety, insurance and contractor approval process in ISNetwork.
- Sold, managed and completed 8 mile 12" DOT natural gas pipeline survey contract for EOG Resources in Stanley North Dakota.
- In Oil/Gas Research Council grant process for UAS pipeline inspection sensor technology.

J Koski Trucking/Clearwater Environmental Services

Co-Founder/Vice President, Sales

2007-2010

- Sold field services to Enbridge Energy, Appalachian Pipeline, Minnesota Power, US Pipeline, Precision Pipeline and Michels.
- Estimated and project managed timber mat-haul, mat wash and pipe yard construction for Alberta Clipper pipeline project.
- Managed, scheduled and coordinated subcontractors and union workers.
- Implemented new sales and marketing strategies for expanded business development.
- Managed relationships with fuel vendors such as Cenex, Como Oil and regional Co-ops.
- Raised initial capital from personal contacts to fund operations.
- Provided leadership and managed project coordinators and field management.
- Initiated sale of company to API Group from business relationship formed in 1998, closed deal February 2011.

Align Technology

Orthodontic Appliance Division

Specialty Territory Sales Representative MN, IA, WI, SD, ND

2003-2007

- Provided initial and continual sales support to Certified Invisalign Providers.
- Implemented practice development and internal sales/ marketing to orthodontic and dental offices in 5 state area.
- Increased orthodontic sales growth from -20% to +33% market share from 2003.
- Lead educator for local and regional C.E. courses.
- Presidents Club Sales Award winner 2004, 2005, 2006 and 2007.
- #1 Overall salesperson of the year 2007.

Education:

University of Minnesota Duluth

Bachelor of Arts 2001

Major: Communication

Minor: Marketing

Labovitz, Emerging Entrepreneur Award Nominee 2008

College hockey team captain 1997-99

Outstanding Athletic Letter Award Winner 1997-99

Mark Alan Hastings

1122 20th Ave South East, East Grand Forks MN, 56721
Phone: (701) 610-1108
E-mail: hastings@aero.und.edu

Objective:

Certifications: Commercial Pilot – Airplane Single and Multiengine Land, Instrument Airplane
Flight Instructor – Airplane Single and Multi-Engine Land, Instrument Airplane
Medical – FAA First Class

Flight Time: Total Time 1250 PIC 970 CRJ FTD..... 1600
Multi Engine..... 140 Dual Given..... 675
Single Engine..... 1110 Turbine 100

Education: Bachelors Degree, University of North Dakota, Grand Forks

Experience:

Supervisor of Flight /Flight Instructor

University of North Dakota
John D. Odegard School of Aerospace
Sciences
Grand Forks, North Dakota
January 2001 – October 2002

Supervisor of Flight duties – observe weather conditions and set appropriate flight restrictions, incident/accident coordination, supervise student solo activities, oversee all flight operations.
Flight Instructor duties – instruct private, commercial, instrument, CFI, and CFII students to part 141 standards. Conduct student stage check evaluations of private, commercial, instrument and CFII students.

Lead Flight Instructor/Ground School Lecturer

University of North Dakota
John D. Odegard School of Aerospace
Sciences
Grand Forks, North Dakota
October 2002 – March 2005

Lead Flight Instructor - Manage, evaluate, and provide guidance for eighteen Flight Instructors. Conduct student primary and advanced flight and ground instruction.
Ground School Lecturer – Conduct ground school for Instrument Rating and Commercial Certification

CRJ-200 Lead CFI /Standardization Lead/Ground School Lecturer/Stage Check Pilot

University of North Dakota
John D. Odegard School of Aerospace
Sciences
March 05 – December 2009

Lead Flight Instructor - Monitor, evaluate, and provide instruction to Senior level college students participating in the CRJ-200 Level 6 FTD course.
Ground School Lecturer – Conduct ground school pertaining to CRJ-200 systems, profiles, and checklists.
Stage Check Pilot – Conduct stage check evaluations in the CRJ-200 and CFI courses for student graduation.

UAS Chief Pilot

University of North Dakota
John D. Odegard School of Aerospace
Sciences
December 2009-Present

Chief Pilot – Development and implementation of UAS Operations Undergraduate Degree Course, development of Standard operating procedures, NAS integration research, overland flood surveillance, ensure safe operations for all UAS operated at UND

Awards:

Instructor of the Month
University of North Dakota
November 2001

Awarded for demonstrating outstanding instructional ability and motivation in the aviation flight training program

Outstanding Job Performance
University of North Dakota
Spring/Fall Semesters 2002

Recognition for dedication to my students, hard work and high quality of instruction

Taylor Butterfield2750 S 38th St. Apt. #301

Grand Forks, ND 58201

651.468.8295 Cell

Email: taylorbutterfield@gmail.com

Education	BBA in Aviation Management BS in Commercial Aviation University of North Dakota, Grand Forks, ND 3.86 GPA	Graduated May 2009 Graduated December 2009														
Honors and Awards	Letter of Commendation for Outstanding Job Performance Awarded to the top 10% of UND Flight Instructors	2011														
	Clay Lacy Professional Pilot Scholarship Recipient John D. Odegard Scholarship Recipient	2008, 2009 2007, 2008														
Flying Experience	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">UAS 130 Total hours</td> <td style="width: 50%;">Traditional Aviation 702 Total hours</td> </tr> <tr> <td>Total 130</td> <td>PIC 467</td> </tr> <tr> <td>UAS Instruction Given 79</td> <td>Instrument 63</td> </tr> <tr> <td></td> <td>Night 65</td> </tr> <tr> <td></td> <td>Cross Country 160</td> </tr> <tr> <td></td> <td>Instruction Given 381</td> </tr> <tr> <td></td> <td>Multi-Engine 28</td> </tr> </table>	UAS 130 Total hours	Traditional Aviation 702 Total hours	Total 130	PIC 467	UAS Instruction Given 79	Instrument 63		Night 65		Cross Country 160		Instruction Given 381		Multi-Engine 28	
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Total 130	PIC 467															
UAS Instruction Given 79	Instrument 63															
	Night 65															
	Cross Country 160															
	Instruction Given 381															
	Multi-Engine 28															
Certifications	AeroVironment Raven-B DDL OEM Certification Draganflyer X6 OEM Certification Commercial Pilot Single and Multi-engine Land Instrument Airplane Certified Flight Instructor, Single Engine Instrument Airplane Class I Medical															
Work Experience	UAS Lead Flight Instructor UND Aerospace, Grand Forks, ND <ul style="list-style-type: none"> • Instructing students on the Corsair ScanEagle simulator • UAS course development and simulator software troubleshooting • AeroVironment Raven-B and Draganflyer X6 Operations • Proficient with Insitu I-Muse and Corsair Eavision software 	December 2010 to present														
	UAS Project Coordinator UND UAS Center of Excellence, Grand Forks, ND <ul style="list-style-type: none"> • Strategic planning, media relations, writing proposals and industry briefings 	March to December 2010														
	Flight Instructor UND Aerospace, Grand Forks, ND <ul style="list-style-type: none"> • Instructing Private, Instrument, Commercial Pilot, and Certified Flight Instructor-Instrument Flight Courses 	Fall 2008 to present														
Activities	Soccer, Hockey, Cooking, Photography, Scuba Diving, Graphic Design President EAA Chapter 1342 (2008, 2009)															

Resume – Aleks Udris

Employment

Managing Partner February, 2006 – Present
BoldMethod, LLC – Grand Forks, ND
Software Systems Design
Training Systems Design

Course Manager June, 2005 – July, 2006
University of North Dakota – Grand Forks, ND
Flight Operations Software Systems Management

Flight Instructor August, 2003 – June, 2005
University of North Dakota – Grand Forks, ND
Single and Multi-Engine Aircraft
Instrument Procedures
FAR 141 Check Pilot

Technical Safety Analyst May 2003 – August, 2003
JetBlue Airways – New York, NY
Implement System Safety Data Systems
Risk Analysis

Intern / Flight Operations Assistant June, 2002 – May, 2003
Atlantic Coast Airlines – Dulles, VA
Flight Operations Personnel Management

Flight Instructor June, 1999 – May, 2002
University of North Dakota – Grand Forks, ND
Single and Multi-Engine Aircraft
Instrument Procedures
FAR 141 Check Pilot

Education

Bachelors of Science – Aeronautics May, 2001
University of North Dakota
Major: Commercial Aviation
Magna cum Laude

William H. Semke

Department of Mechanical Engineering
University of North Dakota
Grand Forks, ND 58202-8359

EDUCATION

Ph.D. Mechanical Engineering, Mathematics minor, May 1999
University of Wisconsin-Madison

M.S. Engineering Mechanics and Astronautics, May 1993
University of Wisconsin-Madison

B.S. Summa Cum Laude, Physics, Mathematics minor, May 1991
Bemidji State University, Bemidji, MN

RESEARCH AND TEACHING EXPERIENCE

Associate Professor (tenured), 8/06 – present

Department of Mechanical Engineering, University of North Dakota

Contemporary research in precision motion and vibration control, smart structures, and aerospace hardware design; along with instruction in the areas of mechanical design and experimental methods

Unmanned Aircraft Systems Engineering (UASE) Laboratory, Director, 10/10 - present

University of North Dakota Center of Excellence in Unmanned Aircraft Systems Research, Education, and Training

Unmanned Aircraft Systems Engineering (UASE) Laboratory, Co-Director, 6/06 - 10/10

University of North Dakota Center of Excellence in Unmanned Aircraft Systems Research, Education, and Training

1st Place Finish, 4th Annual Australian UAS Search and Rescue Outback Challenge, Kingaroy, Australia, October 2010

Interdisciplinary Research Award, 2011

Awarded by the University for Interdisciplinary Collaboration in Research – Mark Askelson, Atmospheric Sciences; Richard Schultz, Electrical Engineering; and William Semke, Mechanical Engineering

North Dakota Spirit Faculty Achievement Award, 2010

Awarded by the School for top faculty achievers based on performance reviews in annual evaluations

University of North Dakota Presidential Scholars Star Faculty, 2010

Awarded by the Office of the President following nomination by University of North Dakota Presidential Scholar students

School of Engineering & Mines Performance Recognition Award, 2007

Awarded by the School for research contributions to the Unmanned Aircraft Systems Center of Excellence

Assistant Professor, 8/00 - 8/06

University of North Dakota Presidential Scholars Star Faculty, 2006

Awarded by the Office of the President following nomination by University of North Dakota Presidential Scholar students

School of Engineering & Mines Olson Professor, 2003-2004

Awarded by the School Policy Committee for successfully demonstrating abilities in teaching, service, and especially research by young faculty

School of Engineering & Mines Outstanding Professor, 2003 & 2004

Awarded by the E-Council of the School of Engineering & Mines by student voting

Consultant

Raytheon Company., Louisville, KY, 8/03-10/03

Mechanical moment of inertia measurements of the Phalanx thermal imager

Ideal Aerosmith, Inc., East Grand Forks, MN, 7/03-8/03

Quality assurance evaluation of a high speed rate table system
Bemidji State University, Bemidji, MN, 12/01-3/02
Minnesota State University program evaluator for Physics (Pre-Engr.) Department
PIEZOMAX, Inc., Madison, WI, 7/99-6/00
Analytical and experimental analysis of ultra-precision positioning stages
Beta Squared, Inc., Allen, TX, 7/99-1/00
Analytical and experimental analysis of ultrasonic lithographic mask cleaning

Research Associate, 5/99-6/00
Computational Mechanics Center, University of Wisconsin-Madison
Lab Manager for a research team evaluating emerging semiconductor lithographies

MEMBERSHIPS

UND Graduate School, Full Member
ASME, 5/99 – present; UND Student Section Advisor, 1/03 - present
ASEE, American Society for Engineering Education, 9/98 - present
SEM, Society of Experimental Mechanics, 12/99 - present
Order of the Engineer, 12/00 – present

GRADUATE STUDENTS ADVISED

David Dvorak, M.S, Mechanical Engineering, May 2011
Thesis Title: "Development and Demonstration of an Unmanned Aircraft Based Precision Agriculture Imaging System"

Richie Spitsberg, B.S, M.S, Mechanical Engineering, May 2011
Thesis Title: "Predictive Velocity Controlled Target Tracking for UAS Operations"

Jonathan Alme, M.S, Electrical Engineering, May 2011
Thesis Title: "Vivaldi Antenna Design for X Band Electronically-Steered Antenna Arrays and Phased Array Radars"

Katie Stuckel, M.S, Mechanical Engineering, May 2010
Thesis Title: "A High Frequency Stabilization System for UAS Imaging Payloads"

Jaganathan Ranganathan, M.S., Mechanical Engineering, December 2008
Thesis Title: "Closed Form Analytical Multi-Axis Gimbal Tracking Algorithms for Use in Small Unmanned Aircraft Vehicles"

Austin Zeller, M.S. Mechanical Engineering, August 2007
Thesis Title: "The Analysis and Design of a Single-Axis Precision Pointing Control Subsystem for the AgCam Remote Sensing Camera System"

Adam Dunnigan, M. Engr. Mechanical Engineering, August 2007
Project Title: "Design, Analysis, and NASA Requirements for the Alternate Agricultural Camera (AgCam) IMAX Mounting Assembly"

Hemant Yadav, M.S. Mechanical Engineering, May 2007
Thesis Title: "Study of the Effects of Curvature in Magnetic Tape"

Matthew Buisker, M.S. Mechanical Engineering, May 2007
Thesis Title: "Statistically Significant Factors that Affect the Pointing Accuracy of Airborne Remote Sensing Payloads"
Currently employed by Daktronics, Inc., Brookings, SD

Vipin Guda, M.S. Mechanical Engineering, May 2007
Thesis Title: "A Precision Positioning Actuator System Using a PID Controller"

Richard Voeller, M.S. Mechanical Engineering, May 2005
Thesis Title: "Closed-Cell Foam Characterization for Packaging and Testing of the Agricultural Camera (AgCam) System"

Jeffrey Hammes, M.S. Mechanical Engineering, December 2004
Thesis Title: "Substructure Coupling for Motion Profile Tuning for the Agricultural Camera (AgCam) Remote Sensing Camera System"

Scott Threinen, M. Engr. Mechanical Engineering, May 2004

Project Title: "Analysis and Development of a Linear Positioning System for the Agricultural Camera (AgCam) Remote Sensing Camera System"

Jason Gullicks, M.S. Mechanical Engineering, December 2003
Thesis Title: "An Ultra-Precision Smart Actuator Design Concept Using Composite and Piezoelectric Materials"

Adam Webster, M.S. Mechanical Engineering, May 2003
Thesis Title: "Analysis and Development of a Vibration Isolation System for the Agricultural Camera (AgCam) Remote Sensing Camera System"

CURRENT GRADUATE STUDENTS - Advisor

Masters Students

Adam Gabbert, B.S, Mechanical Engineering, University of North Dakota, May 2009

Jesse Ehrhorn, B.S, Mechanical Engineering, University of North Dakota, May 2008

Karl Lemler, B.S, Mechanical Engineering, University of North Dakota, May 2011

Benjamin Gunvalson, B.S, Mechanical Engineering, University of North Dakota, May 2011

REFEREED JOURNAL PUBLICATIONS (UND Student Names in Bold)

Semke, W., Bibel, G., Jerath, S., **Gurav, S.**, and **Webster, A.**, "Efficient Dynamic Structural Response Modeling of Bolted Flange Piping Systems," *International Journal of Pressure Vessels and Piping*, Vol. 83(10), pp. 767-776, October 2006.

Webster, A., and Semke, W., "Broadband Viscoelastic Rotational Vibration Control for Remote Sensing Applications," *Journal of Vibration and Control*, Vol. 11(11), pp. 1339-1356, November 2005.

Webster, A., and Semke, W., "Frequency Dependent Viscoelastic Structural Elements for Passive Broad Band Vibration Control," *Journal of Vibration and Control*, Vol. 10(6), pp. 881-895, June 2004.

Bibel, G., and Semke, W., "A Java Enhanced Webpage Used to Illustrate Aircraft Carrier Launch Dynamics," *Computers in Education Journal*, Vol. XI, No. 3, pp. 58-64, 2001.

Semke, W., Weisbrod, E., Engelstad, R., Lovell, E., Festa, J., and Bailey, B., "Mechanical Analysis of the PLASMAX Particle Removal Process for Optical and Next-Generation Lithography Masks," *Journal of Vacuum Science and Technology B*, Vol. 18(6), pp. 3221-3226, Nov/Dec, 2000.

Marlin, C., Semke, W., Dicks, G., Engelstad, R., Lovell, G., Liddle, J., and Novembre, A., "Mechanical and Thermal Modeling of the SCALPEL Mask," *Journal of Vacuum Science and Technology B*, Vol. 17(6), pp. 2878-2882, Nov/Dec, 1999.

Semke, W., Engelstad, R., Lovell, E., and Liddle, J., "Dynamic Analysis of a SCALPEL Mask During Electron Beam Exposure," *Journal of Vacuum Science and Technology B*, Vol. 16(6), pp. 3587-3591, Nov/Dec 1998.

REFEREED PROCEEDINGS PUBLICATIONS (UND Student Names in Bold)

Spitsberg, R., **Mettler, M.**, **Stuckel, K.**, **Czarnomski, M.**, Semke, W., and Schultz, R., "Autonomous Velocity Controlled Tracking for UAS Operations." *AUVSI's Unmanned Systems North America 2010*, Denver, Colorado, August 24-27, 2010.

Dvorak, D., Semke, W., and Schultz, R., "Lessons Learned: Development and Demonstration of an UAS based Agricultural Imaging Payload." *AUVSI's Unmanned Systems North America 2010*, Denver, Colorado, August 24-27, 2010.

Ranganathan, J., and Semke, W., "Three-Axis Gimbal Surveillance Algorithms for Use in Small UAS." *Proceedings of the ASME International Mechanical Engineering Conference and Exposition, IMECE2008-67667*, November, 2008.

Dvorak, D., **Czarnomski, M.**, **Lendway, M.**, **Martel, F.**, Semke, W., Schultz, R., and Neubert, J., "Using Small UAVs to Capture Multispectral Imagery for use in Precision Agriculture."

Proceedings of the Association for Unmanned Vehicle Systems International (AUVSI) Unmanned Systems North America 2008, San Diego, CA, June 10-12, 2008.

Semke, W., Schultz, R., Dvorak, D., Trandem, S., Berseth, B., and Lendway, M., "Utilizing UAV Payload Design by Undergraduate Researchers for Educational and Research Development," *Proceedings of the 2007 ASME International Mechanical Engineering Congress and Exposition*, IMECE2007-43620, November 2007.

Lendway, M., Berseth, B., Trandem, S., Schultz, R., and Semke, W., "Integration and Flight of a University-Designed UAV Payload in an Industry-Designed Airframe," *Proceeding of the Association Unmanned Vehicle Systems International (AUVSI)*, 2007.

Semke, W., Schultz, R., Albrecht, J., Moses, J., and Ridl, P., "An Effective Partnership Between University and Industry: Fulfilling Academic and Corporate Engineering Goals," *Proceedings of the 2006 American Society for Engineering Education Annual Conference & Exposition*, 2006.

Schultz, R., Semke, W., Johnson, A., Olsen, D., Beeri, O., and Seielstad, G., "Satellites, UAVs, and Ground-Based Wireless Sensor Networks: Lessons Learned from an REU Site in Environmental Sensor Development," *Proceedings of the 2006 American Society for Engineering Education Annual Conference & Exposition*, 2006.

Gullicks, J., and Semke, W., "Analytical and Experimental Analysis of a Precision Positioning Actuator System," *Proceedings of the ASME International Design Engineering Technical Conferences*, DETC2004-57325, September 2004.

Webster, A., and Semke, W., "Viscoelastic Rotational Vibration Absorber for Remote Sensing Applications," *Proceedings of the ASME International Design Engineering Technical Conferences*, DETC2003/VIB-48551, September 2003.

Semke, W., Bibel, G., Jerath, S., Gurav, S., and Webster, A., "A Dynamic Investigation of Piping Systems with a Bolted Flange," *Proceedings of the Pressure Vessels and Piping Division Conference (PVP-2002), Design and Analysis of Piping, Vessels, and Components*, ASME PVP Vol. 440, pp. 121-128, 2002.

Semke, W., Bibel, G., Gurav, S., Webster, A., and Jerath, S., "Dynamic Response of a Pipe Having Bolted Flange Connection with a Gasket," *Proceedings of the Engineering Technology Conference on Energy (ETCE)*, ASME, 2002.

Semke, W., Siewert, L., Mikkelsen, A., Risius, E., Tang, N., Engelstad, R., Lovell, E., Zheng, J., and Dao, G., "Pellicle-Induced Distortions in Advanced Optical Reticles," *Proceedings of the 20th Annual BACUS Symposium on Photomask Technology*, SPIE, Vol. 4186, pp. 207-216, 2000.

Sprague, M., Semke, W., Engelstad, R., Lovell, E., Chalupka, A., Löschner, H., and Stengl, G., "Stencil Mask Distortion Control Using Nonsymmetric Perforation Rings," *Microelectronic Engineering*, Vol. 41/42, pp. 225-228, 1998.

ADDITIONAL PUBLICATIONS (UND Student Names in Bold)

Martel, F., Mullins, M., Kaabouch, N., and Semke, W., "Flight Testing of an ADS-B-based Miniature 4D Sense and Avoid System for Small UAS," *Proceedings of AIAA Infotech@Aerospace*, 2011.

Boura, D., Hajicek, D., and Semke, W., "Automated Air Drop System for Search and Rescue Applications Utilizing Unmanned Aircraft Systems," *Proceedings of AIAA Infotech@Aerospace*, 2011.

Qadir, A., Neubert, J., and Semke, W., "On-Board Visual Tracking with Unmanned Aircraft System (UAS)," *Proceedings of AIAA Infotech@Aerospace*, 2011.

Spitsberg, R., Mettler, M., and Semke, W., "Autonomous Predictive Target Tracking of UAS with a Two-Axis Gimbal System," *Proceedings of AIAA Infotech@Aerospace*, 2011.

Stuckel, K. and Semke, W., "A Piezoelectric Actuated Stabilization Mount for Payloads Onboard Small UAS," *Proceedings of the International Modal Analysis Conference (IMAC) XXIX: A Conference and Exposition on Structural Dynamics*, 2011.

Locke, M., Czarnomski, M., Qadir, A., Setness, B., Baer, N., Meyer, J., and Semke, W., "High-performance Two-axis Gimbal System for Free Space Laser Communications Onboard

Unmanned Aircraft Systems," *Proceedings of SPIE: Free-Space Laser Communication Technologies XXIII*, Vol. 7923, 2011.

Dvorak, D., Sorum, J., Semke, W., Neubert, J., and Schultz, R., "Evaluating the Performance of a UAS based Precision Agriculture Imaging Payload." *Proceedings of AIAA Infotech@Aerospace 2010*, Atlanta, Georgia, April 20-22, 2010.

Gabbert, A., Semke, W., Dvorak, D., Satrom, D., Strang, K., Salle, S., and Schultz, R., "Roll and Pitch Imaging Stabilization for Small UAS." *Proceedings of AIAA Infotech@Aerospace 2010*, Atlanta, Georgia, April 20-22, 2010.

Czarnomski, M., Blakely, J., Wang, Z., Williamson, G., Schultz, R., and Semke, W., "Laser Communications for Unmanned Aircraft Systems Using Differential GPS and IMU Data." *Proceedings of SPIE: Free-Space Laser Communication Technologies XXII*, Vol. 7587, 2010.

Stuckel, K., Semke, W., Baer, N., and Schultz, R., "A High Frequency Stabilization System for UAS Imaging Payloads," *Proceedings of the International Modal Analysis Conference (IMAC) XXVIII: A Conference and Exposition on Structural Dynamics*, 2010.

Cavalli, M., Semke, W., and Kulkarni, M., "Engineering Outreach for Under-Resourced High Schools," *Proceedings of the American Society of Engineering Education (ASEE) North Midwest Section Annual Conference*, October 2009.

Martel, F., Schultz, R., Semke, W., Wang, Z., "Unmanned Aircraft Systems Sense and Avoid Avionics Utilizing ADS-B Transceiver," *Proceedings of Unmanned Aircraft Systems (UAS 2009)*, June 2009.

Czarnomski, M., Spitsberg, R., Dvorak, D., Schultz, R., Semke, W., "Benefits of Autopilot Integration for Enhanced UAS Operations," *Proceedings of Unmanned Unlimited*, 2009.

Dvorak, D., Anderson, K., Czarnomski, M., Spitsberg, R., Neubert, J., Semke, W., Schultz, R., "Optimizing UAS Multispectral Data Collection and Post Processing Techniques," *Proceedings of Unmanned Unlimited*, 2009.

Mkrtchyan, A., Schultz, R., Semke, W., "Vision Based Autopilot Implementation Using Quad-Rotor Helicopter," *Proceedings of Unmanned Unlimited*, 2009.

Ranganathan, J., Stuckel, K., Semke, W., and Schultz, R., "Autonomous Tracking of UAS Using GPS Data with a Two-Axis Gimbal System," *Proceedings of Unmanned Unlimited*, 2009.

Martel, F., Schultz, R., Semke, W., Wang, Z., Czarnomski, M., "Unmanned Aircraft Systems Sense and Avoid Avionics Utilizing ADS-B Transceiver," *Proceedings of Unmanned Unlimited*, 2009.

Semke, W., Stuckel, K., Anderson, K., Spitsberg, R., Kubat, B., Mkrtchyan, A., and Schultz, R., "Dynamic Flight Characteristic Data Capture for Small Unmanned Aircraft," *Proceedings of the International Modal Analysis Conference (IMAC) XXVII: A Conference and Exposition on Structural Dynamics*, 2009.

Semke, W., Ranganathan, J. and Buisker, M., "Active Gimbal Control for Surveillance using Small Unmanned Aircraft Systems," *Proceedings of the International Modal Analysis Conference (IMAC) XXVI: A Conference and Exposition on Structural Dynamics*, 2008.

Yadav, H., Semke, W., and Moses, J., "Lateral Force in Magnetic Tape Due to Tape Curvature," *Proceedings of the Society of Experimental Mechanics Annual Conference and Exposition on Experimental and Applied Mechanics*, 2007.

Marshall, D., Trapnell, B., Mendez, J., Berseth, B., Schultz, R., and Semke, W., "Regulatory and Technology Survey of Sense and Avoid for UAS," *Proceedings of AIAA Infotech@Aerospace*, 2007.

Lendway, M., Berseth, B., Martel, F., Trandem, S., and Anderson, K., (Schultz, R. and Semke, W., Faculty Advisors), "A University-Designed Thermal-Optical Imaging Payload for Demonstration in a Small Experimental UAS," *AIAA Infotech@Aerospace*, 2007, (Selected as a finalist in the *AIAA Intelligent Systems Student Paper Competition*).

Buisker, M., and Semke, W., "Statistical Design for Passive Vibration Isolation on Remote Sensing Platforms," *Proceedings of the International Modal Analysis Conference (IMAC) XXV: A Conference and Exposition on Structural Dynamics*, 2007.

Guda, V., and Semke, W., "A Precision Positioning Actuator System using a PID Controller," *Proceedings of the International Modal Analysis Conference (IMAC) XXV: A Conference and Exposition on Structural Dynamics*, 2007.

Semke, W., Buisker, M., and Voeller, R., "Frequency Dependent Closed-Cell Foam Study for Payload Launch Survivability," *Proceedings of the International Modal Analysis Conference (IMAC) XXIV: A Conference and Exposition on Structural Dynamics*, 2006.

Semke, W., Johnson, A., Schultz, R., Won, C., Olsen, D., and Seielstad, G., "An Interdisciplinary Space-Based Remote Sensing Enterprise at the University of North Dakota," *Proceedings of the 67th Annual American Society of Engineering Education (ASEE) North Midwest Section Annual Conference*, 2005.

Semke, W., and Minar, D., "Enhanced Precision Positioning Actuators Using Composite Material Tailoring," *Proceedings of the Society of Experimental Mechanics Annual Conference and Exposition on Experimental and Applied Mechanics*, 2005.

Hammes, J., and Semke, W., "Substructure Coupling for Motion Profile Tuning of a Remote Sensing Camera," *Proceedings of the International Modal Analysis Conference (IMAC) XXIII: A Conference and Exposition on Structural Dynamics*, 2005.

Voeller, R., and Semke, W., "Vibration Attenuation of Closed-Cell Foam for Packaging and Testing," *Proceedings of the International Modal Analysis Conference (IMAC) XXIII: A Conference and Exposition on Structural Dynamics*, 2005.

Zeller, A., and Semke, W., "Transient Response Tuning of a Cantilevered Remote Sensing Camera Stand," *Proceedings of the International Modal Analysis Conference (IMAC) XXII: A Conference and Exposition on Structural Dynamics*, 2004.

Webster, A., and Semke, W., "Vibration Control Using Frequency Dependent Viscoelastic Structural Elements," *Proceedings of the International Modal Analysis Conference (IMAC) XXI: A Conference and Exposition on Structural Dynamics*, 2003.

Hulst, N., Johnson, A., Olsen, D., Osburnsen, P., Schultz, R., Seielstad, G., Semke, W., and Won, C., "The Airborne Environmental Research Observational Camera (AEROCam): A Case Study of Multidisciplinary Experiential Learning," *Proceedings of the 32nd ASEE/IEEE Frontiers in Education Conference*, 2002.

Semke, W., Johnson, A., Schultz, R., Won, C., Gullicks, J., Hulst, N., Olsen, D., and Seielstad, G., "The Development of an Airborne Remote Sensing Camera Array at the University of North Dakota," *Proceedings of the 64th Annual American Society of Engineering Education (ASEE) North Midwest Section Annual Conference*, 2002.

Semke, W., and Webster, A., "The Development of a Cost-Effective Modal Mapping Tool," *Proceedings of the Society of Experimental Mechanics Annual Conference and Exposition on Experimental and Applied Mechanics*, 2002.

Hulst, N., Gullicks, J., Johnson, J., Lauinger, G., Larson, D., Lemcke, S., Johnson, A., Schultz, R., Semke, W., Won, C., Giesinger, B., Olsen, D., Osburnsen, P., Seielstad, G., and Wivell, C., "The Airborne Environmental Research Observational Camera (AEROCam): A Multispectral Digital Photography System for Remote Sensing," *Proceedings of the 2001 National Conference on Undergraduate Research*, (on CD-ROM), 2002.

Semke, W., Webster, A., Spence, B., and White, S., "The Dynamic Characteristics of a Lightweight Deployable Solar Array," *Proceedings of the International Modal Analysis Conference (IMAC) XX: A Conference and Exposition on Structural Dynamics*, pp. 186-192, 2002.

Semke, W., Engesather, D., Gullicks, S., Hodny, R., and Webster, A., "The Development of a Nano-Scale Vibration Testing Facility and the University of North Dakota," *Proceedings of the 63rd Annual American Society of Engineering Education (ASEE) North Midwest Section Annual Conference*, (on CD-ROM), 2001.

Won, C., Schultz, R., Sale, D., Johnson, A., Semke, W., Olsen, D., Wivell, C., and Seielstad, G., "Systems Engineering Pedagogy Through Multidisciplinary Projects," *Proceedings of the 63rd Annual American Society of Engineering Education (ASEE) North Midwest Section Annual Conference*, (on CD-ROM), 2001.

Semke, W., and Boukahil, A., "Finite Element and Experimental Modal Analyses of Ultra-Precision Motion Stages," *Proceedings of the International Modal Analysis Conference (IMAC) XIX: A Conference and Exposition on Structural Dynamics*, pp. 1742-1747, 2001.

Won, C., Sale, D., Schultz, R., Johnson, A., Semke, W., "Spacecraft Systems Engineering - The Initiation of a Multidisciplinary Design Project at the University of North Dakota," *Proceedings of the 2001 American Society for Engineering Education Annual Conference & Exposition*, (on CD-ROM), 2001.

Schmidt, C., Lovseth, J., Barnum, M., Clairmont, J., Langwost, P., Hulst, N., Parisien, K., Rydel, J., Sale, D., Schultz, R., Won, C., Johnson, A., Semke, W., "Systems Engineering Pedagogy Through Balloon-Launched Spacecraft," *Proceedings of the 2001 National Conference on Undergraduate Research*, (on CD-ROM), 2001.

Sale, D., Schultz, R., Johnson, A., Timpone, T., and Semke, W., "The Initiation of a Satellite Systems Engineering Program at the University of North Dakota," *Proceedings of the 62nd Annual American Society of Engineering Education (ASEE) North Midwest Section Annual Conference*, (on CD-ROM), 2000.

Semke, W., Engelstad, R., and Lovell, E., "Modal Analysis of a Hybrid Grillage-Plate-Membrane Structure," *Proceedings of the International Modal Analysis Conference (IMAC) XVIII: A Conference and Exposition on Structural Dynamics*, pp. 543-549, 2000.

Semke, W., Schlax, M., Engelstad, R., Lovell, E., and Liddle, J., "A Modal Analysis of the SCALPEL Mask using Experimental and Numerical Methods," *Proceedings of the 1999 SPIE Symposium on Emerging Lithographic Technologies III*, SPIE, Vol. 3676, pp. 556-567, 1999.

Engelstad, R., Lovell, E., Dicks, G., Martin, C., Schlax, M., Semke, W., Liddle, J., and Novembre, A., "Finite Element Modeling of SCALPEL Masks," *Proceedings of the 1999 SPIE Symposium on Emerging Lithographic Technologies III*, SPIE, Vol. 3676, pp. 128-139, 1999.

Semke, W., "PLASMAX Particle Removal Process SCALPEL Mask Application," International SEMATECH Publication, # 99043722A-TR, 1999.

Semke, W., Engelstad, R., Lovell, E., and Liddle, J., "Transient Analysis of the In-Plane Distortions of a SCALPEL Mask," *Proceedings of TECHCON '98*, 1998.

Semke, W., "Elastic Tethers in Space: A Stability Analysis of an Elastic Nonlinear Pendulum Near Equilibrium Points," *Proceedings of the Fifth Annual Wisconsin Space Conference, Cooperation In Space*, 1995.

Semke, W., "Modeling and Control of an Elastic Tether for Tethered Satellites," *Proceedings of the Fourth Annual Wisconsin Space Conference, Space: An Evolutionary Science*, 1994.

Semke, W., "Exact Power Series Solutions to Non-Linear Differential Equations: The Elastic Pendulum," Vol. 11, *Journal of Student Research*, Bemidji State University, 1991.

TECHNICAL PRESENTATIONS

"Unmanned Aircraft Systems in the Red River Valley," *invited presentation*, Grand Forks Historical Society, Grand Forks, ND, February 27, 2011.

"Unmanned Aircraft Systems in the Red River Valley – An Engineering Perspective," *invited presentation*, North Dakota Society of Professional Engineers, Grand Forks, ND, February 15, 2011.

"A Piezoelectric Actuated Stabilization Mount for Payloads Onboard Small UAS," IMAC XXIX: International Modal Analysis Conference, Jacksonville, FL, January 31 - February 3, 2011.

"Airborne Sense & Avoid Payload Development," *invited presentation*, Milestones and Horizons Summit sponsored by Senator Dorgan, Fargo, ND, October 11, 2010.

"A High Frequency Stabilization System for UAS Imaging Payloads," IMAC XXVIII: International Modal Analysis Conference, Jacksonville, FL, February 1-4, 2010.

"Dynamic Flight Characteristic Data Capture for Small Unmanned Aircraft," IMAC XXVIII: International Modal Analysis Conference, Orlando, FL, February 2-6, 2009.

"Using Small UAVs to Capture Multispectral Imagery for use in Precision Agriculture." (presented by D. Dvorak), AUVSI Unmanned Systems North America 2008, San Diego, CA, June 10-12, 2008.

"School of Engineering & Mines Aerospace Related Activities," *Joel Hietkamp Show*, KFGO 790 AM, June 4, 2008.

"Bon Voyage AgCam," (presented with G. Seielstad), *Hear It Now*, North Dakota Public Radio, February 26, 2008.

"Active Gimbal Control for Surveillance using Small Unmanned Aircraft Systems," IMAC XXVI: International Modal Analysis Conference, Orlando, FL, February 4-7, 2008.

"Utilizing UAV Payload Design by Undergraduate Researchers for Educational and Research Development," IMECE 2007 ASME International Mechanical Engineering Congress and Exposition, Seattle, WA, November 11-15, 2007.

"Lateral Force in Magnetic Tape Due to Tape Curvature," Society of Experimental Mechanics Annual Conference and Exposition on Experimental and Applied Mechanics, Springfield, MA, June 3-6, 2007.

"Regulatory and Technology Survey of Sense and Avoid for UAS," (presented by D. Marshall and B. Berseth), *AIAA Infotech@Aerospace*, Rohnert Park, CA, May 7-10, 2007.

"A University-Designed Thermal-Optical Imaging Payload for Demonstration in a Small Experimental UAS," (presented by B. Berseth and F. Martell), *AIAA Infotech@Aerospace*, Rohnert Park, CA, May 7-10, 2007.

"The Skies Not the Limit Anymore – Aerospace Careers," Invited Presentation, *Job Fair & Career Showcase*, Grand Forks, ND, April 24, 2007.

"Payload Development for Applications in Agriculture, Environment, Energy and Security," Second Red River Valley Research Corridor Unmanned Aircraft Systems Action Summit, Grand Forks, ND, March 26-27, 2007.

"Statistical Design for Passive Vibration Isolation on Remote Sensing Platforms," (presented by Matthew Buisker), IMAC XXV: International Modal Analysis Conference, Orlando, FL, February 19-22, 2007.

"A Precision Positioning Actuator System using a PID Controller," IMAC XXV: International Modal Analysis Conference, Orlando, FL, February 19-22, 2007.

"Industry/University Research and Design: Making It Work," Invited Presentation, *Marketplace for Entrepreneurs*, Fargo, ND, January 16-17, 2007.

"An Effective Partnership Between University and Industry: Fulfilling Academic and Corporate Engineering Goals," *2006 ASEE Annual Conference & Exposition*, Chicago, IL, June 18-23, 2006.

"Frequency Dependent Closed-Cell Foam Study for Payload Launch Survivability," IMAC XXIV: International Modal Analysis Conference, St. Louis, MO, January 30–February 2, 2006.

"Aerospace Sensor Development for Precision Agriculture: A Mechanical Engineering Perspective," Invited Presentation, North Dakota Society of Professional Engineers, Grand Forks, ND, December 20, 2005.

"An Interdisciplinary Space-Based Remote Sensing Enterprise at the University of North Dakota," 67th Annual American Society of Engineering Education (ASEE) North Midwest Section Annual Conference, Bookings, SD, October 13-14, 2005.

"Enhanced Precision Positioning Actuators Using Composite Material Tailoring," Society of Experimental Mechanics Annual Conference and Exposition on Experimental and Applied Mechanics, Portland, OR, June 7-9, 2005.

"Substructure Coupling for Motion Profile Tuning of a Remote Sensing Camera," IMAC XXIII: International Modal Analysis Conference, Orlando, FL, January 31–February 3, 2005.

"Vibration Attenuation of Closed-Cell Foam for Packaging and Testing," (*presented by Richard Voeller*), IMAC XXIII: International Modal Analysis Conference, Orlando, FL, January 31 – February 3, 2005.

"Analytical and Experimental Analysis of a Precision Positioning Actuator System," ASME DETC, Salt Lake City, UT, September 28 – October 2, 2004.

"AgCam HFIT," NASA Human Factors Integration Team (HFIT) and Fit Check panel presentation, Johnson Space Center, Houston, TX, June 9, 2004.

"Transient Response Tuning of a Cantilevered Remote Sensing Camera Stand," IMAC XXII: International Modal Analysis Conference, Dearborn, MI, January 26-29, 2004.

"Viscoelastic Rotational Vibration Absorber for Remote Sensing Applications," ASME DETC, Chicago, IL., September 2-6, 2003

"An Ultra-Precision Smart Actuator Design Concept Using Composite and Piezoelectric Materials", (*presented by Jason Gullicks*), ASME 2003 Mechanics and Materials Conference, Scottsdale, AZ, June 17-20, 2003.

"Vibration Control Using Frequency Dependent Viscoelastic Structural Elements," IMAC XXI: International Modal Analysis Conference, Kissimmee, FL, February 3-6, 2003.

"The Development of an Airborne Remote Sensing Camera Array at the University of North Dakota," 64th Annual American Society of Engineering Education (ASEE) North Midwest Section Annual Conference, Madison, WI, October 10-12, 2002.

"A Dynamic Investigation of Piping Systems with a Bolted Flange," 2002 ASME Pressure Vessels and Piping Division Conference (PVP-2002), Vancouver, BC, Canada, August 4-8, 2002.

"The Development of a Cost-Effective Modal Mapping Tool," Society of Experimental Mechanics Annual Conference and Exposition on Experimental and Applied Mechanics, Milwaukee, WI, June 10-12, 2002.

"The Dynamic Characteristics of a Lightweight Deployable Solar Array," IMAC XX: International Modal Analysis Conference, Los Angeles, CA, February 4-7, 2002.

"The Development of a Nano-Scale Vibration Testing Facility and the University of North Dakota," 63rd Annual American Society of Engineering Education (ASEE) North Midwest Section Annual Conference, Grand Forks, ND, September 27-29, 2001.

"Finite Element and Experimental Modal Analyses of Ultra-Precision Motion Stages," IMAC XIX: International Modal Analysis Conference, Kissimmee, FL, February 5-8, 2001.

"Pellicle-Induced Distortions in Advanced Optical Reticles," 20th Annual BACUS Symposium on Photomask Technology, Monterey CA, September 13-15, 2000.

"Mechanical Analysis of the PLASMAX Particle Removal Process for Optical and NGL Masks," The 44th International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication, Palm Springs, CA, May 30-June 2, 2000.

"Modal Analysis of a Hybrid Grillage-Plate-Membrane Structure," IMAC XVIII: International Modal Analysis Conference, San Antonio, TX, February 7-10, 2000.

"A Modal Analysis of the SCALPEL Mask using Experimental and Numerical Methods," SPIE's 24th International Symposium on Microlithography, Santa Clara, CA, March 14-19, 1999.

"Dynamic Characteristics of the SCALPEL Mask," Invited Presentation, Bell Laboratories, Lucent Technologies, Murray Hill, NJ, September 15, 1998.

"Transient Analysis of the In-Plane Distortions of a SCALPEL Mask," TECHCON '98 Conference, Las Vegas, NV, September 8-11, 1998.

"Dynamic Analysis of a SCALPEL Mask During Electron Beam Exposure," The 43rd International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication, Chicago, IL, May 26-29, 1998.

"Elastic Tethers in Space: A Stability Analysis," The Fifth Annual Wisconsin Space Conference
Whitewater, WI, August 17-18, 1995.

"Modeling and Control of an Elastic Tether for Tethered Satellites," The Fourth Annual
Wisconsin Space Conference, Madison, WI, August 25-26, 1994.

GRANTS AWARDED

"MEMS Antenna for Wireless Communications Supporting Unmanned Aerial Vehicles in the
Battlefield," Air Force Research Laboratory, Co-P.I.s: W. Tang, C. Chao, D. Peroulis, and W.
Semke, UND ME Dept Semke \$205,528), 2 years, February 2011.

Travel Award, ORPD Senate Scholarly Activities Committee, \$480.40, February 2010.

Travel Award, ORPD Senate Scholarly Activities Committee, \$576.30, February 2009.

"Unmanned Aerial System Technology Integration and Education," DoD UAS Joint Center for
Excellence, Team Members: John D. Odegard School of Aerospace Science; B. Trapnell, D.
Marshall, L. Osborne, and M. Askelson, School of Engineering & Mines; R. Schultz and W.
Semke, 2 years, UND ME Dept Semke \$288,000, March 2009.

"Virtual and On-line Science Laboratories for Under-Resourced North Dakota High Schools,"
North Dakota Department of Career and Technical Education, Co-P.I.s: M. Kulkarni, M. Cavalli,
and W. Semke, 1 year, \$10,000, 1 year, September 2008.

"MEMS Antenna for Wireless Communications Supporting Unmanned Aerial Vehicles in the
Battlefield," Department of Defense, Co-P.I.s: W. Tang, C. Chao, D. Peroulis, R. Schultz, and W.
Semke, UND ME Dept Semke \$496,840), 3 years, August 2008.

"Medical Drug Delivery using an Aerosol Generating Nebulizer," University of North Dakota
Faculty Research Seed Money, P.I.: W. Semke, 2 years, \$13,397, April 2008.

Travel Award, ORPD Senate Scholarly Activities Committee, \$425.44, February 2008.

"Unmanned Aircraft Systems (UAS) Center of Excellence for Economic Development," North
Dakota Centers of Excellence Commission, P.I.: B. Smith, Team Members: John D. Odegard
School of Aerospace Science, School of Engineering & Mines, Northern Plains Center for
Behavioral Research, Center for Innovation, 2 years, UND ME Dept Semke \$128,275, April
2008.

Travel Award, ORPD Senate Scholarly Activities Committee, \$430.20, May 2007.

"Unmanned Aerial System Remote Sense and Avoid System and Advanced Payload Analysis
and Investigation," United States Air Force UAV Battle Lab, Team Members: John D. Odegard
School of Aerospace Science; B. Trapnell, D. Marshall, L. Osborne, and M. Askelson, School of
Engineering & Mines; R. Schultz and W. Semke, 1 year, UND ME Dept Semke \$280,618,
August 2007.

"Digital Tape Media Modeling – Pack Shape and Pack Stress (Extension)," Imation Corporation,
P.I.: W. Semke, 1 year, \$4,302, May 2006.

"Center of Excellence for Economic Development in UAVs and Simulation Applications," North
Dakota Centers of Excellence Commission, P.I.: B. Smith, Team Members: John D. Odegard
School of Aerospace Science, School of Engineering & Mines, Northern Plains Center for
Behavioral Research, Center for Innovation, 2 years, UND ME Dept Semke \$47,370, May 2007.

"Dynamic Control and Operations of Unmanned Aerial Systems Supporting Earth Science
Missions," NASA EPSCoR, P.I.: R. Schultz, Co-P.I.: W. Semke, 1 year, \$15,000, May 2006.

"2006 ASEE Annual Conference & Exposition Travel Award," Faculty Instructional Development
Committee, P.I.: W. Semke, \$482, May 2006.

"Development of a Vibration Isolation and Attitude Control Payload Platform," National Suborbital
Education and Research Center, P.I.: W. Semke, \$26,000, March 2006.

Travel Award, ORPD Senate Scholarly Activities Committee, \$287, February 2006.

"UAV Payload Development in the School of Engineering & Mines," ND EPSCoR Small Award,
P.I.'s: R. Schultz and W. Semke, \$2,500, October 2005.

"Digital Tape Media Modeling – Pack Shape and Pack Stress," Imation Corporation, P.I.: W. Semke, 1 year, \$19,252, funded August 22, 2005.

AgCam Mechanical Engineering Student Appointments, Northern Great Plains Center for People and the Environment, P.I.: G. Seielstad, Mechanical Engineering Lead: W. Semke, 3 years, \$135,592.

Summer Fellowship, Northern Great Plains Center for People and the Environment, P.I.: W. Semke, 1 year, \$10,303, funded May 16, 2005.

"REU Site: Engaging Undergraduates in Multidisciplinary Remote Sensing Image Acquisition and Analysis Research at the University of North Dakota," Management Team Member, \$3,434, May 2005.

"Digital Tape Media Modeling," Imation Corporation, P.I.: W. Semke, 1 year, \$8,729, funded January 21, 2005.

"International Modal Analysis Conference Travel Proposal," NASA EPSCoR, P.I.: W. Semke, 1 year, \$2,292, funded December 13, 2004.

Summer Fellowship, Earth System Science Institute, P.I.: W. Semke, 1 year, \$13,050, funded May 16, 2004.

"REU Site: Engaging Undergraduates in Multidisciplinary Remote Sensing Image Acquisition and Analysis Research at the University of North Dakota," Management Team Member, \$3,262, August 2004.

"North Dakota Space Training and Research (ND STaR) - Remote Sensing Platform Development and Enhancement," Faculty Research Advisor, \$5,000, June 2004.

"Novel Techniques and Materials for Enhanced Remote Sensing Platforms," University of North Dakota Faculty Research Seed Money, P.I.: W. Semke, 1 year, \$25,000, funded January 2, 2004.

Summer Fellowship, Earth System Science Institute, P.I.: W. Semke, 1 year, \$15,400, funded May 16, 2003.

"North Dakota Space Training and Research (ND STaR) – The UND CubeSat Project: ZAMBONI-Zippy Aerospace Module Broadcasting Observed Near-Infrared Images," Faculty Research Advisor, \$3,000, June 2003.

"REU Site: Engaging Undergraduates in Multidisciplinary Remote Sensing Image Acquisition and Analysis Research at the University of North Dakota," Management Team Member, \$3,080, August 2003.

Travel Award, ORPD Senate Scholarly Activities Committee, \$525, February 3-6, 2003.

"Ultraprecision Positioning Devices Using Smart Actuators and Material Tailoring", SEM Dean, P.I.: W. Semke, 1 year, \$7,750, funded December 20, 2002.

"The Initiation of the UND CubeSat Project: ZAMBONI – Zippy Aerospace Module Broadcasting Observed Not-so-bad Images", North Dakota Space Grant, Co-P.I.'s.: D. Heckman, C. Schmidt, R. Schultz, and W. Semke, 1 year, \$6,999, funded August 29, 2002.

"REU Site: Engaging Undergraduates in Multidisciplinary Remote Sensing Image Acquisition and Analysis Research at the University of North Dakota," National Science Foundation - Research Experiences for Undergraduates, P.I.: R. Schultz, Co-P.I.: G. Seielstad, Faculty Associates: A. Johnson, W. Semke, C. Won, Senior Associate: D. Olsen, 3 year, \$279,071, funded June 2002.

Summer Fellowship, Earth System Science Institute, P.I.: W. Semke, 1 year, \$17,000, funded May 16, 2002.

"Vibration Laboratory Enhancement," North Dakota EPSCoR, P.I.: W. Semke, Co-P.I.: M. Zahui, and G. Bibel, 1 year, \$34,900, funded April 22, 2002.

Travel Award, ORPD Senate Scholarly Activities Committee, \$398, August 3-8, 2002.

"Vibration Analysis of Micro- and Nano-Scale Devices, Faculty Laboratory and Research Experience (FLARE) Award Klingenstein," North Dakota EPSCoR, P.I.: W. Semke, 1 year, \$11,021, funded February 11, 2002.

"Vibration Testing Laboratory Development," SEM Dean, P.I.: W. Semke, 1 year, \$11,900, funded December 20, 2001.

"The Development of a Vibration Testing Facility for Micro-and Nano-Scale Devices," University of North Dakota Faculty Research Seed Money, P.I.: W. Semke, 1 year, \$30,489, funded December 6, 2001.

"The Dynamic Characteristics of a Lightweight Deployable Solar Array," NASA EPSCoR, P.I.: W. Semke, 1 year, \$2,400, funded November 19, 2001.

Summer Fellowship, Earth System Science Institute, P.I.: W. Semke, 1 year, \$8,280, funded May 16, 2001.

"An Investigation of the Dynamic Characteristics of the Mars Lander Lightweight Solar Arrays," NASA EPSCoR, P.I.: W. Semke, 1 year, \$7,523, funded November 3, 2000.

"Multi-Method Learning and Contemporary Enhancements in the Study of Mechanical Vibrations," 2001 Summer Instructional Development Professorship, P.I.: W. Semke, 1 year, \$2,400, funded April, 2001. (*unable to accept due to previous commitments*)

Travel Award, ORPD Senate Scholarly Activities Committee, \$400, February 5-8, 2001.

Satellite Development Funding, VPAA John Eitling, P.I.: A. Johnson, W. Semke, R. Schultz, C. Won, 1 year, \$20,000, funded January 15, 2001.

Travel Award, ORPD Research Fund, \$1,000, September 12-14, 2000.

Start Up Funds, UND Provost, \$10,000, 2000.

Start Up Funds, ORPD, \$5,000, 2000.

PROPOSALS PENDING

"Evaluation of UAS Data for Flood Risk Mitigation, Levee Monitoring and Inundation Mapping," NASA ROSES, L. Yarbrough and W. Semke, 2 years, \$1,235,308, April 2011.

"Significance of Crop Harvesting in the North Central Region of the United States as a Source of Climatically Important Aerosols," NASA ROSES, Team Members: D. Delene, J. Nordlie, A. Kubatova, W. Semke, J. Tilley, 2 years, \$2,363,147, April 2011.

"Unmanned Aerial System Technology Integration and Education," DoD UAS Joint Center for Excellence, Team Members: John D. Odegard School of Aerospace Science; B. Trapnell, D. Marshall, L. Osborne, and M. Askelson, School of Engineering & Mines; W. Semke, 2 years, \$5,500,000 (SEM \$750,000), February 2011.

"Unmanned Aircraft Systems (UAS) Center of Excellence for Economic Development," North Dakota Centers of Excellence Commission, P.I.: A. Palmer, Team Members: John D. Odegard School of Aerospace Science, School of Engineering & Mines, Northern Plains Center for Behavioral Research, Center for Innovation, 2 years, \$1,680,000 (SEM \$700,000), August 2010.

"UAS-Based Nuclear Material Nonproliferation Monitoring and Detection - A Collaboration between the University of North Dakota and Argonne National Lab," White Paper, National Nuclear Security Administration Office of Proliferation Detection, NNSA BAA11, Co-P.I.s: W. Semke and R. Schultz, \$500,000, 3 years, April 2010.

"Establishing a University-Based Small Spacecraft Development Program," NASA EPSCoR, Co-P.I.s: P. Hardersen, R. Fevig, N. Kaabouch, J. Neubert, R. Schultz, and W. Semke, \$750,000, 3 years, February 2010.

"MRI: Acquisition of Antenna Design and Measurement Laboratory," National Science Foundation, Co-P.I.s: S. Noghianian, S. Faruque, R. Fazel-Reza, N. Kaabouch, and W. Semke, \$208,933, 1 year, January 2010.

COURSES TAUGHT AT UND

Graduate Courses

- ME 523** Advanced Machine Design – Continuous system modeling, finite element simulations, nonlinear and random vibrations, and experimental modal analysis.
- ME 526** Advanced Vibrations – Continuous system modeling, finite element simulations, nonlinear and random vibrations, and experimental modal analysis.
- ME 532** Advanced Dynamics – A *new course* I developed to study 3-dimensional motion using vector and variational methods. Includes velocity and acceleration determination, stability analysis, orbital parameters, and concepts from the satellite and aerospace fields.

Undergraduate Courses

- ME 201** Student Design – A *new course* I developed for the Fall of 2005. Team problem solving with design and build of a machine or mechanism, typically ASME Design Contest project. Machine shop safety and introduction to fabrication processes. Special topic lectures on contemporary Mechanical Engineering issues and research activities.
- ENGR 202** Dynamics – An introductory dynamics course. A web based tutorial was introduced and the results were published in Computers in Education Journal.
- ENGR 203** Mechanics of Materials – An introduction to stress and strain in materials along with mechanical design fundamentals.
- ME 322** Kinematics and Dynamics of Machines – Study of motion of machine components such as linkages, cams, and gears using numerical, graphical, physical modeling, and mathematical methods.
- ME 323** Machine Component Design – Design and analysis of mechanical components. The importance of ethical behavior in engineering is introduced.
- ME 323L** Machine Component Design Laboratory – A *new lab course* in which students are introduced to the design process; concept development, analysis, mechanical drawings, manufacturing, cost analysis, and design report writing and presentation.
- ME 426** Mechanical Vibrations – Single and multi-degree of freedom mechanical vibration systems. *New labs* have been introduced to illustrate the resonant behavior of an airfoil, calculation of damping ratios, and mode shape determination.
- ME 480** Senior Seminar – Effective writing and presentation methods are introduced and put into practice. Peer, instructor, and self evaluations on both written and oral exercises.
- ME 483** Mechanical Measurements Laboratory - Experiments and written reports on the operation and performance of instruments and basic mechanical engineering equipment.
- ME 486** Senior Practice Laboratory – The introduction the concept of Design of Experiments for mechanical design in a *new laboratory exercise*. Realized by varying boundary conditions, physical parameters, and loadings of a vibrating beam.
- ME 487/488** Senior Design – Faculty advisor for a total of six teams. Held weekly meeting to discuss the design process and provide guidance to senior design teams along with industrial and multidisciplinary involvement on select projects.
- ME 490** Special Topics Satellite Systems Engineering – A faculty advisor and guest lecturer on the mechanical design of space hardware.

References

Department of Transportation. (2011) . *Federal Register (Vol. 76 No. 100)*. Washington, DC. Retrieved from http://www.bls.gov/green/frn_2011_05_24.pdf

Industrial Commission of North Dakota. (2008-2009) . *North Dakota Pipeline Authority Annual Report*. Bismarck, ND. Retrieved from <https://www.dmr.nd.gov/pipeline/assets/pdf/NDPA%20Annual%20Report%2008-09%20Final.pdf>

Federal Energy Regulatory Commission. (2010) . *Five Year Review of Oil Pipeline Pricing Index (Docket No. RM10-25-000)* . Washington, DC. Retrieved from <http://www.ferc.gov/industries/oil/gen-info/pipeline-index/RM10-25-000.pdf>

United States Department of Transportation. (2011). *Proceedings from the National Pipeline Safety Forum*. Washington, DC. Retrieved from <http://opsweb.phmsa.dot.gov/pipelineforum/docs/Webpage%20Lead%20Final.pdf>



Minnesota Workers' Compensation Assigned Risk Plan
Standard Workers' Compensation and Employers' Liability Policy
Contract Administrator

Berkley Risk Administrators Company, LLC

P.O. Box 59143 Minneapolis, Minnesota 55459-0143

ADMINISTRATORS COMPANY, LLC Phone (612) 766-3000 Fax (866) 215-8118 NCCI Carrier Code 21466

CERTIFICATE OF INSURANCE

1. The Insured:

WCIP

Policy Number: WC-22-04-211744-00
Association File Number: 3428008

Talent Group LLC
8419 Congdon Blvd
Duluth, MN 55811

Tax ID#: F 43-2036378
UIC #: EXEMPT
Policy Period: From: 11/12/2010
To: 11/12/2011

Date of Mailing: 11/18/2010

The Certificate is issued as a matter of information only and confers no rights upon the Certificate Holder.
This Certificate does not amend, extend or alter the coverage afforded by the Policy listed below.

This is to certify that the Policy of Insurance described herein has been issued to the Insured named above for the policy period indicated. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this Certificate may be issued or may pertain, the insurance afforded by the Policy described herein is subject to all the terms, exclusions and conditions of such Policy.

Part One		Part Two	
Workers' Compensation	Statutory	Bodily Injury by Accident	\$1,000,000 each accident
Employers' Liability		Bodily Injury by Disease	\$1,000,000 policy limit
		Bodily Injury by Disease	\$1,000,000 each employee.

Coverage
State(s)
MN

Should any of the above described policies be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

Certificate Holder's Name and Address:

EOG Resources Inc
Attention: Denver Division Insurance
600 17th Street # 1000H
Denver, CO 80202

All Entities/Insureds:

Talent Group LLC

Election Category	Election Status	Name
Other	Exclude	Zachary Lemppa

Date Issued: 11/18/2010

Corporate 4 Ins Agency Inc
7220 Metro Blvd
Edina, MN 55439-2133

Signature:

BA 3140



Minnesota Workers' Compensation Assigned Risk Plan
Standard Workers' Compensation and Employers' Liability Policy
Contract Administrator

Berkley Risk Administrators Company, LLC

P.O. Box 59143 Minneapolis, Minnesota 55459-0143
ADMINISTRATORS COMPANY, LLC Phone (612) 766-3000 Fax (866) 215-8118 NCCI Carrier Code 21466

WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT

1. The Insured:

Talent Group LLC
6419 Congdon Blvd
Duluth, MN 55811

WCIP

Policy Number: WC-22-04-211744-00
Association File Number: 3429006

Tax ID#: F 43-2036378

UIC #: EXEMPT

Policy Period: From: 11/12/2010

To: 11/12/2011

Endorsement Eff. Date: 11/12/2010

Date of Mailing: 11/18/2010

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

This agreement shall not operate directly or indirectly to benefit anyone not named in the Schedule.

Schedule

EOG Resources Inc
Attention Denver Division Insurance
600 17th Street # 100N
Denver, Co 80202

All other terms and conditions of this policy remain unchanged.

Agency Name and Address
Corporate 4 Ins Agency Inc
7220 Metro Blvd
Edina, MN 55433-2133