



NEW PROGRAM PROPOSAL FORM

Sponsoring Institution(s): Southeast Missouri State University

Program Title: Unmanned Aircraft Systems

Degree/Certificate: Bachelor of Science

Options: None

Delivery Site(s): Cape Girardeau, MO

CIP Classification: 15.0801 (Aeronautical Engineering Technology)

*CIP code can be cross-referenced with programs offered in your region on MDHE's program inventory higher.ed.mo.gov/ProgramInventory/search.jsp

Implementation Date: Fall 2017

Cooperative Partners: None

*If this is a collaborative program, form CL must be included with this proposal

AUTHORIZATION:

Dr. Karl R. Kunkel, Provost

Name/Title of Institutional Officer	Signature	Date
Dr. Bradley Deken, Chair, Dept. of Polytechnic Studies	(573) 651-2104	
Person to Contact for More Information	Telephone	



STUDENT ENROLLMENT PROJECTIONS

Year	1	2	3	4	5
Full Time	10	20	30	40	40
Part Time	2	4	6	8	8
Total	10.8	21.6	32.4	43.2	43.2

Please provide a rationale regarding how student enrollment projections were calculated:

An average of 15 credit hours per student is projected as full-time and 6 credits per student part-time. The total show is the full-time equivalent (FTE).

Provide a **rationale** for proposing this program, including **evidence of market demand and societal need supported by research**:

We believe the field of aerospace engineering technology will experience rapid growth because of growth in the use of commercial Unmanned Aircraft Systems. The U.S. Department of Labor, Bureau of Statistics, projects a total of 11,800 Aerospace engineering and operations technicians' jobs by 2024 (a growth of 3%) with average median pay of \$63,780 per year. While overall job count and growth appears low, there are other signs that point to significant changes to this occupation in the years to come. The Association for Unmanned Vehicle Systems International estimates the addition of 103,000 jobs for those involved in the manufacturing and operations of drones pending FAA rule changes. The growth areas for drone technologies will likely include law enforcement, agriculture, videography and photography, surveying and inspections, and delivery (such as in the much publicized announcements by Amazon and Wal-Mart). The program presented includes coverage of the electrical and electronic systems, mechanical operations, software, and drone specific coverage of aviation, system design, safety, policy, and sensor systems to provide a student with a well-rounded knowledge to become a professional in Unmanned Aircraft Systems and other forms of automation.

The technology in Unmanned Aircraft Systems (UAS) used by professionals trained in this field could prove invaluable to law enforcement and disaster response teams in the future. In addition, these systems could protect life by being used in applications that would normally put human lives at risk.

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A. Total credits required for graduation: 128

B. Residency requirements, if any: 30 cr. (General University Guidelines)

C. General education: Total credits: 55 cr. (Univ. Studies req. w/1 five cr. course)

Courses (specific courses OR distribution area and credits):

Course Number	Credits	Course Title
UI100	3	First Year Seminar
EN100	3	English Composition
PH120/020	5	Introductory Physics I
MN220	3	Engineering Economic Systems
Social Systems	3	
Artistic Expression	3	
Literary Expression	3	
Oral Expression	3	
Written Expression	3	
Behavioral Systems	3	
Living Systems	3	
Political Systems	3	
Major Civilization	3	
UI3XX	3	
IU314	3	GeoInfo Science Today
UI450	3	Capstone Experience
MA137	5	Pre-Calculus

D. Major requirements: Total credits: 73

Course Number	Credits	Course Title
CH180	3	Chemistry in our World
CS155	4	Computer Science I
CS265	4	Computer Science II
ET160	3	Basic Circuits
ET164	3	AC Circuit Analysis
ET245	3	Digital Systems
ET260	3	Electronics
ET366	3	Microcontrollers
ET380*	3	Vision and Sensor Systems
ET381*	3	Fundamentals of Aviation in UAS
ET382*	3	UAS Fundamentals
ET383*	3	UAS Design

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ET384*	3	UAS Law, Policy, and Safety
ET385*	3	UAS Mission Planning and Applications
IM102	3	Technical Communication
MA140	5	Analytical Geometry and Calculus I
MN120	3	Intro to Mechanical Design
MN219	3	Statics and Strengths of Materials
MN324	3	Mechanical Design Process
TN255	3	Microcomputer Maintenance and Troubleshooting
Choose 9 hours from:		
AG440	3	Precision Agriculture
AG444	3	Spatial Analysis
CJ430	3	Policing in an Information Age
CS480	3	Data Communications
GO340	3	Remote Sensing
GO445	3	Geographic Information Systems
GO520	3	GIS Application
IS320	3	Human Computer Interaction
MN356	3	Robotic Fundamentals
TN425	3	Wireless Communications and Mobile Networks

It is proposed that there be six new courses, as outlined in Appendix B. Course numbers have not been finalized.

E. Free elective credits: (Sum of C, D, and E should equal A.) 0

F. Requirements for thesis, internship or other capstone experience: UI450 (3 cr.)

G. Any unique features such as interdepartmental cooperation: N/A



PROGRAM CHARACTERISTICS AND PERFORMANCE GOALS

Institution Name Southeast Missouri State University
Program Name Bachelor of Science in Unmanned Aircraft Systems
Date Fall 2017

(Although all of the following guidelines may not be applicable to the proposed program, please carefully consider the elements in each area and respond as completely as possible in the format below. Quantification of performance goals should be included wherever possible.)

1. Student Preparation

- Any special admissions procedures or student qualifications required for this program which exceed regular university admissions, standards, e.g., ACT score, completion of core curriculum, portfolio, personal interview, etc. Please note if no special preparation will be required.
No special preparation will be required.
- Characteristics of a specific population to be served, if applicable.
Individuals seeking formal education and training to pursue careers in Unmanned Aircraft Systems (i.e. Drones).

2. Faculty Characteristics

- Any special requirements (degree status, training, etc.) for assignment of teaching for this degree/certificate.
In the Department of Polytechnic Studies, there are faculty members (tenured or tenure track) with Ph.D. degrees from fields in Electrical and Mechanical Engineering. Other faculty members in Polytechnic Studies and Computer Science have appropriate degrees and training in their respective areas of expertise in order to teach their respective supporting courses for this program. As reflected in Form FP, an additional faculty member will be needed to teach new courses in aviation and UAS systems. While not necessarily a requirement, it is expected that this faculty member will have a degree in an engineering field and flight experience.
- Estimated percentage of credit hours that will be assigned to full time faculty. Please use the term "full time faculty" (and not FTE) in your descriptions here.
It is anticipated that a majority of the courses in the major (i.e. more than 90%) will be taught by full-time faculty.

- Expectations for professional activities, special student contact, teaching/learning innovation.
As expected of all faculty members at Southeast, faculty teaching in the proposed program will have expectation for professional development activities to keep them current in their respective fields of expertise.

3. Enrollment Projections

- Student FTE majoring in program by the end of five years.
FTE=43.2
- Percent of full time and part time enrollment by the end of five years.
Full Time = 93%; Part Time = 7% (based on FTE)

4. Student and Program Outcomes

- Number of graduates per annum at three and five years after implementation.
3 Yr = 0
5 Yr = 7
- Special skills specific to the program.
The student outcomes of the Unmanned Aircraft Systems program is that upon graduation students will have:
 - a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;
 - b. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
 - c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;
 - d. an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
 - e. an ability to function effectively as a member or leader on a technical team;
 - f. an ability to identify, analyze, and solve broadly-defined engineering technology problems;
 - g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
 - h. an understanding of the need for and an ability to engage in self-directed continuing professional development;
 - i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
 - j. a knowledge of the impact of engineering technology solutions in a societal and global context; and
 - k. a commitment to quality, timeliness, and continuous improvement.
- Proportion of students who will achieve licensing, certification, or registration.
Contingent upon new requirements by the FAA, it is expected that 50% of students

from this program will acquire a pilot's license or other forms of certification/registration to allow for commercial flight of UAS systems within 5 years of graduation.

- Performance on national and/or local assessments, e.g., percent of students scoring above the 50th percentile on normed tests; percent of students achieving minimal cut-scores on criterion-referenced tests. Include expected results on assessments of general education and on exit assessments in a particular discipline as well as the name of any nationally recognized assessments used.

N/A

- Placement rates in related fields, in other fields, unemployed.
If FAA regulations allow for more widespread use of Unmanned Aircraft Systems for commercial use, we expect 75% of graduates to find employment in related fields upon graduation in the next 5 years. We also expect that this number will continue to increase toward a maximum of approximately 90% as these jobs become more plentiful. Given the broad training provided by this program, the remaining graduates will likely be able to find employment in other fields, such as in industrial automation and mechatronics.

- Transfer rates, continuous study.

N/A

5. Program Accreditation

- Institutional plans for accreditation, if applicable, including accrediting agency and timeline. **If there are no plans to seek specialized accreditation, please provide a rationale.**
The program will seek accreditation from Engineering Technology Accreditation Commission of ABET. This organization accredits college and university programs in the disciplines of applied science, computing, engineering, and engineering technology. ABET accreditation, which is voluntary and achieved through a peer review process, provides assurance that the program meets the quality standards established by the profession for which the program prepares its students. Since the ABET evaluation criteria cover graduation requirements, career advice, etc., Southeast will apply for accreditation no sooner than the first graduation of a student from this program, which is expected in Fall 2021.

6. Alumni and Employer Survey

- Expected satisfaction rates for alumni, *including timing and method of surveys.*
Surveys will be conducted on graduates within three months of graduation from the fall and spring terms, requesting their input, among other things, on their satisfaction with the quality of the program. This will be followed up by an every three year survey of these graduates to assess the effectiveness of the program in preparing them for their careers.
- Expected satisfaction rates for employers, including timing and method of surveys.

Surveys will be conducted on employers of graduates every three years requesting their input on quality of the program and its graduates. The Polytechnic Studies Advisory Committee that meets once per year will also provide input during the meetings.

7. Institutional Characteristics

- Characteristics demonstrating why your institution is particularly well-equipped to support the program.

The Department of Polytechnic Studies is well suited to provide the Bachelor of Science in Unmanned Aircraft Systems degree because of the excellent faculty and facilities associated with the department, as well as faculty and facilities throughout the University. This program will be building upon the department's existing program in Engineering Technology that has options in both electrical and mechanical systems. Like this program, the department currently offers several courses in mechatronics and electronic control systems, including courses in programmable logic controllers, microcontrollers, digital systems, industrial robotics, computer-aided machining, and industrial control systems. In addition to this, the majority of the courses associated with the proposed program (except for the 6 new additional courses) are current available and being offered at the University.

Appendix A

Program Requirements with Course Names

Department of Polytechnic Studies

Program Proposal for

BS DEGREE IN UNMANNED AIRCRAFT SYSTEMS

University Studies (55 Credit Hours)

UI100- First Year Seminar	3
Artistic Expression	3
Literary Expression	3
Oral Expression	3
EN100- English Composition	3
Written Expression	3
Behavioral Systems	3
Living Systems (AO120, BI153, or BS105 recommended)	3
MA137- Pre-calculus	5
PH120- Introductory Physics I	5
Major Civilization	3
MN220- Engineering Economic Systems	3
Political Systems	3
Social Systems	3
UI3XX	3
IU314- GeoInfo Science Today	3
UI450- Capstone Experience	3

Major Courses (73 Credit Hours)

CH180- Chemistry in our World	3
CS155- Computer Science I	4
CS265- Computer Science II	4
ET160- Basic Circuits	3
ET164- AC Circuit Analysis	3
ET245- Digital Systems	3
ET260- Electronics	3
ET366- Microcontrollers	3
ET380- Vision and Sensor Systems	3
ET381- Fundamentals of Aviation in UAS	3
ET382- UAS Fundamentals	3
ET383- UAS Design	3
ET384- UAS Law, Policy, and Safety	3
ET385- UAS Mission Planning and Applications	3
IM102- Technical Communication	3
MA140- Analytical Geometry and Calculus I	5
MN120- Intro to Mechanical Design	3
MN219- Statics and Strengths of Materials	3
MN324- Mechanical Design Process	3
TN255- Microcomputer Maintenance and Troubleshooting	3

Technical Electives (choose 9 credit hours)

AG440- Precision Agriculture	3
AG444- Spatial Analysis	3
CJ430- Policing in an Information Age	3
CS480- Data Communications	3
GO340- Remote Sensing	3
GO445- Geographic Information Sys	3
GO520- GIS Application	3
IS320- Human Computer Interaction	3
MN356- Robotic Fundamentals	3
TN425- Wireless Communications and Mobile Networks	3

Appendix B

New Courses in Unmanned Aircraft Systems

Unmanned Aircraft Systems Core Courses

On the pages that follow there are outlines for 6 proposed new courses:

ET380- Vision and Sensor Systems

ET381- Fundamentals of Aviation in UAS

ET382- UAS Fundamentals

ET383- UAS Design

ET384- UAS Law, Policy, and Safety

ET385- UAS Mission Planning and Applications

[Note: Courses numbers pending approval from the office of the registrar.]

ET380 Vision and Sensor Systems

Department: Polytechnic Studies

Course No.: ET380

Title of Course: Vision and Sensor Systems

Revision: New

Catalog Description and Credit Hours of Course:

Theory and applications on vision and sensor systems for the fields of automation, remote sensing and computer cartography. (3 credit hours, 2 hours lecture and 2 hours lab)

Prerequisites: ET260

Proposed Introduction Date: Fall 2018

Purposes of the Course:

Upon completion of this course, the student should be able to:

1. Understand vision and sensor systems as an interdisciplinary process.
2. Describe how 2D and 3D images are acquired and represented in digital systems.
3. Describe the key tools and techniques in vision and sensor systems.
4. Understand the methods for filtering and enhancing images acquired digitally.
5. Use acquired images to make decisions in an automated system.

Student Learning Outcomes:

1. Students will be able to describe the components of vision and sensor system.
2. Students will be able to demonstrate the acquisition and analysis of a digital image.
3. Students will be able to use machine vision to make decisions in an automated system.

Course Content or Outline:

Topic	Hours
Introduction to Vision and Sensor Systems	4
Image Acquisition and Representation in a Digital System	6
Pattern Recognition	8
Filtering and Enhancing Images	8
Imaging for Motion	8
Perceiving 3D from 2D Images	6
3D Models and Matching	8
Case Studies	8
Exams	4

Textbook(s) and/or Other Required Materials or Equipment:

Linda Shapiro and George Stockman. *Computer Vision*. Published by Prentice Hall, 2001.

ET381 Fundamentals of Aviation in UAS

Department: Polytechnic Studies

Course No.: ET381

Title of Course: Fundamentals of Aviation in UAS

Revision: New

Catalog Description and Credit Hours of Course:

Introduction to the concepts of flight, including aerodynamic forces, atmosphere, airfoils, controls for stability, and propulsion. (3 credit hours)

Prerequisites: PH120 and MA140

Proposed Introduction Date: Fall 2018

Purposes of the Course:

Upon completion of this course, the student should be able to:

1. Understand the physical quantities relating to flight, including air pressure, temperature, flow velocity, and streamlines.
2. Analyze the aerodynamic forces on heavier-than-air aircraft
3. Understand the properties of the atmosphere and computations with the hydrostatic equation
4. Investigate aircraft performance based on its geometric properties
5. Describe the basic principles of stability and control commonly used in UAS
6. Describe and understand the most common forms of propulsion in UAS

Student Learning Outcomes:

1. Students will be able to perform basic calculations of lift and drag.
2. Students will be able to identify appropriate control schemes to provide stability in UAS flight.
3. Students will be able to demonstrate understanding of atmospheric conditions and their effect on flight.

Course Content or Outline:

Topic	Hours
History of Aeronautical Engineers	4
Fundamental Thoughts	5
The Standard Atmosphere	6
Basic Aerodynamics	6
Airfoils, Wings and Other Aerodynamics Shapes	5
Elements of Airplane Performance	5
Principles of Stability and Control	5
Propulsion	5
Exams	4

Textbook(s) and/or Other Required Materials or Equipment:

"Introduction to Flight," by John Anderson 8th edition, Copyright 2016 (publisher: McGraw-Hill).

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Form PG – Program Characteristics and Performance Goals

ET382 UAS Fundamentals

Department: Polytechnic Studies

Course No.: ET382

Title of Course: UAS Fundamentals

Revision: New

Catalog Description

Introduces the fundamentals of Unmanned Aircraft Systems, including history, classifications, performance considerations, and control systems. (3 credit hours, 2 hours lecture and 2 hours lab)

Prerequisites: ET381

Objectives of the Course:

Upon completion of this course, the student should be able to:

1. Understand the historical development of Unmanned Aircraft Systems in both military and non-military applications.
2. Describe the basic components of an Unmanned Aircraft System, including the structures, loads, and propulsion systems.
3. Categorize an unmanned aircraft based on its characteristics.
4. Perform basic computations relating to the aerodynamics of Unmanned Aircraft Systems.
5. Analyze performance of an Unmanned Aircraft System, including climb, range, endurance, and gliding flights.
6. Understand the complex sensor and control systems in an Unmanned Aircraft System to allow for stable, autonomous control.

Students Learning Outcomes:

Students will be able to:

1. Determine operational range for an unmanned aircraft.
2. Diagram control loops for an autopilot in an unmanned aircraft.
3. Show the historical development of Unmanned Aircraft Systems.

Course Content or Outline:

Topic	Hours
1. History and Overview	6
2. Classes and Missions of UAVs	6
3. Basic Aerodynamics	8
4. Performance	10
5. Stability and Control	10
6. Propulsion	8
7. Loads and Structures	8
8. Exams	4

Textbook and Other Required Materials or Equipment:

Introduction to UAV Systems, By Paul Fahlstrom and Thomas Gleason. Published by John Wiley and Sons, 2012

ET383 UAS Design

Department: Polytechnic Studies
Title of Course: UAS Design

Course No.: ET383
Revision: New

Catalog Description

Course covers the design considerations of Unmanned Aircraft Systems for commercial applications. Specific coverage of system design, testing, and deployment. (3 credit hours, 2 hours lecture and 2 hours lab)

Prerequisites: ET382

Objectives of the Course:

Upon completion of this course, the student should be able to:

1. Design an Unmanned Aircraft System from conceptual phase to deployment.
2. Understand the design and regulatory standards that effect Unmanned Aircraft Systems.
3. Set up communications between unmanned aircraft and control station.
4. Configure appropriate support equipment for successful deployment of an Unmanned Aircraft System.
5. Design an Unmanned Aircraft System for reliability with particular attention paid to reliability by design and design for ease of maintenance.
6. Certify an Unmanned Aircraft System with appropriate company and customer trials and demonstrations.
7. Recognize the organizations associated with Unmanned Aircraft Systems

Students Learning Outcomes:

Students will be able to:

1. Differentiate between different navigational systems, such as GPS, inertial tracking and way-point navigation.
2. Analyze the design for an Unmanned Aircraft System for reliability and manufacturability.
3. Select an Unmanned Aircraft Systems based on specific mission requirements.

Course Content or Outline:

Topic	Hours
1. Review of Unmanned Aircraft Systems	4
2. Design and Selection of System	4
3. Characteristics of Aircraft Types and Airframes	4
4. Design and Regulatory Standards	4
5. Payload and Communications	4
6. Control and Navigation	4
7. Control Stations	4
8. Design for Reliability	4
9. Ground Testing	4
10. In-flight Testing	4
11. Operational Trials and Certification	4
12. System Deployment	4
13. Civilian, Paramilitary, and Commercial Roles	4
14. Future Prospects and Challenges	4
15. Exams	4

Textbook and Other Required Materials or Equipment:

Unmanned Air Systems: UAV Design, Development, and Deployment, By Reg Austin (Author).
Published by John Wiley and Sons, 2010.

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ET384 UAS Law, Policy, and Safety

Department: Polytechnic Studies
Title of Course: UAS Law, Policy, and Safety

Course No.: ET384
Revision: New

Catalog Description

Course covers the current and emerging laws and policies and the safe use of Unmanned Aircraft System.
(3 credit hours)

Prerequisites: ET383

Objectives of the Course:

Upon completion of this course, the student should be able to:

1. Understand the FAA as a regulating body for aircraft.
2. Fly an unmanned aircraft while complying with all applicable laws and policies.
3. Understand safety considerations involved with Unmanned Aircraft Systems.
4. Recognize the liabilities associated with Unmanned Aircraft Systems and methods to mitigate those liabilities.
5. Properly license the vehicles and operators of unmanned aircraft.

Students Learning Outcomes:

Students will be able to:

1. Detail the steps involved in obtaining a license to operate an Unmanned Aircraft System.
2. Determine how to develop a flight plan that follows appropriate laws and policies, such as remaining in approved airspace.
3. Describe the basic principles of commercial liability and insurance.

Course Content or Outline:

Topic	Hours
1. Regulatory Agencies and the FAA	3
2. FAA Enforcement	3
3. Basic Principles of Liability	6
4. Aviation Insurance	6
5. Accident Notification, Reporting, and Investigation	3
6. Buying, Selling, and Leasing Aircraft	6
7. Airspace	6
8. Safety	9
9. Exams	3

Textbook and Other Required Materials or Equipment:

Practical Aviation Law, 5th edition, By J. Scott Hamilton (Author). Published by Aviation Supplies and Academics, Inc in 2011.

ET385 UAS Mission Planning and Applications

Department: Polytechnic Studies

Course No.: ET385

Title of Course: UAS Mission Planning and Applications

Revision: New

Catalog Description

Covers the applications of Unmanned Aircraft System and the planning of associated missions. (3 credit hours, 2 hours lecture and 2 hours lab)

Prerequisites: ET383

Objectives of the Course:

Upon completion of this course, the student should be able to:

1. Understand various methods for launch and recovery and the tradeoffs associated with them.
2. Plan an Unmanned Aircraft System (UAS) mission for specific navigational waypoints and applications.
3. Describe how communications occur between the unmanned aircraft and the base station.
4. Understand the various payloads associated with UAS applications and their effect on the air vehicle.
5. Understand common UAS applications, including reconnaissance/surveillance, radar, chemical detection, and meteorological sensors.

Students Learning Outcomes:

Students will be able to:

1. Determine appropriate launch and recovery methods for given operational characteristics.
2. Configure a data-link for communication between unmanned aircraft and base station.
3. Plan a UAS mission given specific requirements.

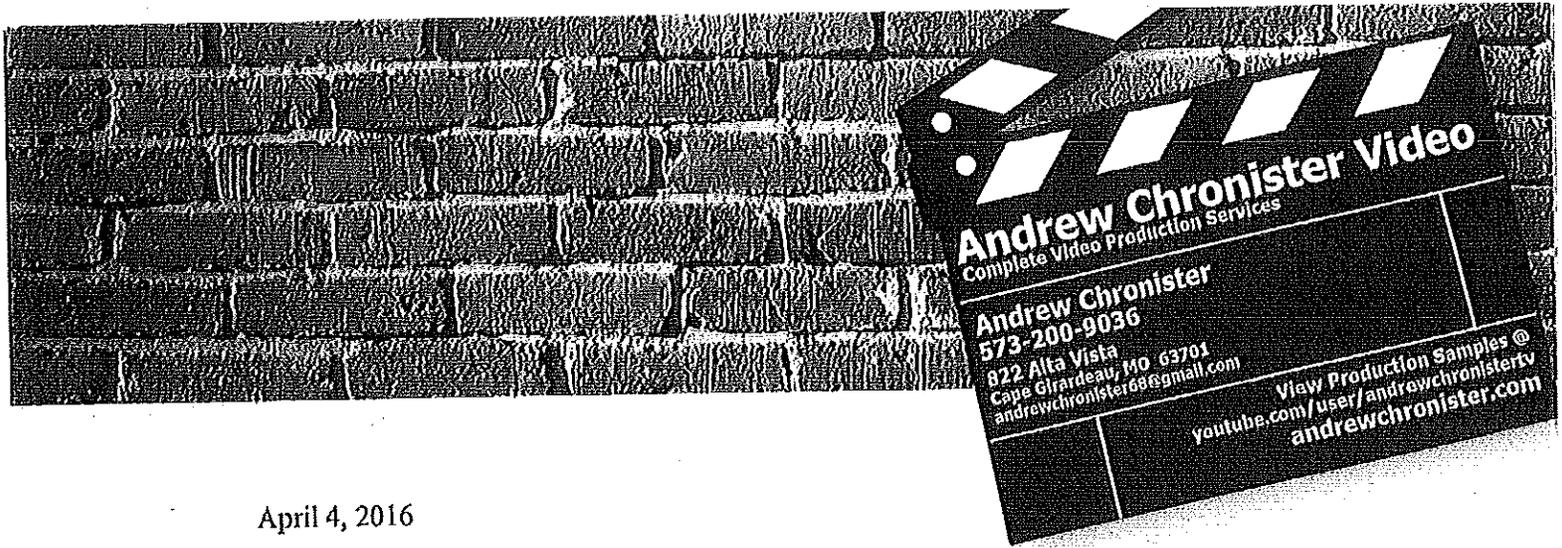
Course Content or Outline:

Topic	Hours
1. Review of UAS Design	6
2. Mission Planning and Control Station	8
3. Air Vehicle and Payload Control	6
4. Reconnaissance/Surveillance Payloads	6
5. Other Payloads	4
6. Data Link Functions and Attributes	6
7. Data-Link Margin and Tradeoffs	8
8. Launch Systems	4
9. Recovery Systems	4
10. Launch and Recovery Tradeoffs	4
11. Exams	4

Textbook and Other Required Materials or Equipment:

Introduction to UAV Systems, By Paul Fahlstrom and Thomas Gleason. Published by John Wiley and

Sons, 2012



April 4, 2016

Missouri Department of Higher Education
Coordinating Board for Higher Education
205 Jefferson St
PO Box 1469
Jefferson City, MO 65102-1469

Dear Members of the Board,

Andrew Chronister Video Productions of Cape Girardeau, MO is a video production company that has been serving the region for over 7 years. Three years ago, Andrew Chronister Video Productions built, programmed and flight-tested a hexacopter (6-rotor Unmanned Aerial System) for video production. Since that time, the demand for UAS "drone" based aerial video has skyrocketed. In just the past year, the FAA has issued waivers to over 4,000 companies who wish to use UAS for commercial purposes. This pace is expected to accelerate for the foreseeable future as more and more applications for UAS are developed.

The FAA regulations required to fly UAS commercially are constantly changing and daunting. Currently, the FAA requires the "Pilot in Command" of the UAS to possess a Sport Pilot License or above. Construction, modification and maintenance of these systems require more than the experience of the typical RC hobby flier. It is vital for UAS developers and operators to have specialized training so they can continue to develop new applications for the technology while complying with regulations and maintaining the safety of US airspace.

Andrew Chronister Video Productions is excited about the prospect of the Unmanned Aircraft Systems program being added to the Department of Polytechnic Studies at Southeast Missouri State University. Not only will such a program benefit the students, but it will greatly benefit companies that utilize UAS. I wholeheartedly support this program.

Best Regards,


Andrew Chronister



TerraTek

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159 Chimney Rock
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www.terratek.land

3.31.2016

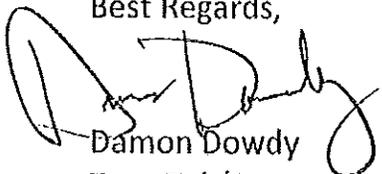
To Whom it may concern:

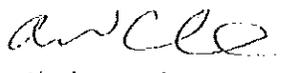
TerraTek and its affiliate, Aerovictus LLC, both companies of Cape Girardeau, MO serve the agriculture industry in our Missouri, Illinois, Arkansas, Kentucky and Tennessee areas. As a soil consultant, TerraTek has relationships with progressive growers interested in any technology that may help increase productivity and/or lower cost. Over the past 2 years, we have proved that agricultural aerial imagery is an excellent tool to assist farmers and consultants in the many challenges of scouting the vast areas of their farming operations. We know of no better way to view and assess those expanses of land than with UAV's.

When Aerovictus (aerial imagery) formed, the "drone" industry by all accounts did not exist. But two years later, all eyes are on this evolving technology. Our company and other newcomers, have struggled to locate knowledgeable vendors able to help us achieve success. That said, our Companies are very interested in supporting your efforts at Southeast Missouri State as you develop programs to educate the aerial imagery industry.

Best of luck to you and your colleagues at Southeast! Please contact TerraTek and Aerovictus anytime we can be of assistance!

Best Regards,


Damon Dowdy
TerraTek/Aerovictus


Andrew Chronister
Aerovictus


Jim Riley
Aerovictus


Craig Arnzen
Aerovictus



RECEIVED

JENNINGS BROS, INC.
2504 County Highway 824
Sikeston, Missouri 63801
(573) 667-5681 FAX (573) 667-5841
jenningsbrosinc@yahoo.com

MAR 24 2016

OFFICE OF THE PROVOST

March 22 2016

To Whom It May Concern

I am writing today in support of Southeast Missouri State University's request to establish a UAS Technology Program. As a farm operator in Southeast Missouri I feel the Drone program has many potential benefits to farm operators some known and others yet to be discovered. Those known would be the ability to fly over the growing crop at all stages of growth and observe any visible problem the growing crop might be having. It would also allow an operator to see any spots not receiving adequate irrigation water while still early enough to correct whatever problem might be occurring. I think this technology has many potential benefits that will be discovered as we learn more about it. Learning about new things is what a University should be all about and I enthusiastically support Southeast Missouri State in its development of this new program.

Sincerely



Charles D. Jennings Jr.

President

Jennings Bros Inc.

2504 Co Hwy 824

Sikeston, MO 63801

THREE RIVERS COLLEGE

THE COMMUNITY COLLEGE OF SOUTHEAST MISSOURI

WESLEY A. PAYNE, PH.D., *President*

Suite 215, Westover Administration Building
2080 Three Rivers Blvd | Poplar Bluff, MO 63901
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March 18, 2016

Southeast Missouri State University
Office of the President
One University Plaza, MS 3300
Cape Girardeau, MO 63701

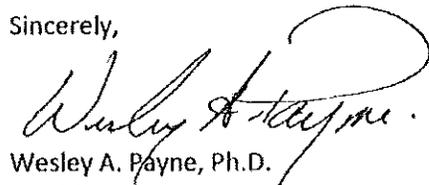
Dear President Vargas:

There is a history of collaboration between Three Rivers Community College and Southeast Missouri State University, most recently evidenced by the establishment of the Cape Girardeau Partnership of Higher Education (CGPHE), the renaming of this endeavor the Cape College Center (CCC) and the discussions now coming to completion that will establish a new operating agreement for this collaborative effort to enhance access to post-secondary education.

The proposal submitted to the Coordinating Board of Higher Education by Southeast Missouri State University to establish an undergraduate degree program in Unmanned Aircraft Systems (UAS) provides another opportunity for collaboration because there is the possibility of connecting the proposed four year UAS degree program with course offerings that Three Rivers can provide at multiple locations. Such a collaboration takes advantage of the strong relationship between our two institutions and the success that the CCC has had in minimizing duplication while expanding affordable educational opportunities that are relevant to southeast Missouri. In this case, I believe the proposed UAS program will expand opportunities for individuals interested in the application of UAV capabilities to reduce agriculture costs and increase agricultural productivity in the Bootheel region.

I look forward to the approval by the CBHE of the proposed UAS program submitted by Southeast Missouri State University and the discussions that will follow to identify connecting points for our two institutions through the delivery of coursework at the Cape College Center or on our main campus.

Sincerely,



Wesley A. Payne, Ph.D.
President

Three Rivers Community College

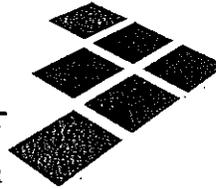
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CAPE GIRARDEAU

CAREER
TECHNOLOGY
CENTER



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Ljby Guilliams
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Kristy Unger
Assistant Director

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Kathleen Clayton
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Industry Training

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Landscape/Horticulture
Physical Therapist Assistant
Practical Nursing
Project Lead The Way
Machine Tool Technology
Marketing
Medical Office Specialist
Respiratory Care
Welding

Adult Basic Education

Customized Training

Personal Enrichment

Assessment Services

March 21, 2016

Dr. Carlos Vargas, President
Southeast Missouri State University
One University Plaza
Cape Girardeau MO 63701

Dear President Vargas:

The educational institutions serving the Cape Girardeau community have a history of collaboration to meet the educational needs of our region. The establishment of the Cape Girardeau Partnership of Higher Education (CGPHE), now named the Cape College Center (CCC) is an example that involves Southeast Missouri State University, Three Rivers College, Mineral Area College and the Cape Girardeau Career and Technology Center.

The proposal submitted by Southeast Missouri State University to establish an undergraduate degree program in Unmanned Aircraft Vehicles (UAVs) provides another opportunity for collaboration because of the possibility of connecting the proposed UAV degree program with students completing the Basic Flight program offered through the Cape Girardeau Career and Technology Center. I believe the proposed UAV program will expand opportunities for individuals interested in flight and the business/commercial applications of UAVs; especially those focused on Agriculture.

As the Director of the Cape Girardeau Career and Technology Center, I look forward to the approval of the proposed UAV program submitted by Southeast Missouri State University.

Sincerely,

Richard Payne
Director

Kunkel, Karl

From: Braden, Indi S
Sent: Thursday, March 24, 2016 11:30 AM
To: Kunkel, Karl
Cc: McGowan, Chris; Aide, Michael; McAllister, Charles
Subject: RE: USDA Support Letter

Dr. Kunkel:

I have contacted 5 different people in various offices with USDA. Unfortunately, the responses are all the same. They are not allowed to write letters of support for grants or programs. By conversations, they were all very excited to see the technology advancements and a UAS program offered. They, however, are unable to provide us any letters for documentation.

Perhaps the Representative from Jefferson City that invited me to Drone Awareness Day at the Capitol last year would provide some support. If I remember correctly, it was Rep. Wilson.

I am sorry that I was able to find someone for a support letter.

Best regards,

Indi S. Braden, PhD
Professor
Department of Agriculture
One University Plaza MS6100
Cape Girardeau, Missouri 63701
isbraden@semo.edu
573/651-2793

Office in Rhodes 109

From: Kunkel, Karl
Sent: Thursday, March 17, 2016 9:02 AM
To: Braden, Indi S
Cc: McGowan, Chris; Aide, Michael; McAllister, Charles
Subject: USDA Support Letter

Good Morning Indi-

The President and I believe it might be important to get some outside letters of support for the Unmanned Aircraft Systems (UAS) degree program proposal currently submitted to CBHE for consideration. Chris Martin and I believe a letter from someone at USDA would be very helpful.

Could you please approach one of your contacts at USDA about providing such a letter? It might be expeditious for you to create a draft for them that they can either use, edit, or revise. If you send them a solid draft, they possible could quickly put it on their letterhead, sign, and return.

The MAJOR issue here is time. We really need to get several letters of support, and we are working on getting several, to CBHE as soon as possible. Within a week is great, a couple weeks probably is OK, and beyond that the letters might not be there in time for CBHE consideration.



MISSOURI RICE
RESEARCH & MERCHANDISING COUNCIL
P. O. BOX 788
BERNIE, MO. 63822

March 18, 2016

Missouri Coordinating Board for Higher Education

205 Jefferson Street

P.O. Box 1469

Jefferson City, MO 65102-1469

Dear Sir/Madam:

As President of the Missouri Rice Research and Merchandising Council, it is my pleasure to submit this letter of support on behalf of Southeast Missouri State University's newly proposed Bachelor of Science in Unmanned Aircraft Systems program that is currently before you for review. In my opinion, this program is an excellent idea and a great opportunity for the students and the University.

To put my support in context, please let me share some brief information about the Missouri Rice Research and Merchandising Council. The MRRC represents the rice producers of Missouri. We are responsible for the allocation of the Missouri rice producers' checkoff dollars. With these funds we coordinate various promotion activities to help rice producers stay viable in emerging markets and many research projects to assist producers in making decisions that maximize their yields and their profitability. Central to our success has been our longstanding relationship with Southeast Missouri State University. Thus, I was pleased to have the opportunity to learn about Southeast's newly proposed Unmanned Aircraft Systems (UAS) degree. I believe the proposed UAS program will place Southeast at the forefront of this emerging field and compliment the successful programs they have in cybersecurity, agribusiness, construction management, commercial photography, and many others that will benefit from this technology.

As a representative of the rice producers in Missouri, I commend Southeast for launching innovative programs like the proposal you have before you in UAS because they attract students to our region and increase collaborative opportunities between higher education and industry. It is great knowing that there will be a pool of qualified graduates in southeast Missouri that will be able to serve the many needs of agriculture, business and utility industries that will become increasingly reliant on the technologies UAS will employ to gather data, create efficiencies, preserve resources, conduct inspections, grow revenues, and execute many more vital responsibilities that will impact day to day operations.

Based on the knowledge I have of Southeast's proposed UAS program, I believe that the southeast Missouri regions and our state would benefit greatly from its approval. The program is innovative, it aligns with Southeast's mission of creating programs that are proactive and responsive to industry need,

and there is no other program like it to my knowledge in southeast Missouri that employers can draw from for new hires. As such, I hope you give Southeast's UAS program just consideration for approval.

Regards,

A handwritten signature in black ink, appearing to read 'Alex Clark', with a horizontal line extending from the end of the signature.

Alex Clark

President