**UAS COE Team Survey: CORE Team**

University Name

University of California, Merced

5200 N Lake Road, Merced, CA 95343

www.ucmerced.edu

Lead POC

 Name: YangQuan Chen

 Phone: 209-2284672 (office); 209-3862958 (cell)

 Email: ychen53@ucmerced.edu

Supporting POC(s) including PI’s if PI is different from Lead POC

 Name: Joshua Viers

 Phone: 209-5918423

 Email: jviers@ucmerced.edu

Level of Interest (Core or Affiliate)

CORE

Describe the University’s ability to support the proposal effort

UC Merced has strong institutional support to this proposal effort. UC Merced RDS (Research Development Services) has 6 full time staff to support proposal development ( <http://researchdev.ucmerced.edu/node/14>) Center for Information Technology Research in the Interest of Society (CITRIS @ UC Merced) also has dedicated administrative staff support.

Describe University’s ability to match FAA grant/contract funds?

UC Merced’s Vice Chancellor for Research & Economic Development Samuel Traina and his office are very supportive to this proposal with formal mechanism to commit matching funds when justified.

Describe political support at local, state, and federal levels

UC Merced enjoys abundant support from local officials on campus and research development projects. Political support from state representatives has been strong as well, showing special interest in the UC Merced MESA lab. California Assembly members have sought out the expertise at UC Merced regarding UAS policy. The governor’s office has prioritized the COE in California and has been deeply involved in building a coalition of stakeholder to support the application. On the federal level, we are working closely with our federal representatives from the San Joaquin Valley to obtain support for the proposal, including Congressman Jim Costa, who represents the UC Merced campus and Congressman Jeff Denham, who sits on the House Transportation and Infrastructure Committee.

Is the university affiliated with an FAA Designated UAS Test Site?

No

Does the University have a COA in place?

1 Active: 2013-WSA-103-COA

1 Pending: 2014-WSA-29-COA

Is your University engaged on a competing test site bid? If so, at what level?

Yes. UC Merced was an active team member for 2013 FAA UAS TSS proposal bid led by Ventura County EDA.

Describe your ability to meet Criteria 1:

The extent to which the needs of the state in which the applicant is located are representative of the needs of the region for improved air transportation services and facilities.

Region: Western-Pacific

The University of California, Merced is located in the Central Valley of California, one of the fastest growing regions of the state and one of the most productive agricultural centers in the world. A recent AUVSI Economic report predicts California to have the greatest beneficial economic impact and employment impact in the nation with the commercialization of UASs, largely derived from the anticipated market of agricultural applications. As such, the Central Valley and the rest of California have significant needs for research and development of UAS technologies, including air safety and UAS integration into the NAS. In addition to agricultural applications, California clearly exhibits a wide range of other significant UAS markets such as entertainment, environmental research, emergency management and response (eg. law enforcement and fire fighting). All of these markets are representative of the expected markets within the Western-Pacific region. In order to satisfy market demand, there remains significant research and development need for UAS integration.

The University of California, Merced has an active UAS research lab, known as the Mechatronics, Embedded Systems and Automation Lab, that specializes in the use of UASs for agricultural and environmental applications and the necessary NAS integration requirements including human-factors, airworthiness, detect & avoid, and UAS crew training and certification.

Describe your ability to meet Criteria 2:

The demonstrated research and extension resources available to the applicant to carry out this subsection.

The University of California, Merced has an active UAS research lab, known as the Mechatronics, Embedded Systems and Automation Lab, that specializes in the use of UASs for agricultural and environmental applications and the necessary NAS integration requirements including human-factors, airworthiness, detect & avoid, and UAS crew training and certification. The MESA Lab is comprised of 40 members, overseeing research projects at both the undergraduate and graduate level.

University of California Corporate Extension (UCCE) Merced County Cooperative Extension has been our close partner in exploring beneficial use of data drones for precision agriculture applications. Most recently, the University of California Division of Agriculture and Natural Resources (UC ANR) has funded two UC Cooperative Extension Specialist positions (Climate Adaption in Agriculture and Nutrition, Family and Consumer Sciences) to UC Merced, which is now only the fourth UC campus to receive these prestigious positions.

Describe your ability to meet Criteria 3:

The capability of the applicant to provide leadership in making national and regional contributions to the solution of both long range and immediate air transportation problems.

Describe your ability to meet Criteria 4:

The extent to which the applicant has an established air transportation program.

UC Merced does not have air transportation program presently. Our close collaborator, Castle Airport, a commercial airport at the former Castle AFB, has a successful manned pilot training program (see <http://education-portal.com/articles/Top_Schools_for_Air_Transportation_and_Distribution.html>) and it

may be possible to extend the Castle Airport – UC Merced ties to satisfy this Criteria #4. (see also Sierra Academy of Aeronautics <http://www.bestaviation.net/school/sierra_academy_of_aeronautics/> ).

Describe your ability to meet Criteria 5:

The demonstrated ability of the applicant to disseminate results of the air transportation research and educational programs through a statewide or region-wide continuing education program.

Sierra Academy of Aeronautics has established a reputation of providing quality flight training for more than 45 years (<http://www.bestaviation.net/school/sierra_academy_of_aeronautics/> ).

Describe your ability to meet Criteria 6:

The projects the applicant proposes to carry out under the grant (specific to research areas listed below)

1. Air Traffic Control Interoperability

2. Airport Ground Operations

3. Control and Communication

4. Detect and Avoid (DAA)

5. Human Factors

6. Spectrum Management

7. Unmanned Aircraft (UA) Crew Training and Certification, Including Pilots

(8. Air Worthiness)

FAA Research Area(s) where University can lead

(Use FAA identified research areas above)

Relevant research area experience/expertise

Research Area 5)

The MESA Lab has researched and published on issues relating to human factors for UAS operations. Research on human factors include human-automation interaction analysis, evaluating the cognitive load of UAS operators and evaluating the interaction needs for pilots and payload operators.

Research Area 7)

The MESA Lab has been developing UAS crew training and certification programs for its UAS operations. In addition to UAS crew training and certification, other necessary UAS training programs such as airworthiness maintenance programs and safety management systems have been implemented to assure the flight readiness of the UAS fleet.

Research Area 8)

The MESA Lab has developed airworthiness and CONOPs documents for its UAS fleet and for a larger audience. Additional research on airworthiness includes research on fault tolerant control systems, health prognostic and embedded health sensor systems and safety management documentation.

Relevant programs

The MESA Lab has an active UAS research agenda focused on a variety of areas specific for small UASs including UAS applications, human factors, UAS Crew Training and Certification and Airworthiness.

UC Merced has nationally recognized research department on Cognitive Sciences.

FAA Research Area(s) where University can support

(Use FAA identified research area above)

Relevant research area experience/expertise

Research Area 1)

The MESA Lab has conducted research on the use of COTS NextGen technology for detect and avoid systems for SUAS and their applicability for agricultural or other applications over sparsely populated areas.

Research Area 2)

The MESA Lab has access to local low traffic airports and inactive runways that may be used for airport ground operations research and developments without hampering existing air traffic operations.

Research Area 3)

The MESA Lab has conducted research on the human needs for control and communication links to maintain necessary situational awareness for conducting UAS operations.

Research Area 4)

The MESA Lab has conducted research on the use of COTS NextGen technology for detect and avoid systems for SUASs and their applicability for agricultural or other applications over sparsely populated areas. The MESA Lab has also conducted research on the use of Forward-Facing cameras and head-tracking cameras for the purposes of detect and avoid systems for SUASs.

Research Area

 Relevant programs

Affiliated universities that your university would work with/through to accomplish projects and research

Utah State University

University of Kansas

University of Florida

Denver University

University of Nevada Las Vegas

University of Nevada Reno

UC MRPI proposal team members:

* UC San Diego
* UC Davis
* UC Berkeley
* UC Santa Cruz

Affiliated industry partners that your university would work with/through to accomplish projects and research

All members of SC-USA team for FAA UAS TSS proposal development, Google, and The Nature Conservancy.

Affiliated government partners (local/state) that your university would work with/through to accomplish projects and research

JPL, national methane mapping

NASA Ames

Sandia National Lab

Lawrence Livermore NL

Lawrence Berkeley NL

Differentiating Factors

The University of California, Merced is located in the Central Valley of California, one of the fastest growing regions of the state and one of the most productive agricultural centers in the world. The local agricultural industry has significant support for the advancement of technology to improve the efficiency of their operations. Given the past year’s drought, improved water management and crop water stress analysis have significant implications for the local economy.

The POC Dr. YangQuan Chen plays a leading role in the UAS research community. He served as the General Co-Chair for 2014 International Conference on Unmanned Aircraft Systems (ICUAS), Orlando; Program Co-Chair for ICUAS2013 (Atlanta). He is the Technical Committee Co-Chair for Aerial Robotics and Unmanned Aerial Vehicles (TC-ARUAV) of IEEE Robotics and Automation Society (RAS). He is a Founding Editorial Board Member for the journal Unmanned Systems (World Scientific); a Senior Editor for Journal of Intelligent & Robotic Systems (Springer); and the Topic Editor-in-Chief on Field Robotics for International Journal of Advanced Robotic Systems (InTech Open). His student UAS team won AUVSI SUAS competition twice (2009, 2011).

Other information you deem pertinent to this effort

The POC of this proposal has led a UC MRPI proposal team to bid for establishing a multi-campus research center under the University of California’s Multi-campus Research Programs and Initiatives. It targets to win $4M for 4 years. The proposed center is “CIDER: California Institute of Data-drone Engineering Research” with confirmed partners

* Sandia National Lab
* Lawrence Livermore NL
* Lawrence Berkeley NL
* UC San Diego
* UC Davis
* UC Berkeley
* UC Santa Cruz