**2018 Meeting of UAS Multistate Research Project S1069 Notes**

**Introduction, Wes Everman**

**Introduction of members present, Appendix A**

**Multistate project overview, Eric Young**

**Federal update, Steve Thomson**

* Working to make agricultural engineering program “integrated” so that projects can include an extension component
* Near-term USDA opportunities
  + Bioprocess/bioengineering
  + Nanotechnology
* NIFA/NSF collaborative opportunities
  + Cyberphysical systems
  + National robotics initiative ($7M allotted)
* Food and Agriculture Cyberinformatics and Tools (FACT); new program
  + Started for current year with conference grants
  + Amount for next year unknown
* CARE (Critical Ag. Research and Extension)
  + Near-term solutions
* Exploratory grants

**Session 1: identify and organize subgroups**

* Discuss S1069 objectives
* Discuss challenges:
  + What are sensors doing
    - Calibration
    - Validation
  + Barriers to adoption
    - Legal issues
    - Should target consultants
  + Metadata
  + Common protocols (across institution)
  + Data transfer
    - Synthesis
    - Privacy/ownership
    - Management/sharing/storage
* Identify groups and members
  + Data reliability
    - Thomasson, Bagnall, Balota, Maja, Khot, Freeland, Rains
  + Data accessibility
    - Spurlock, Boney, Nowatzki, Jackson, Czarnecki, Everman, Purcell, Brodbeck, Young, Martin, Singh, Thomson
  + Metadata
    - Saraswat, Murray, Bagavathiannan, Banerjee

**Sessions 2 and 3: group discussions**

* Reports
  + Reliability
    - Recommendation: thermal data calibration standards
      * Need literature review on thermal calibration
      * Need comparison of thermal cameras
    - Need standard protocol
    - Can distinguish canopy characteristics during drought
    - Spurlock has used a low-tech system
      * over 400 varieties of soybeans
      * attempted to capture entire experiment or replication in one calibration
      * attempted to minimize variance
      * custom software for 0-255 DNs
      * 20 bit values captured variability
    - Consider exploratory grant proposal
      * Thomasson, Balota, Maja, Rains, and Spurlock all interested
  + Accessibility
    - Good v bad data
    - Cost/benefit of the tech
  + Metadata
    - Dharmandra \*get report
    - National imagery iterp. Rating scale

**University updates**

* Virginia Tech (Balota)
  + drought stress, peanuts, wheat biomass
* University of Arkansas (Spurlock)
  + policy developed, new equipment, interest in images but not UAS
  + Fungi and nematodes
* Auburn (Brodbeck)
  + Geospatial assessment of UAS image, RTK w/ GCP’s accurate “all the time”. So Pine Beatle, looking at different systems & applications: GI & kit
* Mississippi State University (Czarnecki)
  + Corn & soybean (herbivory detection), image & thermal, extension
  + Cotton, Palmer amaranth, peanuts scouting
* UTK (Freeland)
  + Cloud issues, NDVI didn’t change much under clouds
  + How much time is non-cloud-covered? Camera over field to study?
* NCSU (Everman)
  + Cotton, Sweet potato, N response, weed species discrim.
* Clemson (Maja)
  + Edisto, visualization, irrigation, UAV sensor suite
* WSU (Khot)
  + Irrigation ag, precision ag grd. & aerial sensing, nursery inventory management, spray drones
* UK (Jackson)
  + Lidan calibration, plant height models in alfalfa, animal management w/ multiple-UAV- identification & locate individual
* NDSU (Nowatzki)
  + Lots of sensors & platforms, lots of software, focus on agrisoft, Hermes; robotic problem.
* University of Georgia (Rains)
  + Li, Porter, Rains, Vellidis cotton, corn, peanut, growth rate maps, height, leading to autonomous scouting, FAA (IPP) integration pilot prog. to test cases outside current 107 reg’s, dynamic irrigation management zones.
* Purdue (Saraswat)
  + Many missions, mostly RGB, effects of flight variables, compared Pix4D to drone deploy
  + 400ft AGL, parallel to crop row, 75-85% overlap 1-Credit class on UAS regulations

**Announcements:**

* Jobs available
  + NDSU position
  + Virginia Tech position

**Appendix A – Members Present**

Maria Balota Virginia Tech

Muthu Bagavathiannan Texas A&M University

Cody Bagnall Texas A&M University

Barry Boney University of Arkansas

Christian Brodbeck Auburn University

Joby Czarnecki Mississippi State University

Wesley Everman North Carolina State University

Robert Freeland University of Tennessee

Xiongzhe Han Texas A&M University

Josh Jackson University of Kentucky

Lav Khot Washington State University

Joe Maja Clemson University

Dan Martin USDA

Seth Murray Texas A&M University

John Nowatzki North Dakota State University

Larry Purcell University of Arkansas

Glen Rains University of Georgia

Dharmendra Saraswat Purdue University

Vijay Singh Texas A&M University

Terry Spurlock University of Arkansas System Coop. Ext. Serv.

Alex Thomasson Texas A&M University

Emma White Texas A&M Agrilife Research

Deb Banerjee Texas A&M University

Steven Thomson USDA | NIFA

Eric Young SAAESD

Dale Cope Texas A&M University

Hussein Gharakhani Texas A&M University

Jianing He Texas A&M University

Jinhyuk Park Texas A&M University

Nithya Rajan Texas A&M University

Misty Vidrine Texas A&M AgriLife Research - Corporate Relations

Gregory Rouze Texas A&M University