

**TEXAS A&M AGRILIFE RESEARCH AT AMARILLO**



6/24/2017

To: Mr. Jason Coleman  
High Plains Water District Board  
Lubbock, Texas

From: Dr. Jourdan Bell, Asst. Prof., Member, Bushland Crop Sciences Coordinating Committee  
Dr. Qingwu Xue, Assoc. Prof., Chair, Bushland Crop Sciences Coordinating Committee  
Thomas Marek, PE, Regents Fellow, Vice Chair, Bushland Crop Sciences Coordinating Committee  
6500 Amarillo Blvd, Texas A&M AgriLife Amarillo, TX

Re: Report regarding 2017 awarded HPWD infrastructure grant

The following is to serve as a record of performance regarding the awarded HPWD funding in 2016.

Thomas Marek presented a research briefing on May 4, 2017 to the HPWD Board at the District headquarters in Lubbock on how the HPWD funding was used by Texas A&M AgriLife Research to enhance irrigation systems at the Bushland research station properties. The briefing was attended by Dr. Xue and Dr. Kevin Heflin as well as Dr. Dana Porter of Lubbock AgriLife who participates in many of the Bushland irrigation projects. Thomas presented a slide presentation describing the new electrical supply and the newly re-designed and installed center pivot system equipped with an advanced variable frequency drive pump and control system with upgraded pipelines and filtering system. Thomas also briefly discussed the research and demonstration work that is currently being conducted using the new advanced irrigation system. 2017 projects include wheat fertility (Dr. Bell), wheat variety (Dr. Xue), wheat curl mite (Dr. Rush), soil sensor assessment (Dr. Porter/Marek), wheat root study (Xue/Dong/Marek), multi-level ET wheat (Marek/Xue), and VRI automation (Hillyer). Thomas also gave a summary of the advanced control systems being developed for fully automated and advanced sprinkler irrigation control. The HPWD funding has been highly leveraged to address R&D efforts in water conservation technologies for the HPWD area and beyond.

Thomas additionally reported on the status of the three (3) monitoring wells that were proposed to be drilled at the Texas A&M AgriLife Research James Bush Farm along with the expected drilling timeframe. The significant financial contributions and great working relationship the HPWD has provided towards water based research were acknowledged throughout the presentation. The presentation concluded by highlighting the significant research output by Texas A&M AgriLife along with local and area collaborators.

Presently, the test holes and monitoring well bids have been received and are being awarded and scheduled for operations to install the proposed two (2) monitoring wells and test hole of the Dockum aquifer. The operations should be completed as soon as logistics of accounting and the well driller can be finalized. The effort was delayed due to the associated level of cost and the requirement of central procurement and processing by Texas A&M in College Station,

As always, thanks are extended to the HPWD Board for their support and cooperative efforts in agricultural research and extension activities.

cc: Dr. Kevin Heflin  
Dr. Brent Auvermann  
Ms. Kathy Wingate  
SRS, College Station, TX

***Projects Briefing  
to  
High Plains Water District Board***

***Thomas Marek, P. E.***

*Senior Research Engineer*

*Texas A&M System Regents Fellow*

*Adjunct Professor, West Texas A&M University-Canyon*

*Former Superintendent, North Plains Research Field, Etter, TX*

*Texas A&M AgriLife Research – Amarillo, Texas*

High Plains Water District Office, Lubbock, TX, March 20, 2018

# Bushland

## Crop Sciences Coordinating Committee

- *Qingwu Xue, Crop physiology- Chair, (PI)*
- *Thomas Marek, Irrigation – Vice Chair, (PI)*
- *Jourdan Bell, Agronomy, member, (PI)*
- Johnny Bible, Farm Manager, (support)
- Brent Auvermann, Center Director, (PI)
- Ravindra Devkota, Wheat , (support)
- Jason Baker, Wheat, (support)
- Preston Sirmon, Agronomy, (support)
- Bronc Finch, Agronomy, (support)
- James Gray, Crop Pathology, (support)
- Jackie Rudd, Wheat, (PI)
- *Group formed to coordinate/advise R&E needs/activities*

# HPWD Awarded Projects

- 1) An Evaluation of the Depth and Water Quality of the Dockum Aquifer in Southwestern Potter County (\$12,500)
- 2) Well Monitoring Instrumentation for the Northern HPWD Region (\$4,000).

# Objective of Projects

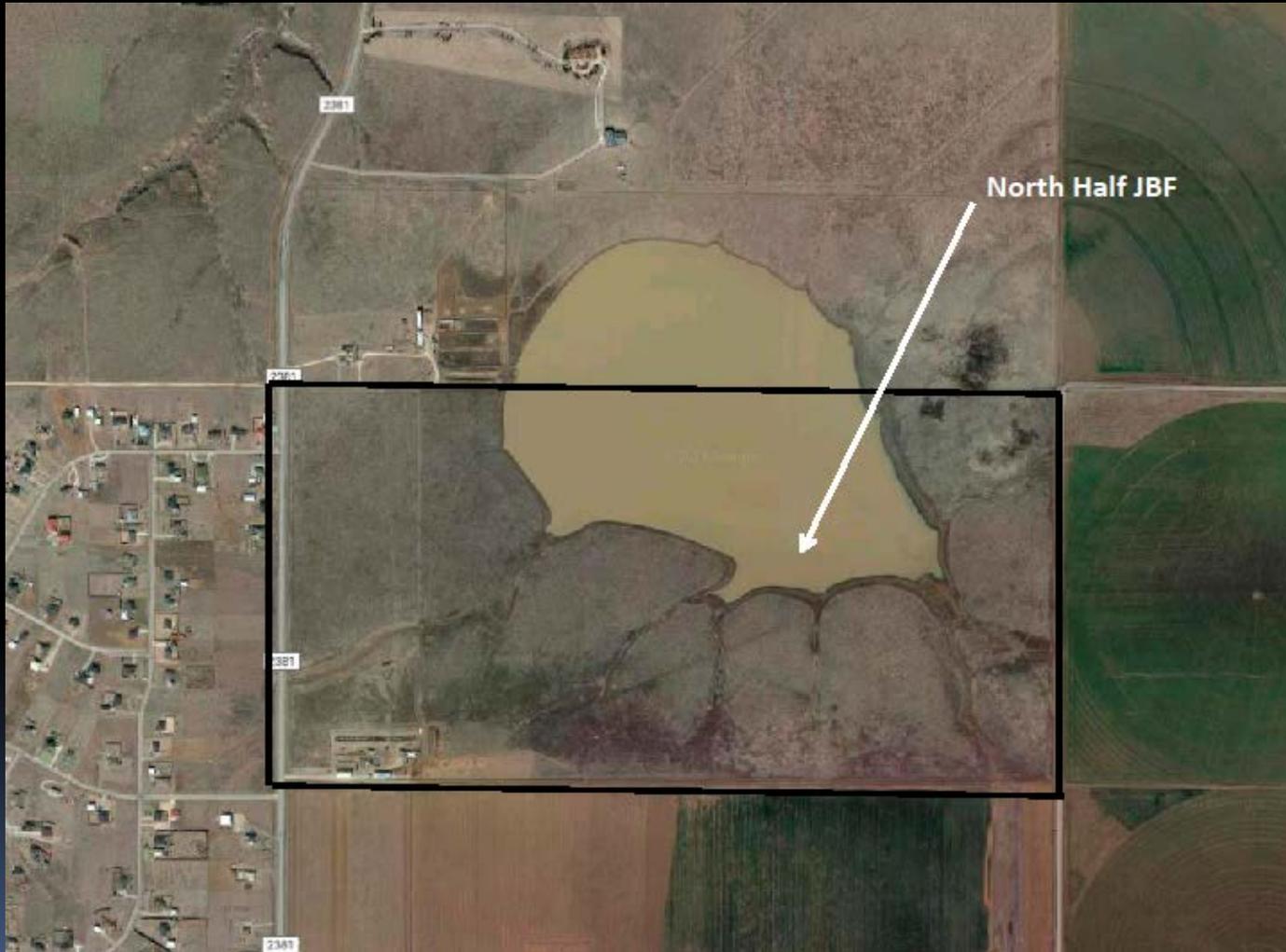
- ...to acquire accurate data for improved assessment of water availability for the HPWD data base and to provide sound data for strategic planning purposes with Texas A&M AgriLife -Amarillo regarding on-going and future research and demonstration efforts.
- ...builds on prior support and R&E efforts.

# Texas A&M AgriLife James Bush Farm



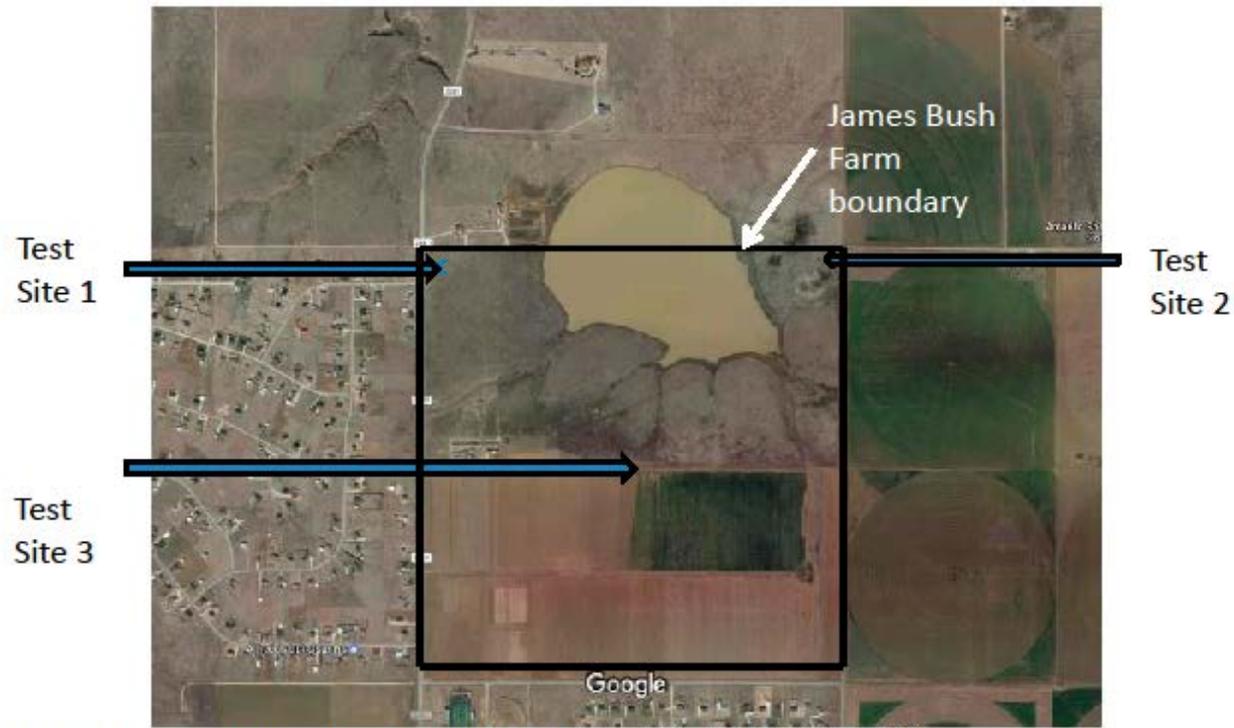
"town" of Bushland → ●

# Texas A&M AgriLife James Bush Farm



# Texas A&M AgriLife James Bush Farm

Figure 3. JBF sites



JBF Site 1 is ~ 35.220762,-102.063118

JBF Site 2 is ~ 35.220739,-102.046908

JBF Site 3 is ~ 35.213868,-102.055470

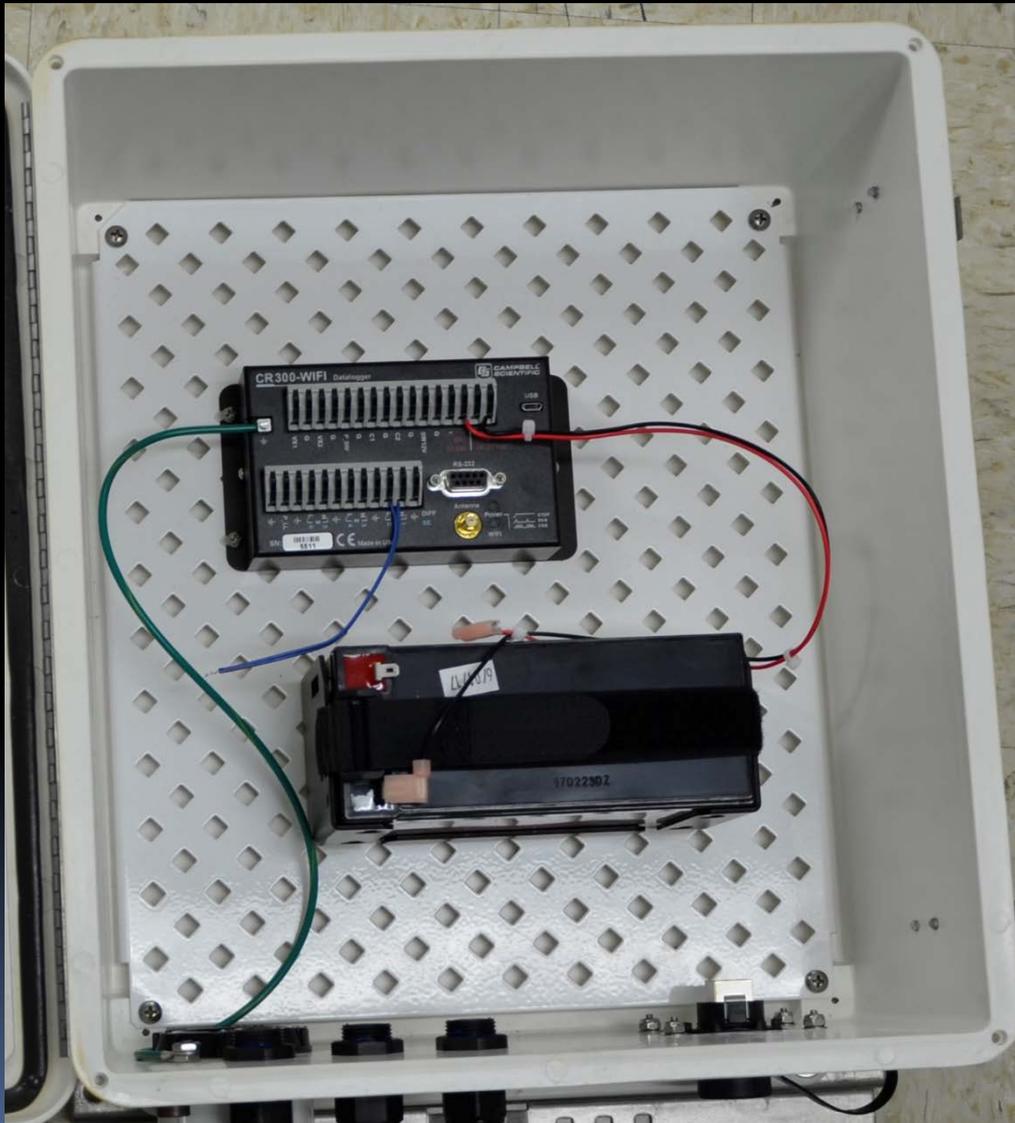
# JBF test hole results

- delays...process required rebid thru campus
- Test hole NW – Ogallala: 35 feet
- Test hole NE – Ogallala: ~0 feet
- Test hole 3 :
  - Ogallala: - nominally 19 ft
  - Dockum 300 to 700 ft- one 3' and 4' strata  
( no water quality samples done)
- Disappointing but...we now know, rather than speculate.

# ...Now the Monitoring locations sites



# ...the Monitoring Equipment

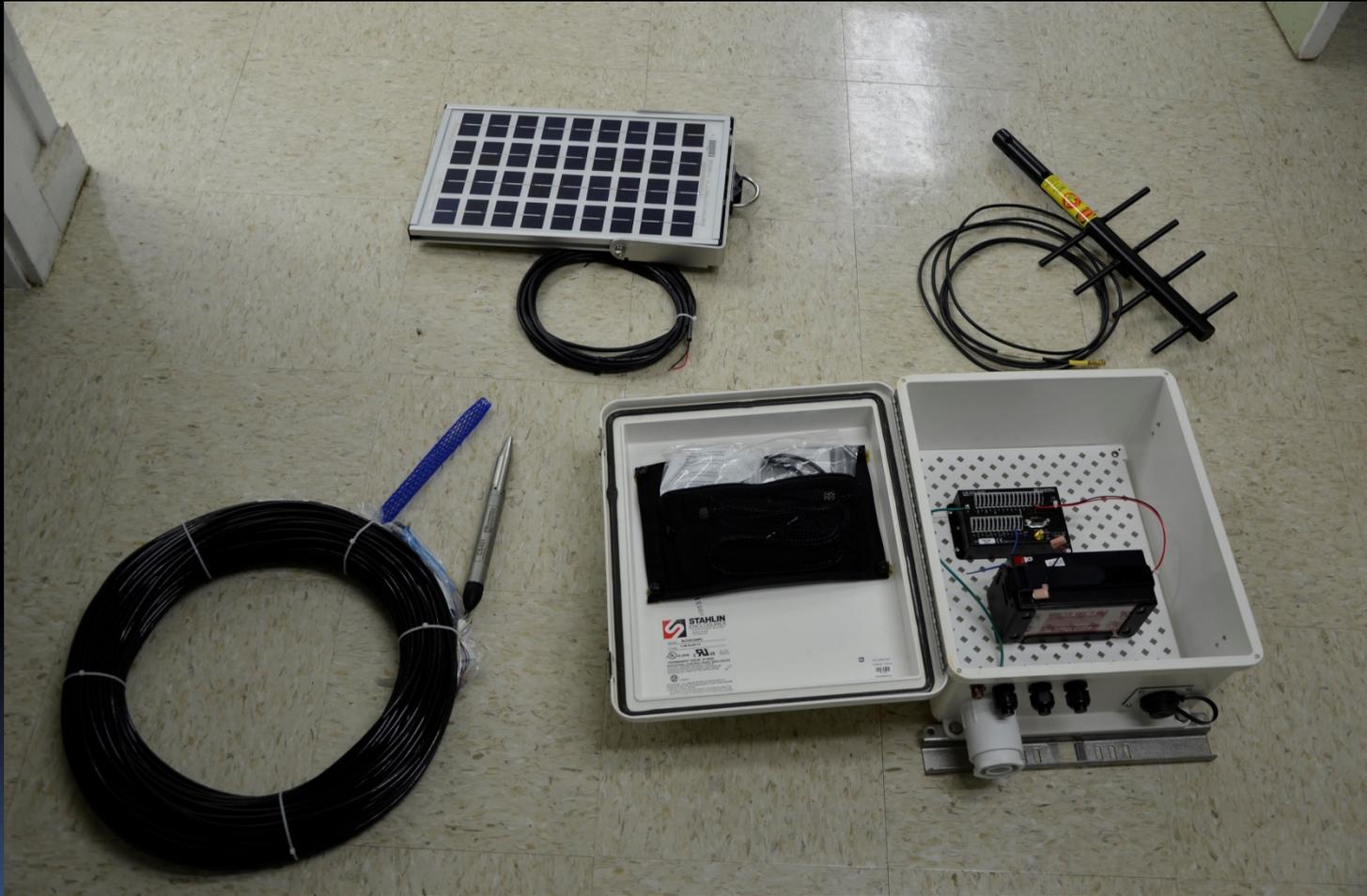


# ...the pressure transducer



...set accurate depth by well sounder

# ..Monitoring Equipment Setup



# ..Transmission Tower



*Texas A&M AgriLife Research – Amarillo*

# Data Acquisition Equipment

...Full  
automated transmission  
installation delayed  
due to renovations &  
asbestos abatement



# Irrigation Research Output- Amarillo

- 2017 Irrigated crop research output of Xue and Marek accounted for **majority** of units journal articles (...a primary measure of unit output).
- Two irrigation IP disclosures, Two International patents pending (Two other disclosures in process, 2 other patents considered)
- USDA-ARS collaborative participations with Texas A&M irrigation efforts **have never been greater !**

# Advanced Pivot Control Project



- ...resurrection,
- ...modifications
- ...upgrades,
- ...VFD pump capable
- ...advanced controls
- ...remote access

# 2018 Irrigation Projects

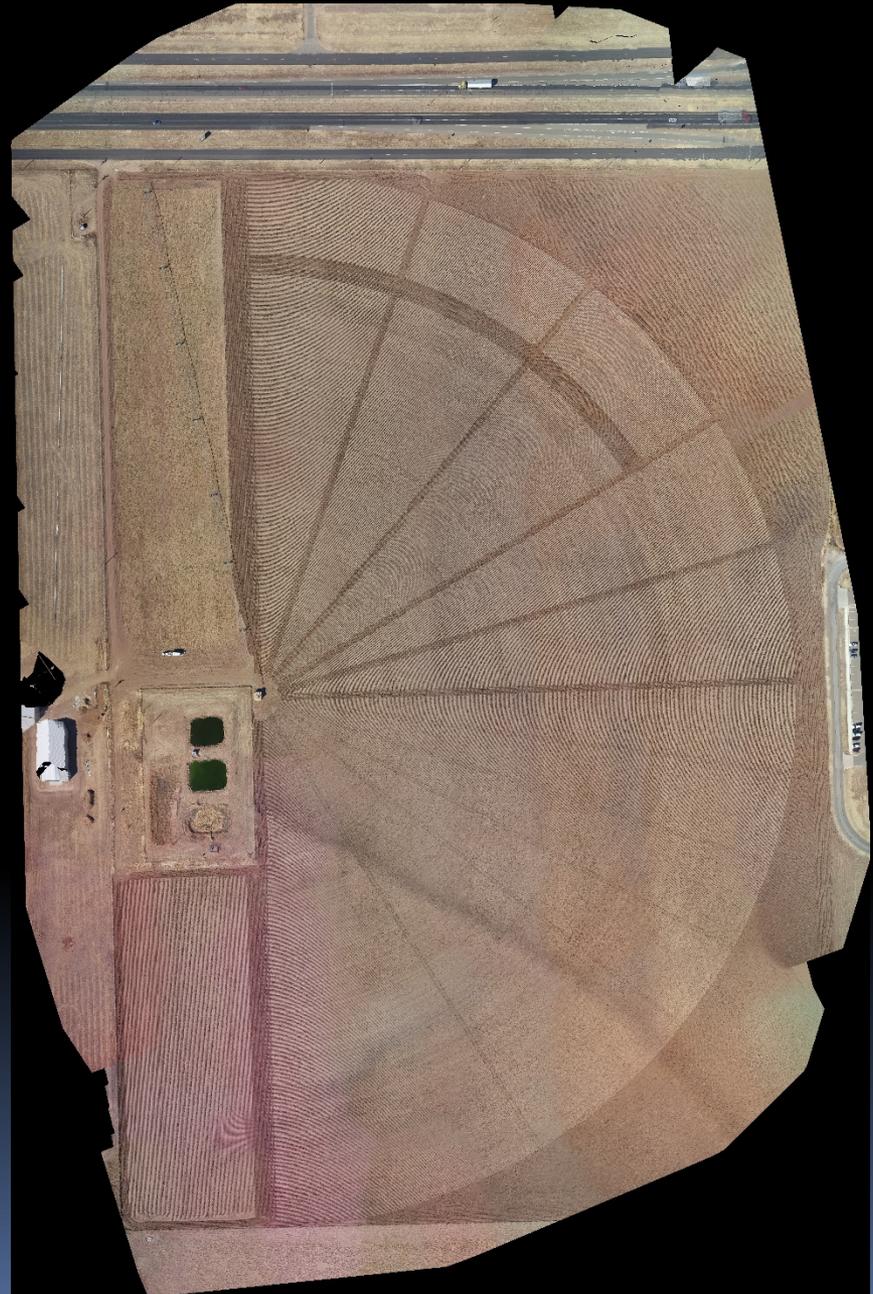
- Advanced system control - Porter/Marek/TEES (CS)
- Multi-level ET corn  $f(x)$  – Marek/Porter/ARS/Xue/Bell
- Multi-level ET GS  $f(x)$  – Marek/Porter/ARS/Xue
- Multi-level ET soybean  $f(x)$  – Marek/Porter/ARS/Xue
- Multi-level ET/advanced genetics corn/silage – Xu/Marek/Xue
- ET/Evaporation Corn Study – Marek/Xu/Xue
- Large Soil Sensor Assessment – Porter/Marek/ARS  
- (multi-state NRCS-CIG effort)
- Corn Genetics – Xu/Marek/Xue
- Cotton Advanced Root Assessment- Bell/Marek
- ...intensive UAS data acquisition - Marek/Heflin/Xu/Xue/Bell/ARS
- - ARS PI personnel include: G. Marek, J. Moorhead, R. Schwartz, P. Colaizzi & D. Parker.

2018 Texas A&M  
AgriLife  
“Emeny  
center pivot”  
plots

~53 ac

(adjacent to ARS)

- 11 studies
- varied study sectors
- stacked, infra ongoing
- more with less...



# Projects & Advanced Pivot Control



# Planned this summer...

- Tentatively set for August 8<sup>th</sup> or 9<sup>th</sup>, 2018
- Bushland Summer Crops Field Day
- Event combined with (OAP sponsored) Center Pivot Capstone Advancements Project – a (50 yr.) multi-state tribute to center pivot development/ technologies/practices in the central Great Plains: - a great timeless ag. production success story !!

***Thank you...***

***“we’re all in the water  
together !”***