From Skeptic to True Believer

PRESENTED BY: ANDREW SAGE FCMCD WETLANDS MANAGER/LEAD SUAS PIC

2017: AMCA San Diego

- **During lunch I spotted a Rotary Prop UAV displayed by a vendor**
- **I got excited**

I Was at the Koolaid Factory and Thirsty

Friday Feb 17

Morning sessions

- Bill Reynolds and Piper Kimball (Leading Edge) presented: Unmanned aerial systems in mosquito control
- They confirmed my belief that UAV's could be incredibly beneficial in mosquito control
- Would this suit our needs at FCMCD and is it reasonable?

Research Galore

- I went further into liquid and granular dispensers research and down the rabbit hole leading me to mapping and imaging, types and ability, etc.
- I began to see the application of UAV's clearly

It became apparent

- UAV tech could increase efficiency in the field AND reduce our overhead in a season or two.
- Better efficiency had to reduce our waste, lessen our footprint, save us time and money and it had to yield immediate positive results.

Bringing an Idea to the Boss of Bosses: The Directors Cut

- **I BROUGHT THE IDEA UP AND…….It didn't fly!!**

UAV's in application? How about some literature?

- **I sent some articles and proposals to my Director**
- **Still Grounded**
- **Then in 2019 at the 85th annual AMCA more UAV talks were being presented and I just happened to have lucked out…..Dave sat in.**
- **As the agriculture industry helped advance the use of UAV's, AND having had a few districts already utilizing UAV's, this was starting to peak an interest in Dave.**

2019: Research and Reaching Out

- **Dave began his own research after AMCA**
- **Having gone from the idea of UAV's as "toys" to an actual tool, now we could make some progress and have solid information being taken seriously**
- **With Dave's newfound interest, the real work began, and we were finally moving forward.**
- **We studied FAA rules and regulations, guidelines, local and regional laws, Part 107, COA's, licenses, approvals, etc……this was getting serious.**

Realizing the Reality

- We contacted the local FAA and other UAV operators, vendors, as well as other districts.
- Gathering as much information as possible was the only way to be sure we could do this and do it right
- Others have already paved the way; should be easy….
- Dave narrowed down the type and expense and I considered the TRUE ability in the field: A primary Tool for application
- Dave found a study aid and we began studying EVERYTHING

2020: And So it Begins

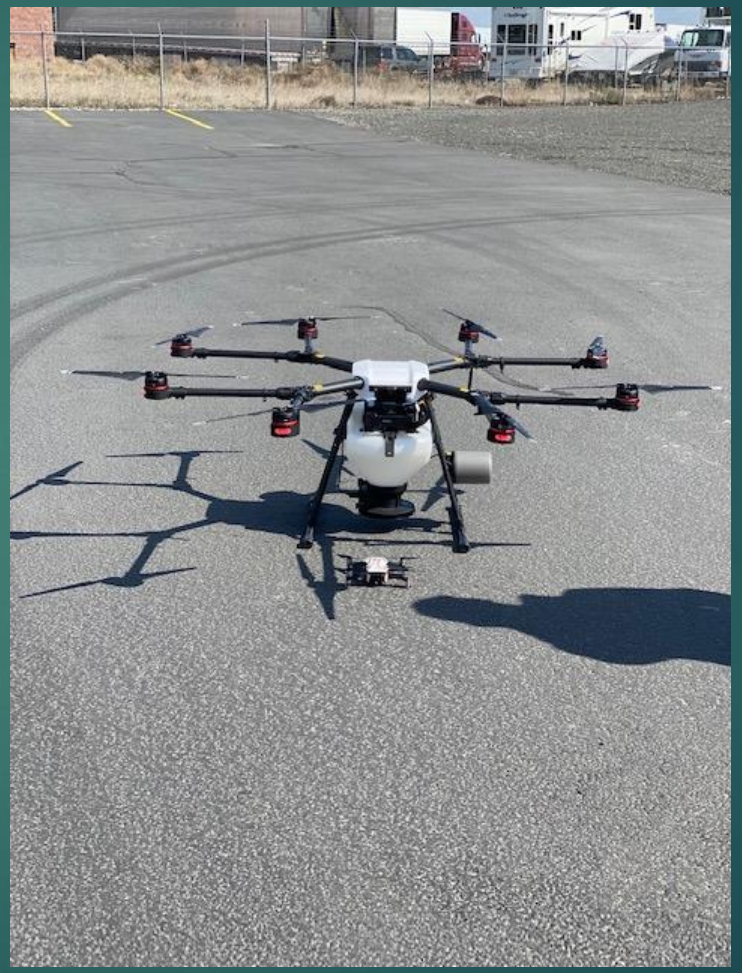
- **Dave was able to purchase a smaller Dji Maverick Air drone**
- **This allowed us to familiarize ourselves before the "Swamp Donkey" got airborne. (Yes, The Swamp Donkey…..No questions, please).**
- **This smaller drone became quite useful for scouting local habitat and locating possible breeding sites as well as mapping borders.**
- **The Swamp Donkey was a different beast entirely**

We Bought a Drone

DJI Agras MG 1-p

Liquid and granular application

Battery time 20 min (1.5-2.5 acres of treatment)

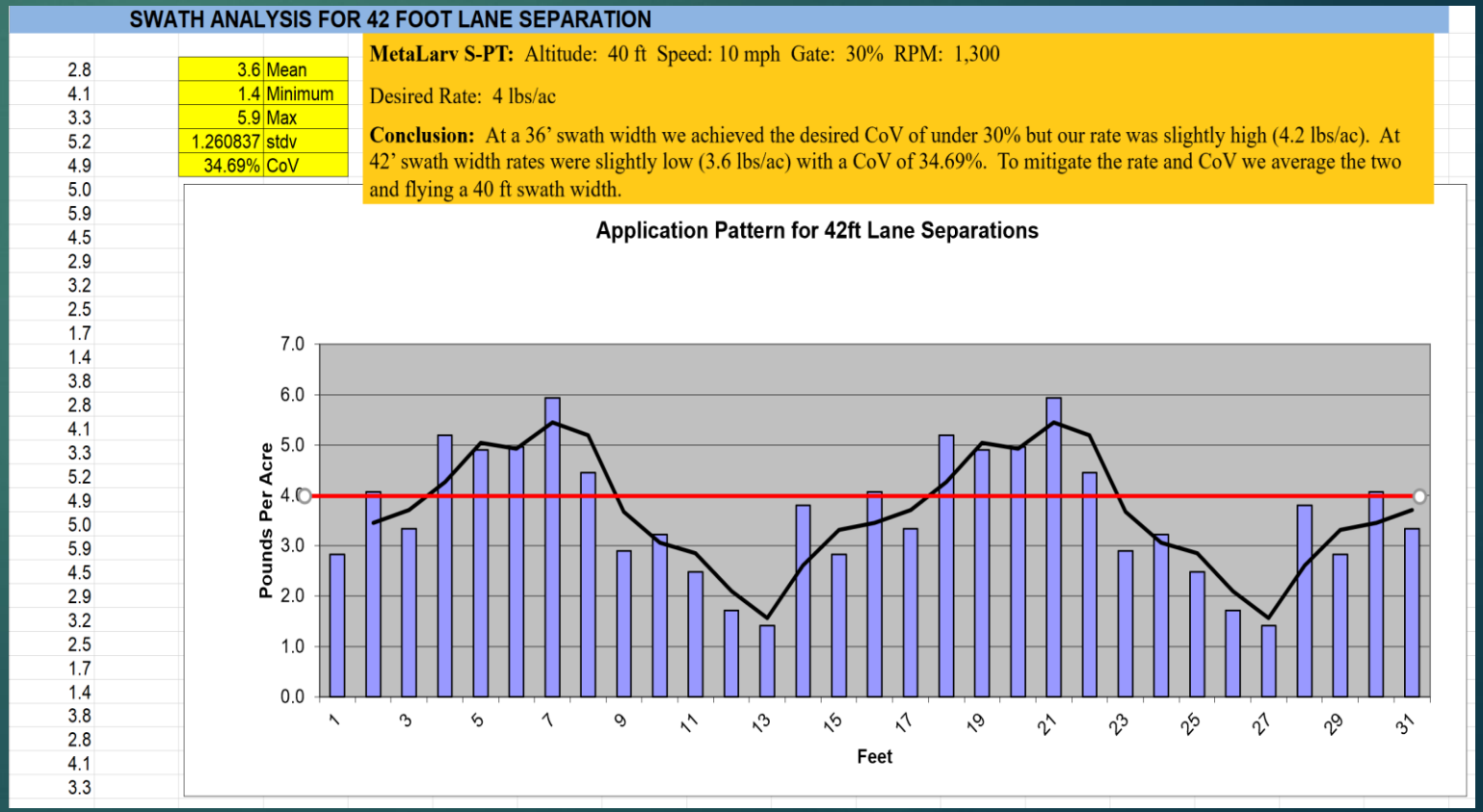


DJI Agras MG 1-P Initial Elements:

- FAA Requires two operators (PIC, VO)
- Elements of mapping, functions and settings, controls, and handling
- Once my Visual Observer (VO) and I felt we had a grip on that, we found out more and more, just by using everything in a controlled environment and seeing what effect was had.
- Updates and software issues
- In the end we did find that this is a user-friendly platform and is as adaptable as we are, to an extent
- There is plenty to learn but it’s not that bad

Calibration to Field Operations

- **Drew Hunter, Valent Bio-Sciences was a big help**
- **We set a grid, mapped a file, loaded up inert and tried it out**
- **Getting proper speed and height**
- **Getting proper gate opening**
- **MATH!!!!!!!!!!!!!!!!!!!!**

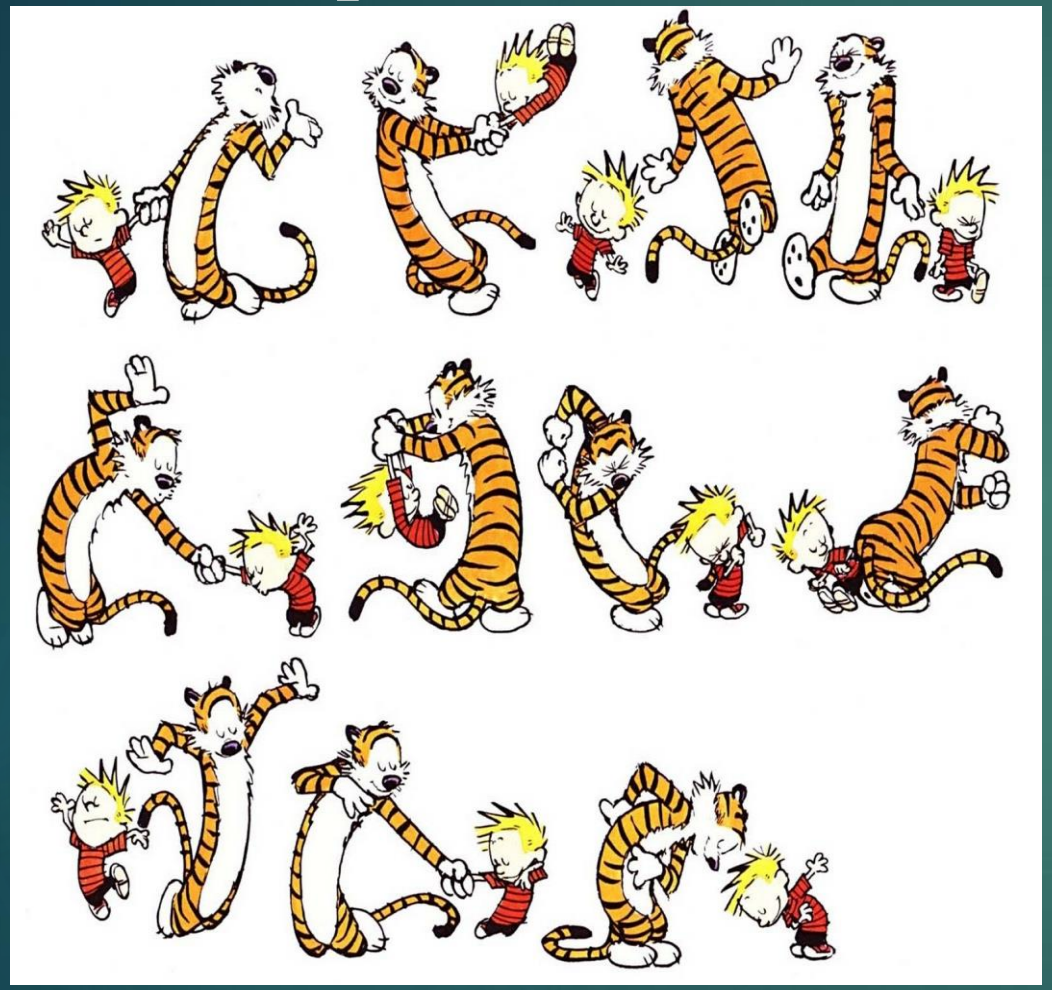


First ACTUAL Calibration

- Catch totes set in a line perpendicular to flight path (into the wind)
- Speed, gate, and height adjusted variably to match label
- MISHAP!! Heed any aggressive Chinese warning coming from controller (lesson learned)

Final Practical Application test of MetaLarv:

Field Operations BABY!



- **Logistics**
- **Trial by operation**
- **Two PILOTS**
- **Trial and Error….and Error….and Error.**
- **SUCCESS**

Logistics Based in Reality

- Agras Mg 1-P and Controller
- 4 Agras Batteries (10)
- Agras 6-Channel Battery Charger
- 2 Controller batteries
- Controller Battery Charger
- Hard Case for Agras and Controller
- Truck
- Trailer
- Methods of securing Equipment
- Generator for field charging
- Tools for quick fix maintenance
- Product (Lots of Product)
- Tarp and tent spears
- Hammer
- Cleaning equipment (Compressed Air, Wipes)
- PPE

What Happened?

- **Complete Logistical Support**
- **Trial by Operation**
- **Two Certified Pilots proved to be useful**
- **Calm and calculated is likely a necessity**
- **SOP's and Protocol made in advance to operations can always be edited later. It's best to have a foundation built before building the house.**
- **I know how it sounds**

SUCCESS: A Season in the Field with UAV Operations

IN ONE SEASON:

- Research
- Studying
- Testing
- COA and Waiver applications
- Calibration, Updating software
- Practical Application and SOP's
- Adaptions to environment and product
- Malfunction

RESULTS:

- Over 93 Operational Hours with 953 Operational Flights
- 1,742.908 acres TREATED
- Reduction in Trap Counts
- More sites treated with positive results
- Created final SOP's based on results and are looking to the future

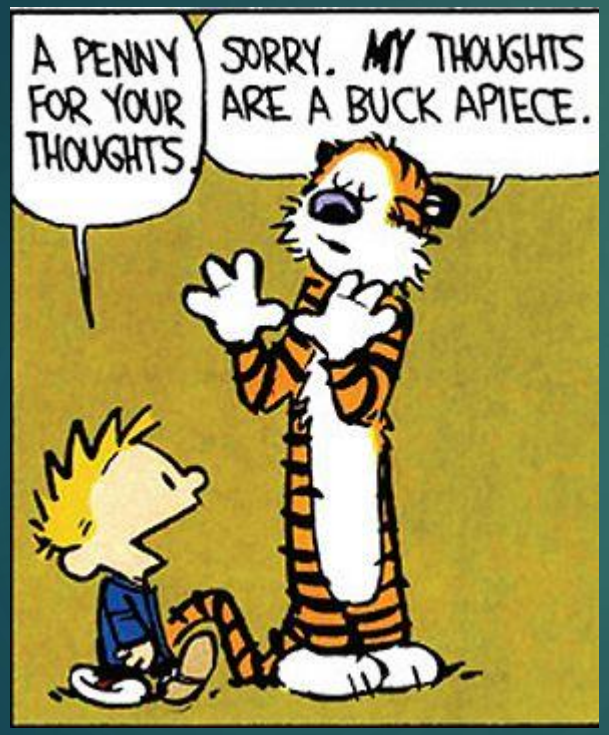
Here's to the Future?

Well….maybe better than THAT!!

What We Have Learned and Going Forward:

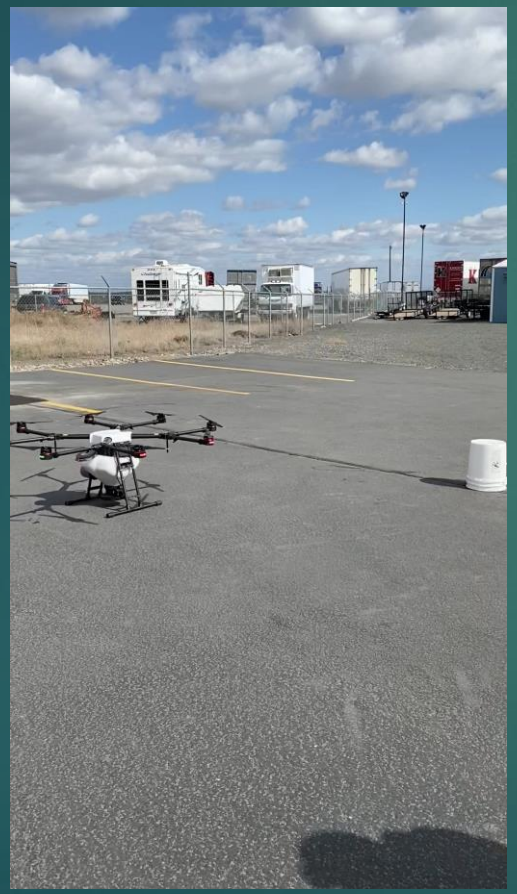
- **Train with INTENT**
- **Improvise, Adapt, Overcome**
- **Adding to the Arsenal**
- **Building new relationships with other districts**
- **Mobile applications as support tools and a typical day**

Attitudes: Sharing is Better

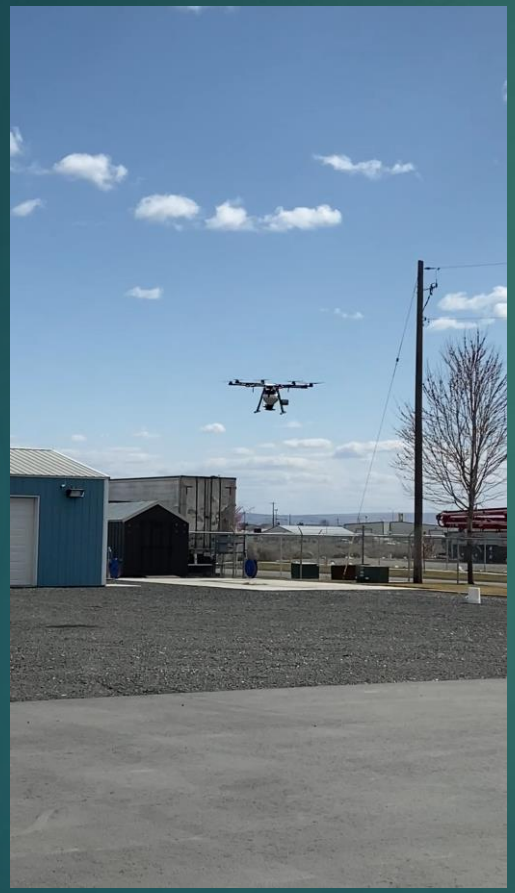


Thank You!

(Sorry if I happened to drone on)



A Little Bit More:



The End: Questions?