

# NEW TECHNOLOGY IN FIELD RESEARCH...

GPS, High Dollar Equipment, Electronic Gadgets  
And other ways to go Broke

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# OR— THE WINDS OF CHANGE ARE UPON US

GPS, High Dollar Equipment, Electronic Gadgets  
And other ways to go Broke

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# LAST YEAR

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- ✖ I talked about Complicated Trials
  - + How the days of a simple Treated and UTC RAC trial are ancient history
  - + Or the 4 treatment Roundup trial which you sprayed once and came back in 2 weeks and wrote 99%....  
Or even just wrote it without going to the field—  
easier yet!

# BUT THIS YEAR...

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- ✖ We are looking at the Technology available to help us with these newer style trials
- ✖ These Trials Are
  - + More complex
  - + More involved
  - + Require lots more manpower
  - + Considerably more planning
  - + More daily management

# HOW DO WE GET IT DONE?

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✕ With a combination of

**Technology**  
and  
**PEOPLE!!**



# AS PAST PRES JIM STEFFEL SAYS....

✘ “There are a lot of grey hairs around any meeting of Research Consultants”

✘ And Red Eyes too  
It would seem



# THE TRUTH OF THE MATTER IS...

- ✗ The people coming along behind us are:
  - + Adept at new Technology
  - + Not excited about working 70 hrs a week as a career
  - + Not Experienced in general Ag
  - + NOT mechanically inclined
  - + Excited to Learn

**AND MOST IMPORTANTLY....**

**Excited to be part of  
Science which helps  
Mankind**



# A QUICK REVIEW OF OUR OLDER TECHNOLOGY



# LET'S TALK ABOUT OLDER SPRAYER TECHNOLOGY





# OR THE MORE AGGRESSIVE APPROACH





# OR THE MATCHING BOOTS AND SPRAY



# BEING PROPERLY PREPARED FOR WORK





# YES, THE TECHNOLOGY HAS CHANGED...





**TODAY IS DIFFERENT—TOMORROW MORE SO**



# BIGGER, MORE COMPLEX SPRAYERS





# SPECIALIZED PLANTING EQUIPMENT





# HI-TECH HARVEST EQUIPMENT



# FARM EQUIPMENT



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# GADGETS

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- ✖ Spad Meters
- ✖ Moisture monitoring sensors and recorders
- ✖ Handheld GPS
- ✖ Tablets like the iPad, Xoom etc
- ✖ Smart Phones
- ✖ And Boring, Antique, LAPTOPS



# BIGGER JUNK

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- ✖ Much of this means two basic things---
  - + Bigger Equipment
  - + More Pesos
- ✖ Which also means
  - + Greater operator Savey
  - + Less Chance you can repair it

# BIGGER JUNK PART 2

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- ✖ It also means that you can get lots done in a hurry—
  - + Spraying 4, Eight treatment trials in a morning is no big deal
  - + Planting 1,000 seed entries in a Nursery trial is not a big deal



# BIG JUNK ALSO MEANS



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# SMART PHONES

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- ✕ Texting
- ✕ Camera—Still and Movie
- ✕ Lots of Apps—
  - + Metronomes
  - + Stopwatch
  - + Level
  - + Good Calculators
  - + And And And And



# TABLETS

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## ✕ iPad's

- + I prefer the iPad
- + Keyboards are much more thought out and user friendly
- + Numbers is a better interface for Excel and ARM
- + iTunes Sucks
- + iCloud is pretty cool and gets around much of iTunes

# TABLETS-2

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- ✖ Xoom and other Android (Honeycomb) Devices
  - + File transfer is relatively easy as it is viewed by computer like any other jump drive or usb disk
  - + Fast with a good Camera
  - + Software is not there yet
    - ✖ No 10 key keyboard, no smart keyboards
    - ✖ LOTS more Apps for the iPad
  - + Usually more expensive
  - + **DOES NOT SAVE AUTOMATICALLY!!!!!!!**



# TABLETS IN USE

- ✖ Use with an ARM Rating Shell
- ✖ Get a good case
- ✖ Great for the General Trial
- ✖ Excellent for single person
- ✖ Easy to get lost on big sheets with lots of crew shouting numbers





# PICTURES

- ✖ Being able to take pictures while you work is Excellent
  - + Documenting subjective scales
  - + Examples of damage
  - + Growth stage assessments
  - + And And And





# GENERAL GPS SYSTEMS

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- ✖ Ag Leader, John Deere, Case, Trimble, Etc.
- ✖ For conducting larger scale trials these can allow for better data and greater precision
- ✖ If you can't dazzle them with brilliance, do it with some Hi-Tech Gear

# CASE STUDY—SEED TREATMENT IN MONTANA

- ✖ Trial is 8 treatments—
  - + Client product with and without other seed treatments
  - + Plots are 40 feet wide by ½ mile and 4 reps
    - ✖ Total of 80acs in an RCB
- ✖ Dry land Winter Wheat
  - + Planted in September 2011



# CASE STUDY–FIELD

- ✖ Like most fields in the Great Plains, soil types vary wildly



# CASE STUDY-PLANTING



© Lee West Cultivated Images



# CASE STUDY—HARVEST

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- ✖ When we harvest in August we will yield map it
- ✖ Overlay that with the Planting Map
- ✖ Overlay that with the Soils Map
- ✖ We can then sort yield responses by treatment, and normalize them for soil types.
- ✖ We are using SMS from Ag Leader to do this.
- ✖ Real World, Commercial Scale Data not before possible

# HI TECH PLANTERS

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- ✕ SRES, Almaco, Kincaid
  - + Some clients want precise planting only possible with a Vacuum planter
  - + Cones still work great for nurseries
  - + When seeds are all named as in some Bio-Tech trials, extra thought must be given to cleanouts



# SRES RUNABOUT



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# SRES RUNABOUT

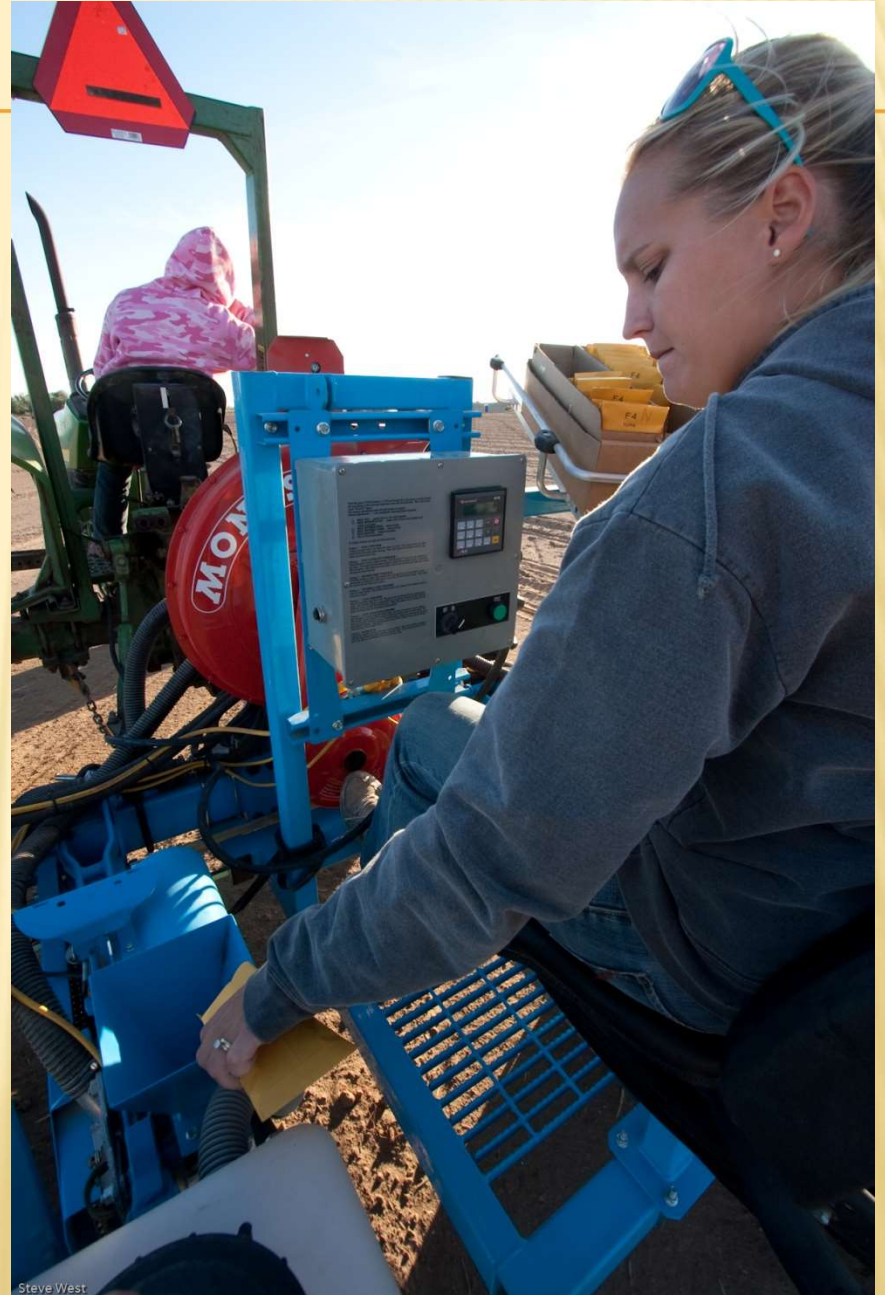


Seed must be in packets



# SRES RUNABOUT

- ✗ Dump the seeds
- ✗ Button push or GPS trip
  - + Charges plate
  - + Rotates plate for even alley
  - + Plants plot
  - + Vacuums out extra seed



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# SRES RUNABOUT



Separate boxes for each row



# GPS SPRAYING

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- ✖ GPS Commercial Systems around for years
  - + Can't control multiple booms
  - + Can tell you where you have sprayed already
- ✖ Two general needs for researchers
  - + Tell me where I am???
  - + Run the sprayer for me

# THE HIGH TECH SPRAYER—2011.01





# NEXT STEP

- ✗ Using SMS From Ag Leader, we are working on the “Where Am I??” part



# SOIL SAMPLING GRID

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- ✖ We are overlaying a soil sample grid on a boundary map and then manually updating the labels to show our plot id's
- ✖ Move it to SMS mobile on a laptop
- ✖ Connect a GPS unit to the laptop
- ✖ Real time position on map shows up.



# EXAMPLE

2 1115	3 1116	UTC 1117	1 1118	4 1119
1 1015	4 1016	3 1017	2 1018	UTC 1019
UTC 915	1 916	2 917	3 918	4 919
4 815	UTC 816	1 817	3 818	2 819

# CHALLENGES TO THIS

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- ✗ Costs are around 4,000 for software, a GPS unit such as an Ag Leader 1500, and the cables.
  - + Best if you have an GPS system in a tractor to do boundaries, etc.
- ✗ Takes a bit of time to set up.
  - + Setting up for a single application may not be worth it



# SPRAY CONTROLLER SYSTEM

- ✗ SRES Developed one
  - + Partnering with R&D Sprayers
- ✗ Not cheap!! Depending on what you have already, it could easily run 4-5 times the other system
- ✗ The beauty is that once you set it up and make your maps, put the bottles on the machine and drive... it controls the booms.

# SPRAY CONTROLLER

## ✗ Precision

- + Comes at a price
- + A basic GPS 1500, accurate to 6 inches is about \$1200
- + The SRES system wants an RTK...
  - ✗ 7 grand Plus another 1,000 or more annually for a subscription with Trimble, JD, Case, etc.
- + But we don't care about sub-inch spraying accuracy



# SPRAYERS—THE BIG BUT

- ✗ We have to understand that the combination
  - + of worker safety of tractor sprayers
    - ✗ Less chemical exposure
  - + Fewer errors
  - + Not as physically demanding
- ✗ Will be critical success factors for our LONG Term viability.

# PLANTERS, COMBINES

- ✖ The crop protection companies now own the seed companies.
  - + The same model of fewer in-house staff and farms will continue for a long time to come
- ✖ The University System, which went moribund years back is accelerating in its demise
- ✖ CRO's will be how most of the science behind feeding the world gets accomplished.



# IN THE FUTURE

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- ✖ We will be using all these tools
- ✖ We may or may not own them—
  - + Clients may provide
  - + Consortiums may develop
  - + CRO's may own them outright
- ✖ We will need Staff, Expertise and Desire to make the changes.

# WHAT WILL IT LOOK LIKE?

- ✖ The Field Researcher of 2025 will be LOTS different than today

