Retrofitting Old Machinery With New Tech On A Budget
Redhead Farm
Paullina - Northwest IA

Certified Organic
107 acres of Corn, Soybeans, Small Grains and Cover Crops.

CompTIA A+ Certified
Tech Certification - Basic troubleshooting knowledge of hardware and software.

Self-Taught
The Beauty of the internet and a desire to learn
Retrofitting

**Definition of retrofit:**
Add a component or accessory to something that did not have it when manufactured.

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**On A Budget…**

“A Budget tells us what we can’t afford, but it doesn’t keep us from buying it.”

*William Feather*
Direction for Today

- Third Party Tech Options
- Using Old Equipment in New Ways
- What is AgOpenGPS?
- Noteworthy Apps and Software
How Tech Savvy Are You?

Do you Know what these terms mean or refer to?

1. RTK
2. Arduino
3. Raspberry Pi
4. Open-Source
1. RTK

Real-Time Kinematic (GPS Corrections)

Two receivers are used in RTK. One of them is stationary, another moves freely.

The Base’s mission is to stay in one place and send corrections to a moving receiver.

The Rover uses that data to achieve centimeter precise position.
2. Arduino

Low cost Open-source micro-controller boards with numerous uses and capabilities ($10-90)

Arduino UNO $11 on amazon
3. Raspberry Pi

Low Cost, Credit-Card sized Fully Functional Computer

- CPU: 4× ARM Cortex-A53, 1.2GHz.
- GPU: Broadcom VideoCore IV.
- RAM: 1GB LPDDR2 (900 MHz)
- Networking: 10/100 Ethernet, 2.4GHz 802.11n wireless.
- Bluetooth: 4.1
- Storage: microSD.
- $47 on amazon.com
A term that is used to describe software is made freely available to study and use.
Creating the remote controlled seeder gate

Problems:
• How do we mount this seeder up front at low cost.
• Not enough hydraulic outlets

Answers:
• Remote operated Electric linear actuator from eBay ($35)
• Remote 3 position switch ($8)
Get Creative…

Recognize anything?

**Arduino Uno**

**Open/Close Buttons**

**3 Programable Presets**

**Parts list**
- Arduino UNO ($11)
- Momentary buttons, Breadboard, Various cables ($14)
- Relay Board ($7)
- Find or write code

Total cost= $32
The Cultivator Guide Hitch

Comes Standard with Crop Sensing Wands…

Navigator Slide hitch
$600-1,000
Bigiron

Buffalo Scout
$300-500
Bigiron

Sunco Acura Trak
$700-2,500 BigIron
Make Sure Your Controls are Correct
Auto-Steer

Outback S3 eDrive X with Baseline RTK*

Current Setup
- 1-2” accuracy
- $5-9,000 used
- No longer supported or repairable*
- No subscriptions fees
- Difficult to swap
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Free Android GPS Apps

Light-Bar Options: Not for Accuracy

- Agribus-Navi
  Both Use Tablet GPS or External USB Receiver

- Field Navigator

- Farm Sprayer GPS
  GPS Field Area Measure
  For Measuring an area via GPS
Wheelman Pro

- WAAS 6-8” accuracy
- Entry level Auto-Steer
- Simple Install
- Works With 700+ makes and models
- Cost: $3,995

handsfreefarm.com
Fieldbee/eFarmer

fieldbee.com
efarmer.nl

Europe based Company

• Wide range of supported makes and models
• Multiple price points and accuracy levels
• eFarmer app manages farm data and does Auto-steer guidance
• Base station for subscription-less RTK
• €800-6,518($900-7,265)
AgOpenGPS
Ag Precision Mapping and Section Control Software (Open Source)

- cm accuracy
- Free (Software)
- Being Developed and updated
- Learning Curve
- Ultimate in DIY Auto-Steer
- Feature Packed
- Runs on Windows Tablet or 2 in 1
*Important*

This Software is for discussion of Precision Ag Algorithms and techniques. It is not in any way to be used on any physical equipment and is meant for use by a simulator only.

Any use of AgOpenGPS on real physical equipment is not allowed and is not recommended in any way, neither off road or on road.

It is completely unsafe and has no safety limits built in or implied.

AgOpenGPS is strictly an example of C# programming for demonstration purposes only and shall not be used for any other purpose.
Hardware

1. Basic Auto-Steer 4-6” accuracy $700
2. High Accuracy 1-2” with RTK Correction $2300-$3000

Yield Monitors
Universal Options For Any Combine

FarmTRX
- Cloud Data Storage
- Mapping
- No Moisture Sensor (coming soon 2020)
- 1st yr subscription free (calculated on acres harvested after that)

Loup ceres 8000i
- Local Data Storage
- Mapping*
- Moisture Sensor
- Optical Yield Sensor
- Excellent Tech support

Loup Elite
- Multi Use monitor (Yield and Seeding)
- touchscreen
- Graphical Mapping
- Load Logging
- Plus 8000i features

Prices:
- FarmTRX: $1,849
- Loup ceres 8000i: $3,200 (Used*)
- $4,175 (New)
- Loup Elite: Request Quote

Images Sourced from rdstec.com, loupelectronics.com, farmtrx.com
Yield Map Moisture %

- 13.5 - 14.6%
- 13.4 - 13.4%
- 13.3 - 13.3%
- 0.0 - 13.2%
FarmOS + Farmier

Web-based App for Agricultural Management, Planning and Record Keeping

- Open-Source
- Free ($75/yr to host it thru Farmier server)
- Sensor data collection
- Web App - Android & iOS apps being developed but not stable yet
- Good How-To installation guides
Zello

Push-To-Talk App

Android & iOS

- private channels up to 6000 users
- works with headsets
  - Wifi/LTE Very low data usage
  - No Range Limit
- Almost Instant
Links

WHEELMAN (GPS)
handsfreefarm.com

FIELDBEE (GPS)
fieldbee.com

AGOPENGPS
agopengps.jimdosite.com

FARMOS
FarmOS.org

ZELLO PUSH-TO-TALK APP
zello.com

FARMHACK
farmhack.org