Overview of Technology in Action

A.L. Baucom Family Farms, Inc.
Monroe, NC, USA
Operations

Based in Union County, NC
Operate in seven counties in NC & SC.
Annual coverage of 14,000 acres
Operations

- 100% No-till
- Some farms 100% no till since 1980
- Red clay to sandy loam soil structure
- Thin to deep top soil
- 0-20% slopes
- 115 unique farms
- 120 landlords
- 100% in-house operations
  - from soil sampling to harvest to crop delivery
Geography

- Field sizes range from 5 acres to 350 acres.
- Irregular field shapes
- Flat and rolling terrain
- Distance between fields up to 100 miles.
GPS-guided auto swath control reduces input waste in irregular fields.
Planting

- Variable-rate (VR) planting
- Seeding rates created in desktop software
- Based on harvest data and agronomic research.
- Automatically adjusts seeding rate on-the-go
GPS-guided tractors, sprayers, and combines make planting and harvest more accurate and less fatiguing on the operator by reducing overlap and controlling steering actions.
Fertilizing

- Variable rate prescriptions for
  - Urea
  - Gypsum
  - Lime
  - Potash
VRT since 1997
17 Years of consistent soil sampling data
Multiple top yield contest placements over the years
Applying Products

- Automatic swath control
- Automatic guidance with all-wheel-steer
- Automatic boom height control by Norac®
Automatic guidance, boom, and swath control in action on Hagie sprayer in Union County soybeans.
Greenseeker® by Trimble

- On-the-go Normalized Difference Vegetation Index (NDVI) crop reading
- Instantly adjusts fertilizer application rate
- Matches current nutrient needs with predetermined yield goals
Use on-the-go
Or survey-only for later application of different product
Grain Harvest

- Harvest data recorded by GPS-linked monitors in combines.
- How data is used:
  - Seed variety decisions
  - Fertilizing decisions
  - Land improvements
Data collected from the combines is processed and filtered in SMS desktop program.

- Yield info
- Machine productivity
- Moisture
- Many more filters available
Compare side-by-side treatment effects on yield. In this field, wheat sprayed with Palisade® yielded fewer bu/ac than non-treated wheat.
Cotton Harvest
Cotton Harvest

- Microwave-based sensors mounted to tubes measure cotton flow through the picker
- Newer cotton pickers can bale, wrap, and code the bale for tracking using QR and RFID technology
Grain Conditioning

- Remote monitoring and control of grain drying
- Nearly all dryer functions can be handled on-site, at PC, or on a mobile device.
- Safety built into mobile program prohibits dryer start-up from off-site.
** Continuous Flow - Automatic Control **

- Plenum Details
- Roll Speed Information
- Grain/Moisture Output
- Calibrate Sensors
- System Diagnostics
- Graphs / Trends
- History Log
- Lower Paddle ON

Current Roll Speed: 36.4 %
Discharge Moisture: 15.4 %
Current Grain Temp: 114 °F

Monitoring dryer status from mobile tablet

On-site dryer touch screen control panel
Grain Storage
Grain Storage

Weather station relays information over Wifi network to BinManager™ system.
Grain Storage

- Remote grain storage control
- IntelliAir’s BinManager™ automatically manages fan control
- Auto or user-defined settings
- Cloud-based monitoring and control
Irrigation

- Irrigation pivots located up to 80 miles from home office.
- Remote management saves time and labor.
Manage multiple center pivot irrigation rigs from desktop or mobile device
Vehicle Tracking

- Remote monitoring of vehicles
- Location
- Movement
Tomorrow’s Tools

Falcon Automatic Soil Sampler
Tomorrow’s Tools

Falcon soil sampler designed to collect, mix, package, and catalogue soil samples on-the-go.
Tomorrow’s Tools

- Use of drone technology to capture
  - NDVI data
  - Photo images
  - Pest damage
- Savings
  - Lessens need to scout crops by foot
  - Counteract stressors more quickly

Quad-copter drone equipped with IR camera & auto-pilot
Considerations

- Establish and prioritize desired goals for technology adoption
  - Cost savings
  - Environmental stewardship
  - Increased yields
  - Operator friendliness
  - Documentation
  - Marketing
    - Identification
  - Cradle to grave tracking
  - Identity preserved
Return on Investment

- Tangible returns
  - AL Baucom internal objective of $20/acre return on total technology investment
  - 14,000 ac x 5yr amort = 70,000 acres covered
  - $20 return x 70,000 ac = $1.4M return over 5 years, or $280,000 per year
  - How much can you afford to save in your operation?
Return on Investment

- Tangible return example from 2014 cotton
  - 2000 ac. cotton
  - Traditional urea "blanket" rate = 115lb/ac
  - Traditional use = 230,000lbs or 115 tons
  - Actual 2014 urea applied per prescription = 130,000lb or 65 tons
  - Savings of 100,000lbs or 50 tons x $500/ton = $25,000 material savings
  - $12.50/acre savings on urea alone in 2014 cotton
  - Additional monetary savings realized:
    - Less machine hours
    - Less operator hours
    - Less urea transportation expense
Return on Investment

- Intangible returns
  - Less operator fatigue
  - Less operator error
  - Greater sense of accomplishment
  - Business image
    - Professionalism
    - Attractive, uniform fields
    - Environmentally-minded
    - Tech investment indicates long-term commitment
- Validation
  - When government agencies, the media, landlords, or other stakeholders ask questions, what can you show them?
- Marketing opportunities
Challenges

Software challenges

Compatibility between brands

Will Brand A tractor communicate with Brand B planter and share data with Brand C desktop software to create script to run on Brand D controller in Brand E sprayer to enhance crops harvested by Brand F combine using Brand G yield monitor?

Level of user involvement:

Automatic updates?

User-initiated updates?

Software glitches prevent machine operation

Becoming too tech dependent?
Challenges

- Personnel challenges
  - Computer skills over mechanical ability
  - Ease of training operators
  - Hiring right mix of experience—older vs. younger generation
Selecting Components
Selecting Vendors

- Is your local equipment dealer committed?
- How many precision ag specialists are employed?
- How often are they trained in new technology?
- When can they be reached?
- Is tech support offered free of charge, pay-per-use, or with annual fee?
Selecting Vendors

- Turning data into informed decisions
  - In-house or out-sourced data management
  - A.L. Baucom combines in-house specialists along with third-party partners to achieve goals
Thank you.

A.L. Baucom Family Farms, Inc.
Monroe, NC, USA