Association of Equipment Manufacturers

Modern Sprayer Technology | May 12, 2021

Tractors

Combines

Pull-Type Sprayer

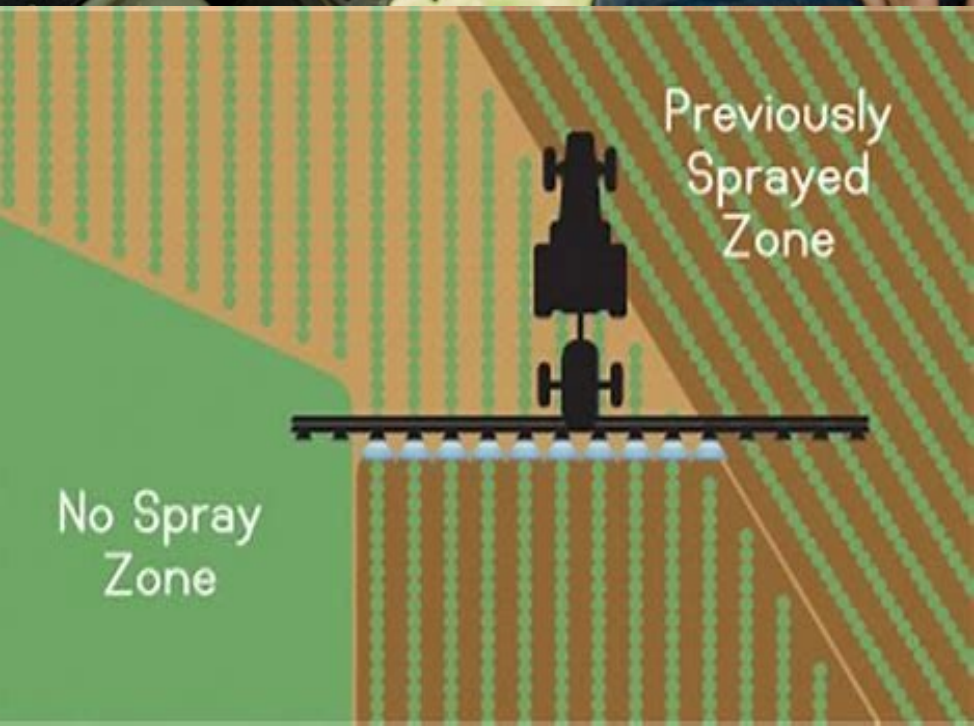
Self Propelled Sprayer

Tillage

Planters

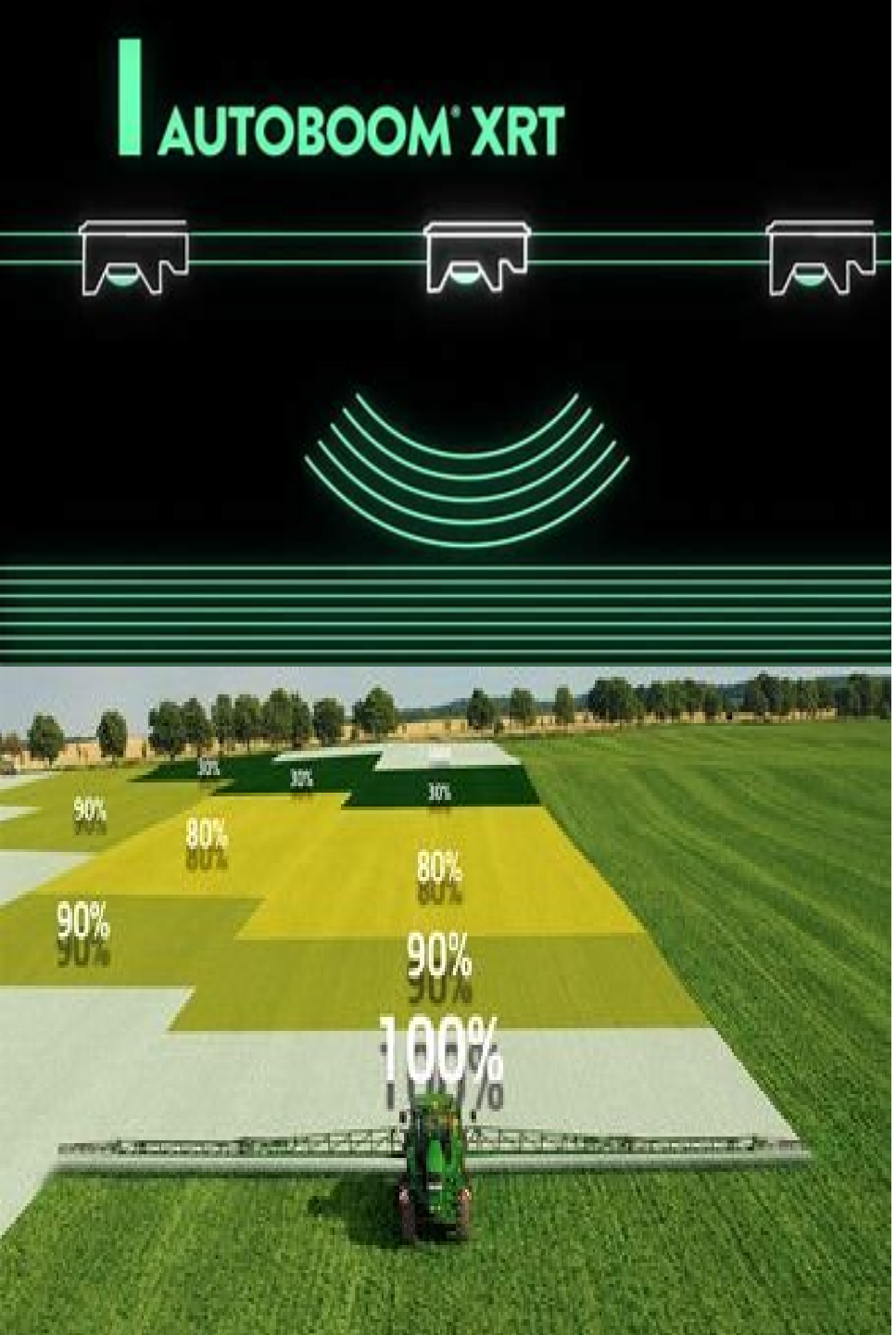
Operations

- GPS Guidance:
  - Tracks machine’s position within the field
  - Enables a number of control technologies that are dependent on speed and position
- Boundary Mapping:
  - Ensures application is only taking place in intended area



Operations

- Smart Guidance (Auto Steer):
  - Maintain consistent application speeds that help deliver consistent droplet size
- No Spray Zones:
  - Created within the field to ensure only areas that require application are applied
  - Exist to provide buffers or assist with erosion control



Controls

- Boom Height Control:
  - Control with chassis roll compensation (terrain look ahead)
  - Maintain correct boom height in relation to target will reduce off target movement
- Rate Control
  - Provide correct rate of application for speed which will help produce the correct droplet size
  - Turn compensation to avoid overspraying while making turns

Controls

- Section Control:
  - Allow for partial boom shut off to ensure intended area is only being applied
  - Can shutoff half a boom all the way down to an individual nozzle
- Pulse Width Modulation (PWM) Control:
  - Ensures consistent droplet size across wide speed range
- Direct Injection:
  - Fully integrated system that allows for more efficient chemical use
  - Makes for faster loading and safer cleaning

Nozzles

- On/Off Nozzles
  - Positive on and off shut off reducing application in unwanted areas and provides more consistent droplet size due to positive shut off versus pressure drop

- Stacked (Tiered) Nozzles
  - Combination of multiple nozzles to achieve flow while maintaining target droplet size

Targeted Spray Technology

- Distinguish difference between weeds and crops
- Consists of lighting, camera, and section control units installed on the boom
- Allows for precise application of pesticide directly onto the weed
- Potential to reduce application by up to 90%
- Works with both pre and post emergence applications

Machine Mounted Weather Stations

- Mobile weather stations mounted directly on sprayer
- Capture and provide information on:
  - Wind speed
  - Wind Direction
  - Temperature
  - Humidity
- Allows for more accurate information to assist in mitigating spray drift

THE OHIO STATE UNIVERSITY

Emerging Ag Tech

February 11, 2021

S.A. Shearer

Food, Agricultural and Biological Engineering

AGCO's Xaver

Xaver - a compact, electric-powered prototype to autonomously in swarms w/ goal of reducing soil compaction, energy consumption, and labor costs.

(Source: www.realagriculture.com)

SwarmFarm

(Source: www.swarmfarm.com)

SABANTO

(Source: www.sabantoag.com)

ecoRobotix

(Source: www.ecorobotix.com)

BlueRiver Technology

(Source: /www.bluerivertechnology.com)

Zasso

(Source: zasso.com)

Current State of RPAAS Technology

Daniel E. Martin, Ph.D

Aerial Application Technology Research Unit, College Station, Texas

VoloDrone

Payload: 440 lbs.

Range: 25 miles

Speed: 50 MPH

Power: Fully Electric

Rotors: 18

Diameter: ~ 20’

Pyka Pelican

625 lb. Payload (~75 gallons)
150’ to Takeoff and Land

NewAtlas.com

Pyka Pelican

38’ Wingspan
20’ Long

Pyka Pelican

90 MPH Cruising Speed

70 miles range

135 acres/hr


Any
Questions