Currently most spray systems are a compromise between optimal goals and often, once a spray system is configured, it is not changed, even though conditions change.

SwathPro System built by Capstan Ag

Controls each individual nozzle using Pulse Width Modulation (PWM)

Pulse Width Modulation
Each check valve is replaced with an electronic solenoid valve. Solenoid valves are pulsed to throttle fluid at each nozzle, effectively enabling your standard nozzles to have a wide range of flow rates.

Flow Controlled @ Each Nozzle:

3 GPA @ 40psi:
3 GPA @ 65 psi:

The System:

Electronic & Fluid Control Elements:
1. Capview (cockpit interface)
2. Gateway Hub (the "brain")
3. Valve Control Module
4. Valve Harness
5. Aluminum Liquid Boom
6. Valve Shell Enclosure
7. High-Performance Spray Valve

Typical Mounting:
- Mounts with minor bracketry
- I can easily swap back to standard boom

Wired & Plumbed:
- Fuselage: Gateway Hub
- Boom Shells:
- Quick-change valves
- Valve Control modules
- Harnessing

Controlling each individual nozzle gives us a whole new spray management tool:

- Change flow rate independent of pressure
- Change pressure independent of flow rate
- Control flow rate for each nozzle independent of the other nozzles/system
- Turn any individual or group of nozzles off independent of the rest of system
Testing

Aircraft Setup
- AirTractor 402 @ 130 mph
- 11-13’ Application height (at the wing)
- 60 degree flat fans
- 2.5 gpa target rate full boom
- 75, 65, 50% boom widths
- Full and ½ Rate
- Right Boom Shut-off
- Elevated Pressure (40 to 65 psi)
- In-wind and Cross-wind conditions
- Water Sensitive Paper for pattern and size data

Collection setup

All ON, Full boom

Right Boom Shutoff

50% Wingspan (on Centerline)
Full Boom, ½ Rate:

Control of flow rate and pressure independently
Right boom and left boom shut off
% of boom control
Adjust for cross wind
Precision applications
Adjust atomization profile
Use of spray model to determine best atomization profile

Crosswind: Right Boom Shutoff

Where from here?

With on the On-Fly control of each individual nozzle we can:

Control of flow rate and pressure independently
Right boom and left boom shut off
% of boom control
Adjust for cross wind
Precision applications
Adjust atomization profile
Use of spray model to determine best atomization profile