John Deere See & Spray

IMPLEMENTED 2021–2025 · AGRICULTURE AND FOOD · US · BAND C · PARTLY PROVED
VERSION 1.1 · PUBLISHED 15 NOVEMBER 2026 · UPDATED 25 NOVEMBER 2026 · FACTS CHECKED 15 NOVEMBER 2026

Camera-equipped sprayers use machine learning to tell weeds from crop and spray only where weeds are found. Deere reports large herbicide savings; two university field tests found savings, with a wide range.

ABOUT THIS SYNOPSIS

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Facts and figures are as reported by the sources listed below, which may be incomplete, self-reported or out of date. Check the original source before relying on any figure.

The impact band, proof marker and SEAM view are MarLuc's opinion. The organisation is not a MarLuc client and has not reviewed or endorsed this synopsis. Names and trademarks belong to their owners.

NOTICE WORDING LAST UPDATED 16 NOVEMBER 2026

AT A GLANCE

AI used: Machine-learning computer vision on a sprayer, identifying weeds and controlling individual nozzles.

Implemented: 2021–2025. Grade: band C, Process change, Partly proved.

Headline result, as reported: Deere reports an average 59% herbicide saving across 1 million+ acres in 2024; Iowa State measured 76% on five fields and Arkansas 43 to 59% over three years

1 · The case

The facts, as reported by the 5 sources listed at the end. Where a source is silent, the field says "Not reported".

Organisation

John Deere (Deere & Company). US maker of agricultural, construction and turf equipment. See & Spray is a camera-based sprayer system for corn, soybeans, cotton and fallow fields, sold as a factory option or an upgrade kit. Canvas block: 4. Operations and process. Also 3. Customers and proposition, 6. Data and technology.

Business challenge

The challenge. Farmers have applied post-emergence herbicide across the whole field. Iowa State describes this as broadcast application, successful but costly. Deere says See & Spray lets farmers apply product only where weeds are present.

How it was addressed. Deere introduced See & Spray in 2021. Boom-mounted cameras scan the

Who implemented it

In-house (In-house): John Deere: Developed and sells the system; acquired Blue River Technology in 2017, per AgWeb..
Iowa State University (University or research lab): Ran a field-scale demonstration in 2024; funding is not stated in the text opened..
University of Arkansas System Division of Agriculture (University or research lab): Ran a three-year field trial using a Blue River test machine..
The university tests are independent evaluations of the system, not implementation partners.

Technology (SEAM pillar E)

SEAM types: T9 AI in physical systems. Deployment: Not reported. Vendors and products: John Deere, See & Spray Premium, See & Spray Ultimate, ExactApply nozzles.

Where it was built in: Cameras and onboard processors on the sprayer boom, with settings on the G5 display and weed pressure and as-applied maps in Operations Center, per AgWeb.

What changed

Before: whole-field broadcast spraying. After: the sprayer treats only detected weeds. By Deere's account the average herbicide saving was 59% in 2024 on more than 1 million acres and nearly 50% in 2025 on more than 5 million acres. AgWeb reports one Illinois farmer moved from a two-pass to a three-pass programme to use the system fully and still saved $31,000 on 5,500 acres after fuel and labour. [1] [2] [3] [4] [5]

What it cost

Not reported for Deere or its customers overall. Deere cites per-acre fees of $1 (fallow) and $5 (in-crop). Arkansas researchers assumed a $25,000 upgrade cost in one analysis, and estimated payback after 819 acres at that cost for a high sensitivity setting.

What it saved

By Deere's account: an estimated 8 million gallons of herbicide mix in 2024 (calculated at an assumed 15 gallons per acre) and nearly 31 million gallons in 2025. Iowa State measured product savings of nearly $6,500 ($15.7 per acre) on 415 acres. Arkansas found 43 to 59% less herbicide than broadcast. [1] [2] [3] [4] [5]

Governance and control

Operators choose sensitivity and buffer settings. Arkansas researchers found that a low sensitivity setting cut herbicide use but increased the Palmer amaranth population by 280% each year. Owner, assurance and safety case within Deere: Not reported.

S2 · Accountable owner · Not reported
Not reported.

A1 · Safe use · Evidenced
Arkansas researchers found that a low sensitivity setting increased the Palmer amaranth population by 280% each year, and recommended a high setting in most scenarios. [3]

A2 · Human in the loop · Evidenced
Operators set sensitivity and buffer settings; AgWeb reports Deere guidance on speed, boom height and camera cleaning. [4]

A3 · Monitoring and assurance · Evidenced
Iowa State used drone imagery and post-application scouting to check applications; AgWeb reports weed pressure and coverage maps for users. [2] [4]

A4 · Vendor AI · Not reported
Not reported.

A5 · Agent controls · Not reported
Not reported.

A6 · Standards and regulation · Not reported
Not reported.

What worked, what did not, what is unproven

WORKED

– Iowa State found an average product saving of 76% across five soybean fields (415 acres), with 4,700 gallons of tank mix saved.

– Arkansas found a 43 to 59% reduction in herbicide use against broadcast spraying over three years.

– Drone imagery and scouting in the Iowa State demonstration confirmed the system identified emerged weeds and applied herbicide to them.

DID NOT

– Savings varied widely: Iowa State's fields ranged from 43.9% to 90.6%, and Deere's own average fell from 59% in 2024 to nearly 50% in 2025, a season it describes as having elevated weed pressure.

– In the Arkansas trial a low sensitivity setting increased the Palmer amaranth population by 280% each year.

– AgWeb reports that Deere says users who had performance issues were often driving too fast or had the boom set too high.

UNPROVEN

– The fleet-wide 59% and nearly 50% figures: no independent audit is reported.

– How the 2024 and 2025 averages vary by crop, region, machine model and settings: Not reported.

– Deere's soybean yield results (an average of 2 bushels per acre from commissioned third-party trials): the studies are not in the sources opened.

– Longer-term effects on weed resistance and the weed seed bank at commercial scale.

Timeline

2017 Deere acquires Blue River Technology for $305 million, per AgWeb [4]

2021 Deere introduces See & Spray [1]

Aug 2024 Iowa State University publishes a field-scale demonstration on five soybean fields [2]

Sept 2024 Deere reports an average 59% herbicide saving on more than 1 million acres in the 2024 season [1]

Dec 2024 AgWeb reports lessons from Deere's end-of-season webinar, including nozzle selection and sensitivity settings [4]

Mar 2025 University of Arkansas publishes results of its three-year trial [3]

Nov 2025 Deere reports use on more than 5 million acres in 2025, with nearly 50% average saving in non-residual herbicide [5]

2 · Grade and SEAM assessment

MarLuc's opinion, made on the evidence above. How cases are graded: marluc.co.uk/case-studies/how-we-rate

Level of change and impact

Claimed: Not applicable. Grade: C, Process change. Proof: Partly proved. Route: Process-led.

Process change (Level 2, band C). The spraying process is redesigned around detected weeds, with a changed pass plan and pricing model, and savings are shown in two university tests. The fleet-wide figures rest on Deere's own account.

Graded C. Spraying has been redesigned around targeted application, with a changed pass plan and a per-acre pricing model, and two university tests found herbicide savings. Deere's fleet-wide averages are its own figures and have not been independently checked. Farm-level results depend on weed pressure and settings.

The SEAM view and lessons learnt

The saving comes from changing the decision from the whole field to the individual plant, and the sources show it depends on settings and weed pressure that the operator controls. For a larger organisation using sensor-based AI in operations, the transferable point is to test the vendor's average against your own conditions before setting a budget. The independent tests agree on direction and differ on size.

1. Test a vendor's average saving on your own sites before budgeting on it.
2. Record the operator settings that drive the result, and review them each season.
3. Link supplier pricing to measured savings where the vendor will agree to it.

Evidence

Score 2 of 4. Mixed: company-reported fleet figures, with two university field tests (a demonstration on five fields and a three-year trial). No audit of the fleet-wide average.

Evaluation method. Company figures (Deere releases) set against university field tests: Iowa State University field-scale demonstration (2024) and University of Arkansas three-year trial (2022 to 2024, prototype machine).

3 · Original sources

Read these in full. To challenge a fact or a grade, use the contact form at marluc.co.uk or the link on https://marluc.co.uk/case-studies/john-deere-see-and-spray

[1] John Deere: See & Spray 59 Percent Herbicide Savings (news release, 18 September 2024)
https://www.deere.com/en-us/john-deere-news/see-spray-59-percent-herbicide-savings

[2] Iowa State University Extension and Outreach: Precision Spraying Technology (Integrated Crop Management News, 22 August 2024)
https://crops.extension.iastate.edu/cropnews/2024/08/precision-spraying-technology

[3] University of Arkansas System Division of Agriculture: Precision agriculture research measures effectiveness of See & Spray technology (10 March 2025)
https://www.uaex.uada.edu/media-resources/news/2025/march/03-10-2025-see-and-spray-research.aspx

[4] AgWeb: See & Spray: 5 Things John Deere Learned in 2024 (9 December 2024)
https://www.agweb.com/news/machinery/see-spray-5-things-john-deere-learned-2024

[5] Robotics & Automation News: John Deere customers use autonomous See & Spray technology across 5 million acres in 2025 (5 November 2025)
https://roboticsandautomationnews.com/2025/11/05/john-deere-customers-use-autonomous-see-spray-technology-across-5-million-acres-in-2025/96266/

John Deere (Deere & Company) website: https://www.deere.com

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VERSION HISTORY

v1.1 25 November 2026 Method update: technology type updated to T9 (AI in physical systems) and controls re-checked against sources; no safety limit outside the AI is reported, so controls are below the T9 minimum.
v1.0 15 November 2026 First published