



INDUSTRIAL · CS-561

TREAT THE WEED — NOT THE WHOLE FIELD.

Machine vision finds the target; only that nozzle opens. Built to cut total product volume per acre.

CAPTURE · INFER · DECIDE · VALVE · DOSE

PATENT PENDING

RADIO AND GNSS PERMITTED — CIVIL WORK MACHINE

1

SOLENOID VALVE PER NOZZLE,
INDIVIDUALLY ADDRESSABLE

5

LINKS IN THE PERCEPTION-TO-
VALVE CHAIN — CAPTURE, INFER,
DECIDE, VALVE, DOSE

4 OF 10

MAJOR SUBSYSTEMS NEW ON
THIS VARIANT — THE REST
INHERITED FROM THE SPRAYER
CS-560

0

PRODUCT, RATE OR MIXING
DECISIONS MADE BY THE
MACHINE — THAT STAYS WITH
THE OPERATOR AND THE LABEL

OVERVIEW

THE BROADCAST BOOM, TAUGHT TO LOOK FIRST.

Part of the **3-system Industrial line** — shares its envelope and doctrine with Sprayer, Self-Charging Dock.

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The Spot Sprayer is Canadian Shield’s targeted-application field machine: the same uncrewed airframe, tank, pump and boom lineage as the broadcast Sprayer CS-560, with one new subsystem added — a forward-mounted camera and onboard inference model that identifies target plants against crop or bare ground, paired with a boom where every nozzle carries its own solenoid valve. Only the nozzles passing directly over a detection open. Everything else on the boom stays shut.

It sits beside the Sprayer in the Industrial line’s application family, and the split between them is deliberate. The Sprayer earns its keep on uniform, full-field coverage; the Spot Sprayer earns its keep wherever the target is a fraction of the field, not the whole of it — patchy weed pressure, spot infestations, fence-lines, and any job where dosing clean crop or bare ground is pure waste. The agronomic purpose is stated plainly: reduce total product volume per acre, and with it cost, drift and runoff, without giving up the pass.

The two machines share a shop floor and a parts bin on purpose. Of the ten major subsystems on the platform, four are genuinely new — onboard inference compute, the individually-valved manifold, the detection model, and the perception-to-valve chain that ties them together. The other six — airframe, power bus, flight control, tank, pump, safety chain — are the Sprayer’s, inherited outright. That ratio is the honest description of the platform: an inherited applicator, taught to look before it doses.

THE COST ASYMMETRY

A MISSED WEED SURVIVES TO THE NEXT PASS. A TREATED CROP PLANT DOES NOT.

The two errors this machine can make are not symmetric, and the design treats them that way: a conservative decision threshold and a default-decline behavior on any ambiguous detection, because the broadcast follow-up is always still available — a wrongly treated crop plant is damage that doesn’t undo.

HOW IT WORKS

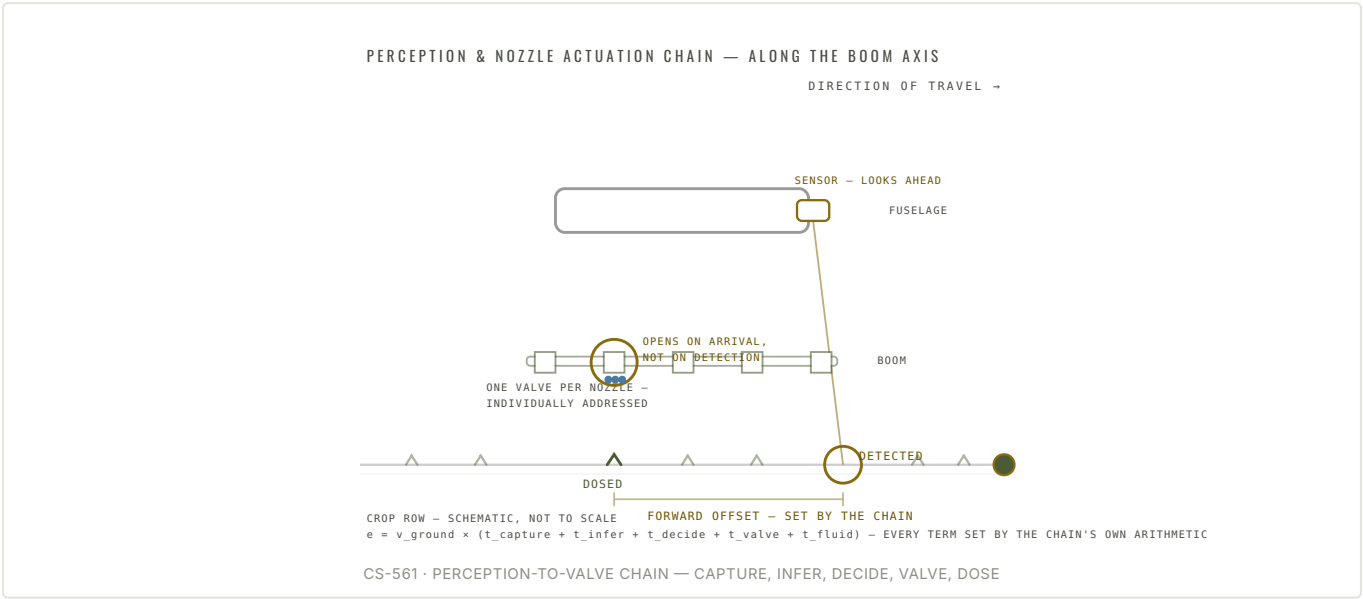
MECHANISM

SEE IT FIRST. DOSE IT ON ARRIVAL.

A camera and an onboard inference model sit forward of the boom, reading the row ahead. When the model calls a target, that detection is handed to a scheduler that knows exactly which nozzle will pass over that ground point — and opens only that valve, timed to the boom’s arrival, not the camera’s.

The chain has five links, and every one of them costs time: capture the image, run the inference pass, decide and map the detection to a nozzle, open the solenoid, and let the fluid travel from valve to target. The sum of those five delays, multiplied by ground speed, is exactly how far ahead of the boom the sensor has to see — so the forward offset between camera and nozzle isn’t a styling choice, it’s the one dimension the chain’s own arithmetic sets. Faster ground speed and tighter placement trade directly against each other; the machine cannot be made quicker without either shortening the chain or accepting a larger error.

The two failure directions aren’t priced the same. A target the model misses simply survives to the next pass — cheap. A crop plant the model wrongly treats is damaged — not cheap. So the decision logic runs conservative on purpose: when a detection is ambiguous, the default is not to treat, and the machine leaves that ground for the next look rather than guessing.



SPECIFICATIONS

CAPABILITIES & SPECIFICATIONS

SPOT SPRAYER CS-561

CONFIGURATION & LINEAGE		PERCEPTION & DECISION	
Designation	CS-561 · Spot Sprayer	Sensor	Forward-mounted camera + onboard inference model, reading the row ahead
Role	Machine-vision weed identification; per-nozzle spot application	Forward offset	$e = v_{\text{ground}} \times (t_{\text{capture}} + t_{\text{infer}} + t_{\text{decide}} + t_{\text{valve}} + t_{\text{fluid}})$ — the chain's latency arithmetic sets the sensor-to-boom dimension
Configuration	Uncrewed multirotor applicator — targeted-application sibling of the broadcast Sprayer CS-560	Detection scope	Alberta prairie and parkland weed spectrum
Lineage	Airframe, flight control, tank and pump inherited from the Sprayer CS-560	Decision policy	Conservative threshold; default-decline on ambiguous or unrecognised plants
New subsystems	4 of 10 — onboard inference compute · individually-valved manifold · detection model · perception-to-valve chain		
APPLICATION SYSTEM		COVERAGE ECONOMICS	
Boom & nozzles	One solenoid valve per nozzle, individually addressable	Product volume, targeted vs broadcast	$V_{\text{targeted}} = V_{\text{broadcast}} \times (\text{treated area} + \text{total area}) \times (1 + \text{overspray margin})$
Actuation	Valve opens on the boom's arrival over the detection, not on the camera's sighting	Governing variables	Ground speed · infestation fraction · swath and nozzle pitch · field efficiency · decision threshold · turnaround and duty cycle
Pressure control	Boom pressure held across a varying number of open nozzles	Value shape	Savings scale with how light the infestation is; a heavily infested field trends toward the broadcast Sprayer CS-560
Product scope	Product, concentration and mixing instruction set by the operator and the registered label — never by the machine		
FLIGHT & CONTROL		SAFETY & TURNAROUND	
Power	Dual-bus power	Safety chain	Whole-airframe parachute + SIG AT polyfoam encapsulation — standard fit
Flight control	Dual flight controllers — inherited fleet redundancy doctrine	Turnaround	Dock-based refill; rinse and purge between products
Navigation	Three GNSS receivers voting 2-of-3; GNSS waypoint flight	Dock interface	Shared with the Self-Charging Dock CS-700
Command & control	Commercial radio C2 and telemetry — permitted on the civil Industrial line	Mission record	Per-nozzle actuation log · detection events with imagery · product usage by field and date
COMPLIANCE			
Patent status	Patent pending		
Classification	Civil work machine — Industrial line; commercial radio, telemetry and GNSS permitted on this line		
Energetic content	None — carriers and working tools, not munitions; no energetic content in any variant		
Regulatory scope	Aerial application engages Transport Canada RPAS rules, PMRA and provincial applicator licensing, plus the product label — approvals belong to each job and are never implied by this page		
Sibling scope	Uniform full-field coverage is the Sprayer CS-560 — not this machine		

NO HEADLINE PLACEMENT-ACCURACY OR PRODUCT-REDUCTION PERCENTAGE IS PUBLISHED: ON THIS MACHINE BOTH ARE GOVERNED BY THE FIELD VARIABLES STATED ABOVE — INFESTATION FRACTION, GROUND SPEED, SWATH AND THRESHOLD — AND A FIGURE QUOTED WITHOUT THEM ATTACHED WOULD BE MEANINGLESS. THE GOVERNING RELATIONSHIPS ARE PUBLISHED INSTEAD.

THE TRADES, STATED

PRECISION IS THE CIVIL LINE’S SOVEREIGN ARGUMENT.

Canadian Shield’s house thesis is that manufacturing is the decisive capability, and precision agriculture is where that manufacturing base earns its keep on Canadian ground — literally.

The Spot Sprayer advances the civil-line thesis on two fronts at once. First, input reduction: the entire subsystem exists to put less product on the field for the same result, which is the sharpest possible argument a civil work machine can make to the operator paying for the chemical. Second, sovereign manufacturing: the airframe, tank, pump and flight-control stack are the same production lineage as the Sprayer CS-560 and the rest of the Industrial line, built on the group’s owned Canadian shop floor rather than assembled from an imported broadcast platform with a camera taped on.

And the radio boundary runs the way it does across the whole civil line. The no-radio doctrine governs the defence, underground and tethered platforms without exception — but the Industrial line is the surface civil exception, and the Spot Sprayer uses both radio and GNSS openly: conventional RF for command and telemetry, GNSS for row-accurate navigation and for the per-nozzle actuation log that is the platform’s other product. A quarter-section is not a jammed battlefield, and we do not build for one out here.

DEPLOYMENT

FIELD PLAN IN. TREATMENT RECORD OUT.

A Spot Sprayer job is a loop, not a flight: the operator’s field plan compiles, the machine executes it row by row, and what comes home is a record of exactly what was dosed and where. Illustrative of how the machine is used — not a job record.

FAMILY CONTEXT

ONE BOOM, TAUGHT TO LOOK. SAME SHOP FLOOR, SAME DOCTRINE.

Beside the Spot Sprayer on the Industrial roster sits its broadcast sibling — same tank, same pump, same airframe, running the uniform-coverage job the Spot Sprayer doesn’t try to do. Both draw on the CS-700 dock for turnaround and the same fleet-wide safety chain. One shop floor, two ways of putting product on a field.

01 · ARRIVE

THE FIELD PLAN COMPILES

The crew arrives with the machine, a tote of product, and the dock. The field boundary, the crop rows, buffer zones and any known infestation areas compile into a field plan before the first pass. Product, concentration and mixing instruction come from the operator and the registered label — never from the machine.

02 · WORK

THE ROW RUNS, THE CHAIN DECIDES

The machine flies the row at the working height and speed the latency budget allows, camera reading ahead, valves opening only on detections. The operator flies the plan and owns the exceptions; the machine doses only what the chain confirms — and each actuation is logged with position, timestamp and the frame that triggered it. Evidence, not just spray.

03 · RECOVER

DOCK, RINSE, RECORD

Back at the dock the tank purges between products and the pack turns around for the next leg. The machine leaves ready for the next tote and the next field; what remains is the field’s own record — a per-nozzle actuation log with detection imagery, the operator’s evidence of what was, and wasn’t, treated.

THE FAMILY

RELATED SYSTEMS

CS-560 · BROADCAST SIBLING

SPRAYER

Uniform, full-field coverage on the same airframe, tank and pump — the job the Spot Sprayer doesn't try to do.

CS-700 · TURNAROUND

SELF-CHARGING DOCK

The dock standard shared across the Industrial-line application family — refill, rinse and turnaround between legs.

Spot Sprayer CS-561 · patent pending · a civil work machine on the surface Industrial line, where commercial radio, telemetry and GNSS are permitted. Application-only carrier — no warhead, no fuze, no energetic material and no terminal-effect system, in any variant, ever. Product selection, concentration and mixing instructions belong to the operator and the registered label, never to Canadian Shield. Aerial application is a regulated activity — Transport Canada RPAS rules, PMRA and provincial applicator licensing govern each job; approvals belong to the job and are never implied by this page.



TREAT THE WEED — NOT THE WHOLE FIELD.

SPOT SPRAYER · INDUSTRIAL · CS-561

One boom, taught to look. Same shop floor, same doctrine.

01 REQUEST A TECHNICAL EXCHANGE

A working session with engineering, not sales — bring your engagement problem, we bring the mechanism.

02 REQUEST THE INDUSTRIAL FAMILY DATA PACK

Drawings, tolerances and test basis for Spot Sprayer and its siblings, gated behind export screening.

03 DISCUSS A TRIAL QUANTITY

Tell us end-user, jurisdiction, quantity band and timeline — we respond against your program, not a price list.

SALES

sales@cdnshield.ca

GENERAL

info@cdnshield.ca

WEB

cdnshield.ca

Direct lines, named points of contact and facility details are shared with qualified programs following screening — not withheld, sequenced.

Canadian Shield is a defence and industrial drone company, backed by SIG: four-domain uncrewed systems built for jammed, GPS-denied environments — no-radio by design, manufactured for cost and salvo depth. The civil Industrial line is the surface exception where radio and GNSS are permitted.

Spot Sprayer CS-561

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Product specification R1.0 · 2026-08-15 · © Canadian Shield, a division of SIG (Sustainable Infrastructure Group).