



DEFENCE · CS-820

NOBODY IN THE SEAT. THE MACHINE STAYS STANDARD.

A self-contained unit that sits in a machine's own seat and drives its own joysticks, levers, pedals and switches — never touching the CAN bus, ECU or firmware.

SEAT-MOUNTED RETROFIT · HUMAN-AUTHORIZED · NO RADIO, NO GNSS

- PATENT PENDING
- EXPORT-CONTROLLED — INTERNATIONAL TRANSFER SUBJECT TO CANADIAN GOVERNMENT PERMITS
- FIELD ENGINEERING ONLY — NEVER OPERATES A WEAPON, NEVER HANDLES ENERGETICS, NEVER FITTED TO A WEAPON PLATFORM

13 ACTUATOR MODULES IN THE SE FAMILY	7 AUTHORITY MODES, OFF THROUGH MAINTENANCE	5 MECHANICAL STATES, OEM THROUGH FAULT/SAFE	0 RADIOS OR GNSS RECEIVERS, ANY TIER
--	--	---	--

OVERVIEW

A REMOVABLE OPERATOR. NOT A NEW MACHINE.

Part of the **5-system Defence line** — shares its envelope and doctrine with Responder, Grizzly, Beaver.

13	7	5	0
ACTUATOR MODULES IN THE SE FAMILY	AUTHORITY MODES, OFF THROUGH MAINTENANCE	MECHANICAL STATES, OEM THROUGH FAULT/SAFE	RADIOS OR GNSS RECEIVERS, ANY TIER

Defender CS-820 is a self-contained unit that sits in the operator's seat of a machine a unit already owns — excavator, dozer, loader, grader, tractor — and works that machine's own joysticks, levers, pedals and switches with its own actuators. It never touches the machine's CAN bus, ECU or firmware. The only wire between them is a fused feed from the accessory point, and when the job is done the unit lifts out and the machine is standard again.

A camera reads the dashboard the way an operator would; the actuators move the same levers, wheel and pedals an operator would move. Nothing about the host machine is cut, wired or reprogrammed to accept it — the dock is the machine's own seat-belt anchors and pins, and the cradle rests on the OEM seat pan with the machine's own lap belt threaded through a closed tunnel between the cradle rails. Status: IFC — In Test.

The seat is the most exposed place on a work site under threat, and Defender's purpose is to take the person out of it. It is the field-engineering profile of the new CS-8xx band — earthworks, berms and revetments, obstacle reduction, route and rubble clearance, and remote handling on ground where a person should not sit. Its sister platform, Responder CS-810, carries a different profile on the same seat-mounted architecture.

THE LOGISTICS ARGUMENT

NO NEW VEHICLE. JUST THE MACHINES YOU ALREADY HAVE.

Ground's Grizzly and Beaver are new vehicles, purpose-built from the frame up. Defender is the opposite kind of asset: no new vehicle to ship, park, fuel or train on. The capability travels as a case and a fit kit, to machines already in theatre or already on the yard.

HOW IT WORKS

MECHANISM

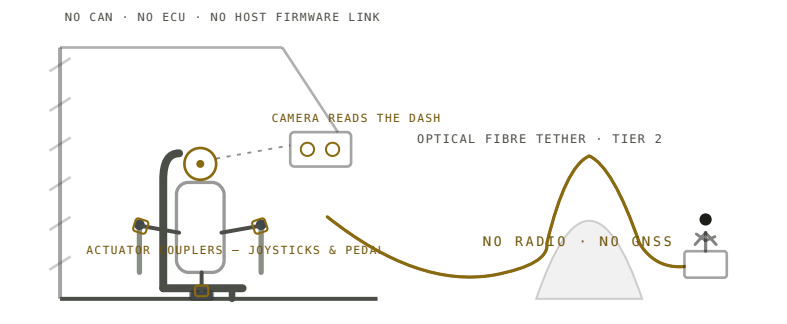
DOCK, READ, COUPLE, CALIBRATE

Four things happen at once, and none of them is electrical to the host machine itself. The unit docks to the seat-belt anchors; a camera reads the dashboard the way an eye would; actuators couple to the joysticks, levers, pedals and switches already there; and a fused feed from the accessory point is the only wire that ever crosses into the machine.

Every day it works, Defender walks each coupled control through a short routine before the first task: finding where neutral sits, where the limits are, and how the control returns when released. Controls wear and no two machines are alike, so that routine runs fresh every session rather than being trusted from the day before.

What runs afterward depends on the guidance tier selected for the task. Tier 1, Preset, loads the task program at the dock and then emits or receives nothing while it runs. Tier 2, fibre-tethered, puts a human at a stand-off station over an optical link that is unjammable by construction — a human authorizes every decision that matters. Tier 3, Optical-AI, plans and perceives onboard, inside a sealed rule set, with no emissions, no link and no GPS anywhere on the line. Authority itself steps through seven modes, from OFF to AUTONOMOUS, with MAINTENANCE held apart from the working chain — and the unit's own mechanical state, from OEM to FAULT/SAFE, is tracked independently of whichever authority mode is selected.

HOST MACHINE CAB — SECTION VIEW



CS-820 · SEAT-MOUNTED INSTALL — NO CAN, NO ECU, NO HOST FIRMWARE TOUCHED. ILLUSTRATIVE SCENE — NOT A DEPLOYMENT RECORD.

SPECIFICATIONS

CAPABILITIES & SPECIFICATIONS

DEFENDER CS-820

INTERFACE & FIT	
Dock	The machine's own seat-belt anchors and pins — the dock stays with the machine
Mounting	Body sits on the operator's seat in a cradle resting on the OEM seat pan
Restraint routing	The machine's own lap belt threads through a closed tunnel between the cradle rails
Removal	Lifts out; the machine returns to standard, unmodified condition
Host machines	Excavator, dozer, loader, grader, tractor — the unit's own machines only

DRIVE & CONTROL	
Actuator family	13 modules — SE-HAND, SE-TILLER, SE-WHEEL, SE-PEDAL, SE-PEDAL-HI, SE-GATE, SE-ROTARY, SE-SWITCH, SE-SWITCH-MATRIX, SE-AUX, SE-SENSE, SE-DOCK, SE-CORE
Steering	Driven from the centre of the machine's own steering wheel via a machine-specific adapter plate
Dash reading	Camera reads the machine's own dashboard
Host machine link	None — never connects to the host machine's CAN bus, ECU or firmware; the only wire crossing in is a fused feed from the accessory point
Electrical	24 VDC family-wide; 12 V machines get conversion in the fit kit
Comms	CAN 2.0 / Ethernet, wired only — wireless never carries the safety loop or motion commands
Calibration	Every control worked through neutral, limits and return-to-release each day it works — controls wear and no two machines are alike

AUTHORITY & STATES	
Authority modes	7 — OFF · MANUAL · ASSIST · APPROACH · TELEOP · AUTONOMOUS · MAINTENANCE
Mechanical states	5 — 0 OEM · 1 INSTALLED/DISENGAGED · 2 ARMED · 3 AUTONOMOUS CONTROL · 4 FAULT/SAFE
Guidance tiers	Tier 1 Preset (loaded at the dock, nothing emitted or received while it runs) · Tier 2 Fibre-tethered, human-in-loop · Tier 3 Optical-AI, onboard and sealed
Task-defined safe state	Each task carries its own — withdraw along the tether, ground the implement and hold, or complete to a defined stop line — designed per task, not chosen in the moment
Key rotation	Excluded from the actuator set — keys are human authority tokens

SECURITY & AUTHORIZATION	
Rule sets & firmware	Signed; a hardware root of trust runs nothing unsigned
Debug access	None on shipped units
Tamper detection	Ends in a safe stop and a retained log
Key custody	Held in Canada
Authorization model	A lease, issued and withdrawable by Canadian Shield, delivered by wire or at the dock, never by radio
Withdrawal / expiry	Safe stop, then the minimum-risk condition; the unit stays installed and will not run until re-authorized — the host machine is never touched
Physical stop	The physical stop and the RED MANUAL RELEASE on every actuator always remain — the lock is on the logic, never on safety
Ownership	Customer owns the machine and the hardware; the configuration and application are Canadian Shield's, licensed and revocable

STANDARDS & COMPLIANCE	
Design standards	ISO 12100 · ISO 13849 · ISO 17757 · ISO 19014 — designed to; no assessment performed
Patent status	Patent pending
Export control	Export-controlled — international transfer subject to Canadian government permits; export posture is counsel-first
Scope	Field engineering, mechanical scope only — never operates a weapon, never handles energetics, never fitted to a weapon platform; weaponization is not a product decision

DESIGN STANDARDS ARE NAMED AT DESIGN; NO ASSESSMENT HAS BEEN PERFORMED AGAINST ANY OF THEM. AUTHORIZATION IS A LEASE, NOT A SALE — ISSUED AND WITHDRAWABLE BY CANADIAN SHIELD, DELIVERED BY WIRE OR AT THE DOCK, NEVER BY RADIO.

THE TRADES, STATED

STOPPING IS NOT ALWAYS SAFE. SO SAFETY IS DESIGNED PER TASK.

Most safety doctrine ends the same way: leave the rules, reach a minimum-risk condition, call a human. For a system working under threat, that is not always true — stopping in the open and waiting can itself put a person in harm's way. Defender's rule set does not treat "stop" as one answer for every task.

Each task in the Defender rule set carries its own defined safe state, designed in advance rather than chosen in the moment: withdraw along the tether, ground the implement and hold, or complete to a defined stop line. Which one applies is set by the task, not improvised after the fact — because the moment authority is withdrawn or a limit is crossed is exactly the wrong moment to be deciding what "safe" means for the first time.

The rules themselves ship sealed — signed rule sets and firmware, a hardware root of trust that runs nothing unsigned, no debug access on any shipped unit, and tamper detection that ends in a safe stop and a retained log, with keys held in Canada. None of that is claimed to make tampering impossible; it is built to make it expensive, slow, obvious and self-defeating. Authorization itself is a lease, not a sale — issued and withdrawable by Canadian Shield, delivered by wire or at the dock, never by radio, and a unit that leaves its authorized hands simply stops being useful. The physical stop and the RED MANUAL RELEASE on every actuator are never part of that lease: the lock is on the logic, and it is never on safety.

Ownership follows the same split as authorization: the customer owns the machine and the hardware; the configuration and application that turn it into Defender are Canadian Shield's, licensed and revocable.

DEPLOYMENT

AN INSTALL, WALKED THROUGH.

One install and one task, walked end to end — illustrative of how the unit is used, not a deployment record.

THE DOCTRINE LINE

AI PLANS. RULES GOVERN.

HUMANS AUTHORIZE. SAFETY HAS VETO.

Four short sentences carry the whole architecture: what the rule set is allowed to plan, that the rules — not the moment — govern what happens next, that a human authorizes anything that matters, and that safety can always veto, no matter which authority mode is selected.

01 · INSTALL

ONTO THE MACHINE'S OWN ANCHORS

The unit docks to the machine's own seat-belt anchors and pins — the same pins that held the belt before Defender arrived. The cradle rests on the OEM seat pan, the lap belt threads through a closed tunnel between the cradle rails, the camera is aimed at the dashboard, and actuators couple to the joysticks, levers, pedals and switches already there. One fused feed from the accessory point is the only wire that crosses into the machine; the CAN bus, ECU and firmware are never touched.

02 · CALIBRATE & AUTHORIZE

EVERY CONTROL, RELEARNED, EVERY DAY

Before the first task of the day, Defender walks every coupled control through its own routine — finding neutral, finding the limits, learning how each one returns when released. Controls wear and no two machines are alike, so nothing is trusted from the day before. Authorization arrives as a lease from Canadian Shield, delivered by wire or at the dock, never by radio, and the guidance tier — Preset, fibre-tethered, or Optical-AI — is set for the task at hand.

03 · WORK & WITHDRAW

A DEFINED SAFE STATE, NOT A GUESS

The task runs inside its sealed rule set until it is done, until authorization is withdrawn, or until a limit is crossed. Either way, Defender reaches the safe state that task was designed with — withdraw along the tether, ground the implement and hold, or complete to the stop line — and if it stays there, drops to the minimum-risk condition. The physical stop and the RED MANUAL RELEASE on every actuator are never part of that logic. When the job is done, the unit lifts out and the machine is standard again.

THE FAMILY

RELATED SYSTEMS

CS-810 · CS-8XX BAND

RESPONDER

The sister platform on the same seat-mounted architecture — brochure to follow.

CS-210 · LEAD VEHICLE

GRIZZLY

Tracked. Battery-electric. 150 kg over muskeg — with nothing to jam. A new vehicle, not a retrofit.

CS-250 · FIELD ENGINEER

BEAVER

Tracked. Battery-electric. An anchored winch pulls roughly seven times what the tracks alone can — a field-engineering vehicle of its own.

CS-260 · ACCESS TOOL CARRIER

WOLVERINE

A compact tracked carrier that places self-reacting tools at the work face — the force closes on the structure, not the machine.

Defender CS-820 · patent pending · a defence cross-fleet platform, no-radio by design · export-controlled — international transfer requires Canadian government permits; export posture is counsel-first. Field engineering, mechanical scope only — never operates a weapon, never handles energetics, and is never fitted to a weapon platform, in any variant; weaponization is not a product decision. Never connects to the host machine's CAN bus, ECU or firmware — the only wire crossing in is a fused feed from the accessory point. The dock is the machine's own seat-belt anchors and pins; lift the unit out and the machine returns to standard, unmodified condition.



NOBODY IN THE SEAT. THE MACHINE STAYS STANDARD.

DEFENDER · DEFENCE · CS-820

AI plans. Rules govern.
Humans authorize. Safety has veto.

01 REQUEST A TECHNICAL EXCHANGE

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

02 REQUEST THE DEFENCE FAMILY DATA PACK

Drawings, tolerances and test basis for Defender 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.

Defender CS-820

Defender CS-820 · patent pending · a defence cross-fleet platform, no-radio by design · export-controlled — international transfer requires Canadian government permits; export posture is counsel-first. Field engineering, mechanical scope only — never operates a weapon, never handles energetics, and is never fitted to a weapon platform, in any variant; weaponization is not a product decision. Never connects to the host machine's CAN bus, ECU or firmware — the only wire crossing in is a fused feed from the accessory point. The dock is the machine's own seat-belt anchors and pins; lift the unit out and the machine returns to standard, unmodified condition.

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